



# **An evaluation of an activity-driven operational cost accounting framework in an electricity distribution company**

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Dissertation submitted in fulfilment of the requirements for the degree **Master of Commerce in Management Accountancy** at the North-West University

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Graduation: May 2019

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## **ACKNOWLEDGEMENTS**

Above everything else, I would like to thank the Almighty God for allowing me and giving me strength to complete this project and the ability to overcome all the challenges through this journey.

This whole project would not have been successful without the guidance, facilitation, training and coaching from my supervisor, Prof Sanlie Middelberg. I would like to say thank you for guiding me through this whole journey. This would have not been possible without your help.

To the staff and management of the North-West University, thank you for allowing me to further and broaden my knowledge through your institution. I highly recommend the University to students who still want to further their studies.

I would not be doing any justice if I don't thank the staff, management, as well as supervisors of Company A, for dedicating their time and always being willing to help whenever I requested information. Your helping hand is noticeable.

My deepest gratitude also goes to my family, my lovely wife for being there for support, motivation and encouragement.

## **DEDICATION**

This dissertation is dedicated to my daughter, I might have missed witnessing when you took your first step, your first tooth, because of my time being largely concentrated and dedicated to this research. This is for you.

## **ABSTRACT**

**TITLE:** An evaluation of an activity-driven operational cost accounting framework in an electricity distributing company.

**KEYWORDS:** Time-Driven Activity Based Costing, Activity Based Costing, Management accounting, Cost accounting.

The business environment has become dynamic and is furthermore evolving rapidly through new technological advances, economic situational changes and global warming. Under these circumstances businesses require costing models and systems that ensure that the best value is achieved and maintained to ensure sustainability and ongoing concern.

Company A, the selected case study, is the market leader in South Africa in generating, transmitting and distributing electricity. Its objective is to increase sales and expand its customer base to neighbouring countries. To achieve the above, Company A needs information that is factual, relevant and that creates value through the cost savings initiatives that will result in it being a low cost electricity producer. Company A plays a significant role in the economy of South Africa.

The main objective of this study was to evaluate an activity-driven operational cost accounting framework within Company A. The results proved that the time-driven activity-based costing (TDABC) was superior to the existing costing method used. TDABC was compared to the current costing system of Company A, and the results between the two costing methods revealed that there were an under-absorption of overheads in departments with a low 3-factor formula (the current costing method), while an over-absorption was recorded where the 3-factor formula was high. This has resulted in the distortion of financial reporting and possible misrepresentation of costs and in turn making cost management decisions that could be detrimental to the company.

TDBAC, as a cost management technique, will result in Company A's cost management processes being improved, resulting in improved decision-making.

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# CHAPTER 1

## 1 INTRODUCTION

### 1.1 BACKGROUND

The business environment has been changing rapidly and is becoming more unpredictable, with business leaders required to sustain their businesses while maintaining the quality of services (Gaula, 2011:9). Under these circumstances, companies require optimal- and useful costing systems to arrive at production costs for decision-making purposes. Companies are therefore encouraged to be more innovative, adopt new strategies and new costing systems (Gunasekaran & Sarhadi, 1998:231).

To alleviate the misrepresentation of costs and overcome the limitations of traditional costing models, activity-based costing (ABC) was introduced and accepted as costing tool, many years ago. ABC is described as an enhanced technique of: i) apportioning the overheads costs, ii) evaluating the product profitability, and iii) managing the operating costs. According to Sartorius *et al.* (2007:3) it is a methodology used to cost and monitor activities, which involves outlining resource consumption and costing of end products. According to Gupta and Galloway (2003), ABC is an information system, technologically advanced to overcome some of the shortcomings of the traditional cost accounting models and to improve its usefulness to strategic decision-making.

Although ABC has been considered as an alternative tool for traditional costing systems, further studies developed by Kaplan and Anderson (2003), revealed a new approach: Time-Driven Activity Based Costing (TDABC). TDABC does not disregard the application of ABC, but is simply adding more simplicity to the costing system. TDABC does not require an in-depth analysis, such as pure ABC costing. It does however support the direct apportionment of costs to cost centres, using the estimation of two parameters for each group of resources, namely: i) the capacity cost rate, and ii) the time required to complete an activity (Barros & Ferreira, 2017:14).

Information gathered through the application of ABC, can be used for effective decision-making purposes (Vigario, 2007). This is referred to as Activity Based Management (ABM). ABM refers to the utilisation of ABC information to understand and make effective decisions, based on how companies conduct their business (Noor, 2010:42).

The concept of value chain management on the other hand, considers traditional cost accounting systems as irrelevant, according to Schulze *et al.* (2012). Generally, the provision of

information for coordination and optimisation of activities across the firm is in the form of a value chain (Schulze *et al.*, 2012). A value chain is described as the connected set of value adding activities (Dekker, 2002:4). On the other hand, according to Rios-Manriques *et al.* (2014:222), ABC is considered to be a usable costing tool in the value chain, as it ascertains the processes in the chain and allocates costs by specific activities. It is of vital importance for a company to continually and effectively evaluate its activities by identifying and examining the capabilities and processes of the value chain.

## 1.2 LITERATURE REVIEW

The literature review will be presented in the following order: i) the various countries where ABC research were conducted, ii) the relevant industries in which ABC was implemented, and iii) ABC as a costing tool.

ABC has been extensively researched in the developed countries (Liu *et al.*, 2007); however this is still limited in South Africa, which is a developing country. This is reiterated by Sartorius *et al.* (2007:1) who found that there is still an underlying need for companies to adopt ABC costing in South Africa. In Chile, similar to South Africa, Neriz *et al.* (2014) found that the use of ABC costing methodologies in the public sector, is limited. Government departments, such as the Health Care Services Department are furthermore required to manage their own costing systems (Neriz *et al.*, 2014). On the other hand, ABC has gained acceptance in developed countries, such as the United States of America (USA), as well as in Pacific and European-based companies (Gupta & Galloway, 2003).

ABC application has been widely discussed and has become a mature cost estimation technique in the manufacturing industry (Ahmed, 2015:259). It has been evidenced by various authors including Wouters (1994); Park and Kim (1995); Gunasekaran and Sarhadi (1998); Askarany and Yazdifar (2012); and Askarany *et al.* (2014). There are many examples where ABC has been researched and implemented. These include studies by Andrade *et al.* (1999); Kallunki and Silvola (2008); Schulze *et al.* (2012); Carli and Canavari (2013) and Neriz *et al.* (2014). However, according to Ahmed (2015:259), the application of ABC in the costing of maintenance, construction and services industries has been limited.

ABC has been advocated by many researchers and business practitioners as a method of improving cost management of complex processes. However, one of the identified challenges, particularly in the engineering and construction sector, is that every work process is variable (Back *et al.* 2000:49). The principal use of ABC has become more of a management decision making tool than that of the traditional accounting tool (Kannaiah, 2015:277). Back *et al.* (2000:57) concluded that ABC is an essential business tool, mostly in times where engineering

and construction companies are continually trying to improve the effectiveness of operations. Korpunen and Raiko (2014:347) concluded that the application of ABC methods suits the needs of the electricity production industry, as well as that it provides valuable information for decision-making at all levels. In this context, it is apparent that substantial improvements have been made in the application of ABC in various industries. There is still however a gap in the literature in the context of electricity distributing companies. This study aims to address this gap by collecting the relevant data and the efficient use of such costing data in the electricity distributing companies for decision-making purposes. A case study approach will be followed.

