AN ANALYSIS OF THE IMPLEMENTATION OF ACTIVITY BASED COSTING AT THE WATER TRADING ENTITY

by

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An analysis of the implementation of activity based costing at the Water Trading Entity

I declare that the above dissertation is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

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SIGNATURE DATE

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ABSTRACT

The Water Trading Entity (WTE) is a subdivision of the Department of Water and Sanitation responsible for water infrastructure and resource management. Despite ABC implementation at the WTE, the water resource management charge remains high, raising concern. This study aimed to establish what influence ABC implementation has on this charge. Through semi-structured interviews, the study found that the steps and factors generally associated with successful ABC implementation are partially followed, but undefined duplicated activities exist, due to insufficient training and limited technology. The study found that ABC implementation has minimal influence on the increase of the charge. When deciding on the charge, factors such as capping play a role, therefore limiting ABC use. Further research on ABC implementation in government departments can be conducted to ascertain how they can adhere to policies without compromising the use of ABC and identify the skills and training needs for an effective ABC implementation.

KEYWORDS: Activity based costing; traditional costing; water resources; factors influencing implementation; steps to implementation; water resource management charge; performance measurement.

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LIST OF ABBREVIATIONS

ABC	Activity Based Costing
APD	Activity-Product-Dependence
DWAF	Department of Water Affairs and Forestry
DWS	Department of Water and Sanitation
DWA	Department of Water Affairs
EAD	Expense-Activity-Dependence
ERP	Enterprise Resource Planning
GAAP	Generally Accepted Accounting Principles
PFMA	Public Financial Management Act
SAP	System Application
WARMS	Water Authorisation Management System
WMA	Water Management Area
WTE	Water Trading Entity

CHAPTER ONE:
INTRODUCTION

1.1 BACKGROUND

Organisations are faced with challenges of keeping up with the fast changing and growing business world (Yousif & Yousif, 2011). Globally, organisations are competing to stay relevant and to make a profit. Organisations are striving to produce quality services for their customers at a competitive rate. For an organisation to operate successfully in such a competitive environment, it has to implement an efficient costing system (Yousif & Yousif, 2011). Elhamma (2012) and Baird, Harrison and Reeve (2004) stated that there are variables such as the size of a company, expertise, size of the budget and the responses of the market that are central in an understanding of the relevance, effectiveness and reliability of the costing systems in any economic sector.

The traditional costing system is an example of a cost accounting system that uses single-volume measures such as direct labour hours, direct labour costs and machine hours to allocate costs (Maiyiki, 2011. The problem with using the traditional costing system is that the company's pricing and market strategies can be misstated because the traditional costing system does not always give the correct cost of a product). Moreover, for companies to continue to improve customer service and build better products, they need a costing system that does not give distorted information that can have a negative influence on the companies' decision making processes (Maiyiki, 2011). Fei and Isa (2010) argued that, as manufacturing companies advance in their use of technologies such as robotics and improved computer systems; this has resulted in a major change in their cost structures and made the traditional costing system insufficient in the current manufacturing environment. The inadequacy of the traditional costing system has resulted in organisations looking for an alternate costing system which led to the introduction of Activity Based Costing (ABC).

ABC is widely regarded as superior to the traditional volume-based costing system (Fei & Isa, 2010; Harrison, 2010). Jawahar and Seema (2009) define ABC as a system that focuses on individual activities as fundamental cost objects. They argue that ABC uses the costs of the individual activities as the basis for assigning costs to other cost objects such as products or services.

In a study on factors influencing the implementation and success of ABC in companies in Saudi Arabia, it was found that companies implemented ABC because of deficiencies in their existing costing systems and the changes in their environment and practices such as competitiveness (Mohammed, 2011). Baker (1998) and Cooper and Kaplan (1991) contended that the implementation of ABC will provide managers with accurate cost data which will assist them in allocating activity costs and cost drivers to their products and services. Harrison (2010) described ABC as a refined system that reduces cost distortion to a minimum as its focus is on activities as the fundamental cost objects. By identifying each activity and the costs of performing such activities, ABC goes into detail to understand how the organisation's resources are being used (Harrison, 2010). In a study done on government-run departments, Becker, Bergener and Räckers (2009) suggested that management needs to implement ABC for more accurate data and an improved understanding of the organisation's activities and traceable overheads.

Baxendale (2001) in his study on small businesses and Stout and Propri's (2011) study on medium-sized electronic companies established the need for organisations to invest in good technology before implementing ABC in order for it to be beneficial to the organisations. Based on a study done among manufacturing companies in Nigeria, Salawu and Ayoola (2012) also stated that ABC performs better when it is used with good technology. When ABC is implemented properly in an organisation that uses good technology, it can provide managers with accurate product-cost data that can be used to make better decisions about pricing and process improvements. Although the cost involved in implementing ABC is high, especially for organisations that still need to invest in good technology, the benefits of implementing ABC outweigh the costs (Salawu & Ayoola, 2012). Vazakidis, Karagiannis and Tsialta's (2010) study on the relevance of ABC in the Greek public sector agrees that, when ABC is combined with new technologies, it can resolve the deficiencies of the public sector and help produce services at a minimal cost. The use of ABC with technology has been proven by both private and public sectors to improve accuracy on the data used for decision making.

Garrison, Noreen and Brewer (2008) added that ABC provides cost information to managers to assist in decision making that potentially affects both fixed and variable costs. This cost information, when captured correctly, can reduce losses from organisations thereby increasing operational efficiency (Garrison et al, 2008). ABC is needed by organisations to make better strategic decisions that involve pricing, the evaluation of business process, product mix as well

as sourcing, as it will provide accurate cost information necessary for such decisions to maintain cost effectiveness in a volatile economic environment (Baker, 1998; Cooper & Kaplan, 1991).

The emphasis on effectiveness of ABC does not mean that it is applied uniformly in all organisations. ABC has been widely implemented in manufacturing companies and has been recorded as being beneficial in reducing the costs of production thereby increasing profits (Baker, 1998; Cooper & Kaplan, 1991). In their survey on different manufacturing firms in Bahrain, Al-Basteki and Ramadan (1998) found that most organisations implement ABC because of its ability to allow insight into cost causation which affects cost control and reduction. This was confirmed by Matthews, De Jager, Van Harmelen, Wilson and Duval (2009) in their study of developing an ABC model for South African municipalities to be used to quantify costs of delivering water in rural arrears. They indicated that water services can save costs when using ABC by identifying activities that include direct and indirect costs accruing from different levels associated with water service provisions. They also found that ABC can monitor expenditure levels against the budget line to keep management up to date with the company's product costs (Matthews et al, 2009).

Similarly, in a study done on the costs of a public university, ABC was found to be beneficial to the service departments for two reasons, firstly, the increase in competition which requires service departments to improve planning and control and, secondly, to make managers in the service departments, which have grown in size and organisational complexity, conscious of using accounting information for planning and decision making (Amir, Auzair, Maelah & Ahmad, 2012). Government departments are also referred to as service departments because they provide services to the general public. The implementation of ABC will assist government departments in remaining relevant and providing better service through planning and informed decision making as they will be aware of their product costs.

1.2 PROBLEM STATEMENT

Section 1.1 described ABC as a costing system that provides insight into cost causation. Oseifuah (2013) agreed and claimed that the implementation of ABC in the Buffalo City Municipality has given it insight into cost causation which allows it to compare costs against the services they are providing to the public. The municipality is able to be transparent with the ratepayers on the cost involved in the tariffs because it is able to be more accurate and in

line with the service it is providing. South Africa, as a developing country with water shortages, will benefit from a costing system that is able to define accurately the costs needed to render the service to the public.

According to section 27 of the South African Constitution (South Africa, 1996), everyone has a right of access to sufficient food and water. The Department of Water and Sanitation (DWS) is a national department of the South African government and is the custodian of South Africa's water resources. In terms of the National Water Act (South Africa, 1998), the Department is responsible for setting regulations regarding how water should be used in South Africa by ensuring that the process of water allocation is done equally for the benefit of the public. The Act makes provision for cost recovery on services rendered by the DWS to water users. It is against this background that the Department created the Water Trading Entity (WTE) within its administration.

The WTE is responsible for developing new water infrastructure as well as maintaining and rehabilitating the existing water infrastructure assets (DWA, 2011). The WTE is also responsible for water resource management which addresses the use, conservation and allocation of water resources in each water management area in a manner that will benefit the public. The funding for water resource management is partly augmented from the fiscus as well as through revenue generated from water users in each water management area through a charge called the "water resource management charge". It is the aim of the WTE management to be independent and to decrease its reliance on the fiscus (DWA, 2011). As a result, the WTE is faced with the challenge of reducing costs to ensure that the water resource management charge is affordable for all citizens of South Africa.

Although ABC has been implemented at the WTE, the audit report indicates the high costs involved in the management of water resources which, in turn, affect the calculation of the water resource management charge (DWA, 2012). The high cost threatens the WTE's aim of providing affordable water to all its users.

The literature discussed in section 1.1 above, shows that organisations apply ABC for various reasons, amongst which is its ability to provide an understanding of cost causation which improves cost control and reporting as well as provides a better understanding of opportunities to reduce costs. Based on the above discussions, the research problem can therefore be formulated as follows:

Despite the prior implementation of ABC, water resource management costs are high, negatively affecting the independence and the ability of the WTE to supply affordable water effectively.

1.3 RESEARCH OBJECTIVES

The aim of the study is to determine whether the high costs at the WTE are influenced by the success or failure of the implementation of ABC. The research objectives are to:

1. Identify the steps and factors generally associated with successful ABC implementation.
2. Investigate whether the steps and factors to successful ABC implementation are being followed for the water resource management charge at the WTE.
3. Assess whether the water resource management charge is calculated according to ABC principles at the WTE.
4. Ascertain staff members' perceptions and their influence on ABC performance at the WTE.

1.4 THESIS STATEMENT

The use of an ABC system at the WTE that follows the steps of implementing ABC, while taking the factors such as technology, management support and training into account will result in improved cost control which will result in a more accurate cost for the water resource management charge.

1.5 DELINEATIONS AND LIMITATIONS OF THE STUDY

This study is limited to the WTE of the DWS. The scope of this study is limited to the revenue management department within the WTE and the staff members at the WTE. A potential limitation of the research was the way the staff responded to the questions posed during the interviews as the study was dependent on the interviews that were conducted. Face-to-face interactions may yield unexpected information that may not have surfaced if the questions were required to be answered in writing. Since the study is limited to an analysis of one government department, results of the study may not necessarily apply to other organisations or necessarily represent the broader picture of government departments of South Africa.

1.6 DEFINITION OF TERMS

ABC is an acronym for Activity Based Costing which is a system that focuses on individual activities as the fundamental cost objects. It uses the costs of these activities as the basis for assigning costs to other cost objects such as products or services (Jawahar & Seema, 2009).

Implementation is the act of putting a plan into action or of starting to use something (*Cambridge Dictionary*, 2017, sv 'implementation').

Traditional costing system is defined as any of the older costing systems that use direct material and labour hours as the primary means of apportioning overheads (Turney, 1996).

Overheads are those cost items that cannot be directly measured in respect of each particular cost unit (Atrill & Maclaney, 2012).

Cost Objectives is often a product or department for which costs are accumulated or measured. For example, a product is the cost object for direct materials, direct labour and manufacturing overhead (*AccountingCoach Dictionary*, 2017, sv 'cost object').

Cost drivers is "any factor which causes a change in the cost of an activity, for example the quality of parts received by an activity is a determining factor in the work required by that activity and therefore affects the resources required. An activity may have multiple cost drivers associated with it" (CIMA Official Terminology, 2003:3).

1.7 SIGNIFICANCE OF THE STUDY

This research highlighted the effectiveness of the costing system used by the WTE. Suggestions were made in this study on how to improve the usage of such a costing system to the benefit of the WTE. This information is primarily intended for internal use by the management of the WTE so that management can make informed decisions about production levels, pricing, future investments and a host of other concerns. By tracking and categorising this information according to a rigorous accounting system, management can determine with a high degree of accuracy the cost of the water resource management charge.

1.8 RESEARCH METHODOLOGY

1.8.1 Literature review

Leedy and Ormrod (2005) stated that a literature review gives an account of what has been published on the research problem. A literature study was done to describe and define ABC,

its importance in an organisation, the implementation process and what impact it can have in an organisation. In order to obtain relevant literature, electronic databases, internet websites as well as accounting journals and textbooks were used. Zimmerman (2006) defined secondary data as the information that has been printed or published. A review of the WTE was done using annual reports, government acts and government gazettes:

- To obtain information on steps and factors that influence ABC implementation, articles from journals, theses and text books were used. The study also made use of search engines like Google scholar to obtain journals and theses.

- To investigate whether the steps and factors of the implementation of ABC are being followed at the WTE, using annual reports and an example of the water resource management charge calculation to source information.

- To verify whether the water resource management charge is calculated according to ABC principles at the WTE, annual reports, government acts and/or policies and government gazettes were used together with scholarly journals and theses. Google scholar was used as a search engine for journals and theses.

1.8.2 Research design

According to Fei and Isa (2010) most of ABC researches were conducted using quantitative method. The research design of this study was qualitative. Qualitative research is more fluid than quantitative research which exhibits a tendency for the researcher to view events from the outside and to impose empirical concerns upon social reality (Hopkins, 2000). Qualitative research also stresses the need to understand social behaviour in its social context and to understand particulars rather than generalising to universals (Denzin & Lincoln, 2000).

A qualitative analysis, according to Mayring (2000:2), is "an approach of empirical, methodological controlled analysis of texts within their context of communication, following content analytic rules and step by step models, without rash quantification".

1.8.3 Research method

The primary data was collected through semi-structured interviews. According to Wilkinson and Birmingham (2003), semi-structured interviews allow the interviewer to be flexible. The

interviewer is able to prepare the questions before the interview but can still add questions as the interview develops.

The population of this study comprised 17 staff members who are senior and middle managers and accountants (ABC users) at the WTE's revenue management billing and collection department. Krueger and Casey (2000) posited that the purpose of the study is necessary to assist the interviewer when determining the targeted population for semi-structured interviews.

A non-probability sampling method was used to select participants because it allows the researcher to target specific individuals. The non-probability sampling technique that was followed was purposive sampling (Tansey, 2007) that allowed the researcher to select eight participants who are ABC users, which includes middle and senior managers at the WTE. Only six participants were interviewed because saturation was obtained after only four interviews.

Bogdan and Biklen (2003) declared that data analysis is the process of analytically examining and organising the interview transcripts and field notes that are gathered in order to produce findings. The interviews were recorded and field notes were taken. The recorded interviews were then transcribed and the researcher made use of Atlas.ti as a tool to analyse the collected data.

The study also responded to ethical issues. The participants from the department were informed of the research and what it intended to achieve before the interviews were conducted through distributing letters of consent which the department, together with the researcher, signed in agreement. The letter of consent stipulated how the participants are protected, how information obtained will be treated and will clearly indicate participants' rights. The interview recognised titles with responsibilities in the organisation thereby giving preference to those in power before interviewing other users.

1.9 LAYOUT OF THE STUDY

This study consists of six chapters.

Chapter One presents a general background to the study by providing the problem of the study as well as highlighting its objectives. This chapter also indicates the significance of the study and provides an outline of the research as a whole. The research method used for the study is introduced and briefly explained. This chapter is used as a map for the rest of the study.

Chapter Two reviews literature relating to the key issues raised in various scholarly sources. The chapter reviews literature on ABC to assist in defining and understanding ABC. The steps to ABC implementation are then discussed followed by the review of the benefits experienced by organisations using ABC. The chapter focuses on the factors that influence ABC implementation as well as the limitations of using ABC. A discussion on ABC in the public sector, both globally and in South Africa, concludes the chapter.

Chapter Three gives background information about the water industry by giving an overview of the DWS together with the WTE. The legislation used in the water industry is also highlighted. The chapter responds to objective two which deals with steps and factors to a successful implementation of ABC and objective three which focuses on the principles followed when calculating the water resource management charge. The implementation of ABC at the WTE is reviewed by showing the steps it follows when determining water resource management charge.

Chapter Four focuses on research methods, procedures and techniques. It highlights the use of qualitative research methods. The chapter first describes the type of population that the sample was drawn from and then the sample size is explained. The data collection method as well as the data analysis process that was followed is also outlined. Reliability and well as validity of the study is addressed. The method's limitations and ethical considerations of the study are also outlined.

Chapter Five discusses the findings of the study in relation to the research method raised in chapter four and the interviews conducted. The perception of staff on ABC at the WTE is outlined. Atlas.ti was used as well as an external coder who assisted with coding. The coded data is divided into themes and sub-themes. The interviews are also presented in the form of tables and/or bar line graphs to capture responses and to show patterns emerging. A summary of the findings as a whole is provided at the end of this chapter.

Chapter Six provides a summary of the research, the outcomes of each objective and a summary of the findings. The conclusion of the study as a whole, limitations of the research, recommendations as well as suggestions for further research, are also provided.

CHAPTER TWO:
LITERATURE REVIEW

2.1 INTRODUCTION

An introduction to the research was provided in chapter one which included the background, the research problem and the objectives. An overview of the methodology, the limitations and the significance as well as the chapter outlines of the study was introduced.

This chapter reviews existing literature on ABC with the aim of achieving the first objective relating to the steps and factors associated with successful ABC implementation. The views of various authors which relate specifically to the problem are presented here.

This chapter first gives a background to ABC by reviewing traditional costing systems, then a brief history on ABC development which explains the difference between the two systems and highlights the necessity of implementing ABC. Next, the ABC concept is provided. The ABC implementation methodology follows, which includes the steps of implementing ABC and the global perspective on ABC implementation and uses. The chapter then focuses on the factors that make ABC implementation successful as well as the benefits derived from implementing ABC. This is followed by a brief explanation of the limitations of ABC. The last part of the chapter reviews ABC in the public sector by first introducing an international overview of ABC in the public sector and then ABC in the South African public sector.

2.2 BACKGROUND AND DEVELOPMENT OF ABC

2.2.1 Traditional costing system

The traditional costing system assigns fixed overhead costs directly to the product instead of assigning them to activities and then to product units. Traditional costing systems only have one cost pool of indirect costs per department. Applied costs are based on an indirect cost allocation and are often based on volumes and units (Foster & Swenson, 1997).

Hilton (1994) stated that traditional costing systems utilise a single, volume based cost allocation measure. The use of a single, volume based cost allocation results in the cost of the product being distorted. He further alluded that this type of costing system assigns overhead costs to products on the basis of their relative usage of direct labour and/or machine hours. Johnson and Kaplan (1987) as well as Johnson (1987; 1991) confirmed that traditional costing systems tend to distort product costs and lead to poor strategic decision making. Hilton (1994)

added that the inaccuracies in product line costing are caused by the use of labour as the volume-based cost allocation in assigning overheads. Glad and Becker (1996) agreed with Hilton that using volume-based cost allocation will result in a reduction of the quality of the product instead of a reduction in the cost of producing the product. This costing method does not work well for multiple products. Hilton also pointed out that one of the shortcomings of the traditional costing system is treating the cost of technology as a period cost without checking the degree of its use (Glad & Becker, 1996; Hilton, 1994).

A good example of the traditional costing system can be found in the mining industry. The study done by Lind (2001) on ABC in a mining industry stated that traditional costing systems attempt to allocate overhead costs directly to products because it is understood that activities are not paramount, instead products cause costs. Then activities are assigned to product units to specify what is consumed rather than why it is spent. Brignall (1997) posited that traditional costing systems take the total costs required to produce a number of products and divide these among the unit based products. The traditional costing system fails to reflect other resources or costs of activities that add value to the production since all costs incurred have to be assigned to one or the other product, which can often result in the cross-subsidisation of costs (Adams, 1996; Innes & Mitchell, 1997; Johnson & Kaplan, 1987). They agreed that it is difficult to identify the exact cost of any kind of project an organisation embarks on because of the cross-subsidisation as only a generalised cost is obtained.

Lind (2001) further declared that the major shortcomings of the traditional costing system can be summarised as follows:

• Cross-subsidisation of costs in products;

• Cost of technology (capital) is treated as a period cost;

• Processes rather than specific groups of products are costed; and

• It is difficult to accurately account for multiple products since it is volume based (Lind, 2001:78).

The above shortcomings indicate the difficulties faced by organisations using the traditional costing system as the cost information is not clear or traceable and therefore cannot be assigned to any specific activity.

The following example was used by Cooper and Kaplan (1988:97) to demonstrate how the traditional costing systems failed to report accurate product costs:

> Consider two hypothetical plants turning out a simple product: ballpoint pens. The factories are the same size and have the same capital equipment. Every year Plant 1 makes 1 million units of only one product: blue pens. Plant II, a full-line producer, also produces blue pens, but only 100 000 per year. Plant II also produces a variety of similar products: 80 000 black pens, 30 000 red pens, 5 000 green pens, 500 lavender pens, and so on. In a typical year plant II produces up to 1000 product variations, with volumes ranging between 100 and 100 000 units.

From the above information, Cooper and Kaplan explained the difference between the plants, saying that Plant I requires less manufacturing support facilities because it has a simple production environment. Plant II, because of its higher diversity and complexity of operations, requires a much larger support structure, as it will need more people to set up, schedule and inspect machines as well as to purchase and handle materials. Since traditional costing systems use a single volume based costing system, it will be more difficult to account fully for the second plant's costs. The second plant's considerably higher expenses on support overheads cannot be described as either direct labour, machine hours operated or the amount of materials purchased (Cooper & Kaplan, 1988).

The problem with traditional costing systems is that a large amount of indirect expenses continue to be apportioned, using allocation factors that are not related to what caused the costs to be incurred (Krishnan, 2006). Sulaiman, Ahmad and Alwi (2004) explained that it is difficult to reveal the actual cause and effect relationship between indirect costs and individual products because the cost allocation in traditional costing systems is usually based on labour hours, machine hours or units produced.

Organisations that are able to improve quality and efficiency of operations and eliminate products and services that incur losses, while lowering costs, tend to be successful (Drury, 2014; Kuchta & Troska, 2007). This is why some organisations are successful while others fail (Drury, 2014; Kuchta & Troska, 2007). Organisations' costing systems help management with the strategic planning and play a vital role in supplying accurate cost information about the organisations' products, services and customers (Rasiah, 2011; Shil & Pramanik, 2012).

Managers need a cost management system that is timely and which supplies quality data to assist them with decision making. To achieve this, many organisations have moved away from conventional or traditional costing systems to ABC which is a more popular cost methodology system (Drury, 2011; Ozbayrak, Akgun & Turker, 2004). It is therefore important that the difference between ABC and the traditional costing system is investigated.

2.2.2 ABC developments from traditional costing shortcomings

ABC was developed as an alternate approach to the traditional costing systems which, as explained above, were broadly used but lacked the ability to accurately determine actual production and service costs or provide useful information for decision making. Managers were making decisions based on the information provided through the traditional costing system which exposed them to making decisions based on inaccurate data (Cardos & Pete, 2011). This is in agreement with Needy and Bopaya (2000) who said that ABC aims to avoid the inadequacies inherent in traditional costing systems when allocating the overhead costs.

ABC was first introduced towards the end of the 1980s by Robin Cooper and Robert Kaplan (Yousif & Yousif, 2011). The theory behind this model was that, since all of the companies' activities exist to support the production and delivery of goods and services, they should all be considered as product costs. Also since nearly all factories and corporate support costs are divisible, they can be split and traced to individual products. Yousif and Yousif (2011) further pointed out that the logic behind ABC lies in producing products that are generated by activities. Activities often require resources to be supplied which, in turn, generate costs. If companies are able to define their activities, ABC will assist them to trace each product cost.

Turney (2008) gave an overview of ABC development over the years. He mentioned that most large organisations implemented ABC in the late 80s and early 90s, with the first commercially available software introduced in 1990. ABC was highly marketed through publications, journals and the general media which resulted in many organisations showing an interest in implementing it. This resulted in ABC implementation rising in the early 90s. With this in mind, the concept and definition of ABC is discussed in full below.

2.3 THE ABC CONCEPT

In the various studies on ABC, different terms are used, including that ABC is a method (Garrison et al, 2008), a methodology (Narong, 2009), an accounting system (Baxendale, 2001)

or an accounting technique (Pandey, 2012). For the purpose of this study, ABC is referred to as a system.

The Figure 2.1 describes the resources, activities and cost objectives and how they relate to each other in the ABC process:

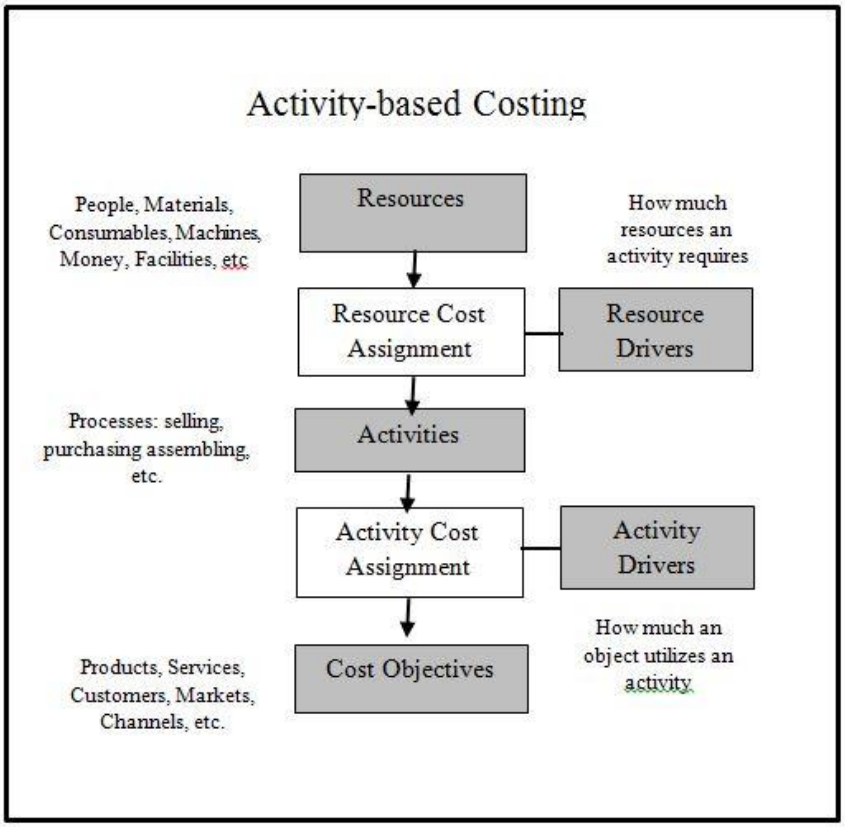

Figure 2.1 ABC Process
Source: Fichman and Kemerer (2002)

The above diagram outlines the ABC process starting with the resources which represent the people, materials and machines needed. The flow then moves to the resource cost assignment which represents the resource cost drivers which assist in determining how much of a resource is needed for each activity that is performed. The activities are defined, this represents the process or action an organisation will embark on, for example, selling, purchasing and assembling. Next, each activity will have an activity cost assignment representing the activity drivers which determine how much an object utilises an activity. The cost objectives represent the final product, for example, services, customers and markets.

Garrison et al (2008) defined ABC as a system providing cost information to managers to assist in decision making that potentially affects both fixed and variable costs by allocating costs individually to each product. Narong (2009) concurred and described ABC as a system that produces a bill of activities which provides the cost of each individual product and service. An activity is the centre of ABC, therefore organisations should clearly indicate their activities in order to decrease costs and increase profits. ABC provides an opportunity to identify inefficient and unnecessary activities. This system educates and makes it easier for management to understand the true costs of processes, products and services (Narong, 2009). Tho (2006) agreed and explained ABC as a system that assesses the cost and performance of activities, resources and cost objectives. When organisations allocate costs to each activity involved, it allows management to see where they are spending, which assists them in deciding whether to cut or reduce costs to maximise profit.

Turney (1996) contended that ABC is a system for tracing costs, assigning costs to cost objectives and measuring performance of activities and relevant cost objectives. The costs are traced to activities according to their consumption of resources. Baxendale (2001) as well as Krumwiede and Roth (1997) confirmed this by defining ABC as a system used to measure the cost and performance of activities, products and other cost objectives. The use of accounting systems helps management to recognise unused cost information for strategic decision making and planning by defining each objective and activity in the organisation and by determining the cost per objective and activity (Baxendale, 2001; Krumwiede & Roth, 1997). Pandey (2012) defined ABC as a system designed to guard against potentially serious financial problems that can arise when an organisation's accounting costs deviate significantly from its actual costs. Organisations need a costing system that is able to measure the cost and performance of activities to assist management in decision making. When management is able to define activities required for the products, it will be able to reduce production costs to a marginal level.

Pandey (2012) argued that ABC is a system that identifies cost objectives or activity centres in an organisation. When using individual cost drivers, he explained how ABC gathers costs into working activity cost objectives and matches them to products or services, based on the kinds of transactions or events taking place. Chea (2011) agreed and stated that, for each process, the organisation must identify the cost of activities. It must also recognise the cost drivers for each cost activity and calculate the cost per driver. Costs are determined by counting the drivers.

For example, if a customer generates 100 invoices and it costs R5.00 to charge one invoice, the related cost will be R500. Another customer might generate more than 100 invoices and therefore have a cost structure which is quite different from the first customer. The main duty when setting up an ABC system will be to identify and calculate the cost drivers (Chea, 2011). ABC therefore helps organisations to identify activities and calculate cost drivers to suit each objective.

Pandey (2012) further described how, because of its ability to identify activities, ABC has proved its popularity in the manufacturing context since its inception. He revealed how the ABC system has effectively retained the operational cost at marginal level and is still able to deliver improved customer service in the manufacturing sector. Furthermore, ABC is therefore essential when organisations want to reduce operational costs as it provides accurate and timely information.

When used in conjunction with other frameworks, ABC is claimed to be effective in supporting performance management and the balanced scorecard. The study done by Elmezughi (2007) on Australian businesses found that there is a significant positive relationship between ABC and performance management when ABC is used concurrently with the balanced scorecard. Maiga and Jacobs (2007) also found that cost improvement has a positive impact on financial performance. This confirms that the use of ABC results in positive improvements in the overall performance of an organisation.

Based on the above discussion, ABC is believed to provide more accurate data than other costing systems. It has, however, also been highly criticised by a number of authors. There has been evidence that ABC does not always allocate costs completely accurately, however most organisations will follow the system they believe to be more accurate or that offers more approximate data than others (Armstrong, 2002; Wilson & Chua, 1993).

2.4 ABC IMPLEMENTATION

2.4.1 Steps to the implementation of an ABC system

In view of the above definitions and benefits of ABC, Roztocki (2005:2) carried out research on ABC implementation for companies engaged in e-commerce. The research paper discussed six steps which give a clear indication of how ABC can be implemented. Roztocki also said that these steps are very similar to the procedure initially developed for small manufacturing

companies where the success of implementing ABC was first established. Further, Roztocki found these steps to be relevant and useful in the organisations in question.

The implementation can be performed in six (6) major steps as discussed by Roztocki (2005):

- *Step 1: Establish objective and requirements of the ABC system*

This requires management to decide on the main objective of having a costing system. A costing system, for example, can be used to control costs, establish pricing policies or assess inventory. Management must furthermore decide upon the level of accuracy and reliability required of their costing system, bearing in mind that the higher the level of accuracy, the higher the effort and cost of data collection (Roztocki, 2005:2). Horngren, Datar and Rajan (2015) concluded that ABC improves costing systems by focusing on individual activities as the central cost objectives. They defined an activity as an event, task, or unit of work with a specified purpose, for example, setting up machines, designing products, operating machines and distributing products. ABC uses all activities required to produce each product or service to calculate and to allocate costs to specific products and services (Horngren et al, 2015).

- *Step 2: Identify main activities*

The second step to follow will be to identify the main activities (which cause fixed overhead expenses). Activities to be identified include but, are not limited to order processing, product marketing, telephone support, product handling and product shipping. The level of accuracy and reliability desired by an organisation helps management decide on the main activities to be identified (Roztocki, 2005:2). Garrison et al (2008) confirmed the need for organisations to identify activities and group them into activity objectives. They defined activity objectives as the supporting activities that tie in to a product line or service which may include fractionally assigned costs of supporting activities to individual products.

- *Step 3: Trace overhead to activities using the expense-activity-dependence (EAD) matrix*

Costs which can be related to a specific cost objective are considered “direct”. Costs which cannot be associated with a specific cost objective are defined as “overheads”. Overheads, which are the focus of the ABC analysis, are traced to main activities during step 3. The Expense-Activity-Dependence (EAD) matrix can be utilised to associate costs to activities systematically to determine their overhead use (Roztocki, 2005:2). In their paper on ABC in

small and medium companies, Gecevska and Anisic (2006) explored the EAD matrix in detail and showed that overheads were easily traced. It was concluded that, using the EAD to trace overheads, is one of the methods that ABC implementers should consider to reduce the costs involved in implementing ABC.

- *Step 4: Trace overhead to cost objectives using the activity-product-dependence (APD) matrix*

In step 4, overhead costs are traced from activities to cost objectives. Cost objectives are objects of a certain interest in the cost analysis, such as activities, products, product lines, processes, departments, services, customers or even the entire organisation. To systematically relate activities to cost objectives and then to identify the cost objective's overhead consumption rate, the Activity-Product-Dependence (APD) matrix can be used (Roztocki, 2005:2). APD which is also known as activity cost drivers, as discussed by Saniuk, Saniuk and Witkowski (2011) in their paper on using ABC in a metalworking process, are considered important when calculating the cost of production since operational information such as the number of machine hours and the number of production batches should also be considered. Defining cost drivers is considered to be a very important step of an ABC costing system.

- *Step 5: Calculate the product cost of each cost objective*

During this step, the direct and overhead costs of each cost objective are added together in order to obtain the product cost. The product cost represents an estimate of the actual expenditure on the part of a company to generate a cost objective, rather than the cost of that objective to a customer by, for example, tracking the cost for designing a product instead of how much it will cost the customer (Roztocki, 2005:2).

- *Step 6: Use the ABC analysis for strategic decision-making and improvements*

After the calculation of the product cost, management can utilise the results to judge profitability, make informed pricing decisions, identify cost saving opportunities, take decisions on the discontinuance of unprofitable product lines or the introduction of more promising ones. Product cost information on its own from the ABC system would not automatically improve the performance of the business. Rather, equipped with the ABC analysis, the decision-makers would be challenged to accurately understand the data and utilise it to advance the efficiency of their business. Roztocki (2005) concluded that the best way to

implement ABC is to apply it to service packages for which consumption of resources is largely predictable and automatic units of services can be identified. For activity-based costing analysis to be truly worthwhile, the organisation should implement specific plans based on the information about costs and profits disclosed in the analysis (Roztocki, 2005:2). Service departments will therefore benefit from using the ABC analysis as it will help management to make informed decisions that will improve service delivery to the public.

2.4.2 A global perspective on the extent of ABC implementation

In view of the above steps in implementing ABC, it is clear that ABC represents a different model in cost allocation. Zaman (2009), in his empirical study of 1 250 US companies, confirmed that they have implemented and are using ABC. They found that the use of ABC has an indirect positive impact on the company's financial performance. This was confirmed by Friedl Hammer, Pedell and Kupper (2009) in the study done on how German companies run their cost accounting system. They reported that ABC is one of the costing systems being used by German companies with 7% of organisations using ABC as a stand-alone system, while 24% of the respondents use ABC together with other costing systems. They found that employee's satisfaction of ABC implementation was positively correlated with clarity of objectives and quality of ABC information.

Table 2.1 below presents the evolution of the implementation rate of ABC in some developed countries across the globe.

Table 2.1 The extent of ABC implementation in some developed countries

Countries	Year	Study	Implementation rate
USA	1993	Armitage and Nicholson	11%
	1995	Shim and Sudit	25%
	2003	Kiani and Sangeladji	52%
UK	1991	Innes and Mitchell	6%
	1994	Drury and Tayles	13%
	2000	Innes, Mitchell and Sinclair	17.5%
	2001	Tayles and Drury	23%
France	2001	Bescos Cauvin, Gosselin & Yoshikawa	23%
	2002	Alcouffe	15.9%
	2007	Cauvin and Neumann	23%
	2008	Rahmouni	33.3%
Australia	1998	Chenhall and Langfield-Smith	56%
	2004	Pierce and Brown	27.9%

Source: Elhamma and Fei (2013:24)

Table 2.1 indicates that the ABC implementation rate has increased over the years in the countries listed. From the US perspective, Armitage and Nicholson (1993) revealed that, for manufacturing organisations, 11% of the respondents implemented ABC. Shim and Sudit's (1995) study amongst US Fortune 1 000 companies displayed that an ABC system is becoming more popular and is quickly recognised in the US, with an ABC implementation rate of 25%. A study by Kiani and Sangeladji (2003), limited to the 500 largest US industrial firms, found that 52 % of the respondents were using ABC. This indicates that even though the studies are based on different populations, there is an increase in the implementation of ABC in the US.

The same trend is seen in the UK and France. In the UK, the increase was constant ranging from 6% in 1991 to 23% in 2001 amongst respondents from various sectors. Innes and Mitchell (1991) found that 6% of the CIMA members' organisations had implemented ABC. Drury and Tayles (1994) found that 13% of the manufacturing organisations implemented ABC. Innes, Mitchell and Sinclair (2000) in their study on large financial institutions, found that 17.5% of those institutions are using ABC. An increase was also noted by Tayles and Drury (2001) in their survey of 187 of the UK's largest companies. They found that 23% of the respondents are using ABC. The above indicates an improved interest in ABC implementation coming from different industries which may also signify the effectiveness of ABC.

In France, Bescos et al (2001) recorded that 23% of organisations in different sectors across France have implemented ABC. Alcouffe (2002), in his study on the dissemination of ABC in France, found a lower number, 15,9%, of manufacturing companies have implemented ABC. Cauvin and Neumann (2007) found that 23% of the respondents have implemented ABC. Their survey was based on a population of 2 500 members of the association of financial directors and management accountants from different industries. An increase was again confirmed by Rahmouni (2008) in his study based on French firms when he found an implementation rate of 33% amongst the respondents from different industries. The above surveys show the same trend as those done in the UK and US based on different industries which confirm growth after the implementation of ABC.

The trend seems to change slightly in Australia as a decrease in implementation has been recorded. Chenhall and Langfield-Smith (1998) first found that a high number, 56%, of Australian manufacturing firms implemented ABC during the 1990s. The rate however went down during the 2000s, as seen in the findings by Pierce and Brown (2004) indicating that only 27.9% of the respondents in different sectors were implementing ABC. They found that the size of a firm influences ABC implementation rates since smaller firms find it too costly.

Pandey (2012) highlighted the outcomes obtained from a study that was based on the relationship between ABC, business strategy and organisational performance in 62 Moroccan enterprises. His study determined the level of use of ABC in those organisations as 12.9% of the organisations reported using the ABC system. The outcomes based on logistic regression, shows that business strategy plays a major role in the use of this method of cost allocation.

Also, Pandey (2012) found that the cost allocation system based on the ABC system results in improved performance for enterprises that have implemented it (Pandey, 2012).

The above discussion indicates ABC's success over the years. When ABC is properly implemented, organisations are likely to achieve more than they would have with other costing systems. It has also shown that organisations in developing countries can achieve better results with ABC when following the same steps as indicated above.

2.5 FACTORS INFLUENCING ABC IMPLEMENTATION

In the study conducted by Wessels (1997) on ABC implementation amongst listed companies in South Africa, the author contended that most studies found or suggested that problems are mostly likely to occur during ABC implementation stages. In her study, Wessels (1997) investigated the actual problems that organisations implementing ABC in South Africa face. The researcher had an opportunity to analyse in detail the technique and the implementation process. She found that most often, the actual problems differ from the perceived problems.

In the same study, Wessels (1997) further found that in South Africa, ABC implementation has been mostly free from serious problems. She suggested that South African organisations benefited from the vast amount of research already done on ABC as a business tool. Wessels further stated that another reason for the success in implementing ABC in organisations could be as a result of how the implementation process was carried out. At the beginning, companies were implementing ABC on a smaller scale, as an experiment, before implementing it throughout the company, in the hope that if any problems existed, they would be revealed at an early stage. This would eliminate problems before the system was implemented in the rest of the organisation. She found management support, staff acceptance/involvement of the new system and training as well as coherent factors such as system software to be crucial for ABC implementation to be successful as expressed by most South African organisations that implemented it (Wessels, 1997).

Ismail (2010) agreed in his study on ABM implementation at higher education institutes that the successful implementation of a cost management system is an administrative innovation. The success of an administrative innovation is determined, to a large extent, by behavioural and organisational factors. Organisational factors refer to management and employees' support for the project as well as resources made available to the project such as computers. The

following is a detailed description of some of the factors influencing the success of ABC implementation as experienced by most organisations that implemented it.

2.5.1 Strategic and operational management support

Correia, Langfield-Smith, Thorne and Hilton (2008) agreed with Morrow and Connolly (1994) who found that, in the early stages of ABC, top management in organisations have a major role to play when it comes to the implementation of ABC. Management support during the implementation phase can result in a successful ABC implementation. They further stated that it is essential for top management to prioritise the implementation project in order to maximise the benefits the organisation can get in the future from a well-developed system (Correia et al, 2008; Morrow & Connolly, 1994).