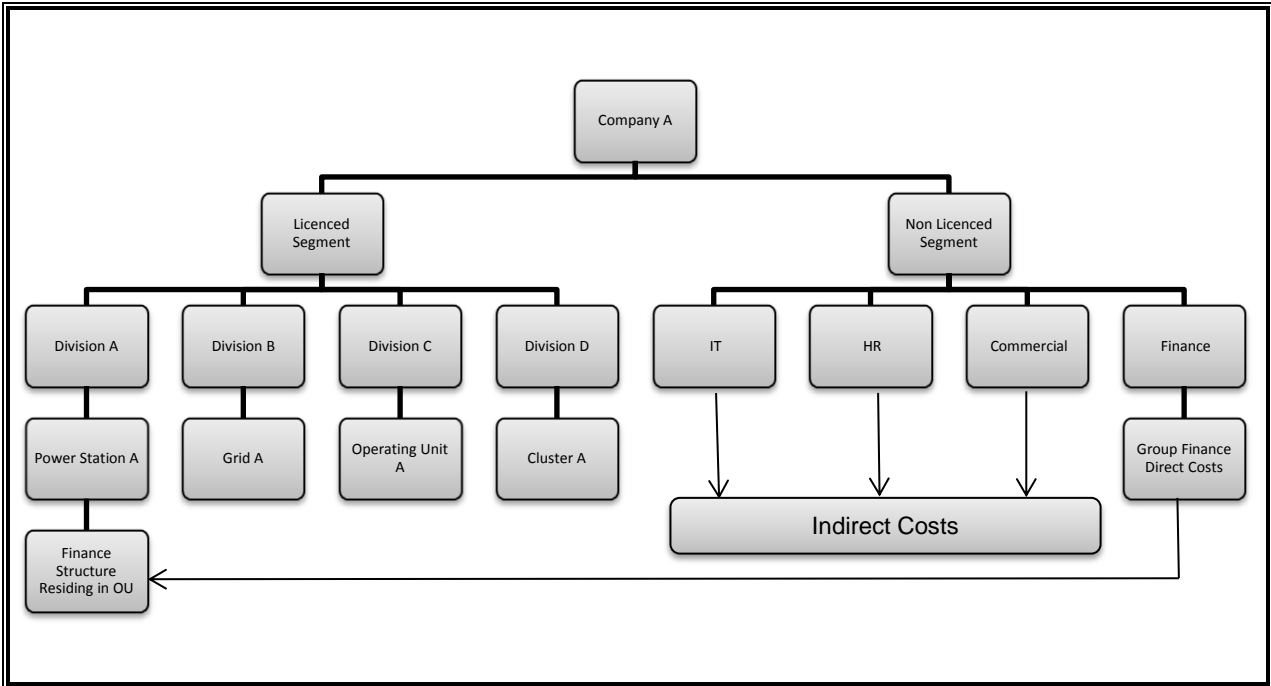
### 1.3 CASE STUDY

Company A generates, distributes and ensures reliable electricity to the customers by building, operating and maintaining distribution assets. Company A generates approximately 95% of the electricity used in South Africa and approximately 45% of the electricity used in Africa. Company A generates, transmits and distributes electricity to industrial-, mining-, commercial-, agricultural- and residential customers and redistributors. Company A has four licensed divisions: Generation, Transmission, Distribution and Customer Services (as reflected in Figure 1.1).

Each one of these divisions will now be discussed.

- i.) **Generation (Division A):** produces the electricity that the company supplies to its clients. It endeavours to make Company A world class generating utility by using renewable energy sources.
- ii.) **Transmission (Division B):** responsible for planning, operating and maintaining Company A's transmission assets. It transmits large amounts of electricity (measured in megawatts) from power stations to substations.
- iii.) **Distribution (Division C):** builds, operates and maintains Company A's distribution assets. It aims to distribute electricity at smaller scales to residential and industrial customers.
- iv.) **Customer Services (Division D):** responsible for managing the interface with the entire spectrum of customers, ranging from small power users and municipal customers, including the metros. Customer Services also provides advisory services and facilitates the resolution of all customer service requests, ranging from supply problems to applications for service, billing and vending services.

**Figure 1-1: Company A’s enterprise structure**



Source: Researcher’s own construct.

Company A’s divisions are granted licenses by the National Energy Regulator of South Africa (NERSA) to form an enterprise structure (refer Figure 1.2). A non-licensed cost centre is a cost centre not forming part of a licensed division, but physically resides in a licensed division, for example: Group Information Technology (IT), Group Human Resources (HR), Group Commercial and Group Finance, Services and Strategy Development, Properties and Shared Services. These cost centres provide support functions to the licenced divisions of Division A, Division B, Division C and Division D. The cost incurred by the non-licensed divisions is viewed as indirect- or overhead costs.

The costing model currently used to allocate the overhead costs incurred by the support functions, is prescribed by the enterprise structure and is governed by the cost allocation manual, which is reflected in the chart of accounts. A cost model is a combination of costing concepts that is presumed to provide Company A with the ability to analyse processes, measure efficiency, control costs and monitor improvements.

The overhead costs incurred by the non-licensed divisions to the licensed divisions (Division A, Division B, Division C and Division D), are not allocated based on an ABC or TDABC costing model. The current costing approach of Company A is approved in the “position paper” and indicates that overhead costs should be recovered based on a 3-factor formula. The 3-factor formula is effectively an average of the 1) employee costs, 2) revenue, and 3) net assets per

division, as a percentage of the total. Where the non-licensed cost centre is not linked directly to a licensee, that cost centre must attempt to charge “as much cost”, directly to the licensed division to which it provides a service. The term “as much cost” is not defined in the cost model. The costs are allocated to the licensed division as an overhead charge in the form of a fixed price that must be agreed upon. These overheads are then assigned, based on an average costing method, to all licensed divisions.

The key challenge in Company A is the lack of cost accounting data that the accounting system is able to provide to assist in decision-making. The term “as much cost” or the 3-factor formula is simply defined as dividing the overhead cost equally to the licensed divisions by using the weighted average cost formula.

#### **1.4 MOTIVATION OF TOPIC ACTUALITY**

Traditionally calculated production costs do not provide valuable information for decision-making, as they cannot provide reasonable explanations of costs behaviour (Scarlett, 2009:55). The shift from traditional costing systems to an ABC model should lead to an improved decision-making, which in turn could lead to an increased profitability (Roztocki, Porter, Thomas & Needy, 2004:19). World class- and successful organisations are able to account for costs in an effective and equitable way and have successfully implemented the methodology of allocating overhead cost to the products (Satorius *et al.*, 2007). The existence of an efficient cost information system is essential to improve a company’s decision-making, which in turn could lead to increased profitability and competitiveness. ABC assists in supervising and controlling the operational activities and method of allocating costs that a company performs, and hence the maintenance activities, and enhances the rationality of decisions made (Ahmed, 2015:269).

There are various reasons companies are implementing ABC. These include: i) cost accounting and cost management purposes, ii) performance measurements, iii) decision making, iv) general management, and v) forecasting better relationships. Companies need quality cost data to support strategic and tactical decisions. This is further connected with the budgeting and performance management and improved cost management capability (Sartorius *et al.*, 2007:5).

#### **1.5 PROBLEM STATEMENT**

As highlighted in the case of Company A, a key challenge faced by companies is the lack of trusted accounting systems that assists in effective decision-making and furthermore contributing to the strategic objectives of the company, i.e., to stabilise the company and to deliver expansion programs within budgets. Currently Company A does not intend to grow, however it is in a phase of delivering on its capital expansion programs. According to Sartorius

*et al.* (2007:2), companies that continue to use the traditional costing techniques are more likely to make cost management decisions that can be potentially disastrous. There is a strong need for companies to find ways to reduce costs. ABC is a management tool that responds to shortcomings and limitations of traditional cost techniques and cost management practices (IMA, 2006).

In the modern manufacturing environment, indirect cost contributes a high percentage to total cost and a meaningful way to allocate these costs to products, is to understand the activities that gave rise to them (Scarlett, 2009:55). Cost estimation is a crucial element, as it has a direct effect on the company's performance. The results of overestimation and underestimation can negatively impact a company's image and consequently it can lose its competitive advantage (Ahmed, 2015:259). The challenge faced by most manufacturing companies is the misalignment between what happens in the manufacturing department and the methodology and costing principles applied by the finance department. In many instances the financial data is based on assumptions and estimations, which are considered to be the convenient option (Van der Linde, 2011).

As in the case of Company A, there is no clear rule of the costing method applied. Costs are determined through the following method:

- The 3-factor formula, which is an average of Company A's employee costs, revenue and net assets.
- There is no direct correlation between cost behaviour and cost estimation, which results in distorted costs.

The shortcomings of using the 3-factor formula for Company A are:

- Using only employee costs: Division A will absorb the highest proportion of overheads as it has the highest employee costs.
- Using only net assets: Division B will absorb the highest proportion of the overheads as it has the highest net asset value.
- Using only revenue: Division D will absorb the highest proportion of the overheads as it earns the highest revenue.

For Company A to be able to meet its strategic objectives, a costing strategy needs to be revised.

The research question can therefore be formulated as: will the application of an activity-driven accounting framework assist Company A in making improved costing decisions?

## **1.6 OBJECTIVES**

The objectives can be divided into a main research objective and is supported by secondary research objectives.

### **1.6.1 Main objective**

The main objective of this study is to evaluate the application of an activity-driven operational accounting framework in Company A (an electricity distributing company).

### **1.6.2 Secondary objectives**

To achieve the primary objective, the secondary objectives are as follows:

- To identify and present the applicable research methodology to address the main research objective (Chapter 2);
- To conceptualise the literature on ABC costing and understand the background of ABC and TDABC, thus exploring the benefits and disadvantages of implementing these costing methodologies (Chapter 3);
- To develop and apply a costing framework through an activity-driven operational accounting system for Company A (Chapter 4); and
- To make recommendations from the findings gathered from Company A and thus support the company in evaluating the value of an optimal costing system by selecting the most relevant costing tool for decision-making (Chapter 5).