Liu and Pan (2007) confirmed that, for ABC implementation to be successful, it is vital to have top level managers champion the initiative as well as to gain acceptance by lower-level managers by demonstrating how the existing cost accounting system often produces distorted thus misleading information. Also, how the existing accounting system is not able to reflect the increasing complexity of the organisation and the products and services it offers. He further stated that effective communication at all levels, down to the accounting system users, results in the success of ABC implementation, as it diffuses any resistance from other level users (Liu & Pan, 2007). It is therefore important that, before the first phase of implementation, management is fully informed and is aware of the benefits of ABC over the current system, in order to support its implementation.

2.5.2 System acceptance by staff and training

Kaplan and Anderson (2005) found that ABC does not conform to Generally Accepted Accounting Principles (GAAP) and that organisations using ABC should also adhere to and maintain GAAP cost accounting as it is a requirement for external reporting. This can be seen by employees as duplicate work and may affect their behaviour towards ABC implementation (Kaplan & Anderson, 2005). Staff resistance and a lack of training may result in the implementation taking longer and costing the organisation more than the budgeted amount. Training and knowledge increase the users' confidence in the ABC system (Govender, 2011; Khozein, Dankoob & Barani, 2011). Ehlers and Lazenby (2007) argued that if sufficient training increases organisational capacity for ABC execution, then training employees increases the likelihood of them being committed and motivated to improving performance. If

the staff who are going to use the ABC system are well informed regarding the system and are properly trained before and during the implementation process, this can contribute towards a successful ABC implementation.

2.5.3 Computer software as a coherent factor

Coherent factors are those that are used together with ABC to make it easier to trace costs and for information to be readily available whenever needed, for example, computer technology like Microsoft Excel for accounting processing, which assists organisations to capture data and calculate cost information per activity. Other organisations may prefer their own personalised system which will easily define their products and services (Nah, Lau & Kuang, 2001).

Kim and Kim (2011) stated that, although it can be costly for an organisation to implement ABC when it comes to the technology needed to run the costing system, the benefit of having an ABC system in the organisation outweighs the cost of installing the required technology. ABC implementation may be successful when an organisation has also invested in good and reliable technology. Sohal and Chung (1998) agreed and argued that ABC can be beneficial if used with sophisticated technology. Organisations implementing ABC should first invest in good technology which can be used together with ABC. It can be costly for organisations to implement ABC if they do not have technological resources that will reduce costs when it comes to data collection and processing (Sohal & Chung, 1998). The use of technological resources will also assist the organisations with readily available data for management during ad hoc reporting. It is therefore imperative for organisations to implement ABC together with reliable computer software.

2.6 BENEFITS DERIVED FROM SUCCESSFULLY IMPLEMENTING AND USING ABC IN THE PRIVATE AND PUBLIC SECTORS

Velmurugan and Nahar (2010) stated that ABC has been widely implemented in manufacturing companies and has been recorded as being beneficial since the 1980s in reducing costs of production thereby increasing profits. Innes and Mitchell (1995) and Drury and Tayles (2000) recorded that service organisations can also benefit from implementing ABC. The implementation of ABC in the city of Indianapolis helped management to decide on the services the city wanted to provide to the citizens and determining what it would cost the city to provide such services. In doing so, management were able to deal with operational efficiency and improved decision making (Anderson, 1993).

Briciu and Capusneanu (2010) confirmed that ABC enables managers to measure costs associated with the department more reliably, as well as to provide an understanding of how these costs are derived. They further revealed that managers may also use the ABC system to examine different ways of regulating their businesses. Managers can compare different ways to handle their customers, product lines and delivery methods (Briciu & Capusneanu, 2010). When organisations accurately assign costs to products, services and objectives, management will be able to make informed decisions which, in turn, will improve and increase profitability.

Accurate information is another benefit of ABC since management makes decisions based on information provided by the costing system and the use of ABC provides precise cost information for each allocation (Sheu, Chen & Kovar, 2003). Raz and Elnathan (1999) indicated that ABC has assisted many organisations, in particular, manufacturing and service departments, to understand their cost structure better, which, in turn, assisted management with better decision making. Organisations using ABC improve their competitiveness because ABC improves the accuracy of product or service costing and assists managers in understanding how resources are distributed across the organisation. ABC is simple and easy to understand and use (Raz & Elnathan, 1999).

Rundora, Ziemerink and Oberholzer (2013:489) outlined the following benefits of implementing and using ABC:

- Provides more accurate product line costing, particularly where non-volume related overheads are significant and a diverse product line is manufactured;
- Is flexible enough to analyse costs by cost objectives, other than products, such as processes, area of managerial responsibility and customers;
- Aids identification and understanding of cost behaviour and thus has the potential to improve cost estimation. ABC provides plant managers with a more structured approach to evaluate the expenses associated with specific activities used to support a product;
- It gives more accurate product and customer profitability measurements and better-informed strategic decisions about pricing, product lines and market segments;
- It provides more accurate measurements of activity-driving costs, helping managers to improve product design decisions, better customer support decisions and fostering value-enhanced projects that will increase the profits generated by the organisation;

- It supplies the information to identify areas where process improvement is needed, this can also be achieved by employing ABM principles;
- Improved product costs lead to better estimates for job costs for pricing decisions, budgeting and planning;
- It presents better information to identify the cost of unused capacity and maintains a separate accounting for this cost (Rundora et al, 2013: 489).

Bahar (2014) investigated the adoption or non-adoption of ABC in the plastic industry in Iran. He established that improved accuracy was the first important perceived benefit of implementing ABC, followed by understanding cost behaviour and causation. The respondents also identified the following as benefits of implementing ABC in a plastic company: product or service pricing, cost reduction, control and better process design with performance measures (Bahar, 2014). ABC has been beneficial for organisations that have implemented it both in the private sector and in the public sector. The benefits seem to outweigh the costs of implementation. This confirms that organisations can improve their financial standing if ABC is properly implemented.

Another key benefit of ABC is that management can trace costs and use the information to determine and compare the cost of producing a specific product against another alternate product. This can assist management in deciding on the most profitable product to produce by benchmarking (Kinsella, 2002). Cooper and Kaplan (1991) described how management can improve decision making when each activity is identified and has its own cost allocation. In this way, management can determine which activities generate revenue and are profitable. Management can easily identify cost allocation for their kind of business, either through the services they are providing or the customers they are serving, individually or in a group of similar customers (Cooper & Kaplan, 1991).

2.7 LIMITATIONS OF ABC

Despite the success that has been documented by various scholars, it has also been documented that ABC has some limitations that may result in the failure of its implementation. These include the method, cost and time involved in implementing ABC. The process of data collection and data capturing may require organisations to hire more employees and that can increase costs (Namazi, 2016). Garrison et al (2008) confirmed that ABC can be expensive and gave an example of ABC at Insteel industries which has shown that its 20 most expensive

activities made up 87% of the plant's costs. A bigger amount was being consumed by non-value adding activities. Kim and Kim (2011) also stated that ABC can be successful when used with good technology/accounting systems, but this requires money to implement. They further stated that the accounting system on which ABC is running must be regularly updated which, in turn, increases the cost for organisations to implement or keep ABC.

Kaplan and Anderson (2005) found that it is not easy to identify some activities such as the salary of the chief director as it is not based on a per-product usage basis and estimating costs of activity pools is difficult and can be very expensive. They further explain how ABC fails to account for hours that employees spent outside their duties, for example, the time spent on tea breaks. They also said that some activities do not necessarily add value to the product or process of the firm. ABC's emphasis on attention to detail can result in an organisation losing sight of the strategic objectives while trying to save on small items. The organisation may define one activity as non-value adding or non-remunerating while that activity can achieve other strategic objectives (Kaplan & Anderson, 2005). It is therefore important for management to study the ABC analysis to understand their organisations' activities before deciding on excluding or including more activities as well as products.

2.8 ABC IN THE PUBLIC SECTOR

2.8.1 A global perspective

A great deal of research has been done on ABC in public sectors around the world. Most of the research showed ABC to be successful and efficient in departments where it was implemented. The study done by Vazakidis et al (2010) on the Greek public sector investigated the success of ABC when used with technology. They established that ABC, when combined with good technology, can resolve deficiencies previously faced by the public sector and that it can also provide services to the public at a minimal cost.

The cost reduction was confirmed by Waters, Abdallah, Santillan and Richardson (2003) who calculated unit costs for providing healthcare in the Peruvian NGO healthcare system. They found that applying ABC to healthcare organisations can disclose where the organisation is spending money. This will help management in decision making and in finding alternatives to reduce costs (Waters et al, 2003).

This process of finding out where the organisation is spending money, while working on reducing costs, was also confirmed by different researchers. Kline (2003) indicated that with

accurate, comparative cost information, it is easy for management to find problems and initiate improvements. ABC was used to compare two Marine Safety offices of the U.S. Coast Guard. It was found that the overheads in one office were twice those of the other. This allowed the Coast Guard to identify two ways to reduce overheads and improve performance. Similarly, the city of Indianapolis established that the cost of ploughing a mile of snow was less for more miles for one area of the city and more for fewer miles for another. An analysis of the difference determined that one area was using excessive amounts of salt per mile and not using an optimal mix of equipment (Kline, 2003).

2.8.2 A South African perspective

The study done by Oseifuah (2013:35) on ABC at the Buffalo City Municipality, in the Eastern Cape Province of South Africa, investigated the impact and possible related improvement in financial performance resulting from ABC use and how the South African public sector can manage such improvement. The case study method was used to gather and analyse data relating to improvements in financial performance, opinion and success of the organisation. The study confirmed that ABC provides significantly more accurate and useful information than traditional cost accounting (Oseifuah, 2013:35).

Van Wyk (2003), in his study about a performance measurement approach to improve financial management in provincial governments in South Africa, and Gaula (2011) in his study on ABC for a South African pharmacy council, which is a non-profit organisation, found that using ABC in the public sector can provide management with information regarding the cost of providing services for strategic decisions. For example, management will have insight on the causes of costs and will also have better cost control and management. This will result in management having a better understanding of how it can reduce costs and provide better service to the public.

In his research done on the South African Post Office, Taba (2005) confirmed that implementing ABC in conjunction with the right software and technology, support from senior management and co-operation between sectional departments can improve financial performance in an organisation. This was also confirmed by Matthews et al (2009) in their study of developing an ABC model for municipalities to be used to quantify costs of delivering water in rural arrears. They found that municipalities can save costs when using ABC by identifying activities including direct and indirect costs accruing from different levels

associated with water services provisions. They also found that the model assists management with budgeting, as it validates expenditure requests and monitors expenditure levels against the budget line (Matthews et al, 2009).

The study on ABC in small manufacturing firms in South Africa by Rundora et al. (2013:489) confirmed that ABC systems deal with the pricing misrepresentations which exist in traditional cost accounting systems. ABC gives operational cost data and discretionary project cost data which would not be provided when using a traditional costing system. In addition, the method assigns a more accurate base for decision-making, which involves the possibility of changing the product offerings, bringing strategies that are profitable and long term in order to achieve a sustainable advantage. Similarly, in service departments, an ABC system that provides detail operational cost data assists management in dealing with misrepresentations, thereby improving their decision making to benefit the organisation in the service they are providing.

The above was confirmed by Oseifuah (2013) in his paper on the ABC approach to financial management in the South African public sector. He found that ABC implementation does indeed impact on management decisions and reduces costs by re-allocating them from expensive activities in order to perform better in other activities. ABC also assists management in the public sector with planning and budgeting. Management can use its improved decision making based on ABC for planning and budgeting to avoid, for example, over or under spending.

2.9 SUMMARY

This chapter reviewed the published literature on the theory of ABC systems, the steps and factors of its implementation, its benefits as well as its limitations. The chapter started by giving an overview of a traditional costing system which was used by most organisations before ABC was introduced. The discussion illustrates the difference and the shortcomings such as cost distortion that the traditional system had that led to organisations implementing ABC.

The ABC concept was discussed and it was found that ABC is defined by most writers as a costing system that provides accurate information that is useful for management during planning and decision making. The ABC process was also outlined starting with resources which refers to people or materials required. This was followed by determining the resource cost drivers needed for each activity which refers to the process which includes but is not

limited to selling and purchasing. The flow then determines the cost driver needed for each activity in order to achieve a cost objective which can be referred to as a product.

The step by step process of implementing ABC was also discussed. The first step was to establish objectives and requirements for an ABC system to be implemented. The following steps identified the activities to be performed and traces overheads to activities as well as cost objectives. The fifth step gathers data to calculate product cost. The final step was to use the ABC analysis for improved decision making. The global perspective of the extent of ABC implementation was also presented with the USA, UK and France showing a steady increase in the organisations implementing ABC however Australia showed a decline in the number of organisations implementing it. ABC's success was linked to its implementation process.

Factors that influence successful implementation of ABC were identified as: strategic and operational management support; training of and acceptance by staff; and technology to be used with ABC. The chapter then discussed the benefits derived from implementing ABC, namely, tracing costs, reducing costs and comparing the costs of producing one product over the other. ABC improves decision making as more accurate cost information is achieved, which therefore allows management to measure costs and gain an understanding of what is causing those costs. It provides more accurate measurements of activity-driving costs. The limitations of ABC were also outlined and, amongst others, time consuming was found to be one of the limitations. Further, ABC was said to be expensive because of the need to implement a technology system to use for ABC. It was also found to be difficult to measure some activities such as directors' salaries as it is not based on per product usage.

The chapter also gave an overview of ABC in a service oriented organisation by describing ABC use in the public sector. An overview of ABC in the public sector internationally was discussed first to illustrate the success experienced. It was found that ABC has assisted management in service sectors in determining which services to provide for the public and how they can reduce overheads through accurate cost information. The discussion on ABC in South Africa's public sector found the same and pointed out that accurate cost information was helping management in making informed decisions. The next chapter will discuss the management of water services in South Africa.

CHAPTER THREE:
FRAMEWORK FOR WATER RESOURCE MANAGEMENT AT THE WTE

3.1 INTRODUCTION

Chapter Two provided a literature review of ABC in the public and private sectors. The discussion included the steps of implementing ABC, the extent of ABC use as well as the factors influencing successful ABC implementation.

This chapter answers the first part of the second objective of the study which is to investigate whether the steps to successful ABC implementation are being followed for water resource management at the Water Trading Entity (WTE). The chapter also seeks to answer the third objective which is to assess whether the water resource management charge at the WTE is calculated according to ABC principles. This will be achieved by reviewing the existing literature on the administration of water resource management at the WTE. An overview of the South African government and the Department of Water and Sanitation (DWS) will be provided to indicate their links to water resource management at the WTE.

The chapter starts by giving a background overview of the tiers of South African government and the changes since democracy in 1994. Some of the legislation and policies that govern the DWS will also be provided. This includes discussions about the Constitution of South Africa, the Water Services Act, the National Water Act, the Public Finance Management Act, the Free Basic Water Act as well as A Pricing Strategy of Water Use Charges. The discussion introduces the water industry by providing a brief explanation of the industry then giving an overview of the DWS as well as the WTE. Water resource management is then discussed as one of the WTE's main functions by giving a brief explanation of what it is and how it is managed. It will be linked to the water pricing chain for cost recovery where the water resource management charge will be introduced. Then a discussion of the challenges of financing water resource management follows. A brief overview of the WTE's previous costing system is also provided. Lastly, the chapter focuses on ABC implementation at the WTE. First, the ABC costing system used at the WTE is confirmed. An overview of ABC implementation is provided including an example of the step-by-step calculation of the water resource management charge at the WTE. The billing process of the water resource management charge is also briefly discussed.

3.2 BACKGROUND TO THE SOUTH AFRICAN PUBLIC SECTOR

The South African public sector consists of national, provincial and local government entities (Cameron, 2009; Fraser-Moleketi & Salojee, 2008). These entities are responsible for providing South African citizens with goods and services at a marginal cost. The goods and services include, amongst others, education, healthcare, housing, water and sanitation (Cameron, 2009; Fraser-Moleketi & Salojee, 2008). Before the advent of democracy in 1994, South Africa was under an official system of racial segregation and white minority rule known as apartheid, which disadvantaged black South Africans by providing fewer services such as water, sanitation and electricity. Cameron (2009) and Fraser-Moleketi and Salojee (2008) further stated that the public sector changes that were initiated during 1994 were promulgated to deliver better service to the people therefore the public sector was pressured to initiate the process of transformation. This pressure to transform was brought about by the new political dispensation as well as the global public sector transformation movement. The need to improve efficiency, effectiveness and accountability by all public sector departments became the main objective behind public sector transformation (Cameron, 2009; Fraser-Moleketi & Salojee, 2008).

In light of the above, the provinces and local governments of South Africa are allocated duties such as water and municipal infrastructure, amongst others. They are expected to distribute resources independently of the national government in order for them to meet the basic needs of the South African citizens while giving effect to national priorities (South Africa, 2013). This study will only focus on the national level.

3.3 PRESENT NATIONAL WATER LEGISLATION AND DIRECTIVES

Claasen (2015:46) stated that South Africa's new water legislation is significant. Its policy developments have an on-going principle that accommodates environmental protection and socio-economic development priorities. This policy has proved to be successful because it is supported by a large number of stakeholders, legal practitioners, environmental scientists and politicians. He further revealed that South Africa took the lead in implementing national water legislation that could be utilised in the transformation of society, from a social and environmental justice perspective.

The DWS (Department of Water and Sanitation) (2014) highlighted that legislation directs the work of the department. The legislative directives mandate the department's right to protect

the country's water resources, as well as to manage, use, develop, conserve and control the delivery and effectiveness of water supply and services. This is done in accordance with the requirements of the water related policies and legislation which are critical in delivering the right of access to sufficient water, transforming the economy and eradicating poverty. The key pieces of legislation that inform the department's core functions are discussed below.

3.3.1 The Constitution of the Republic of South Africa 1996

The South African public sector is governed by the Constitution of South Africa (Act No. 108 of 1996) which has a Bill of Rights which is described as a cornerstone of democracy in the country. The constitution enshrines people's rights in the country and affirms the democratic values of human dignity, equality and freedom. The constitution also notes that the state has a responsibility to take reasonable legislative steps within its available resources, to achieve the progressive realisation of each of these rights (South Africa, 1996).

The Constitution supports socially acceptable economic developments and inculcates the right of everyone to a non-damaging and healthy environment. The Constitution's objective is to address the rights of individuals to have access to clean water and sanitation by setting out the institutional framework for providing services. It gives national and provincial government authority to regulate local government in terms of water services and has an obligation to support and strengthen the capacity of local government to provide services. The executive authority of municipalities to provide water services in their areas of jurisdiction is also granted by the Constitution. (South Africa, 1996).

3.3.2 Water Services Act 1997

The objective of the Water Services Act (Act No. 108 of 1997) is to control the legislative duty of local government as water service authorities, to provide water supply and sanitation according to national standards and norms (South Africa, 1997). It also provides regulations to water boards as important water service providers. Section 156 of the Water Services Act grants the Minister of Water and Sanitation the authority and responsibility to sustain and reinforce the capacity of local government to, not only perform their functions, but also to manage their own affairs and exercise their powers. The Minister of the DWS is obliged by the Water Services Act to sustain and monitor the performance of all water services boards, such as the Trans Caledon Tunnel Authority, Bloem Water and Lepelle Water, through a National Water Services Information System (South Africa, 1997).

3.3.3 National Water Act 1998

As discussed in section 1.2 of this study, the objective of the National Water Act (Act No. 36 of 1998) is to ensure that all persons in South Africa benefit from protected water resources that are used, developed, conserved, managed and controlled in such a way that is equitable and sustainable. The National Water Act provides National Government, through the minister, the power to control the allocation, use, flow and control of all water in the Republic (South Africa, 1998).

3.3.4 Public Finance Management Act 1999

There are various legislative frameworks that have been introduced to define how and by whom public finance management should be effected. The Constitution (South Africa, 1996) prescribes principles and underpins the administration and management of public funds. These principles include transparency, accountability and effective management of public funds. The constitution introduced legislation to ensure that these principles are realised. The Public Finance Management Act (PFMA) (Act No. 1 of 1999, as amended by Act No. 29 of 1999) was introduced to manage public funds. The act was introduced during 1999 and has been continuously updated. The act promotes good financial management in order to maximize service delivery through the effective and efficient use of the available funds (Public Administration Leadership and Management Academy, 2012).

The key objectives of the PFMA (Act No. 1 of 1999) can be summed up as being to:

- have a modernised system of managing finances in the public sector;
- enable public sector managers to not only manage, but also to be held accountable;
- ensure that reports and quality data are provided on time; and
- stop wasteful and corrupt utilisation of public resources (South Africa, 2009).

The act has been designed with the aim to assist management in managing the budget in the public sector. It enforces accountability to each user from different levels of responsibility. When followed correctly, management is able to provide quality data and reports which will eliminate the corrupt use of public funds.

3.3.5 Free Basic Water Policy 2001

As stated in section 1.2 of this study, section 27 of the Bill of Rights in the Constitution gives the right to access water and sanitation (South Africa, 1996). This brought about The Free Basic Water Policy which was implemented as part of the 2001 Strategic Framework for Water Services to ensure that all citizens' rights to water are achieved. The Free Basic Water Policy assists governing provinces, municipalities and water agencies, as part of the decentralisation of the South African government, to operate appropriately. This process is overseen by the national Department of Water and Sanitation to ensure that everyone receives a sufficient amount of water (DWAF, 2002).

3.3.6 A Pricing Strategy of Raw Water Use Charges

A Pricing Strategy of Raw Water Use Charges contains the objectives, methodology and implementation strategy for setting water use charges for the purpose of funding water resource management by the DWS. In this study, A Pricing Strategy of Raw Water Use Charges will be referred to as the "pricing strategy for raw water" The pricing strategy for raw water was established by the minister of the DWS in terms of section 56(1) of the National Water Act (Act no. 36 of 1998) (DWAF, 2007).

3.4 THE WATER INDUSTRY

The water industry is responsible for supplying raw and bulk water for domestic, industrial and agricultural use. This industry is responsible for developing and maintaining the water infrastructure in order for regional, social, economic and environmental objectives to be met for the benefit of all South African citizens. The water industry has approximately 359 dams and weirs to manage and maintain. The management of the water infrastructure and water resources ensures that sufficient water is available to domestic, industrial and agricultural users (DWA, 2013).

In his study on how management accountants can implement enterprise resource planning systems in the water industry, Mudau (2012) stated that information systems are used in the water industry to measure the availability of water, report to management on the availability of water, for decision making purposes and to determine the condition of water as well as water resources. The ABC system is used within the water industry to manage the value chain of water resources effectively. The WTE manages the water resources through Water Management Areas (WMA) shown in the figure below.

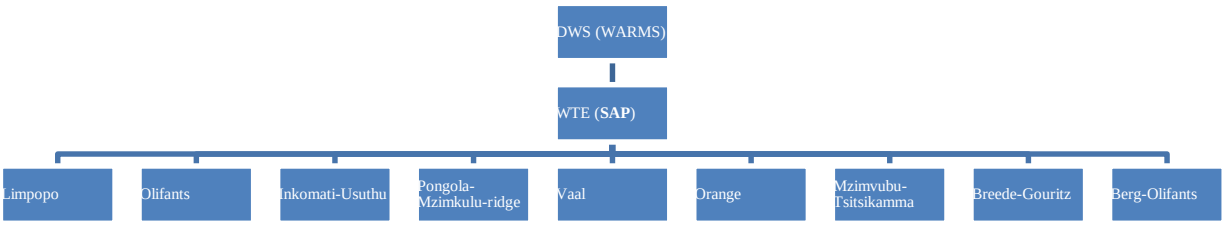

Figure 3.1 Water Management Areas
Source: Diedricks (2015)

The above figure illustrates the stages of authority of the water industry. The figure introduces the relationship between the DWS and the WTE and a brief discussion of each is provided in sections 3.4.1 and 3.4.2 respectively. The water use licencing, registration and revenue collection (Water Authorisation Management System (WARMS)) is the main mission of the DWS. The SAP (System Application) represents WTE's main exchange account, with the nine WMAs serving as water schemes that the WTE has to accommodate in its budget and reporting. Each scheme has activities that are taken into account when determining the cost of providing water and sanitation to the public (Mudau, 2012).

3.4.1 Department of Water and Sanitation as a water utility

As discussed in section 1.2, the DWS is the custodian of South Africa's water resources. Its main responsibility is to formulate and implement the policy governing this sector (DWA, 2013). The DWA has the authority to overrule the responsibility for water services provided by local governments. The DWS aims to: ensure the availability and supply of water at national level; facilitate equitable and sustainable social and economic development; and ensure the complete and efficient supply of water services at local level. While striving to ensure that all South Africans gain access to clean water and safe sanitation, the department also promotes

effective and efficient water resources management to ensure sustainable economic and social development (Scott, 2015).

The DWS is one of the national departments of the South African government. In May 2009, following the election of the new president, Mr Jacob Zuma, the Department of Water Affairs and Forestry was divided, with the forestry responsibility being transferred to the Department of Agriculture, Forestry and Fisheries. The department was transformed again during the 2014 election to become the DWS (DWS, 2014).

The DWA (2013) indicated that, since 1994, government has evaluated the imbalances in water infrastructure that characterised the nation and pursued an ambitious plan to put matters right by addressing the backlog. Mudau (2012) reported that, in 1994, only 59% of the population had access to clean drinking water. The number of South Africans with access to drinkable water has increased to 95.2% over a period of 20 years. This has posed challenges for sustainability management. He further stated that the much higher percentage of the population with access to drinkable water comes with increased costs of maintaining the schemes in order to make them sustainable (Mudau, 2012). It is therefore argued that, although service delivery has improved, the rate of the improvement exceeded the administrative and costing function growth within the DWS. As such, the need for a costing system that can assist management in tracing costs becomes even more important.

The increased access to drinkable water was achieved by the DWS in terms of the mandate in section 27 of the Constitution discussed in section 3.3.1 which states that every South African has a right to a sufficient supply of water and sanitation. Furthermore, the National Water Act of 1998 remains a milestone in government's water reform process which saw the provision of a basic water supply and sanitation to the majority of South Africa's people being given high priority on the political agenda (DWS, 2014).

3.4.2 An overview of the Water Trading Entity

The WTE was first established and approved in 1983 as a Water and Equipment Trading Account but was subsequently transformed through the PFMA 1999 (Act 1 of 1999) as amended, into a Water Trading Entity (DWS, 2014). The DWS (2014) indicated that the Water Trading Entity (WTE), also referred to as the National Water Resource Infrastructure Branch (NWIRB), operates within the DWS (DWS, 2014). For the purpose of this study, the term WTE will be used.

Through the PFMA (1999), the WTE was required to change from cash-based to accrual-based accounting (DWS, 2014). According to Tracy (2011), cash-based accounting refers to keeping a record of cash inflows and cash outflows. It does not reflect economic reality for businesses that buy and sell on credit, whereas accrual-based accounting allows companies to record all assets and liabilities of the company, keeps track of money invested and the accumulated profit retained in the business (Tracy, 2011). This change was however only effective during 2006 and the WTE first presented its financial statements in compliance with GAAP at the end of the 2005/2006 financial year. It has since converted from GAAP to General Recognised Accounting Practices which requires reporting directly to the accounting officer of the DWS (DWS, 2014).

According to the DWS (2014), the WTE does not have its own accounting officer. This is however not supported by the PFMA since it requires that a structure such as the WTE should be fully ring-fenced and operate independently to ensure full accountability when it comes to integrated water resource management, integrated water resources system and bulk water supply. The WTE has as its main function the development, operation and maintenance of water resources infrastructure as well as the management of water resources in the above mentioned WMAs (DWS, 2014).

The WTE is divided into two components namely, Water Resource Management and Infrastructure Management. The following diagram shows the two components as well as the water resource management charge which will be discussed in detail later in the chapter.

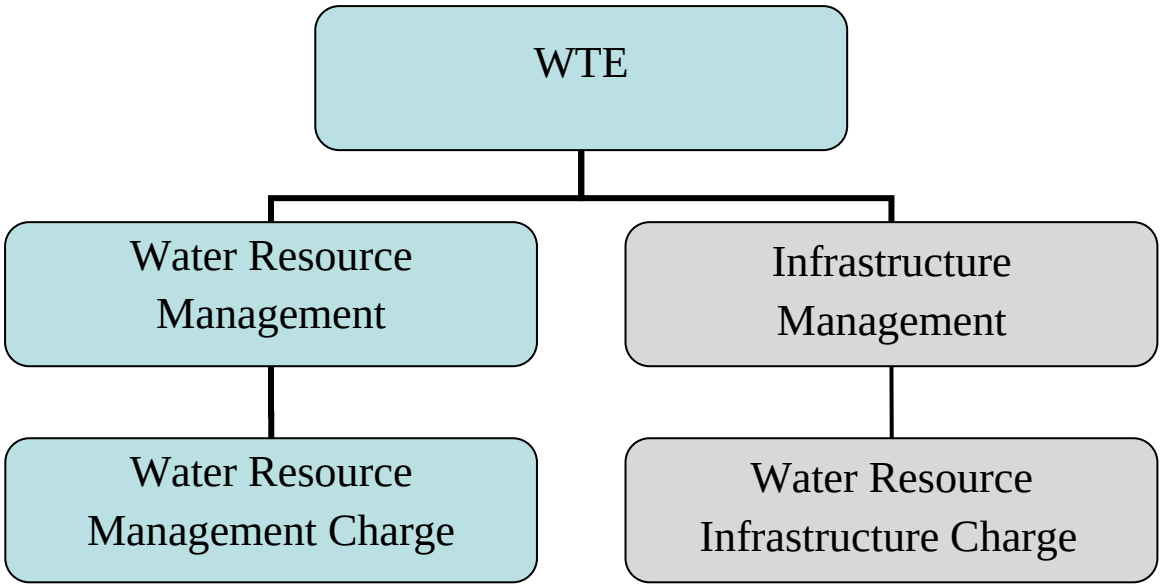

Figure 3.2 WTE Overview
Source: Lehutso (2016a)

The two components shown in the figure above, water resource management and infrastructure management are required to develop, protect, use, conserve and manage the water resources and infrastructure around a WMA as discussed in the pricing strategy for raw water (DWAF, 2007). The two components as indicated in the above figure are now discussed.

- Water Resource Management: This component deals with the management of water resources which includes the use, conservation and allocation of water resources in a sustainable and equitable manner for the benefit of the people living in the relevant WMA. This component is funded through revenue generated from water users in those areas as well as partly augmented from the fiscus to cover a shortfall in revenue (DWS, 2014).
- Infrastructure Management: This component deals with developing new infrastructure, as well as the operation and maintenance of the existing one. It is divided into two subcomponents, the Integrated Systems component which was created to transport water from water rich areas to areas where water is very limited and the Bulk Water Schemes component that comprises primarily of former homeland schemes and agricultural sectors. The funding of both subcomponents is through revenue and part-augmentation from the fiscus to cover a deficit in revenue, especially where there is

insufficient revenue to, not only cover the development of new infrastructure, but also the general operations of the branch (DWS, 2014).

For purposes of this study, only water resource management will be discussed and further explored. The next section gives an overview of water resource management, which includes the water pricing chain and introduces the water resource management charge.

3.5 WATER RESOURCE MANAGEMENT

South Africa experiences low rainfall and high evaporation (DWA, 2011). Some areas across the water management areas are without water due to the lack of rain. According to Jonker (2007), South Africa is the 30th driest country in the world. This is due to the low level of rain and the high evaporation that is experienced in the country. The uneven distribution of water across the country means that the availability of water resources differs from area to area. One of WTE's functions is to ensure the management of water resources in order to reduce the unequal distribution of water (DWS, 2014).

Prachi and Tanvi (2014) defined water resource management as the facilities and installations required in order to develop and manage water resources, including the delivery, treatment, supply and distribution of water to its users as well as the collection, removal, treatment and disposal of sewage and wastewater. The list of facilities identified includes but is not limited to monitoring and assessing water resource availability and use, the management of floods, droughts, water abstraction and water conservation and demand management.

To manage water resources properly, a water resource management charge was introduced to cover some of the expenses associated with water management. Water resource management charges have to be paid by everyone within a WMA, including industries, mines, irrigators, domestic users and foresters who are registered water users. The water resource management charge is used to finance the management of water resources which can include: water abstraction control to ensure that all get their fair share of water; monitoring and pollution control to ensure clean and healthy rivers; planning for the development and extension of new and existing schemes; and clearing of invasive alien plants which consume water that should be available for public use. Water resource management is then linked to water pricing in order to recover costs of managing and sustaining water resources. This is done by introducing a water resource management charge as part of the water pricing chain.

3.5.1 The water pricing chain for cost recovery

The following Figure 3.3 illustrates the water pricing chain linking water resource management and water services. It shows seven different charges that can be levied for the various functions performed at the different stages in the water pricing chain.

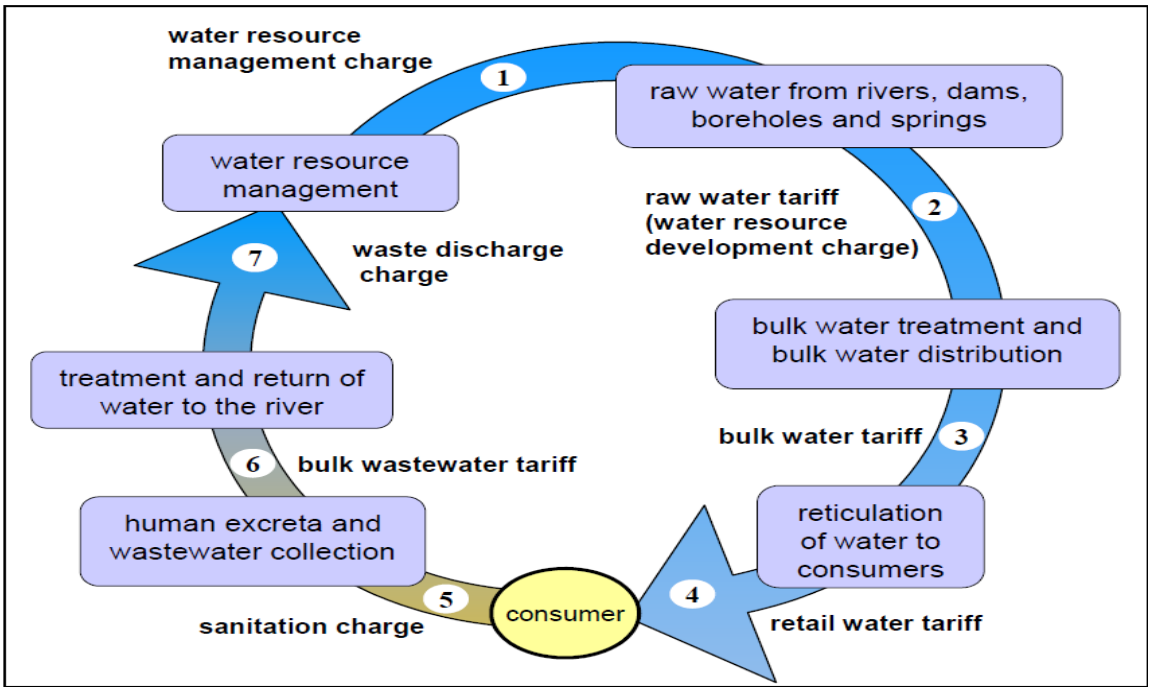

Figure 3.3 Water pricing chain linking water resource management and water services
Source: European Union Water Initiative – Finance Working Group (2012)

The above figure represents the chain that links water resource management and water services. The chain commences in step 1 with water resource management which is one of the components of the WTE. This component involves management of water resources which addresses the use, conservation and allocation of raw water. This step attracts a charge called the "water resource management charge" which will be the focus in this study and will be explored further. According to DWAF (2007), the charge applies to water that is supplied by government schemes and DWS, through the WTE, is the price setter and regulator of the charge.

From the allocation of raw water, the chain moves to providing the dams and boreholes to store the raw water. This is seen in step 2 which represents the infrastructure management component of the WTE, with the raw water tariff as the charge. The tariff includes the cost of providing

dams and boreholes. This tariff, like the step 1 charge, also applies to water that is supplied by government schemes. DWS through WTE sets and regulates the charge (DWAF, 2007).

Step 3 represents the water boards with bulk water tariff as the charge. The Water Boards, which are shown in figure 3.1 above, are the price setters of this charge but DWS approves the charge. They report to the DWS who is the policy setter. This charge includes the cost of treating the water and distributing the water to different consumers (Eberhard, 2009).

From there, the chain moves to the water services tariffs which are the retail water tariff in step 4 and the sanitation charge, step 5. Eberhard (2009) declared that the charges involve the process of water distribution to consumers and the collection of wastewater and human excreta. These charges become effective when there is an external water service with a concession of a contract, for example, the contract between the municipality and their customers who are household water users. The next step, the bulk wastewater tariff in step 6, is set by the Water Boards. This step involves the process of treating and returning of water back to the rivers. Step 7 is the waste discharge charge which provides an economic instrument to support the management of water quality. The charge is set by the DWS (Eberhard, 2009). Steps 2 to 7 will not be discussed in this study.

According to Palmer (2009), the water pricing chain for cost recovery is a critical process in establishing an organisation's position in the industry. The pricing chain identifies primary elements that are needed to supply the needs of customers while achieving the organisation's main objectives. Once these elements are established, the use of a pricing chain further contributes towards continuous improvement strategies such as ABC. Palmer (2009) further declares that ABC is a sound principle as it ensures emphasis on both short term and long term constraints towards improved decision making. As indicated in the ABC literature in section 2.5, the various elements, such as management support and computer technology, need to be considered. Several continuous enhancement aspects such as the significance of cost drivers form an integral part of the process towards sound decision making and business performance in the water industry (Palmer, 2009). The ability of organisations to define cost drivers clearly will result in better decisions taken.

The European Union Water Initiative Finance Working Group (2012) contends that most countries recover costs of water supply from water users. South Africa is one of the countries that have good systems for charging water users as one of the ways of funding water resource

management. However there have been some challenges that have been experienced with financing water resource management.

3.5.2 Challenges of financing water resource management

The Organisation for Economic Co-operation and Development (2011) listed the following as challenges faced when financing water resource management at the WTE:

- A continued deterioration of water quality in many parts of the WTE area of responsibility;
- A decrease in the reliability of water supply in many schemes due to the development of small farms' unlicensed expansion of irrigation and acquisition of water;
- Inadequate investment in maintenance and refurbishment.

As these challenges can result in an increase in costs that were not part of the budget, the use of ABC during budgeting stages by the WTE would limit these challenges which result in higher costs for the organisation.

In his study on financing water and sanitation infrastructure in South African municipalities, Ambe (2008) listed the following as challenges:

- Capacity at local government: The inadequacy of project management capacity, the process of appointing and reaching agreement with service providers as well as the difficulties faced in obtaining planning information;
- Over-expenditure of projects: Significant increases in budgets due to higher costs than estimated;
- Flexibility: Limited flexibility in the allocation of budgets with respect to urgent or flagship bulk project funding;
- Political uncertainties: Uncertainty of the DWS's future role in managing the program and the magnitude of the program (Ambe, 2008).

Although the WTE may have an advantage as a result of its implementation of ABC, the challenges facing municipalities may also be experienced by the WTE as they are responding to the same regulations which are set by the DWS. The WTE however may have an advantage of more accuracy on estimating expenditure costs or better ways of dealing with political uncertainties based on the improved decision making derived from the use of ABC.

3.6 COSTING OVERVIEW PRIOR TO ABC IMPLEMENTATION

The traditional costing system which is volume based was used by the WTE prior to the implementation of ABC. As seen in Chapter Two, the traditional costing system assigns fixed overhead costs directly to the product instead of assigning them to activities and then to the products. This type of costing system assigns overhead costs to products on the basis of their relative usage of direct labour and/or machine hours. The use of a single volume based cost allocation results in the cost of the product being distorted. The water resource management charge was determined by adding together both the direct and indirect costs for each WMA and that was then assigned to each of the WTE's products. This will be discussed further in section 3.7 below (DWAF, 2004).

The overhead cost was allocated based on the labour hours and the volume of water in the dam. The WMA with an adequate supply of water would therefore have higher charges than a WMA with small volumes of water in its dams (DWAF, 2004). The disadvantages of using a traditional costing system were discussed in section 2.2.1.

3.7 ABC AT THE WTE

Cokins (2006) stated that, at the initial stage of designing an ABC system, there are two distinct ways in which to view the system, namely, the cost assignment view and the process view. The cost assignment view provides information on resources, activities and cost objects. It transforms the expenses of resources (e.g. salaries and supplies) into costs required to perform work activities and then into final cost objects (e.g. customers and/or products). Process view, on the other hand, sequences the work activities in time and accumulates the build-up to the end of the business process. The WTE uses the cost assignment view of the ABC system.

The costing system has taken the following activities into account during ABC implementation at the WTE: planning and implementation, monitoring and assessing water resource availability, water quantity management and water use allocations. These activities are taken into account when setting up a charge.