## **1.7 RESEARCH DESIGN/METHOD**

For the purposes of this research, the researcher will be conducting a literature review and empirical study. To achieve quality data for the purposes of the empirical study, the researcher will follow a case study approach.

Many definitions of research methodology have been given by different authors. Some of them are as follows:



According to Phophalia (2010:6), the research methodology is the process to analytically answer the business problems. It is understood as a science of studying how research is done scientifically. Research methods are related with the understanding of reality, defining the problem and considering an approach to analyse the research problem, interpretation of data and, making recommendations and conclusions.

According to Killam (2013:9), the research methodology refers to the process of finding and gathering knowledge in a systematic way. The researcher's ontology and epistemological beliefs are the main driving forces for the research to be conducted. Phophalia (2010:16) outlines the following research methods, which are used in the modern world, including historical method, descriptive method, experimental method, field study method and case study method.

### **1.7.1 Historical method**

This method collects facts relating to the research problem by referring to the past. The researcher depends mainly on the library materials, historical records, secondary data and observations. It is necessary to fill the gap in the human knowledge and builds a platform for the future.

### **1.7.2 Descriptive method**

The descriptive method is finding facts about a certain topic and a process of gathering and accumulating facts. It is useful in the evaluation of opinions, conduct and the cultural beliefs of a selected population.

### **1.7.3 Experimental method**

This method is popular for research in the field of natural sciences, where mostly the conditions are controlled. Though the results of experimental research are more reliable, there could be difficulties in conducting a truly scientific research.

### **1.7.4 Field study method**

A field study attempts to reveal the attitudes, behaviours, values and perceptions of individuals and groups under certain circumstances. This study is also known as a survey method and is mainly used in business and social sciences.

### **1.7.5 Case study method**

According to Baxter and Jack (2008), case study is an approach to the research that facilitates investigation of an occurrence within its perspective using a variety of data sources. This ensures that the research is not explored through a single method, but rather a variety of developed outlooks, which allows for multiple aspects of the research to be understood. Case study research is more than simply conducting research on a single individual or situation. A case study approach can deal with simple and complex situations. It enables the researcher to answer “how” and “why” type questions. It enables the researcher to gather data from a variety of sources and to analyse the data in order to give meaning to the case study.

## **1.8 LITERATURE REVIEW**

The purpose of the literature review is to establish what has been published by other researchers. The objective is to convey the knowledge that has been established and obtain further knowledge about the topic. The following sources of information will be assessed: journal articles, text books, internet sources, dissertations and theses, as well as governmental reports.

## **1.9 EMPIRICAL RESEARCH**

As mentioned earlier, a case study approach will be followed. This type of study will be conducted in order to compare the results of the existing traditional costing method with TDABC framework in Company A. Unstructured interviews will be conducted with key players. The format of an unstructured interview is informal and the aim is to explore in depth an area that you are interested in (Saunders *et al.*, 2016:391). The target population selected from the case study in Company A, will vary from the finance department within Division A and a representative from the other non-licensed divisions. The finance staff is involved in the day-to-day processing of transactions, budget preparations and compilation of monthly reports, thus has a better understanding of how costs are collected, accumulated and classified.

Secondary data will comprise of management accounting reports from Company A. The information gathered will provide conclusive evidence in suggesting practical ways and recommending the implementation of a TDABC framework within Company A.

## **1.10 PARADIGMATIC ASSUMPTIONS AND PERSPECTIVES**

A paradigm may be regarded as conventional basic principles that deals with ultimate or the first principles. It represents a person’s world view (Guba & Lincoln, 1994:107). For the purposes of

this study, an interpretivist paradigm will be followed. That is because qualitative data will be collected by way of interviews and the data will then be interpreted.

Ontology and epistemology are both important fundamentals of the philosophy of knowledge. Although they often are seen as having similarity, they have a clear dissimilarity: epistemology is about the way we identify and recognise things, while ontology is about what things are (Clement, 2013). According to Guba and Lincoln (1994), epistemological and ontological paradigms are so interrelated that one answer often leads to another.

### **1.10.1 Ontological assumptions**

Ontology is about defining things and how they are associated with one another to answer the question: "what is it?" It refers to the study of human survival and the ultimate nature of reality (Killam, 2013:7). To gather what the reality is and what is known for Company A, the three questions that should be asked are: what exists, what is true and how can things be sorted:

**What Exists:** Company A, which generates, transmits and distributes electricity to South Africa, and other African countries.

**What is true:** Uses costing methods that are not clearly aligned to the activities within the company.

**How things can be sorted:** An application of an activity-driven operational accounting framework within Company A can improve decision-making. Previous research revealed that ABC is the more equitable method of assigning overhead costs to manufactured products. ABC is accepted as it provides managers with value adding information for strategic decision-making. ABC focuses on activities that could not have been noticeable where traditional costing methods were utilised (Noor, 2010:42).

### **1.10.2 Epistemological assumptions**

Epistemology studies the connection between the researcher and knowledge. It states what we know and how we came to know it (Killam, 2013:8). Under epistemology, consideration should be given to: how the knowledge is acquired and how that knowledge is transferred. Mostly, it examines the fundamental choices and offers options in attempting knowing things (Clement, 2013).

## **1.11 CHAPTER LAYOUT**

This section indicates the flow of the research study and the reasoning processes. It will provide some initial high-level information of the objectives within each chapter.

### **Chapter 1: Introduction and Background**

The purpose of this chapter was to outline the background to the study, the methodology used for the research, research objectives and motivating the topic to be researched.

### **Chapter 2: Research methodology**

This chapter is aimed at identifying the applicable methods of research and aligning this with the identified objectives. The focus will be on the case study approach.

### **Chapter 3: Activity-driven principles**

The related studies on ABC and TDABC will be explored, making contrasting references to previous findings. It will focus on the literature published on ABC, ABM and TDABC principles. The wider uses of these methodologies will be explored.

### **Chapter 4: Empirical results of case study**

This chapter will present the empirical study following the case study approach. The existing cost model used in Company A will be compared to a newly developed TDABC framework.

### **Chapter 5: Conclusions and recommendations**

The related findings on the comparison between the existing cost model used by Company A and the newly developed TDABC as costing method will be presented. Recommendations will be made based on the set research objectives.

The next chapter will present the research design and research methodology followed to address the main research objective.

## **CHAPTER 2**

### **2 RESEARCH METHODOLOGY AND DESIGN**

#### **2.1 INTRODUCTION**

The main purpose of this chapter is to address the first secondary objective as set in chapter one (refer page 7). The objective is to identify and present the applicable research methodology. The first step is to understand the research process that will be followed for this study. As mentioned in Chapter 1, the researcher conducted a literature review and an empirical study. To collect quality data for the purposes of the empirical study, the researcher followed a case study approach.

It is important to define research. The English word “research” is derived from the French word “rechercher”, which means to seek again and search for a better knowledge (Phophalia, 2010). Many definitions of research have been given by different authors. Some of them are as follows:

According to Kothari (2004:23), research can be described as the search of knowledge and an art of investigation. It can also be defined as a systematic and scientific search for the information on a specific topic. Research can assist in solving operational and planning issues of various organisations. According to Phophalia (2010:1), research is a systematic attempt to find answers to meaningful questions through the application of scientific procedures. It is further described as a systematic and objective analysis and recording of controlled observations that lead to the development of principles and theories, resulting in ultimate control of events.

The Cambridge Advanced Learner’s dictionary (2008) defines research as “a detailed study of a subject, especially in order to discover new information or reach new understanding”. According to Tesch (2013), research does not take place in a neutral environment, it is guided by assumptions about the nature of knowledge and it has political antecedents and consequences. Research can therefore be defined as the seeking of information that will be verified as representing the truth of knowledge regarding a certain topic. Research is about finding new information and facts about the subject and the topic under discussion.

#### **2.2 PARADIGM**

In Chapter 1 (refer page 9) it was explained that this study is nested in the interpretivist paradigm. The ontological and epistemological assumptions were clearly explained. The next section will describe the research approach.

## 2.3 RESEARCH APPROACH

The purpose of the research is to ascertain answers to questions through the application of systematic and logical procedures. The classification of research can be distinguished by its objective and it is based on the quality of knowledge itself. The research can follow either a qualitative or quantitative or mixed method approach.

A **quantitative research** approach uses quantitative measurements to collect data and the use of statistical methods to evaluate the data.

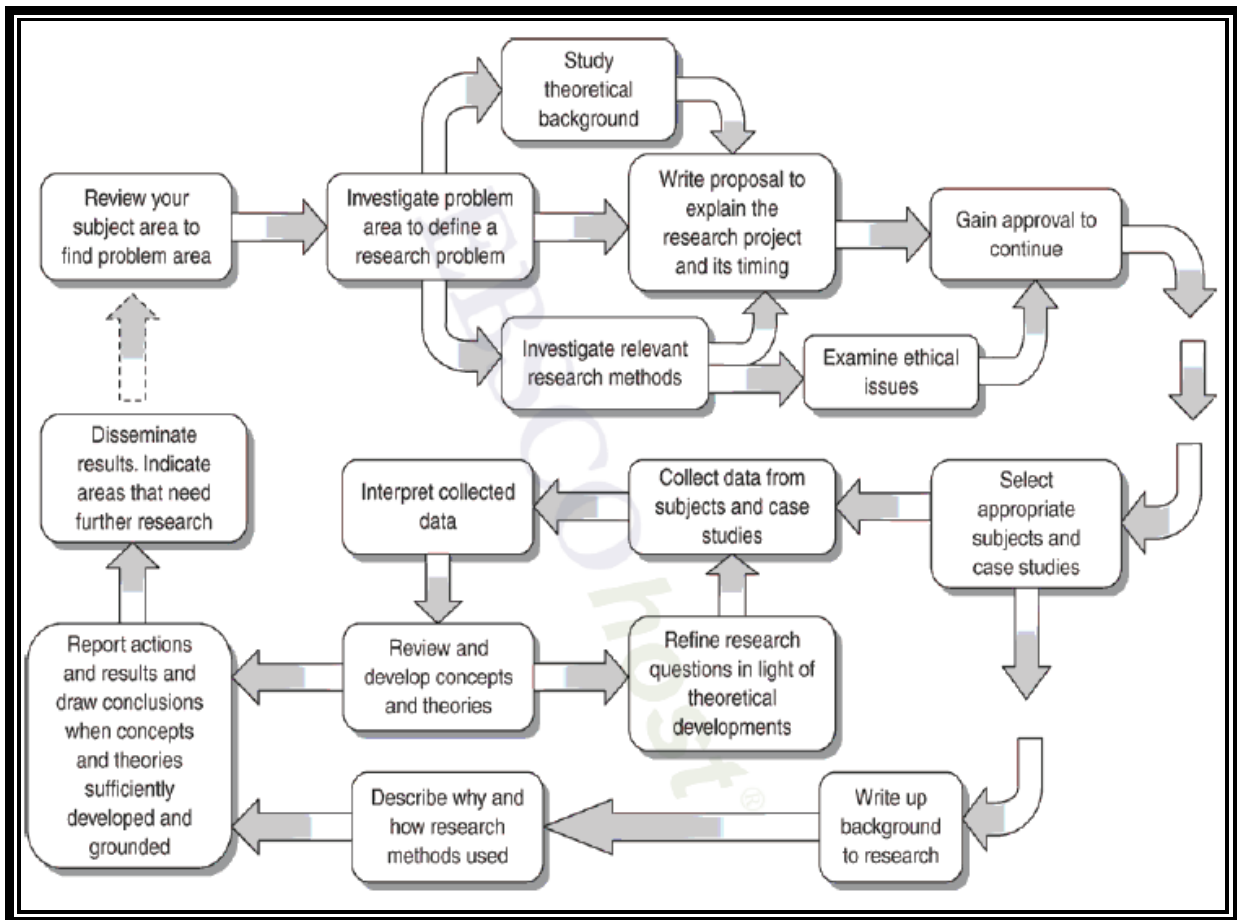
A **qualitative research** approach on the other hand, presents reality as experienced by groups, community and individuals and therefore the data collection techniques include interviews and observations. In a study conducted by Noor (2008:1602), qualitative research is explained as imposing an importance on methods and implications that are not observed and measured in terms of quality, amount, intensity and frequency.

A **mixed method** approach is the type of research in which a researcher combines the different data findings of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis) for the purposes of the in-depth of the research. Mixed research started with researchers who believed qualitative and quantitative viewpoints and methods were useful in addressing the research questions (Johnson, 2007:113). In explaining the mixed methods approach, Creswell (2009) outlines four important aspects in planning the approach. Those considerations are timing, mixing, weighting and theorising.

The research approach for this study will be qualitative approach.

An example of a work flow when conducting qualitative research is presented in Figure 2.1.

**Figure 2-1: Work sequence in qualitative research**



Source: Adapted from (Walliman, 2011)

## 2.4 RESEARCH DESIGN

According to Rogelberg (2004:11), a research design involves planning and conducting data collection, with the emphasis on addressing the research objectives and supporting valid conclusions.

The research designs used by the qualitative researchers, differ depending on the purpose, nature and the resources available. According to De Vos, Strydom, Fouche and Delport (2005:269), qualitative research design differs from quantitative research design, in that it does not provide the researcher with a step-by-step plan or permanent technique to be followed. The researcher's planning determines the design or strategy, while in a quantitative research design the design determines the researcher's planning.

According to Creswell (1998:2), research design in a qualitative perspective, is the entire process of research from theorising the problem to report writing. Creswell (1998) identifies

strategies of design that could be used to design qualitative research and these are outlined as follows: 1) biography, 2) phenomenology, 3) grounded theory, 4) ethnography, and 5) case study.

### *Biography*

This is the term used to indicate the comprehensive fact-based writings. This strategy is used to report on and document an individual's life and know-hows, as articulated to the researcher or facts established in documents. Interviews and documents are the methods of data collection.

### *Phenomenology*

This methodology aims to comprehend and give meaning to subjects. Observations and interviews are utilised as methods of data collection.

### *Grounded Theory*

Wiesche, Jurisch, Yetton and Krcmar (2017:686) describe Grounded Theory Methodology (GTM) as the method that is intended to the finding of inductive theory. This method is predominantly relevant for research on topics for which little research has been directed towards and for which theory gathering is necessary. Martin and Turner (cited by Wiesche *et al.*, 2017:686) confirm that GTM allows a researcher to advance a theoretical account of the all-purpose features of the topic, while concurrently grounding the account in the empirical observations.

### *Ethnography*

Babbie and Mouton (2001:271) define ethnography as the data of cultural anthropology that is derived from direct observation of conduct in a specific society. This strategy of inquiry is categorised by the interpretations and descriptions of the conduct of a small number of cases (De Vos *et al.*, 2005:271). Creswell (1998:271) defines ethnography as the study of an integral cultural or social group based mainly on observations over a period of time.

### *Case Study*

According to Creswell (1998:61), a case study is a survey or an in-depth analysis of a particular case or multiple cases over a period of time. The exploration and description of the case takes place through comprehensive data collection methods, involving multiple sources of information. These may include interviews, documents, observations or archived records (De Vos *et al.*, 2005:272; Yin, 2009). Case studies involve the analysis of a number of variables and take



multiple viewpoints into account and endeavour to comprehend the influences of multi-level social systems on subject's behaviours and perspectives (Babbie & Mouton, 2001:281). According to Baxter and Jack (2008), the selection of a case study depends on the nature of the research and overall study purpose. Baxter and Jack (2008) gave the types of case studies as explanatory, exploratory, collective, intrinsic, multiple and descriptive. Table 2-1 gives explanations of each type of a case study and examples of a published case study:

**Table 2-1: Type of Case Studies and published examples**

<b>Case Study Type</b>	<b>Description</b>	<b>Published Case Study Example</b>
Explanatory	This type of case study would be used if the researcher is seeking to answer a question that required explaining the situations in real-life interventions that are too complex for the survey.	Abadie and Diamond (2010): Synthetic control methods for control for comparative case studies: Estimating the effect of California's tobacco control program.
Exploratory	This type of a case study is used to explore the situation where the outcome is not clear or no single set of outcomes or unknown.	Harter (2002): Business-Unit level relationship between employee satisfaction, employee satisfaction and business outcomes: a meta-analysis.
Descriptive	This type of a case study is used to discuss the circumstance in the real life situation.	Morley (1995): Poverty and inequality in Latin America: the impact of adjustment and recovery.
Multiple Case studies	This type of a case study is used to discuss the circumstance between different case studies. Comparisons can be made between the results and findings.	Davis and Lenat (1982): Knowledge-based systems in artificial knowledge: 2 Case Studies.
Intrinsic	This type of a case study is exclusively concentrated on the aim of attaining an improved	Bailey, Armour, Kirk, Jess, Pickup, Sandford and

	understanding of the individual case. The purpose is to describe the case being studied rather than to understand a broad social issue.	BERA Physical Education and Sport Pedagogy Special Interest Group (2009): The educational benefits claimed for physical education and school sport: an academic review.
Instrumental Case Study	This type of a case study is used to gain an understanding of a social issue. The case study simply serves the purpose of facilitating the researcher's gaining of knowledge about the social issue.	Margulis (2003): Privacy as a social issue and behavioural concept.
Collective Case Study	This type of a case study broadens the understanding of the researcher about a social issue being studied. Evaluations can be made between cases and so theories can be validated.	Sampson, Raudenbush and Earls (1997): Neighbourhoods and violent crime: A multilevel collection study of efficacy.