3.7.1 Overview of ABC implementation at the WTE

The WTE currently employs an accounting software system called SAP that makes provision for the use of an ABC system. The ABC system at the WTE was implemented concurrently with the new pricing strategy for raw water during 2007. The pricing strategy for raw water

outlined the activities that formed part of the ABC implementation at the WTE that contribute to the calculation of total product cost of the water resource management charge. It provides a guideline by providing the price per unit for all the types of pricing, including the water resource management charge. The WTE uses ABC to calculate administration and overhead costs that form part of the water resource management charge (DWAF, 2007).

As seen above, the water resource management charge contributes towards water abstraction control to ensure that all consumers within a WMA get their fair share of water. The costing of the water resource management charge for each WMA is done by the WTE. The WTE uses the water resource management charge to cost the water that is distributed to its consumers in the following consumer categories:

- Domestic/industrial: This refers to water services authorities such as municipalities and/or water boards as well as industrial mining and energy industries;
- Agriculture: Refers to irrigation and intensive stock watering;
- Stream flow reduction: Refers to commercial forestry.

The above consumer categories are classified as cost objectives of the water resource management charge at the WTE and are referred to as products (DWAF, 2007).

According to ABC theory discussed in Chapter Two, the total product cost per unit consists of direct material costs, direct labour costs and overhead costs. Overhead costs will be dealt with in detail below. The direct material costs will not be included as they are carried by third party suppliers through a procurement process (Lehutso, 2016a).

The following are the direct labour costs for each cost objective that forms part of the water resource management charge calculation:

Table 3.1 Direct Labour Cost

	Domestic/Industrial R'000	Agriculture R'000	Stream flow reduction R'000
Water Demand Management	1 362,30	2 724,60	454,10
Water Pollution Control	766,40	1 532,79	-
Water Use Control	1 641,61	3 283,23	547,20
Dam Safety	840,25	1 681,72	-
Pollution Control Mines	1 009,65	-	-
Total Direct Cost	**5 620,21**	**9 222,34**	**1 001,30**

Source: Lehutso (2016b)

Table 3.1 illustrates direct labour costs that form part of the water resource management charge calculation. Each WMA will have some or all of the above costs that directly affect its water resource management. The WTE will either outsource or perform the duties itself. The WMA is expected to ensure that each water resource is free of pollution including dams that are situated close to mines and also that dams are safe and that there is control over water demand and how water is used. The costs relating to water resource management in a WMA forms part of the water resource management charge calculation which is done at the WTE (DWAF, 2007). Both the direct and overheads costs used in these steps represent costs that are incurred in a particular WMA of the WTE. One WMA will be sufficient to show the process of ABC at the WTE.

In Chapter Two, the implementation process of ABC was discussed. Section 2.4.1 gives the correct steps to follow when implementing ABC within organisations. Roztocki (2005) found the steps to be clear and easy to follow for most organisations and he claimed that, should the correct steps be followed when implementing ABC, there will be a certain degree of accuracy. As seen in section 1.1, ABC has been proven to assist organisations with more insight into cost causation which results in improved cost control. The steps, as discussed in section 2.4.1, will be followed by the researcher with respect to how ABC was implemented and is being used at the WTE in order to arrive at the water resource management charge. The researcher also found the steps easy to follow and to understand.

The steps are used to determine the overhead costs of the WTE. The steps start by determining the activities and their cost drivers which form part of the water resource management charge

at the WTE. They are shown in Table 3.2 below:

Table 3.2 The WTE Activities

Description	**Activities**	**Cost Drivers**
Preparations of business plan and reporting (including institutional establishment)	Planning	Number of allocation plans
Resource studies investigations and strategy development	Technical Support	Number of allocation plans
Allocation plans	Water Use	Number of customers
Authorisation of water use	Authorisation	Number of customers
Water quality management plan	Water Quality	Number of transactions
Indirect labour and general office support (overheads)	Administration	Number of hours worked
Acquisition of goods and services and payment to suppliers of goods and services	Finance and supply chain	Number of transactions
Office accommodation	Office Services	Floor space occupied
Water authorisation management system (WARMS) – receiving, collecting and capturing of applications for water licensing as well as the costs of the system used.	Water authorisation management system (WARMS)	Number of customers

Source: Lehutso (2016b)

Following the above activities and their cost drivers, Table 3.3 below represents the next three steps as described in section 2.4.1 which is to determine the activity costs as well as the cost drivers in order to calculate the pre-determined overhead rate. A cost driver is a cost related to each activity which can be measured. Each time an activity is performed, costs are incurred and these costs are allocated to such activity. This step requires that cost drivers be assigned to each activity. An estimation of activity level is also provided which will assist in calculating the pre-determined overhead rate for each activity.

Table 3.3 Calculation of pre-determined overhead rate

Activities	**Estimated Activity Cost**	**Cost Drivers**	**Estimated cost driver activity**	**Pre-determined overhead rate**
	R'000			**R'000**
Planning	5 256	Number of allocation plans	500	10,51
Technical Support	1 557	Number of allocation plans	800	1,95
Water Use	1 774	Number of customers	2 000	0,89
Authorisation	2 888	Number of customers	1 500	1,93
Water Quality	15 742	Number of transactions	3 000	5,25
Administration	13 350	Number of hours worked	3 500	3,81
Finance and Supply chain	6 075	Number of transactions	10 000	0,61
Office Services	3 363	Floor space occupied	25 000	0,13
WARMS	2 670	Number of customers	70000	0,04

Source: Lehutso (2016b)

Table 3.3 indicates the results of the calculation of the pre-determined overhead rates. The overhead rate is calculated by dividing estimated activity cost by estimated cost driver activity.

Table 3.4 illustrates the allocation of overhead costs to each product. As seen above, the WTE's cost products are classified by the group of consumer to which they supply water.

Table 3.4 Allocate overhead to products

Activity	Unit of Measure	Domestic/ Industrial	Agriculture	Stream flow reduction	Total
Planning	Allocations	150	250	100	500
Technical Support	Allocations	230	400	170	800
Water Use	Customers	600	900	500	2 000
Authorisation	Customers	450	700	350	1 500
Water Quality	Transactions	1 000	1 500	500	3 000
Administration	Hours worked	1 200	1 300	1 000	3 500
Finance and Supply chain	Transactions	3 000	5 000	2 000	10 000
Office Services	Floor space	8 000	12 000	5 000	25 000
WARMS	Customers	30 000	30 000	10 000	70 000

Source: Lehutso (2016b)

The above table shows the estimated product cost for each customer group (product) that shares in the total calculation of the water resource management charge. The next table determines the total overhead cost for each of the WTE's products.

Table 3.5 Determine total overhead cost

		Agriculture		Domestic/Industrial		Stream flow reduction	
Activity	**Pre-determined overhead rate**	**Cost driver activity**	**Overhead allocated**	**Cost driver activity**	**Overhead allocated**	**Cost driver activity**	**Overhead allocated**
	R'000		**R'000**		**R'000**		**R'000**
Planning	10,51	150	1 576,73	250	2 627,88	100	1 051,15
Technical Support	1,95	230	447,59	400	778,42	170	330,83
Water Use	0,89	600	532,12	900	798,17	500	443,43
Authorisation	1,93	450	866,48	700	1 347,85	350	673,93
Water Quality	5,25	1 000	5 247,49	1 500	7 871,24	500	2 623,75
Administration	3,81	1 200	4 576,98	1 300	4 958,40	1 000	3 814,15
Finance & Supply chain	0,61	3 000	1 822,56	5 000	3 037,60	2 000	1 215,04
Office Services	0,13	8 000	1 076,26	12 000	1 614,39	5 000	672,66
WARMS	0,04	30 000	1 144,29	30 000	1 144,29	10 000	381,43
Total overhead cost allocated			**17 290,49**		**24 178,24**		**11 206,37**

Source: Lehutso (2016b)

Table 3.5 calculates the overhead cost allocated to each product by multiplying the pre-determined overhead rate for each activity by the level of cost driver activity used by the product. The next table determines the product cost per unit for each of the WTE's products.

Table 3.6 Product cost per unit

	Agriculture	**Domestic/Industrial**	**Stream flow reduction**	**Total**
	R'000	**R'000**	**R'000**	
Direct Labour Cost (Table 3.1)	5 620,21	9 222,34	1 001,30	15 843,85
Overhead Cost	17 290,49	24 178,24	11 206,37	52 675,10
Total Product cost	**22 910,70**	**33 400,58**	**12 207,67**	**68 518,95**
Volumes used for Calculation :	6 125	10 372	5 107	21 604
Product cost per unit cm^3	3,74	3,22	2,39	3,17

Source: Lehutso (2016b)

Table 3.6 represents the results in the calculation of the product cost by adding the direct labour cost to the overhead cost for each product. The product cost per unit, measured in cubic metres, is also calculated by dividing the total product with the volume used by each product.

3.7.2 Billing the water resource management charge

The water resource management charge is billed to users who are using water from water resources (ground water or surface water) and those users who are engaged in a stream flow reduction activity such as commercial afforestation. Water users who receive their water under an arrangement with a water service provider, such as the municipality, are not charged by the WTE as they are already paying for water in such arrangements (DWAF, 2007).

The water resource management charge will fund the water resource management functions in each of the WMAs. These functions relate to the protection, allocation, conservation, management and control of all the nation's water resources (DWAF, 2007). The administration and overheads form part of these functions and ABC is used to determine this cost.

3.8 SUMMARY

The chapter outlined an overview of DWS's involvement in ensuring that water and sanitation services are supplied appropriately to all South African citizens. Background information was provided on the South African public sector, specifically as it relates to the rights of South African citizens to water and sanitation. This was further elucidated by discussing the

legislative framework that regulates the water industry in South Africa. Other Acts to which the DWS and the WTE need to abide by, such as: the Public Finance Management Act, which regulates how public finance should be managed; the National Water Act which proclaims the protection of South Africa's water resources; and the Water Services Act that has an objective to control the water and sanitation supply in the local government, were also discussed. The Free Basic Water Policy which governs South African water agencies was included and a summary of its impact on the WTE was provided. Subsequently, the water industry was introduced and an overview of the DWS was provided.

It was established that the DWS is the custodian of the South African water sector. The WTE was discussed as a sub division which falls under the DWS that represents the DWS's main exchange account. This was followed by a detailed discussion on water resource management as the area of focus for this study. Water resource management was defined as a list of facilities and installations needed to develop and manage water resources, including the delivery, treatment, supply and distribution of water to its users.

The outline of the water pricing chain for cost recovery in the water industry introduced the water resource management charge that is used to manage water resources by contributing towards water abstraction control, monitoring and pollution control to ensure rivers are clean and healthy. The main challenges faced when financing water resource management were ascertained as: the need to improve effectiveness; the ability to link resources to inputs and outputs; and the need to improve the way of managing costs and improving accountability. The traditional costing system was used by the WTE before the implementation of ABC and an overview of this system was provided.

The chapter then focused on ABC at the WTE. The cost process view was outlined as the ABC costing model that is used at the WTE. A computation example of the ABC implementation and use at the WTE was established by providing both the steps that are followed and the estimated costs. The estimated costs were based on only one WMA. It was found that each WMA has three consumer categories which are referred to as products at the WTE. These products were defined as: domestic/industrial, which refers to water services authorities; agriculture, which refers to irrigation and intensive stock watering; and stream flow reduction which refers to commercial forestry. From the example, the overhead cost, as well as the product cost per unit of each of the products, was determined. The water resource management

billing process was also introduced and it was established that each WMA charges a different rate per cubic metre according to the amount of water that is required. The next chapter will deal with the methodology which will be used for the empirical part of the study.

CHAPTER FOUR:
RESEARCH DESIGN AND METHODOLOGY

4.1 INTRODUCTION

The framework for the empirical research was provided in chapters two and three which formed the literature study for this research. The first objective, which is to identify the steps and factors generally associated with successful ABC implementation, was addressed in Chapter Two. Chapter Three addressed the first part of the second objective which is to investigate whether the steps to ABC implementation are being followed for water resource management charge at the WTE. Chapter Three also partly addressed the third objective which is to assess whether the water resource management charge is calculated according to ABC principles at the WTE. The second part of objective two, which deals with factors to successful ABC implementation at the WTE, objective three as well as objective four will be addressed by following the methodology of the empirical study.

This chapter seeks to identify the research methodology most appropriate to address the research problem. This is done by discussing the research design and methodology for this study.

The chapter first discusses the research design for the study as well as the rationale for choosing the research design. The research methodology follows starting with the identification of the research instrument, the population of the study and the sampling technique. It further outlines how data was collected and analysed as well as how the researcher ensured reliability and validity of the research findings. Limitations of the method and steps that will be followed to ensure ethical clearance are also provided.

4.2 RESEARCH DESIGN

This study used a qualitative research design. Lee and Lings (2008) indicated that a research design refers to the overall plan to incorporate the different components of the research project in order to conceptualise the research problem eventually leading to its conclusion. Leedy and Ormrod (2005) stated that the research design is the entire approach the researcher adheres to in order to resolve the research problem and that it gives the structure for the chosen procedures. Feng (2006) suggested that a research design may be referred to as a way a researcher can organise a research project in order to deal with the research questions. Adams and Schvaneveldt (1985) related research design to a strategy, outline or guide for data collection

and analysis; it is a set of instructions that allows the researcher to conceptualise and examine the problem under study. It is therefore necessary for the researcher to outline the research design for the study as it represents the plan the researcher will follow in order to collect and analyse data.

Collis and Hussey (2003) identified a range comprising two main research paradigms, namely, the positivistic paradigm which indicates quantitative research design and the phenomenological paradigm which indicates qualitative research design. The positivistic approach was described as a paradigm that seeks to define the relationship between information variables and convert them to numbers. The phenomenological paradigm was described as the paradigm that implies that social reality lies within the unit of research and that the act of investigating reality has an effect on that reality. The phenomenological paradigm pays substantial regard to the state of mind of the individual who is being interviewed (Collis & Hussey, 2003). This study did not intend to define relationships between variables but rather to explore the existing reality of ABC use at the WTE. Therefore qualitative research methodology was chosen for this study because it seeks to have an in-depth understanding of how ABC is used at the WTE.

4.3 RATIONALE FOR CHOICE OF RESEARCH DESIGN

Denzin and Lincoln (2003) defined qualitative research as an imperative, multi-method approach that examines people in their natural environment. Sarantakos (2013) concurred that qualitative research functions within an interpretative and naturalistic domain. According to Christensen (2001), qualitative research can be divided into three primary components that are vital to understanding its nature. The first component is interpretative, followed by multi-method, meaning that a diversity of approaches is used under qualitative research to gather data. The third component is that it is conducted in the field or in the person's natural surroundings, such as individual staff offices, boardrooms or a board meeting. De Vos (2005) agreed and described qualitative research as an approach that uses multiple perspectives with different qualitative techniques and data collection methods from social interaction, aimed at making sense of or describing the meaning of subjects being researched. Van Maanen (1993) and Churchill and Lacobucci (2009) argued that qualitative data is rich, full, unsophisticated, complete and real; it is inductive rather than deductive. Elo and Kyngas (2008) defined a deductive approach as an approach that tests theories, while the inductive approach builds theories. The above three components correspond to what the researcher intended to do for this

study; conducting the research in the participant's natural environment which will be the participant's office. The researcher intended using different methods to gather as much data possible from the participants. One of the objectives of the study was to assess whether ABC principles are followed at the WTE. An interpretative research design will assist the researcher in meeting this objective.

Merriam (2009) stated that qualitative researchers focus on people's experiences. They want to understand how people interpret their experiences, how they formulate their words and what their experiences mean to them. Winberg (1997) posited that, in qualitative methodology, the researchers see people in their circumstances which are not limited to their current situations but can also include their past. People are not reduced to variables in qualitative research. Qualitative research was chosen for this study because of its ability to allow the researcher to stay close to the real or empirical world. Since the study also sought to ascertain the staff perceptions of ABC, the use of a research design that studies people's behaviour allowed the researcher to meet the research objectives.

4.4 RESEARCH METHODOLOGY

Leedy and Ormrod (2005) argued that a research method refers to the approach the researcher will follow in order to carry out the research. The approach taken usually indicates which research strategies or tools need to be selected. They further pointed out that the term "method" is used to indicate which approach the researcher decides to follow in gathering and analysing the data. Below is the discussion on the approach this study took in order to collect and analyse data.

4.4.1 Research instruments

The purpose of research interviews is to explore the views, experiences, beliefs and motivations of individuals regarding specific issues (Gill, Stewart, Treasure & Chadwick, 2008). Wilkinson and Birmingham (2003) posited that semi-structured interviews allow the interviewer and participant flexibility. The interviewer is able to direct the interview from questions that were determined before the interview, but also has the flexibility to allow the participant an opportunity to mould the stream of information provided. In a semi-structured interview, the participant may be allowed to put together the schedule of the interview (Scott & Usher, 2000). However, the presence of the interviewer as well as other kinds of controls the interviewer may apply can result in the participant not having full control of the schedule (Scott & Usher, 2000).

The interviewer is the one who sets up the interview, can suggest the venue for the interview, decides the purpose, agenda and asks the questions. Participants answer questions and give accounts of their work in terms of their experiences and understanding of the settings in which they are situated. Thus, the researcher decides on gender, race, class and other types of power relations, such as the level of the position held which forms a vital background to the answers that the participants will provide (Scott & Usher, 2000). This will enable the researcher to obtain fixed answers to questions with limited options, but will also enable the participants to share their own views without being led by the researcher. The method enables the researcher to obtain more accurate and specifically applicable information to the participants; work environment.

Wengraf (2004) described a semi-structured interview as an interview that has questions already prepared however the interviewer is allowed to have follow-up questions and to probe in order to enhance the required information for the research. He further suggested that semi-structured interviews afford the researcher a smaller sample size as more information can be collected from participants. Krueger and Casey (2000) claimed that starting with broad questions about the study before asking the main questions, encourages the participants to talk and interact. Kvale (2006) added that talking to people is one of the most effective methods for attaining and exploring a topic under study. More specifically, as interviews are interactive, interviewers can press for complete, clear answers and can probe into any emerging topics. Hence, interviewing is expected to broaden the scope of understanding the investigated phenomena, as it is a more naturalistic and a less structured data collection instrument (Kvale, 2006). The flexibility of semi-structured interviews could result in more information than what could be gathered through secondary data. Although many factors influencing ABC implementation have been mentioned in articles, books and journals, there is a possibility that, through semi-structured interviews, the researcher can find more information or factors influencing ABC use at the WTE by determining and investigating whether the steps and factors to successful ABC implementation are being followed at the WTE, by assessing whether the principles of ABC are being followed for the water resource management charge and by ascertaining the staff perceptions of ABC. Semi-structured interviews were therefore conducted to give the researcher the advantage of structuring the questions as well as the flexibility to diverge in order to pursue the responses in more detail.

4.4.2 Target Population

Blaikie (2003) described a population as all the elements that meet the criteria for inclusion in a study. These elements may include people, events, places or social actions referred to as single members or units of a population. As explained, the semi-structured interviews were conducted with individual staff members; therefore the unit of analysis for this study is individual staff members. Blaikie (2003) defined the criteria of inclusion as a list of characteristics that are required to form part of the targeted population. ABC knowledge, skill and experience forms part of the characteristics the researcher looked for when selecting the population for the study. The targeted population selected for the semi-structured interview was determined by the purpose of the study (Robinson, 1999; Krueger & Casey, 2000). The population of this study therefore comprised 17 staff members who are senior and middle managers and accountants (ABC users) of the WTE's revenue management billing and collection department.

4.4.3 Sample design

Collis and Hussey (2009) declared that the sample is supposed to represent the population from which it is drawn. They further stated that it is important to make sure that the sample that is chosen is unbiased in the way that it represents the population under study.

Thomas (2003) added that qualitative research allows the researcher to select participants purposefully who will answer the research question. Salkind (2009) agreed and cited that sampling plays an important role in providing the information for decision making. It provides the researcher with sufficient information needed to conclude a study. The sampling technique used for the semi-structured interviews is usually non-probability sampling where the opportunity of individuals being selected to be part of the interviews is not guaranteed (Salkind, 2009). A non-probability sampling technique was used for this study.

According to Roberts (1997) and Lane, McKenna, Ryan and Fleming (2001), purposive sampling is one of the techniques applied under non-probability sampling. They defined it as a technique that purposely chooses participants in relation to the nature of the study in question. Purposive sampling was used for this study to select staff from the relevant department within the WTE. Purposive sampling assisted the researcher in selecting participants who have ABC knowledge and/or are ABC users at the WTE.