Source: Researcher's own construct.

According to Mark (cited by De Vos *et al.*, 2005:272) each of the various types of case studies has a different purpose. According to Noor (2008:1602), case studies become predominantly suitable where the researcher wants to understand a particular problem or current situation. In expanding the case study, Noor (2008:1602) explained that explanatory research can be used to study processes in companies. A case study is not intended to study the whole sequence of events in a company; however it can be focused on a single business unit or a particular issue.

#### **2.4.1 Research Design for this study**

An exploratory case study was selected as the method of conducting research in Company A. As this type of case study involves data gathering from various sources, the employees of Company A, management accountants, documents and archives will be utilised to gain a deeper understanding of the current costing method used within Company A with the aim of developing a new costing method using the TDABC method.

## **2.5 RESEARCH METHODOLOGY**

As outlined in chapter 1, the researcher will use a case study as methodology for Company A. In this method, information gathered relates to the present, future and the past behaviour of certain elements to enable the researcher to make conclusions.

Primary data will be collected through interviews. This type of study will be conducted in order to measure the results of the comparison between the existing costing method and the newly developed activity-driven operational framework in Company A. This will give a clear indication of the current costing method used, the understanding of TDABC and the possible suggestions of revising the costing method.

### **2.5.1 Population and site selection**

According to De Vos *et al.* (2005:328), the researcher must first be clear on the restrictions of the population and then the sample size can be chosen. Sampling, according to De Vos *et al.* (2005:193), means taking any slice of a population as typical demonstrative of the entire population. Sarantakos (2000:156) described sampling in qualitative research as being relatively limited. However Patton (2002:244) argued that there are no limitations and boundaries for the sample size. In qualitative research, sample size is dependent on the purpose of the research, what will be suitable, what will have trustworthiness, and what can be done with the resources available.

The target population selected from the case study of Company A, is firstly the employees of the Centre of Excellence (CoE) department and employees from the other non-licensed divisions. The reason for selecting the CoE finance staff is because they are responsible for the drafting of policies and procedures with regards to the costing models of Company A. These include policies and procedures regarding internal recovery systems, internal charges, overheads recovery, processing of transactions, budget preparations and compilation of monthly reports, and therefore understand how costs are collected, accumulated and classified.

The employees from non-licensed divisions are at operational level with the knowledge of the day-to-day operations and therefore understand the activities, including the time taken to perform the activities.

### **2.5.2 Data collection**

Qualitative research is conducted in various ways; therefore various data collection methods have been developed to accommodate the necessities of different subjects, such as: qualitative

interviewing, focus groups, participants, discourse and conversations analysis and analysis of text and documents (Walliman, 2011:110). In explaining data collection, Noor (2008) explained that the documentary sources are important as they act as a backup of any failures in data collection through other methods.

### **2.5.2.1 Data collection for this study**

This will involve management of accounting reports, financial reports, position papers, policies and procedures of Company A. Unstructured interviews with employees of Company A were conducted to supplement data collection.

**Documentation:** Company A records will be studied. Documents will be kept on file as backup documents. These shall include official documents and unofficial documents to gather as much information as necessary.

**Observation:** the researcher will observe some of the activities conducted in Company A. This will be done in order to gather information that was not available from other sources of information. This will also assist in understating the TDABC requirements, i.e., capacity and time taken to conduct certain activities.

### **2.5.3 Data analysis**

Walliman (2011:110) found that the assurance, as a result of carefully worked out formulae and probability theories, is difficult to apply in the nature of qualitative data analysis, unlike the conventional statistical methods of quantitative data analysis.

Walliman (2011:117) outlines a wide range of the analytical methods that can be applied in the data analysis. Narrative analysis is one such example. This form of analysis is aimed at extracting themes, structures, interactions and performances from stories or accounts that people use to explain their present and past situations, as well as interpretation of events. Data is collected by semi- or unstructured interviews, participants' observations or any other undirected method. As in the case of Company A (refer chapter 1), unstructured interviews will be conducted.

## 2.6 METHODOLOGICAL RIGOUR

### 2.6.1 Case Study Methodological Rigour

Conducting rigorous research means performing and conducting the research and having to explore different ways of data gathering and the inspiration to move beyond data and analysis methods that are convenient and comfortable (Tracy, 2013:232). In terms of rigorous data analysis, the researcher must give a detailed explanation about the process by which the data were collected, transformed and structured into the research report (Tracy, 2013:232).

Porter (2007:84) argues that there is no golden rule to judge validity and rigour. He ascertained that there have been other robust methodologies established, to ascertain whether or not knowledge can be considered as valid or not. For example, Pawson *et al.* (cited by Porter, 2007:85), developed the acronym TAPUPAS as criteria that does not limit itself to validity, but includes other issues such as transparency and accessibility. The TAPUPAS is outlined as follows:

*Transparency:* is performing duties with no hidden agenda and in such a way that it is easy for others to see what actions are being performed.

*Accuracy:* are the claims made based on information that is free from errors and verified to be correct.

*Purposively:* are the methods used to gather knowledge appropriate to task suitable for purpose.

*Utility:* knowledge is suitable to the requirements of the researcher.

*Propriety:* has the research been conducted ethically and legally.

*Accessibility:* is the research readily available and easy accessible to the researcher.

*Specificity:* does the knowledge generated meet the quality of standards.

The researcher was careful to consider these factors during the research process.

## **2.7 ETHICAL CONSIDERATIONS**

According to Babbie (2010:418), there are at least two ethical issues, which are of a special concern in the analysis and reporting of qualitative research. Firstly, it calls for subjective judgements and secondly privacy becomes particularly important. Ethics focuses on providing the guiding principle for reviewing and evaluating the research, and establishing application tools to ensure ethical research. Aguinis and Henle (2004), highlight the ethical considerations during planning, followed by the ethical concerns when recruiting the participants and how to report the research results in an ethical manner. Ethical misconduct can occur in any of the stages of the researchers.

### *Ethical considerations in planning the research*

It is of vital importance that the researcher evaluates their skill and competency to conduct research, their knowledge of ethical principles and ethical acceptability of the study. Aguinis and Henle (2004) suggested that those who do not have the necessary skills and expertise to conduct research should be supervised. Failing which, the research may be considered being untrue due to invalid results.

### *Recruiting and selecting participants in research*

Recruiting participants deserves an ethical consideration. Consideration should be given as to the right to privacy, the right to confidentiality, the right to protection from deception and the right to debriefing. As per the letter requesting research within Company A, it is clearly stated that the information will be used for study purposes only and no information will be published without the company's concern.

### *Reporting the results*

Ethical considerations do not simply stop with data collection, but however goes further to reporting the results and submitting it for publications. To avoid misrepresentation of research results, researchers must honestly and accurately report findings, and not falsify, distort or omit findings. Editing data is especially prominent when the results obtained reflect negatively on the organisation in which data were collected. Rosental (cited by Aguinis and Henle, 2004) that failing to report data that contradicts previous research, is deemed unethical.

## **2.8 SUMMARY**

The objective of this chapter was to address the first secondary objective as indicated in chapter 1 of identifying and presenting the applicable research methodology. The background of the types of research, research methodology and research design were described.

The research approach to the study was reviewed and it was ascertained that the approach can be distinguished by the research objective and it can follow either a qualitative or quantitative or mixed method approach.

This chapter provided a definition of qualitative research designs, which stated that there is no cast and concrete rule that should be followed by researchers in qualitative research design. Following Creswell (2009), five strategies were identified as tools that can be utilised in qualitative research design.

The chapter addressed the research methodology where it was discussed that the research methodology is to analytically answer the business problems. The different types of research methodology were reviewed including the historical method, descriptive method, experimental method, field study method and case study method. The case study method was selected to conduct this study.

The chapter addressed the various ways and means of data collection. The researcher has to be clear on the population and sampling method to be utilised. The sample will be drawn from Company A's employees, utilising the purposive sample method.