McGowan and Klammer (1997) revealed that the role played by the individuals who prepare and present management reports determines the kind of perception ABC will have in an organisation. Their perception could therefore have a strong bearing on the perception of ABC at the WTE. The researcher also interviewed staff members who use the system within the department as participants. The reason these individuals were chosen is that, according to Krumwiede (1998), individuals who are system users tend to distance themselves from organisational boundaries; therefore interviewing them can yield useful information. He further mentioned that these users mostly have contact with a cross-section of the company's staff members and are able to provide the necessary technical and organisational detail required for answering the questions. Howell (1997) and Cagwin and Bouwman (2002) argued that using individuals in the same position provides increased reliability of results because they are expected to have the same or a close enough level of experience. The sample used for the study consisted of eight participants who are ABC users and included senior and middle managers at the WTE. According to Crouch and McKenzie (2006), sample size should be determined by data saturation. This is because, as the study continues, having more data does not necessarily lead to more or better information. He further posited that frequencies of occurrence are not important in qualitative research, as one occurrence may be enough to understand the process behind the study. The researcher believes the sample size is adequate enough to obtain feedback for most or all perceptions and that it represents the available resources.

4.4.4 Data collection

The literature research involved reviewing journals and electronic data that was relevant to the topic as well as primary data that was collected based on the above sample. Zimmerman (2006) declared that primary data is gathered to assist in solving a problem. It is information obtained directly from people who are identified and selected to be participants in the study. He further indicated that audio data, video data, text data or a combination of these can be referred to as primary data. In this study, primary data was collected through semi-structured interviews using an audio recorder. These interviews lasted for an hour for each participant. The interview took place at the WTE offices in Pretoria.

4.4.5 Data analysis

Patton (1989) defined data analysis as the process of bringing order to the data that was collected and organising the data into designs, classes and basic descriptive elements. Bogdan

and Biklen (2003) declared that data analysis is the process of systematically searching and arranging the interview transcripts, field notes and materials that you accumulate to enable you to produce findings. McMillan and Schumacher (2006) described qualitative data analysis as an inductive process of arranging the data into classes and identifying designs among the classes. They further stated that data analysis involves arranging what you have observed, heard and read in order to make sense of the gathered data. The researcher, with assistance from a transcriber, transcribed the recorded semi-structured interviews and made use of Atlas.ti as a tool to code the data.

4.4.6 Reliability of the research findings

Merriam (2009) explained that reliability refers to the degree to which research findings can be reproduced. The question the research will have to answer is whether the study will bring the same results if it were to be done again. Reliability in research design is based on the assumption that there is a single reality and that studying it repeatedly will yield the same results. The reliability of this study will be achieved by means of ongoing consultation with an external coder, who will act as a second coder to formulate codes to be assigned to data collected from the interviews. The codes will be assessed and agreed upon between the researcher and the external coder.

4.4.7 Validity of the research findings

Gravetter and Forzano (2009) defined the validity of research as the degree to which the study accurately answers the question it was intended to answer. Babbie and Mouton (2012) supported this and stated that validity ensures that the selected research instruments measure what they are supposed to measure. Validity, in this study, was established by designing questions after an intensive literature study. This was done to ensure that all the questions were relevant to the various categories of participants and the research objectives. The validity of the sample was confirmed by establishing whether the selected candidates have the relevant knowledge, skills and task set to provide data accurately.

4.5 LIMITATIONS OF THE METHOD

According to Hofstee (2006), all methods have limitations and it is seldom that perfection is attained, if ever. He further declared that a method's limitations are what separate doing the research according to a specific method versus perfection. Since the primary data of this study was collected through semi-structured interviews, the researcher was limited to the sample size

that was available at the organisation as well as what the individual participants said at that time. The participants may give socially-acceptable responses, saying what they think the researcher wants to hear (Hofstee, 2006). Hammersley and Gomm (2008) added that researchers should be aware that what participants say in an interview will indeed be shaped, to some degree, by what they think the interviewer wants, by the questions they are asked or by what they believe the researcher would approve or disapprove of. The interview schedule was divided into two parts, part one allowed the participants to answer at their own pace and part two was an audio interview. The first part reduced the degree of dependency on what the participants said during their interviews. The researchers' own opinions will not influence the participants answer to questions in a certain manner since there are no verbal or visual clues to influence the participants. However, Kvale (2003) declared that interviews, when compared to questionnaires, are more powerful in eliciting narrative data that allows researchers to investigate people's views in greater depth.

4.6 ETHICAL CONSIDERATIONS

Ethical clearance was obtained from the UNISA College of Accounting Sciences Research Ethics Committee before conducting the interviews. The clearance certificate is in Appendix E. Permission letters were forwarded to each of the eight participants that formally requested them to participate in the research interview. Participants were required to sign the consent form to acknowledge the context and nature of the research. The researcher kept the participants' identities private by making use of pseudonyms. Personal identifiers will be removed from research-related information.

4.7 SUMMARY

The chapter outlined the research design to be used in the study. The different research designs were defined and qualitative research was chosen for this study.

The chapter then focused on the methodology of the study and discussed interviews as the tool that will be used to collect data. Semi-structured interviews were chosen because of their flexibility for both the researcher and participants. The targeted population selected for the semi-structured interview was outlined to include senior managers, managers and accountants at the WTE based on the knowledge and/or experience they might have gathered on ABC over the years as well as the level of seniority held at the organisation. The sampling method the study followed was discussed next and it was established that purposive sampling was used to

select the interview participants at the WTE. The data collection method was identified. Secondary data was collected through a literature review and the primary data was collected through semi-structured interviews. The theory of data analysis, reliability and validity was outlined. Analysis was found to be the process of systematically searching and arranging the interview transcripts and field notes accumulated to enable the researcher to produce findings. The collected data was transcribed and the researcher made use of Atlas.ti for coding and analysing. Reliability refers to the extent to which research findings can be reproduced. The researcher had ongoing consultations with an external second coder for the formulation of codes from the research findings. Validity is said to be the degree to which the study accurately answers the question it was intended to answer. An intensive literature study was done before the interview questions were designed to ensure the validity of the study.

The limitations of the research method were found to be the way the participants respond to the questions and whether they will be biased. Ethical considerations were covered by providing consent letters to be signed by the participants; by making use of pseudonyms and by removing personal identifiers from the research-related information.

The next chapter presents and analyses the findings of the study. This was done by examining the transcribed interviews.

CHAPTER FIVE:
RESEARCH FINDINGS AND ANALYSIS

5.1 INTRODUCTION

In Chapter Four, the proposed research methodology was discussed. Qualitative research through the use of semi-structured interviews was chosen as the research method for the study. Qualitative research was defined as an interpretative process that highlights not only the significance of similar but also variations in critical voices within the same sample. Semi-structured interviews allowed the researcher the flexibility to structure the questions.

This chapter analyses and interprets the data obtained from the semi-structured interviews and relates this to the literature review.

Factors influencing ABC use at the WTE is discussed first under theme one, followed by the determination of the water resource management charge under theme two, then theme three gives the perception of ABC at the WTE and how it influences the use of ABC.

5.2 ANALYSIS OF RESULTS

As stated in Chapter Four, semi-structured interviews were conducted at the WTE's offices. Six participants were interviewed instead of the eight mentioned in Chapter Four. The remaining participants were not available to be interviewed. However, data saturation was reached with participant number four. As a result, the researcher did not deem it necessary to interview the remaining two participants.

As proposed in the methodology chapter, the data gathered through semi-structured interviews was transcribed. Atlas.ti was used to code the transcribed data by arranging the data into classes known as themes and sub-themes developed from the formulated codes to allow an in-depth analysis of the findings.

Theme 1 that analyses the extent to which ABC is used to determine the water resource management charge has five sub-themes:

- The ABC steps and activities used to determine the water resource management charge;
- How the water resource management charge is calculated using ABC principles;
- The influence ABC has on cost causation and cost control at the WTE;
- Its impact on budgeting; and

- The challenges faced when determining the water resource management charge.

Theme 2 analyses the factors influencing the water resource management charge at the WTE. This theme has three sub-themes which are:

- the impact of technology on the use of ABC and its reporting at the WTE;
- training as a factor influencing ABC use; and
- the influence of management support over ABC use.

Theme 3 will provide an analysis of staff perceptions of ABC and how their perceptions have influenced the use of ABC at the WTE. This theme has three sub-themes which are:

- The influence of staff perception on the use of ABC;
- ABC benefits enhancing organisation performance; and
- The WTE's ABC limitations influencing ABC results.

The table below lists the themes together with the sub-themes which will be discussed in detail in this chapter. This cross references to Appendix D that shows the questions in the interview schedule.

Table 5.1 Themes and sub-themes

Themes	Sub-themes
Theme 1: The determination of the water resource management charge (Parts A and B, Question 1 and Part A, question 3).	• The extent to which ABC is used to determine the water resource management charge (process and activities). • Calculation of the water resource management charge using ABC. • Improvement in cost causation and cost control. • The impact of ABC on budgeting at the WTE. • Challenges encountered when determining the water resource management charge.
Theme 2: Factors influencing the water resource management charge at the WTE (Parts A and B, Question 2).	• The impact of technology on the use of ABC and decision making. • Training of users as a factor influencing ABC use at the WTE. • The influence of management support over ABC use.
Theme 3: ABC at the WTE and perception of users (Part B, Question 3)	• The influence of staff perception on the use of ABC. • ABC Benefits enhancing organisation performance. • The WTE's ABC limitations influencing ABC results.

The above table provides the themes with sub-themes based on the data gathered through the semi-structured interviews. Each theme is discussed in detail in the next sections of this chapter starting with the factors influencing the water resource management charge at the WTE.

5.3 THEME 1: THE DETERMINATION OF THE WATER RESOURCE MANAGEMENT CHARGE

Theme 1 consists of all sub-themes that relate to the impact of ABC on the determination of the water resource management charge. This theme is linked to the third objective which assesses whether the water resource management charge is calculated according to ABC principles at the WTE. The theme represents responses obtained from the semi-structured interviews based on Question 1 of both Part A and Part B and Question 3 of Part A.

5.3.1 Sub-theme 1: The extent to which ABC is used to determine the water resource management charge (process and activities)

All six participants displayed a good understanding and grasp of the ABC process as it applies to the water resource management charge at the WTE:

> *The process is to ensure that the cost that are relevant to the scheme are identified, the other process is to identify all the registered users of that particular scheme cos those users are the ones who are going to bear the cost of that water management area. [2]*

The process was further summarised by participant 3:

> *In summary the process starts with the calculation part, then the process of presenting it to the public then to the minister for approval. [3]*

All six participants agreed that the contributing activities needed to be identified prior to determining costs associated with water management. This was expressed by participant [4] as:

> *... we basically what we do is, we take the activities performed at a catch management agency all the activities we've got 11 activities that are performed, their all costed using the ABC for us to determine the correct charge or reasonable charge for our customers, we cost all the activities and we divide it by our volumes, the capacity of the dam. [4]*

Participant [2] said:

The benefit of using ABC is that ABC ensures that we investigate or unearth all the relevant expenditure that goes into that particular scheme. Meaning we should be able to identify one by one which are the cost drivers for each expenditure.[2]

This view is enforced by Garrison et al (2008) who, in section 2.4.1, observed that there is a need for organisations to identify activities and group them into activity objectives when determining costs using ABC. The emphasis on identifying "*cost drivers for each expenditure"* is necessary because the logic of ABC is grounded in producing products that use activities. Therefore it assists in determining the cost required when making a specific product. This agrees with Yousif and Yousif's (2011) findings as stated in section 2.2.2.

The researcher also found ABC to be a system of tracing costs which are then traced to activities based on their utilisation. This was voiced by one participant at the WTE who said that:

During the new year it is easier to look at the activities that were spending more and those that where spending less in order to align the budget accordingly. If it was just from one program it would be difficult, the inclusion of ABC has assisted us a lot in being able to identifying the cost drivers that are actually performing. [2]

Participant [4] confirmed this by adding:

We charge for whatever we provide we don't charge you for overheads that are not applicable to you. Only the overheads that is applicable to the customers that we provide the service to.[4]

The fact that all participants agreed on the principle and the need to identify activities may indicate that the WTE is following the steps to successful ABC implementation and use. The above statements agree with Saniuk et al's (2011) findings in section 2.4.1 that defining the factors that drive cost is considered an important element when determining a charge using ABC.

5.3.2 Sub-theme 2: Calculation of the water resource management charge using ABC

Six participants agreed that ABC is a valuable tool used to determine the water resource management charge. The products that all six participants identified are described by participant [6]:

There are three sectors of the users, you've got your domestic/industrial which consist of your mining industries, your municipalities, and irrigation which is agriculture, then you've got forestry consisting of flow reduction.[6]

These three products, as mentioned above, correspond to the products discussed in section 3.7.1. Each of these products has a water resource management charge based on their activities.

Only four of the participants were familiar with and understood the importance of steps followed in the process of calculating product costs using direct and overheads costs. As one put it:

The final charge that we charge from our water users, the steps is to get the activities budgeted in that particular water resource management area and then you get the quantity of water registered within that particular water resource area and then you check the budget divide by the volumes and then you get unit cost.[5]

The above quote clearly identifies the steps that are involved in the calculation of the water resource management charge. These steps are consistent with past research (Roztoki, 2005) discussed in Chapter Two.

The following figure shows whether or not the staff members at the WTE agree with how the water resource management charge is calculated.

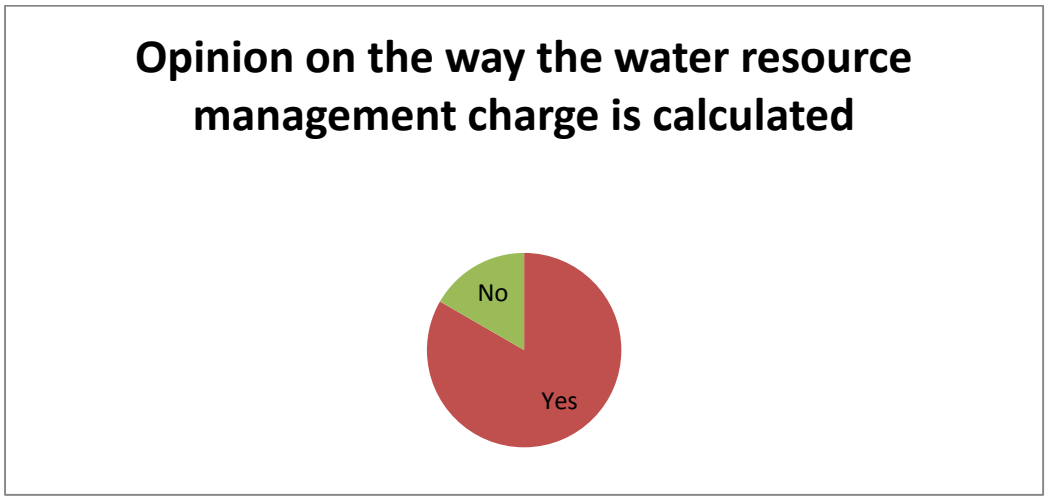

Figure 5.1 Water resource management charge calculation

The above Figure 5.1 indicates that the majority of staff members agreed with how the water resource management charge is calculated. This is illustrated by one of the participants:

> *There are two scenarios that we use when determining our unit cost for the resource management charge. One it's by the registered volumes were our customers will come to the institution and register the amount of water they want to utilize and also the capacitor of the dam which we call the yield volumes and the registered volumes. So we use the higher of the two volumes to determine the charge. The higher of the two will mean if we use the lessor of the two the charge becomes high but the higher one it makes the charge to be lower, no wonder the department will continually encourage their clients to register for the charge to be lower because is based on the registered volumes based on their consumption. So basically is to determine the reasonable charge for our customers.[4]*

Participant [3] said that:

> *The total cost of all the activities is divided by the volume of that area then it will give a charge.[3]*

Two participants were hesitant to agree with the way the charge is calculated, citing reasons such as the impact politics has on the final charge. For example, top management together with external stakeholders may influence the amount of the charge. The above view was alluded to by participant [3] who added that:

> *There is a process of regional consultation to present the charge, we also involve sector specific like AgriSA to give their input. We also request users to have input before the charge goes for approval… because the minister has the discretion of determining the charge. There is always a shortfall. [3]*

The lack of consistency in how the participants interpreted the outcomes versus the process may therefore have a negative influence on the successful use of ABC at the WTE.

Given the above process to obtain the unit cost, participants were also asked to comment on the current amount of the water resource management charge as indicated in Figure 5.2 below.

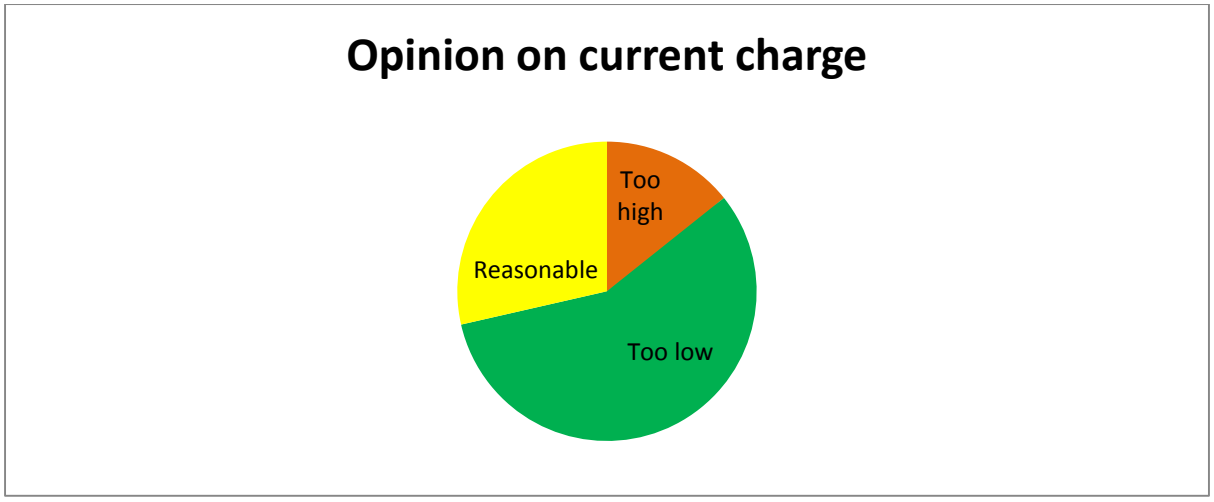

Figure 5.2 Opinion of the current water resource management charge

From the above figure, it was determined that four of the six participants believed that the water resources management charge is too low. The reason they felt it is too low is that they are never able to recover the cost fully:

> *Remember water resource charge has been very low from where I am sitting it should have been higher because of there is more activities that needs to be done under water resources [1]*

However, one of the four agreed with the remaining two participants who felt that the current water resource management charge is reasonable:

> *If there is a huge increase on the water resource charge is that eventually it will have impact on end users as mention we have agriculture and industrial, so the more price you charge on them it might have an impact on the produce of maize.*

5.3.3 Sub-theme 3: Improvement in cost causation and cost control

Participants agreed that there is a link between ABC and improvement in cost control and causation. This was summarised by participant [4] who said that:

> *I think it helps us in the manner that when you look at ABC all the costs that are involved or the cost that we take into account when providing the services to your customers. It helps us in identifying what is really that are of high importance that we provide for our customers. So it assist us in a manner that whatever the charge we going proposed it will be based on the activities that we performed to our client not the activities that are performed at head office were you will find that we are charging you for activities that are*

performed here, no we charge you for activities that are specifically performed for your catchment, other than that no.[4]

Whereas participant [4] commented on the causation of the water resource management charge, participant [1] below focused on how ABC has improved the cost control by apportioning costs to their respective products:

When WTE implemented ABC it has helped to apportion correctly the cost in terms of the 3 streams and also helped in identify were most of cost are incurred between the 3 streams. Unlike volume based, which turn to look at where most volumes are sitting which may not be correct, but what ABC did it helped us to apportion those costs correctly.[1]

The recognition of causations and apportioning costs is confirmed by past research (Bahar, 2014; Al-Basteki & Ramadan, 1998) which established that understanding cost behaviour and causation is one of the important benefits of implementing ABC.

5.3.4 Sub-theme 4: The impact of ABC on budgeting at the WTE

Participants agreed that ABC also assists the WTE during budgeting periods. Participant [3] said:

Since I started working at WTE it became easier for me when we doing budget. You will look at previous year's actual expenditure as they are structured the ABC way. One example is there are issues like geo hydro and hydrology, the guys that do the studies for underground water the problem in the past was double budgeting, at WTE will budget for them and the main account section will also budget for the same project.[3]

The above view suggests that budgeting became easier after the implementation of ABC. Participant [6] also pointed out that ABC:

… does assist because you look at the actual cost that you require than incremental budgeting, because incremental budget is where you look at from the point of saying if I am having hundred thousand so I can increase it by CPI and then which means probably you can have 110 000 but it doesn't look at the detail costs.[6]

The above views are consistent with past literature (Oseifuah, 2013; Matthews et al, 2009) as discussed in section 2.8.2 that noted that ABC has also assisted the public sector with budgeting and planning by monitoring the expenditure levels against the budget line.