The chapter concluded by reviewing the ethical considerations. To this end, ethical considerations play an important role in the process of research. The study revealed that ethical considerations do not merely stop at data collection; however it is the series of events, from data collection, analysis, until reporting.

The following chapter will review the literature on activity-driven principles.

## **CHAPTER 3**

### **3 ACTIVITY-DRIVEN PRINCIPLES**

#### **3.1 INTRODUCTION**

The main purpose of this chapter is to address the second secondary objective as set in Chapter 1 (refer page 7) of conceptualising the literature on ABC costing and understanding the background of ABC, benefits and disadvantages of ABC, thus exploring the benefits and disadvantages of implementing the ABC and the enhancement of a traditional costing system to TDABC. ABC is considered to be the building block that led to the introduction of TDABC. In this section, the basic fundamentals of ABC are discussed as it is considered to be the base of TDABC followed by the introduction of TDABC.

The need for the development of new costing systems has become necessary in the modern business environment. In a study conducted by Gunasekaran, Williams and McGaughey (2005:524), it is mentioned that the development of new costing systems are necessary based on the following reasons: i) inaccurate product costing systems, ii) no improvements on current costing systems, iii) large portions of costs formed by overheads, and iv) a lack of sufficient non-financial information. Even as early as in the 1990's, businesses considering the implementation of an activity-driven accounting framework were well advised to incorporate as much physical and non-financial information as possible in properly structured databases (Glad, 1993:29). Due to the growing concern of companies, with respect to an increase in market competition, a number of initiatives have since been underway to improve competitive advantages of companies, one of which is the implementation of ABC (Rezaie, Ostadi & Torabi, 2008:1047).

The concept of ABC and how to construct an ABC cost model have since been discussed by various authors (Anderson, Hesford & Young, 2002; Innes & Mitchell, 1995; Turney, 2012). An overview of literature on ABC has revealed that there are some of the implementation issues that have not been considered. Gunasekaran and Sarhadi (1998:233) ascertained one such issue as the lack of a well-thought-out method to analyse and continually improve the fundamental activities, such as manufacturing, marketing, communication and other important aspects of the company's operations.

More often than not, ABC has been used parallel to other process improvement tools, such as just in time (JIT) and total quality management (TQM) to track cost improvement. However, according to Roztocki and Needy (1999:17), even the most cost reductions do not automatically



create shareholder value and this is because, although ABC gives satisfactory results in the calculation of operating costs, it still lacks the full appreciation of capital costs.

In this chapter, ABC will be discussed under the following headings:

- Background of ABC,
- Components of ABC,
- Limitations of ABC,
- Benefits of ABC,
- The evolution of TDABC methodologies,
- Steps in the implementation of TDABC, and
- Advantages and Disadvantages of TDABC.

### **3.2 BACKGROUND OF ABC**

According to Latshaw and Cortese-Danile (2002:23), ABC was introduced to overcome the limitations of the traditional costing systems. Finance staff channelled their efforts to improve the effective use of the accounting information in controlling the continually increasing indirect costs. The main focus of ABC was to provide more accurate individual product costs (activity based costing) and secondly to assist in dealing with the indirect costs (activity based management) (Latshaw & Cortese-Danile, 2002:23).

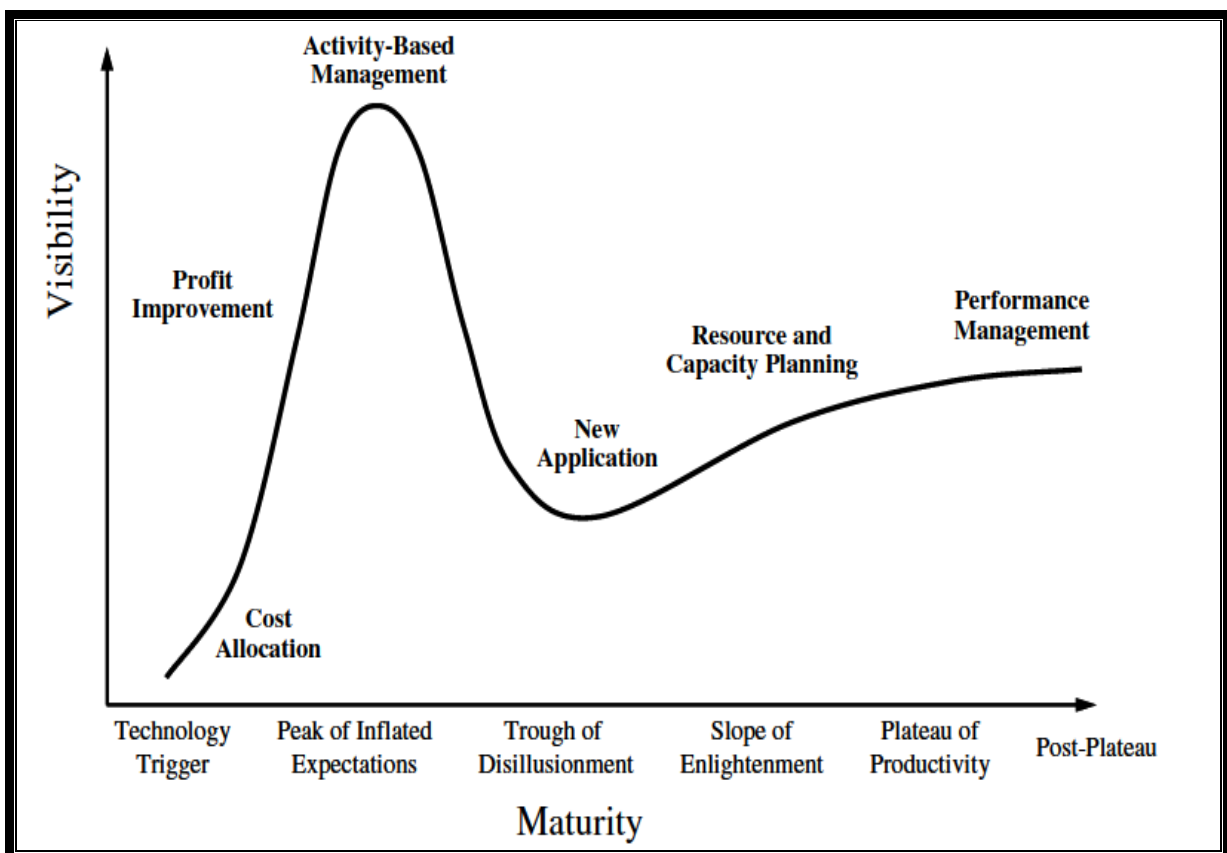
The history of traditional cost accounting emanates back from the period 1870 to 1920. During those days industries were more labour intensive, the product variety was limited, and generally the overhead costs were insignificant. In the late 1960's and 1970's however, it was concluded that there should be a relationship between activities and costs (Bazrafshani & Karamshahi, 2017:4). The next phase of ABC was further developed in the 1980's. Cooper and Kaplan (1988, 1992) are the developers behind the introduction of ABC. It is therefore apparent that ABC has been around since the latter part of the 1980's. Given its existence from that time, it is worthwhile to consider its relevance as to:

- How has ABC developed over its lifecycle?
- What lessons have been learned from the evolution of ABC? and

- What ABC can do today that was impossible before its evolution?

According to Turney (2012), ABC became well-known and recognised as an innovative and potential valuable costing method in a very short period of time. As the time goes by, ABC developed into other areas such as cost-to-serve activities, customer profitability and channel profitability. By the late nineteen nineties, ABC was used broadly in various industries, such as service firms and manufacturing firms. Turney (2012) referred to the evolution of ABC as the ABC hype cycle. The hype cycle (refer to Figure 3.1) is the maturity, adoption, and business application of technology represented in a graphical way.

**Figure 3-1: The ABC hype cycle**

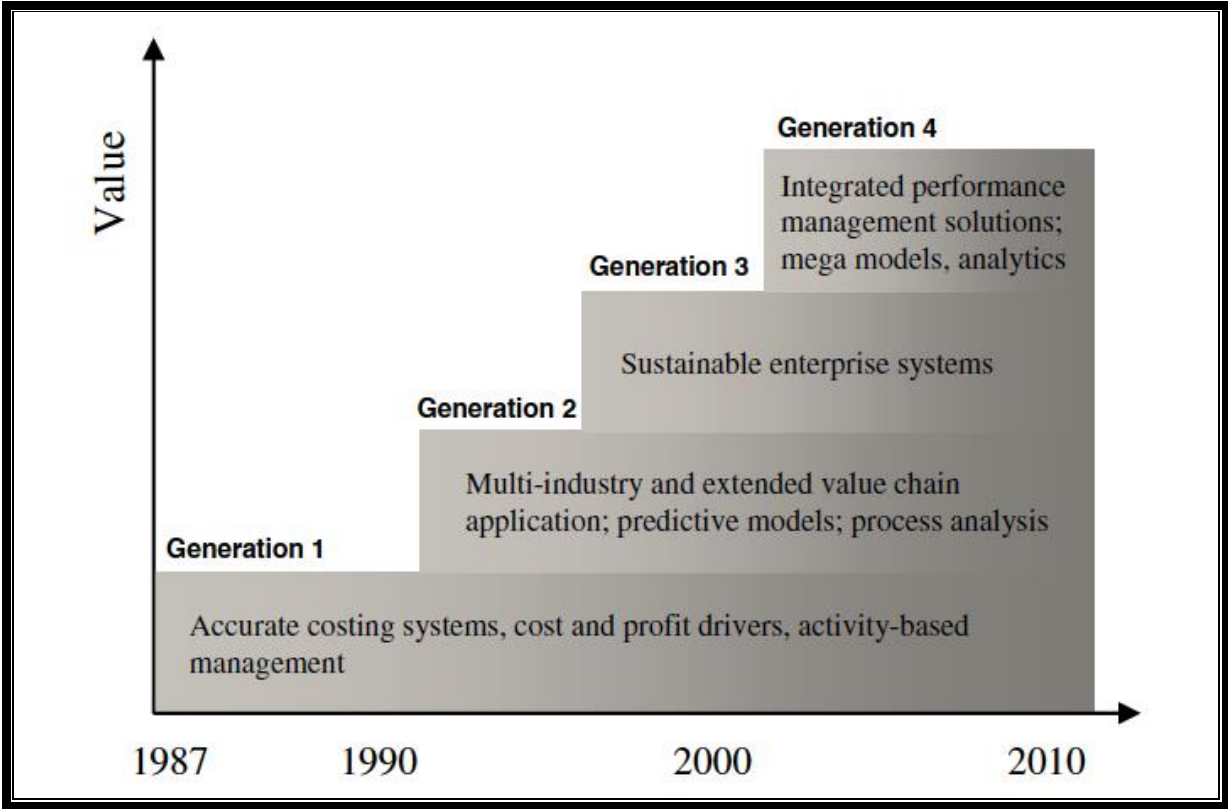


Source: (Turney, 2012)

The lessons learned from the evolution of ABC, similar to the lifecycle of any other development of technology, are not unique. Firstly, the performance increased over time, reflecting ongoing research and growth. Secondly, the interactive response to ABC advanced to be accepted by businesses' successes as evidenced in Figure 3.1. The first five phases represent the history of ABC, while the sixth phase represents the current state of ABC. Each of the phases, as described by Turney (2012), will now be discussed.

- *Technology Triggers (1984-1987): Innovations in cost accounting*  
The development of ABC was due to the increasing competition experienced by Western companies, mainly those in the electronics- and automotive sector.
- *Peak of Inflated Expectations (1987-1991): New Generation*  
The peak of inflated expectations can be explained as the eagerness and willingness to use new technology. During early 1987, most articles on ABC appeared in the Harvard Business Review, the Journal of Cost Management and other publications. These publications and presentations explained how to implement ABC, what it meant, and what impact it would have on businesses that adopted it.
- *Trough of Disillusionment (1991-1995)*  
During this period ABC was the target of critics. Critics of ABC generally fell into two categories. Some argued that ABC was not compatible with the principles of continuous improvement and TQM. It was furthermore regarded that ABC did not focus on customer satisfaction, was not process approach driven, did not improve organisational learning, and followed a top-down approach. Others argued that ABC was not consistent with the theory of constraints.
- *Slope of Enlightenment (1995-2000): Second Generation*  
ABC focused on rectifying the misallocation of overhead costs to products inherent in cost accounting systems. With continued use of ABC, it became clear that ABC was relevant to other areas outside cost accounting. For example: administration, sales, marketing, research and development, supply chain, and logistics.
- *Plateau of Productivity (2000-2006): Third Generation*  
Turney (2012) describes the plateau of productivity as where the use of ABC is embraced and approaches the accepted use of the technology, and is measured by a market penetration exceeding 30%. It is the point at which the benefits of the technology are recognised and assumed to exceed the cost and effort required to implement.
- *Post Plateau (2006-present): Fourth Generation*  
According to Turney (2012), this was the beginning of the use of ABC as a fundamental component of business performance management solutions and embedded in operations. For example, performance management and profitability management (refer to Figure 3.2).

**Figure 3-2: The four generations of activity-based costing**



Source: (Turney, 2012)

The next section discusses the benefits of ABC.

**3.3 THE BENEFITS OF ABC**

The ABC method was developed to have an added advantage over the traditional costing systems. According to Suthummanon, Ratanamane, Boonyanuwat and Saritprit (2011) the most important advantage of ABC lies in a more accurate cost calculation, largely in situations where product diversity is important and in which the indirect costs represent a larger portion of total cost. Rundora, Ziemerink and Oberholzer (2013:489) affirmed that ABC improves the accuracy of product costing and assists managers in understanding and evaluating how the resources are utilised across the company’s value-chain in achieving positive strategic results.

An example of particular relevance to the current study is industries where the ABC costing system was successfully implemented:

In a study conducted by Neriz *et al.* (2004), the implementation of an ABC system in a nutrition department showed positive results. ABC reduced the costs of the nutrition department and it was therefore concluded that it could produce similar results for the entire hospital.

Rundora *et al.* (2013:489) outline the following benefits of using ABC:

- Provides accurate product costing, mostly where non-volume related overheads are significant,
- It helps with the understanding of cost behaviour,
- ABC provides managers with an approach to match the expenses with specific activities,
- It helps with the identification of areas of improvement,
- Better decision making process through an improved product cost, and
- It helps with the identification of non-value adding activities and provides better information as to how to treat those costs.

According to Sohal and Chung (1998:138), the companies that have implemented ABC after making their decision to adopt it, had achieved five goals:

- Accurate product costing;
- Enhanced cost management techniques;
- Enhanced cost control;
- Improved allocation of overheads; and
- Accurate cost information.

There are however also limitations and shortcomings of ABC, which will now be discussed.

### **3.4 LIMITATIONS AND SHORTCOMINGS OF ABC**

Since the inception of ABC, advocates of ABC noticed that it yielded poorer results than expected (Stratton, Desroches, Lawson, Raef & Hatch, 2009:10). Kaplan and Anderson (2003) identified reasons why many companies did not continue with ABC as: i) it did not address the complications of their operations, ii) it took too long to implement, and iii) it was too expensive to implement and maintain. In a study by Stratton *et al.* (2009), it was mentioned that ABC was simple in theory, but not in the real practise. It involved defining activities which had to be reviewed regularly.

Like any other system application or technological changes, there will always be limitations and shortcomings due to the change. Although the application of ABC provides more accurate costing results, it is still criticised by many, as it is regarded as a sophisticated absorption costing system, having the same limitations as traditional methods (Vigario, 2007).

Bazrafshani and Karamshahi (2017:4) claim that the collection of data for an ABC system takes time. This problem becomes even more prominent when the company is at an early stage of implementing ABC. Torres (2014) further confirms that ABC requires a significant amount of time, it is very costly and it does not conform specifically to the general accepted accounting standards (GAAP). In summary, managers and accountants may be unwilling to develop an ABC costing system, due to time and effort to be taken into account.

In another study by Datar and Gupta (1994), they highlight that there has been an analysis of the reasons why an ABC system with multiple cost pools, activity drivers and allocation bases, generates more accurate product costs. Interestingly, the results revealed that improving the cost allocation bases and increasing the number of cost pools in a system, increase specification and aggregation errors. In addition, according to Latshaw *et al.* (2002:23), it is vital that those involved with business operations understand the business situations in which ABC works best, the fundamental assumptions and the misrepresentations that can arise from the deviation from such assumptions.

Howell and Soucy (1990) suggested that using more than one costing system can address the limitations and shortcomings of ABC. However, Reyhanoglu (2004) argued that by using more than one costing technique can be very costly and moreover can confuse business results. He suggested that a new and improved accounting system can be introduced, such as Time Driven Activity Based Costing (TDABC). TDABC is discussed under section 3.7.1.