5.3.5 Sub-theme 5: Challenges encountered when determining the water resource management charge

It was stressed by participants that using ABC assisted the WTE to calculate the water resource management charge accurately. The participants also agreed that there are limitations experienced after the calculation of the water resource management charge such as capping. For example:

> *… noticed that it is not fully utilised because the outcome is being capped. Meaning that if we get the charge to be R15 using ABC, the government may say we can't charge that. For example if the capping is R13 you cannot exceed it even if your calculation using ABC resulted in more than R13. [1]*

As stated in section 1.1 above, the audit report indicated that costs of managing water resources have increased despite the implementation of ABC at the WTE. Capping of the water resource management charge outweighs the benefit of better insight into cost causation and an improved cost control experienced with the implementation of ABC at the WTE.

Participant [5] explained that the processes of defining activities may not be followed in full because of the influence of external factors such as the Minister of Finance who may suddenly change the budget:

> *One other challenge is that within the government sector itself there's always some sort of cost containment which also doesn't necessarily help ABC. Because you based your costing on activity and somebody comes when you done with your process and say no cut because the Minister of Finance doesn't want us to do this activity, and that activity. And then at the end of the day we will end up not realising the fruits of ABC cause somebody somewhere has got a mind of his own whiles you have got the mind of the business that you are working with.[5]*

One of the participants concluded that ABC does not assist the WTE in calculating an accurate charge as the result is not always what the charge will be but added that it assists in getting accurate costs of all the activities that should constitute the charge:

> *The moment that we cap the charge it means we are no longer on full cost recovery there will be that small portion that we are not going to recover. That is why I am saying water resource management charge according to the ABC doesn't provide the accurate water resource management charge. The capping is according to the pricing strategy policy,*

currently we are using the 2007, their busy reviewing the new one even though their still capping. The difference is covered by the national treasury called augmentation but the aligning of the budget sometimes is not necessarily the case, about 3 years back the capping and the shortfall will receive the funding to cover the different. But because of the belt is a bit tight from treasury they have actually cut down the augmentation quite significantly which makes it difficult to cover all the deficits from all other CMA. Before I would say ABC was accurate in determining the charge because the difference caused by the cap was given by the treasury now it is not always the case. Example there reason why there is this inconsistency now before the CMA will budget say 50mil for their costs, then come a capping then there will be a shortfall of about 10mil. It's expected that the CMA are supposed to spend the 50mil but normally at the end they will only spend 25mil that is why they are no longer receiving the funding as their supposed to.[3]

The policy, as well as the external factors, plays a major role in the determination of the water resource management charge at the WTE. This resulted in the different opinions voiced by participants on the accuracy of ABC at the WTE. The existence of the above-mentioned challenges limits the range of benefits that an organisation can reap from implementing and using ABC.

5.4 THEME 2: FACTORS INFLUENCING THE WATER RESOURCE MANAGEMENT CHARGE AT THE WTE

Theme 2 includes all sub-themes associated with the factors influencing the water resource management charge at the WTE. This theme has three sub-themes, namely, the impact of technology on the use of ABC and decision making; training of ABC users; and management support as factors influencing ABC use. The sub-themes are linked to Question 2 of both Parts A and B on the interview schedule. This theme is also linked to objective 2 which is to investigate whether or not factors to successful ABC implementation are being followed for the water resource management charge at the WTE.

The figure below indicates whether the factors exist at the WTE and what their influence has been.

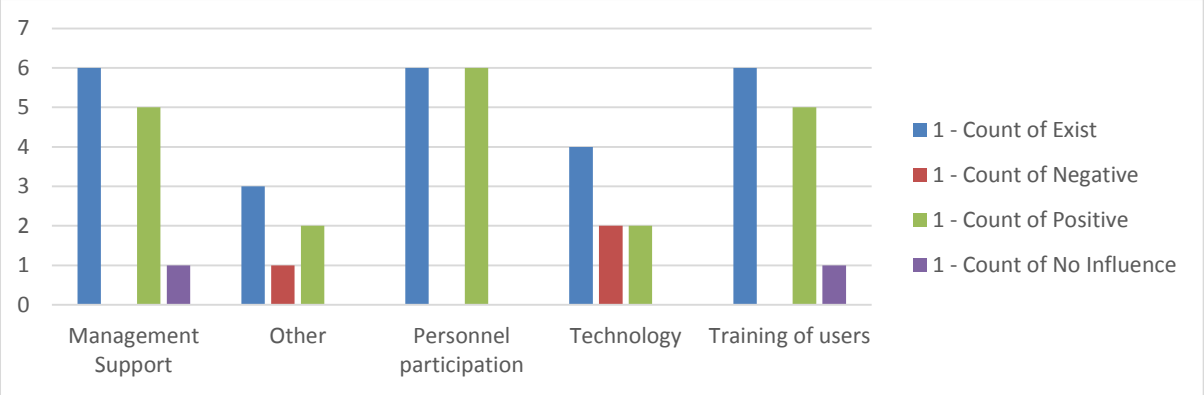

Figure 5.3 Analysis of factors influencing the use of ABC at the WTE

From the above figure, it can be determined that all six participants indicated that management support, personnel participation and training of users are factors that exist at the WTE. Personnel participation will be discussed under theme 3 in greater detail in order to determine its influence. Most of the participants agreed that the influence these factors have on ABC performance at the WTE has been positive. However, two of the six participants stated that the current technology is inadequate and therefore influences ABC performance negatively. The above agrees with the findings by Ismail (2010) as stated in section 2.5 above that all these factors are necessary for the successful implementation and use of ABC in an organisation.

Three of the participants indicated that there are other factors that influence the use of ABC at the WTE. One of the factors is capping of the charge which is the maximum amount per year that the WTE can charge its customers. This agrees with the findings by Wessels (1997) as stated in section 2.5 above that most often the factors influencing the implementation of ABC differs from the perceived factors. The other factor mentioned is processes, which refers to the steps of determining the charge using policies like the pricing strategy for raw water. The influence of capping has been negative whereas that of the process has been positive. The participants felt that the process influences ABC use positively because there are specific steps in place that are followed. However, the participants were of the view that capping influences ABC negatively. This view is understandable because, if the result obtained from the calculation of the water resource management charge is higher than the capped amount, then the capped amount will be used. To summarise the impact of the factors influencing ABC use at the WTE, the three sub-themes are now discussed.

5.4.1 Sub-theme 1: The impact of technology on the use of ABC and decision making

The figure below is linked to Part A, Question 2b of the interview schedule. The figure indicates the computer software that is used for ABC at the WTE.

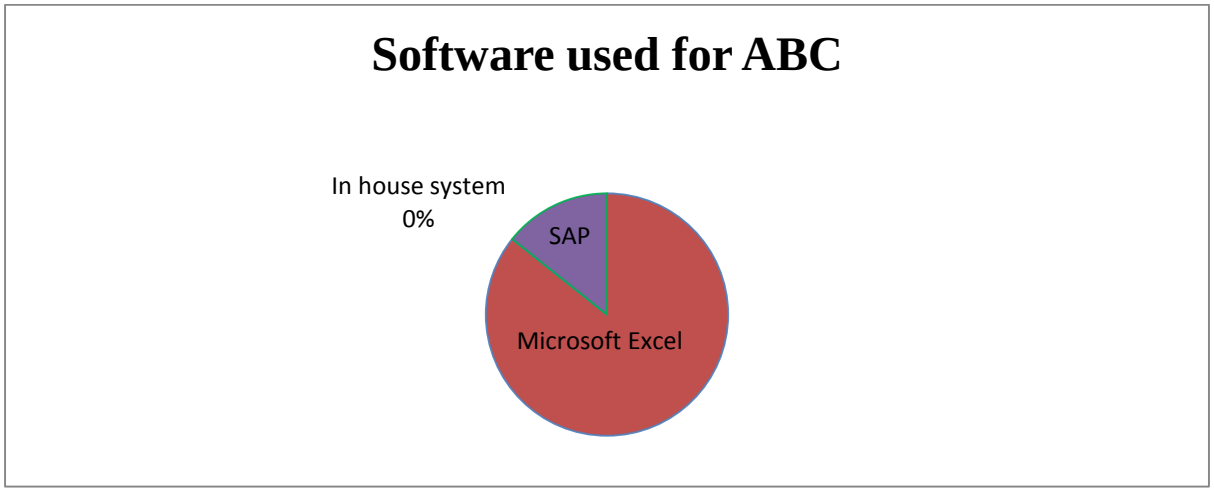

Figure 5.4 Software used for ABC

All six participants confirmed using ABC on Excel to calculate the water resource management charge at the WTE as can be seen on the figure above. However, one of the six participants also mentioned the use of SAP, a system application together with Excel. This agrees with DWAF (2007) as indicated in section 3.7.1 above. The recognition of SAP as an added system may suggest this particular participant is more knowledgeable. The existence of computer software for ABC use concurs with Kim and Kim's (2011) view emphasised in section 2.5.3 above.

Four of the participants felt that the Excel software they are using now seems accurate to produce data but may not be reliable for management to use for decision making processes. This view was explained by one of the four participants who said:

> *All I will say is that the system we are using currently is Excel and we know the risk that Excel as a system has. So in terms of the accuracy I will say it is but there are risks in terms of the system that they are using. Example is anyone can tamper with Excel. I will say it's difficult to put together a report for management because most of it is done outside the system, preferable you will want to use an ERP system. I would prefer a program created for ABC unlike Excel" [1]* and another participant said that *"My view will be its good enough in the absence of the other systems. In the absence of other system Excel is good. I am happy using Excel. Management can rely on the information. [4]*

However, the remaining two believed that it is accurate enough and management should rely on it.

> *What we have done is to develop a system in terms of the system, that system we put some formulas, so they can't amend those formulas, we lock the system, is only us, if they require additional rows they come back to us then we unlock and put those rows and then we lock and send back.[6]*.

Five of the six participants felt that it will be beneficial for the WTE to develop an enterprise resource planning (ERP) system for the use of ABC. According to one of them:

> *Because of the fact that we have started with a new system I have seen the importance of having the system based process of calculating the charge because one problem that happens is that since we receive different spreadsheets from different WMA to consolidated into one before sending to the minister, so there was always a problem of human error, especially when you working with a lot of spreadsheets. Last week we had a user testing session whereby we have seen that we don't need to receive nine spreadsheets. The system will consolidate for you. We just need to administer to make sure there are no errors.[3]*.

The common thread in the above responses is that there is general agreement that Excel can produce data that management can use for reporting. However, the first four participants qualified their agreement by suggesting that there are "*risks"* that make it "*difficult to put together a report for management."* Whereas two of the six participants believed that the system is fool proof and working well, five of the six did not entirely agree as they are proposing the development of an ERP system that can eradicate *"human error".*

This agrees with the findings by Nah et al (2001) as can be seen in section 2.5.3 above.

5.4.2 Sub-theme 2: Training of users as a factor influencing ABC at the WTE

Five of the participants indicated that training is vital when using ABC. Participant [3] mentioned that:

> *ABC in itself is a proper system but quite a lot of influential officials who are supposed to put it into place their not doing it adequately. The policy that we use in conjunction with ABC they somehow don't talk to each other. One example dam safety there's an activity on strategy call dam safety, then forestry their not supposed to pay for dam safety because they are not abstracting water from dams, so if you make them pay it doesn't talk to ABC. Another example will be we charge WARMS which is supposed to fall under water use*

authorisation, but the CMA are budgeting for them under functional support. This shows discrepancies of the policy the strategy gives explanation of each activity and also what functional support is about but regions instead of budgeting under water resource authorisation whereby a person comes to want x amount of water that must be abstracted at this area, the cost of travelling for verification cost are supposed to be under water use authorisation but because people don't know where to budget they put them under functional support cause it is not clear you can put anything there. Water use authorisation is very clear though. Can it be training issue, yes. I am hoping with the new pricing strategy that they try to go at length to explain all the activities. These are the smaller issues that are there and are shared amongst people about ABC.[3]

The participants agreed that training users may reduce the risk of tracing cost drivers to incorrect activities. Participant [5] added "… *the only shortfall is the proper training.*" This confirms the findings by Nah et al (2001) and Govender (2011) from the literature reviewed in section 2.5.2 that providing training for staff enhances skills development by sharing information and transferring knowledge. Tracing cost drivers to incorrect activities may have a negative influence on management's decision about cost estimations as it is based on their understanding of cost behaviour.

5.4.3 Sub-theme 3: The influence of management support over ABC use

Based on the analysis of figure 5.3, all six participants agreed that management at the WTE supports the use of ABC. The support has influenced the use of ABC positively. However one participant felt that the support management is giving for ABC use does not have any influence on the success of ABC at the WTE. The view of the majority agreed with previous research as seen in section 2.5.1 (Correia et al, 2008; Morrow & Connolly, 1994) which indicated that the role played by management determines the success an organisation will experience.

5.5 THEME 3: ABC AT THE WTE AND PERCEPTION OF USERS

Theme 3 comprises all sub-themes that relate to how staff perceive ABC at the WTE and how these perceptions influence ABC use. This theme has three sub-themes and it is linked to objective four which is to ascertain staff perception and its influence on ABC performance at the WTE. The theme analyses responses to Question 3 of part B of the interview schedule.

5.5.1 Sub-theme 1: The influence of staff perception on the use of ABC

This sub-theme covered participants' perceptions of how ABC users at the WTE perceive ABC. It was established that the majority of the participants felt that users at the WTE have welcomed ABC. This is confirmed by participant [2]:

> *The attitude across all levels is that it has been welcomed very well. There have accepted it usage. As indicated it is used for charge calculation which goes to top management. From all levels it has been accepted due to its ability to apportion cost to respective activities.[2]*

The acceptance of ABC by the users determines the success of ABC at the WTE. Previous literature (Dubihlela & Rundora, 2014; Kaplan & Anderson, 2005) confirms this view.

However, participants also noted that implementing ABC can be time consuming which may result in staff being reluctant to use it:

> *We have picked up that ABC requires more planning time when comparing to volumes/standard costing. It requires more time during planning stages because you need to source cost drivers now and then which has an impact on planning. At the beginning it was difficult to come up with cost drivers but over the years it has become easier.[1]*

This perspective is also shared by Rasiah (2011) in section 2.2.1.

Although some complained about time, the overall perception of ABC use at the WTE has improved over time. Participant [1] added that:

> *the attitude has changed over the years, people have gotten used to the way the charge is determined, so I would not say negative, I will say over the years it has improved to be positive in terms of users, especially the people who are capturing all this information for the charge. [1]*

It can be concluded that the overall perception of staff at the WTE is positive and this has resulted in the WTE benefiting from using ABC. The next sub-theme outlines these benefits.

5.5.2 Sub-theme 2: ABC benefits enhancing organisation performance

This sub-theme represents the benefits of ABC as perceived by the staff at the WTE. Various authors found a number of benefits that organisations experienced after implementing ABC as seen in section 2.6 above. According to participants, the WTE is no exception to this. Based

on the aim of the WTE for water resource management, participant [4] stated one of the benefits of implementing ABC at the WTE is to recover costs:

> *The aim is to provide the services. Whatever we give we want to recover, so ABC helped us in the manner that whatever activities that we perform, whatever budget that we budgeted we aimed at getting the very same amount. So we want to breakeven. In a nutshell ABC helps us to breakeven as an organisation. [4]*

Another benefit experienced at the WTE, as alluded to by participant [5], is the ability to trace costs:

> *As government we work with projects so its best suits our business to trace costs so we need to know where the money went to, and how far the progress of the project is and we report in terms of that but all am trying to say is that it helps us trace the costs and know which cost drivers are moving which cost drivers are not moving, so the minister can stand and say yes, we can report on certain project accurately so because we are using ABC and as much as we are an activity department it means that whatever we give to the minister must be 99.9% correct. [5]*

This statement agrees with Kinsella (2002) that ABC assists management with tracing costs in order for them to compare and determine the cost of producing one product over another.

5.5.3 Sub-theme 3: The WTE's ABC limitations influencing ABC results

This sub-theme presents the limitations of ABC as perceived by the staff at the WTE. As in any other organisation, the WTE has also faced some limitations on the use of ABC. One of the participants found activities were not clearly defined:

> *The problem with ABC was that the roles for each activity were not clearly defined. The person that is doing water use authorisation and the person doing water allocation, they would not know who is supposed to do what, so the ABC was there the roles were not clearly defined. Not understanding what you are supposed to do directly affect how you supposed to budget. I never use any other system except of ABC so I can't compare. [3]*

This agrees with Kaplan and Anderson's (2005) findings that organisations struggle to identify some of the activities using ABC.

That ABC is time consuming was also mentioned as one of the limitations of ABC at the WTE by participants:

we are changing and improving the system we are using, which is the excel and also our system, SAP system that we are using which means when you change, change affects your day to day operation so sometimes it's a lot of work with minimal hands which is now time consuming, so this has been the drawback.[5]

This agrees with the finding by Namazi (2016) as stated in section 2.7 that the time organisations spend on data collection and data capturing can be seen as time consuming. Time spent on a task may have a negative influence on the staff performing the task which may result in organisations spending more.

However two of the six participants also said they have not experienced any downsides to using ABC at the WTE:

The downfall of using ABC, to be quite honest with you I wouldn't know whether is me and my limited capacitor in but I haven't come across any downfall maybe it's me I haven't zoom in deeper to ABC, but ABC to has been accurate. I am not saying maybe there are other system that we can use that may be better or that be better use than ABC but so far ABC has been the only system that we using that we find it more appropriate.[4]

In summary, the limitations identified when using ABC at The WTE do not suggest that ABC has become obsolete or cannot be improved upon.

5.6 SUMMARY

In this chapter, data collected from the semi-structured interviews was discussed. Different themes relating to objectives of the study were formulated to give a clearer overview of the results of the semi-structured interviews. The literature review as well as the six interviews conducted were used as a basis when formulating each theme as well as the corresponding sub-themes.

The chapter started by providing a table of themes with sub-themes. Theme 1 focused on how ABC is used to determine the water resource management charge. The first sub-theme indicates the identification of activities followed by the actual calculation of the water resource management charge at the WTE. The steps to ABC implementation of determining the activities and cost drivers to address objective one were identified through the literature review. The participants confirmed that this is the correct process to follow in order for the organisation to maximise the benefits of ABC. Improved cost control was also discussed as one of the benefits of using ABC for the water resource management charge calculation. The impact ABC

has on budgeting was outlined. The challenges experienced when using ABC to determine the water resource management charge were also outlined. Capping was identified as an issue which may result in ABC not being fully utilised for the water resource management charge at the WTE.

The chapter then moved to the second theme, which is about factors influencing ABC use at the WTE. The theme was discussed through the three sub-themes: the impact technology has on the use of ABC at the WTE; the influence of training ABC users and management support. It was confirmed through the literature review as well as by all six participants that it is necessary for organisations who implement ABC to invest in good software. Five of the six participants indicated the need for an ERP system to be implemented for ABC use. Training on how to use ABC was also mentioned as one of the factors that influence the success of ABC use in the organisation. All six participants also confirmed the need for training as an important factor to the successful use of ABC at the WTE.

The third theme was also presented and it focused on the perceptions of ABC users which includes what the users perceived to be the benefits as well as the downside of using ABC at the WTE. The literature review indicated that the perception of ABC users influences the success of ABC implementation in organisations. It was found by the participants that the perception of users at the WTE, has, over the years, improved and currently ABC is welcomed. Accuracy and the ability to trace costs have been confirmed by both the literature review and five of the six participants as benefits for implementing and using ABC. Whereas time spent on collecting and capturing activities as well as the difficulty experienced when identifying some of the activities were listed as limitations experienced when using ABC at the WTE. The next chapter will provide the summary, conclusions and recommendations of the study.

CHAPTER SIX:
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1 INTRODUCTION

The analysis of the empirical study and research findings was provided in Chapter Five. This chapter reviews findings in relation to the research objectives of the study. The summary of the research and outcomes of the research objectives are provided first. Then the limitations of the research, conclusions as well as the recommendations follow. The chapter also provides a suggestion for future studies.

6.2 SUMMARY OF RESEARCH

Section 1.1 established that ABC was developed as an alternative costing system as a consequence of the inadequacy of a traditional costing system. ABC's principle of identifying activities and assigning them to their cost drivers give organisations a better insight into cost causation which may result in improved cost control. ABC has been implemented at the WTE. The WTE is responsible for water resource management which addresses the use, conservation and allocation of water resources in each water management area in a manner that will benefit the people. Its aim is to provide affordable water to the people of South Africa. The WTE introduced the water resource management charge which is used by the organisation to recover costs in order to maintain and plan new water resources. ABC is used at the WTE to determine the water resource management charge.

In this study, the researcher aimed to identify why the water resource management costs at the WTE were high despite the implementation of ABC. In order to answer this problem, the researcher focused on four research objectives. To achieve the objectives, the researcher made use of a literature review as well as empirical research, more specifically, semi-structured interviews. The following section will provide a breakdown of the findings and their impact for each of the research objectives.

6.3 OUTCOMES OF THE RESEARCH OBJECTIVES

The outcomes in respect to objectives as stated in section 1.3 is discussed in this section. This discussion shows how these objectives were achieved.

6.3.1 Objective 1: Identify the steps and factors generally associated with successful ABC implementation

This objective was established to identify the steps and factors associated with the successful implementation of ABC as reflected in the existing literature. From section 2.4.1, the following steps were identified on how ABC can be implemented by organisations to be relevant and useful. It starts by establishing the objective and requirements of the ABC system, identifying the main activities, tracing overheads to activities, tracing overheads to cost objectives using activity-product-dependence, calculating the product cost of each cost objective and finally using the ABC analysis for strategic decision-making and improvements.

The factors generally associated with a successful implementation of ABC were identified in section 2.5. It was determined that management support is one of the factors which play a major role in the success of ABC, especially in the early stages. Training of ABC users is another of the factors identified. Lack of training results in users being reluctant and resistant to ABC which limits the benefit the organisation would have acquired from implementing ABC. Staff acceptance of the ABC system was also identified to be one of the factors influencing the successful implementation of ABC. It was established that staff resistance may result in the implementation taking longer and costing the organisation more than the initial budget. In section 2.5.3 above, technology was also identified as one of the factors influencing successful implementation of ABC in organisations. It was established that the use of technological resources will reduce costs related to data collection and processing.

6.3.2 Objective 2: Investigate whether the steps and factors to successful ABC implementation are being followed for the water resource management charge at the WTE

The objective was established to investigate whether the steps and factors to a successful ABC implementation, identified in the literature review, are followed for the water resource management charge at the WTE. The WTE is a subdivision of the DWS responsible for the management of water resources which it does through the administration of the water resource management charge. During the literature review in section 3.7 and through the semi-structured interviews, it was found that the steps to ABC implementation as discussed in section 6.3.1 were followed for the calculation of the water resource management charge. Although the steps are being followed, participants also indicated that this has not been achieved in full. They agreed that the WTE initially faced difficulty in identifying some activities and tracing overheads to those activities but this has improved with the use of ABC.

Management support, technology and training of staff have been identified as factors influencing the successful implementation of ABC. It was found that the management of the WTE is actively involved in the use of ABC and is supportive of ABC. Its involvement has influenced the use of ABC positively. However, it was also found that there is a need for more training to be provided to some of the users. Participants agreed that training of ABC users is important for the organisation to maximise the benefit of the ABC system.

The researcher found that there are inaccuracies in the current system that is used for ABC at the WTE. It was established that a technological resource such as an ERP system is required for the WTE to maximise fully the benefits of using ABC.

6.3.3 Objective 3: Assess whether the water resource management charge is calculated according to ABC principles at the WTE

This objective was established to assess whether the water resource management charge is calculated according to ABC principles. The literature review in section 3.7 found that the ABC principles were followed at the WTE. The interviews however found that the participants were of the opinion that the cost per unit obtained from the calculation of the charge was not necessarily the amount that was eventually charged to the public. WTE is therefore not utilising ABC to its full potential. There are two more factors that are considered when deciding on the charge. These factors are: external factors such as political pressures and capping which was initially fully covered by augmentation from the fiscus. This cover has however reduced over the years resulting in costs that are never fully recovered and negatively influence the independence the WTE is aiming for as per section 1.2 above.

The other factor is the impact the charge will have on the production or price of products. The actual charge based on the ABC calculation is higher than the charge that is actually charged the consumers. As seen in section 3.7.1, the WTE distributes water to three consumer products, namely, domestic/industrial, agricultural and stream flow reduction. Charging based on the ABC charge for domestic/industrial products may have a negative influence on things like job security for the employees of industrial, mining and energy industries. Agricultural products may result in reduced numbers of agricultural products produced. The impact of the stream flow reduction on manufacturing organisations may result in fewer numbers of products, such as paper, manufactured. These factors limit the use of ABC in relation to the results of the calculation.

The researcher established that the participants agreed that the principles of a successful ABC implementation are being followed at the WTE, although the result of the calculation is not always used. An example of the water resource management charge calculation following the ABC principles to a successful ABC implementation is provided in section 3.7.1 of this study.

6.3.4 Objective 4: Ascertain staff members' perceptions and their influence on ABC performance at the WTE

This objective was set to ascertain the perceptions of ABC users and the influence their perceptions have on ABC performance at the WTE. It was found in section 2.1 and 2.5.2 that the success of ABC is dependent on the staff member's acceptance of the ABC system. It was also established in section 2.7 that the fact that ABC is time consuming seems to be an issue that is raised with ABC users. The interviews indicated that participants at the WTE share the same view that, during the planning stages, following ABC principles is time consuming. This resulted in some of the ABC users at the WTE being resistant to using and learning about the ABC system. Factors such as duplication of duties or functions due to insufficient identification of activities contributed to staff reluctance to use ABC at the WTE. However, participants also indicated that the staff member perception of ABC at the WTE has improved over the years and this has resulted in the successful implementation of ABC. Participants also agreed that the perception of ABC users at the WTE has influenced ABC performance positively.

6.4 CONCLUSIONS

The aim of the study was to determine whether the high costs at the WTE are influenced by the success or failure of the implementation of ABC. It is concluded that ABC implementation has a minimal influence on the increase in costs of water resource management at the WTE As discussed above, all the objectives of the study were met, and therefore the aim of the study was achieved.

6.5 LIMITATION OF THE RESEARCH

Some limitations should be noted when interpreting the results of this study. The limitations, however, present opportunities for future study.

- With regard to the literature review, even though literature is available on ABC implementation and benefits, there is little reference linking successful implementation of ABC and the influence of financial performance.

- As seen in section 1.5 above, the scope of the study was limited to the WTE's Revenue Management staff members. This may reveal only a small portion of the WTE findings. The findings of this study may have been different if a broader range which included supporting sections like staff members at WARMS had been selected.
- Because the study only focused on the national level, the findings do not represent all levels of the water industry.

6.6 RECOMMENDATIONS

The empirical results established clearly the benefits when the steps and factors to a successful ABC implementation are followed. It was however suggested that the WTE investigate the following aspects:

- Further and continuous training of ABC users in the organisation. This will result in an improved ABC performance.
- The possibility of implementing an ERP system that will work together with ABC. The cost of implementing the ERP must however be weighed up against the benefits as the water resource management charge is overridden by other factors.
- Developing clearly defined activities and assigning them to their cost objectives to avoid duplication.

6.7 SUGGESTION FOR FUTURE RESEARCH

From the research conducted, further research on the implementation of ABC principles in government departments can be conducted to:

- Ascertain how government departments can adhere to policies without compromising the use of ABC.
- Identify exact training needs for the effective implementation of ABC. Further research could be conducted on identifying the skills and training required for staff to use ABC optimally.

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APPENDIX A: REQUEST FOR PERMISSION

"An analysis of the implementation of activity based costing at the Water Trading Entity".

19 September 2016

Name: _____

Tel no: _____

Address: _____

_____

Dear_____,

My name is Naome Bvumbi and I am doing research with Prof L Julyan and Mrs J Foot, an associate professor and senior lecturer respectively in the Department of Management Accounting towards a Master of Philosophy degree at the University of South Africa. I have funding from UNISA's Master's and Doctoral Support Program for research assistance such as transcribing. I am inviting you to participate in a study entitled:
"An analysis of the implementation of activity based costing at the Water Trading Entity".

The aim of the study is to determine whether the high costs at the Water Trading Entity (WTE) are influenced by the success or failure of the implementation of Activity Based Costing (ABC).

Your organisation has been selected because it utilises ABC.

The study involves audio taping of semi-structured interviews with middle and senior management. The questions will cover the following:

- To assist the researcher in understanding the steps used and factors of implementing ABC at the WTE – This involves your general knowledge of what steps and factors influence the implementation of ABC as well as the context in which ABC is used within your organisation.

- ABC principles – This section will involve how ABC is used for the calculation of the water resource management charge at the WTE. You will be asked for practical examples of the various applications regarding ABC in your organisation.
- ABC support within the organisation – This section involves the perception of ABC users in your organisation. You will be asked about people's attitudes relating to ABC and how this has impacted the proper functioning of ABC.

The interview should take around 45 minutes but can be as long as an hour depending on how the discussion develops.

The benefits of this study will be to provide more insight into the cost causation, which will result in more accurate cost of the water resource management charge at the WTE. The society will also benefit as more insight will assist the department to supply sufficient and affordable water.

There are no anticipated risks that will accompany this research.

Feedback procedure will entail a briefing meeting that will be arranged with you.

Yours sincerely

N Bvumbi

N Bvumbi
M.Phil, Student number: 35801948
University of South Africa

APPENDIX B: PARTICIPANT INFORMATION SHEET

19 September 2016

Title: An analysis of the implementation of activity based costing at the Water Trading Entity

Dear Prospective Participant

My name is Naome Bvumbi and I am doing research with Prof L Julyan and Mrs J Foot, an associate professor and senior lecturer respectively in the Department of Management Accounting towards a Master of Philosophy degree at the University of South Africa. I have funding from UNISA's Master's and Doctoral Support Program for research assistance such as transcribing. I am inviting you to participate in a study entitled:

"An analysis of the implementation of activity based costing at the Water Trading Entity".

WHAT IS THE AIM/PURPOSE OF THE STUDY?

The aim of the study is to determine whether the high costs at the Water Trading Entity (WTE) are influenced by the success or failure of the implementation of Activity Based Costing (ABC).

WHY AM I BEING INVITED TO PARTICIPATE?

Your chief director nominated you to participate. A total of 8 people were selected to participate. You were selected to participate in the research because you conform to the following criteria:

- WTE utilises ABC.
- You have some knowledge or practical experience relating to ABC and will be able to provide information regarding your experience with ABC in your organisation.

WHAT IS THE NATURE OF MY PARTICIPATION IN THIS STUDY / WHAT DOES THE RESEARCH INVOLVE?

The study involves audio taping of semi-structured interviews with middle and senior management. The questions will cover the following:

- To assist the researcher in understanding the steps used and factors of implementing ABC at the WTE – This involves your general knowledge of what steps and factors influence the implementation of ABC as well as the context in which ABC is used within your organisation.
- ABC principles – This section will involve how ABC is used for the calculation of the water resource management charge at the WTE. You will be asked for practical examples of the various applications regarding ABC in your organisation.

- ABC support within the organisation – This section involves the perception of ABC users in your organisation. You will be asked about people's attitudes relating to ABC and how this has impacted the proper functioning of ABC.

The interview should take around 45 minutes but can be as long as an hour depending on how the discussion develops.

CAN I WITHDRAW FROM THIS STUDY?

Being in this study is voluntary and you are under no obligation to consent to participation. If you do decide to take part, you will be given this information sheet to keep and be asked to sign a written consent form. You are free to withdraw at any time and without giving a reason.

WHAT ARE THE POTENTIAL BENEFITS OF TAKING PART IN THIS STUDY?

Your participation will enable the researcher to complete the research project and provide valuable insight on the dynamics of ABC implementation at the WTE.

WHAT IS THE ANTICIPATED INCONVENIENCE OF TAKING PART IN THIS STUDY?

The only inconvenience you may feel is the time spent during the interview. The researcher is however flexible when it comes to time in order to accommodate you. A notice period will be given to you. You may choose the date and time that will be most suitable.

WILL WHAT I SAY BE KEPT CONFIDENTIAL?

Your name will not be recorded anywhere and no one will be able to connect you to the answers you give. Your answers will be given a fictitious code number or a pseudonym and you will be referred to in this way in the data, any publications, or other research reporting methods such as conference proceedings.

Your answers may be reviewed by people responsible for making sure that the research is done properly, including the transcriber, external coder, and members of the Research Ethics Committee. Otherwise, records that identify you will be available only to people working on the study, unless you give permission for other people to see the records.

Your anonymous data may be used for other purposes, e.g. research report, journal articles, conference presentation, etc. A report of the study may be submitted for publication, but individual participants will not be identifiable in such a report.

HOW WILL INFORMATION BE STORED AND ULTIMATELY DESTROYED?

Hard copies of your answers will be stored by the researcher for a period of five years in a locked cupboard/filing cabinet at the researcher's home for future research or academic purposes; electronic information will be stored on a password protected computer. Future use of the stored data will be subject to further Research Ethics Review and approval if applicable. Information will be destroyed by shredding and formatting of electronic media after the five-year period has expired.

WILL I RECEIVE PAYMENT OR ANY INCENTIVES FOR PARTICIPATING IN THIS STUDY?

You will not be entitled to any payment or incentive for participating in this research.

HAS THE STUDY RECEIVED ETHICAL APPROVAL?

This study has received written approval from the Research Ethics Committee of the College of Accounting Sciences, Unisa. A copy of the approval letter can be obtained from the researcher if you so wish.

HOW WILL I BE INFORMED OF THE FINDINGS/RESULTS?

If you would like to be informed of the final research findings, please contact Naome Bvumbi on (084) 504 2655 or bvumbmn@unisa.ac.za. The findings are accessible for five years.
Should you have concerns about the way in which the research has been conducted, you may contact Prof L Julyan, (012) 429 4821 or email julyal@unisa.ac.za.

Thank you for taking time to read this information sheet and for participating in this study.

Kind Regards.

N Bvumbi

M.Phil, student number: 35801948

University of South Africa

APPENDIX C: PARTICIPANT CONSENT FORM

I, _____ (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be anonymously processed into a research report, journal publications and/or conference proceedings.

I agree to the recording of the interview.

I have received a signed copy of the informed consent agreement.

Participant name & surname…… (please print)

Participant signature……..Date……

Researcher's name & surname……(please print)

Researcher's signature……..Date……

Witness name & surname.....(please print)

Witness's signature…….....Date….....

APPENDIX D: INTERVIEW SCHEDULE

The interview schedule will contribute towards the completion of a Master of Philosophy degree at the University of South Africa.

Participant	008

This research is done via qualitative research as the researcher seeks to understand how ABC is used at the WTE for water resource management. The researcher is making use of semi-structured interviews. Part A may be completed by the participant prior to the interview, whereas Part B will be questions posed to the participant at the interview and will require a verbal response.

Ethical considerations:

Ethical clearance has been obtained from UNISA to conduct the research. A permission letter has been sent to you to request you to participate in the research interview. Participants are then required to sign a consent form to acknowledge the context and nature of the research. All participants' identities will be kept private and all personal identifiers will be removed from research-related information.

PART A (QUESTIONS THE PARTICIPANT MAY ANSWER BEFORE THE INTERVIEW)

Please indicate your response by drawing a cross (X) in **all** boxes that apply.

1. How the water research management charge is determined at the WTE:
    a. Do you agree with the way the water resource management charge is calculated?

Yes	No

    b. In your opinion, is the current charge too high, too low or reasonable?

Too high	Too low	Reasonable

c. The Audit report shows that water resource management costs have increased; in your opinion is this the case?

Yes	No

d. How has the use of ABC influenced the water resource management charge?

No influence	Increased cost	Accurate cost	Reduced cost

e. Would you say ABC has simplified or complicated processes?

Complicated processes	Simplified processes

2. Factors influencing the water resource management charge at the WTE

a. State whether each of the following factors affect ABC system used in your organisation. Indicate firstly whether each factor exists at the WTE and secondly, whether the influence is negative, positive or has no influence.

Factor	**Exist(Y/N)**	**Negative**	**Positive**	**No influence**
Management support				
Technology				
Training of users				
Personnel participation				
If applicable, add other factor below:				

b. What computer system is used for ABC in your organization?

Microsoft Excel	In house system	Other: specify	

3. Steps for ABC implementation and use at the WTE

a. Do you agree that the importance in understanding the cost behaviour in any organisation is identifying the cost drivers upon which various types of costs depend, e.g direct labour hours worked?

Yes	No

b. Do you make use of cost drivers to reflect the extent to which cost objects consume activities, e.g number of hours?

Yes	No

PART B (QUESTIONS THE RESEARCHER WILL ASK IN THE INTERVIEW)

In the interview, the researcher will be posing the following questions which will require a verbal response.

1. Why and how is the water research management charge determined at the WTE:
    a. What is the purpose of a water resource management charge?
    b. What is the continuum of activities involved in the calculation of the water resource management charge?
    c. In your opinion, how do you think ABC principles have assisted in identifying the cost causation of the water resource management charge at the WTE?
    d. Please explain your opinion given on questions 1 (c) of part A.
2. Factors influencing the water resource management charge at the WTE:

a) Is the information obtained from the computer system accurate enough for management to use it for decision making? Please explain your opinion.

3. ABC at the WTE and the user's perception
    a. What has been the benefit of using ABC at your organisation?
    b. What has been the downfall of using ABC at your organisation?
    c. Generally, one of the benefits of using ABC is more accurate cost determination. In your opinion, has this been true for the water resource management charge at the WTE? Why or why not?
    d. What is your opinion of the ABC system used in your organisation?
    e. What is the general attitude of users of ABC in your organisation, and what influence has this had on the utilisation of ABC in your organisation?

APPENDIX E: ETHICAL CLEARANCE

UNISA university of south africa

COLLEGE OF ACCOUNTING SCIENCES
RESEARCH ETHICS REVIEW COMMITTEE

Date: 26 September 2016

Ref: 2016_CAS_053
Name of applicant:
Ms N Bvumbi
Student/Staff #: 35801948

Dear Ms N Bvumbi

Decision: Ethics Approval

Name: Ms N Bvumbi
bvumn@unisa.ac.za

Tile: An analysis of the implementation of activity based costing at the Water Trading Entity

Qualification: Postgraduate student research

Thank you for the application for research ethics clearance by the College of Accounting Sciences Research Ethics Review Committee for the above mentioned research. Final approval is granted for the completion of the research.

For full approval: *The research ethics application was reviewed in compliance with the Unisa Policy on Research Ethics by the College of Accounting Sciences Research Ethics Review Committee on 11 October 2016.*

The proposed research may now commence with the proviso that:

1) *The researcher/s will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.*
2) *Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study, as well as changes in the methodology, should be communicated in writing to the College of Accounting Sciences Research Ethics Review Committee . An amended application could be requested if there are substantial changes from the existing proposal, especially if those changes affect any*

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of the study-related risks for the research participants.

3) *The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study.*

Note:

The reference number [top right corner of this communiqué] should be clearly indicated on all forms of communication [e.g. Webmail, E-mail messages, letters] with the intended research participants, as well as with the College of Accounting Sciences RERC.

Kind regards,

Ms Lindie Grebe
(Chairperson of CAS RERC)
grebel@unisa.ac.za
(012) 429 4994

Prof Elmarie Sadler
(Executive Dean of CAS)

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APPENDIX F: CODER

UNISA university of south africa

Coder Confidentiality Agreement

I, Dr Charmaine Williamson, hereby declare that I understand and agree to the following conditions with regards to the coding of the interviews:

1. I understand that the interviews transcripts are received for the purpose of coding records of the interviews held with the participants in the study

2. I understand that the identity of the participants and any individuals/ organisations/ institutions discussed as well as the content of the interviews are confidential and may not be revealed.

3. I undertake to treat all interviews and transcripts as confidential content to which only I will have access. I will keep the interviews, coding and any copied material securely in a locked safe and a password protected computer

4. I will destroy all records of the coding and transcriptions upon the Student's indication that the full examination process has been completed and that there is no further need for 2nd coding information as back up information

Full Name of Coder: Charmaine Williamson

Independent Coder and Academic Advisor

2016

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APPENDIX G: LANGUAGE EDITING

Barbara Shaw
Editing/proofreading services
18 Balvicar Road, Blairgowrie, 2194
Tel: 011 888 4788 Cell: 072 1233 881
Email: bmshaw@telkomsa.net
Full member of The Professional Editors' Group

To whom it may concern

This letter serves to inform you that I have done language editing and formatting on the thesis **AN ANALYSIS OF THE IMPLEMENTATION OF ACTIVITY BASED COSTING AT THE WATER TRADING ENTITY** by **Mulalo Naome Bvumbi**

Barbara Shaw

20 February 2017