Cohen, Venieris and Kaimenaki (2005:984) argued that irrespective of several benefits of ABC, there are companies that are not in favour of the adoption of ABC. The main reasons for rejecting the adoption of ABC could be summarised as:

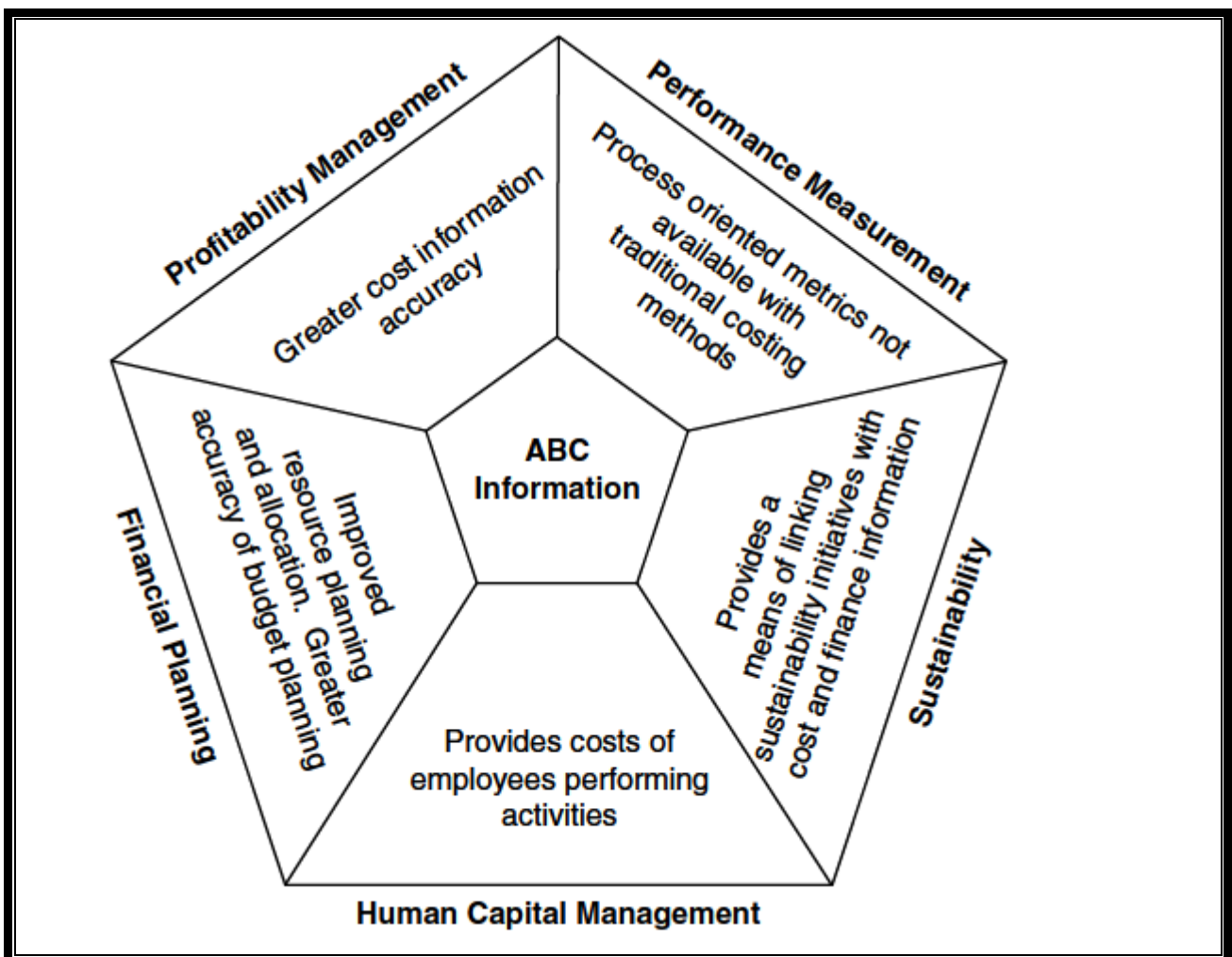
- Being in favour of the existing costing system, while the ABC implementation is associated with high costs,
- lack of resources to undertake an ABC implementation, and in turn considering ABC as not providing accurate cost information, and

- Overbearing supervisors and management override, regarding a requirement to follow the parent company's policies and procedures, including the selection of a cost accounting system.

Cohen *et al.* (2005:984) further stress the difficulties experienced in the implementation of ABC, including the unwillingness to accept the new system, and difficulties in selecting cost drivers and activities.

As mentioned previously, Turney (2012) referred to the evolution of ABC as the hype cycle, and the last cycle as the Post Plateau (2006 to present) or 4<sup>th</sup> Generation. This is the current state of ABC (refer figure 3.2, page 27). These new solutions are now regarded as the other uses of ABC and include: profitability management, performance measurement, financial management, sustainability and human capital management (refer Figure 3.3).

**Figure 3-3: ABC-The foundation of performance management**



Source: (Turney, 2012).

According to Turney (2012) each of the components reflected in Figure 3.3 can be explained as follows and highlights the other uses of ABC:

**Profitability Management:** new technology such as Profitability Management Systems offers an increased power and faster results from ABC information. This allows an analysis of complex business models.

**Performance Measurement:** In businesses that integrate ABC with performance management, ABC is an important source of performance measures. These measures are typically found in the process dimension of a scorecard where activity costs provide the focal point for target setting and scoring of goals around process performance.

**Financial Management:** ABC supports the preparation of budgets and long-term plans that are logically derived from strategic goals. ABC models with predictive capability can be combined with forecasting and other analytic techniques to support fact-based scenario development.

**Sustainability:** ABC can help those companies that are willing to improve sustainability.

**Human Capital Management:** New solutions such a Human Capital Management can pull all the information together and predict skills, capability and employee churn effects. ABC provides three important insights: First, ABC analysis can be used to analyse high cost processes and improvement action taken to free up resources. The freed capacity may be redeployed, using cross-training, to meet critical needs. Second, ABC can be used to forecast the transaction level of activities, which are then used to forecast the amount of resources used to perform the new level of activities. Finally, ABC input can be used to perform statistical forecasting to accurately determine the number of people required to support targeted products, channels, markets, and customers.

The next section discusses the steps to be followed when designing an ABC system.

### **3.5 ACTIVITY BASED COSTING SYSTEM DESIGN**

According to Mahal and Hossain (2015:69), before an organisation decides on designing an ABC approach, the following questions should be considered:

- Should the system be integrated with the existing system or should it be a standalone system?
- Should a formal design be approved before implementation?



- Who should take ownership of the new system?
- How precise the system should be?
- Should the system report historical or future costs?
- Should the initial design be complex or simple?

Having answered these important questions, the organisation can start designing the appropriate ABC system according to its desired and specific requirements.

The basic principle in an ABC system is to identify the activities of an organisation, calculate the cost of each activity and then costing the product, based on the consumption of activities (Gunasekaran & Singh, 1999:414). Reviews of the literature, including case studies on ABC, have provided valuable information on the implementation of the ABC framework. Examples of such literature include Gunasekaran and Sarhadi (1998:240); Gunasekaran and Singh (1999); Özbayrak, Akgün and Türker (2004); Taba (2005); Raab, Shoemaker and Mayer (2007).

Gunasekaran and Singh (1999:414) ascertain that the identification of activities and the level of details of activities are key in the design of an ABC system. The accuracy of costing depends on this step. Table 3.1 presents the 10 steps of an ABC system design.

**Table 3-1: The ABC system design**

Step	Description
1	Set the Objectives of Activity-Based Costing System
2	Establish the ABC Team
3	Analyse the Organisational Issues
4	Identify and Define Activities
5	Identify Primary Cost Drivers
6	Determine the Activity Cost Pool
7	Determine Secondary Cost Drivers
8	Define Cost Objects
9	Compare product Cost with Traditional Cost
10	Develop a Framework for the Implementation of ABC

Source: (Gunasekaran & Singh, 1999)

Figure 3.4 presents the difference between the traditional costing method and an ABC method. From this figure it is clear that the traditional costing method allocates expenses based on percentages to products, as opposed to the ABC method that uses cost drivers to allocate expenses.

**Figure 3-4: Traditional vs. Activity-based costing**

<b>TRADITIONAL METHOD OF COST ACCOUNTING</b>	<b>ACTIVITY – BASE COST ACCOUNTING</b>
GENERAL INDUSTRIAL EXPENSES	GENERAL INDUSTRIAL EXPENSES
DISTRIBUTION OF COST WITH PERCENTAGES	DISTRIBUTION OF COST BASED ON THE COST – DRIVERS THAT CONNECTS EXPENSES WITH ACTIVITIES
COST - CENTRES	ACTIVITIES
TRANSPORT OF COST IN THE PRODUCTS ACCORDING TO THE VOLUME OF PRODUCTION	TRANSPORT OF COST IN THE PRODUCTS ACCORDING TO THE ACTIVITIES
PRODUCTS	PRODUCTS

Source: Adapted from (Dimitropoulos, 2007)

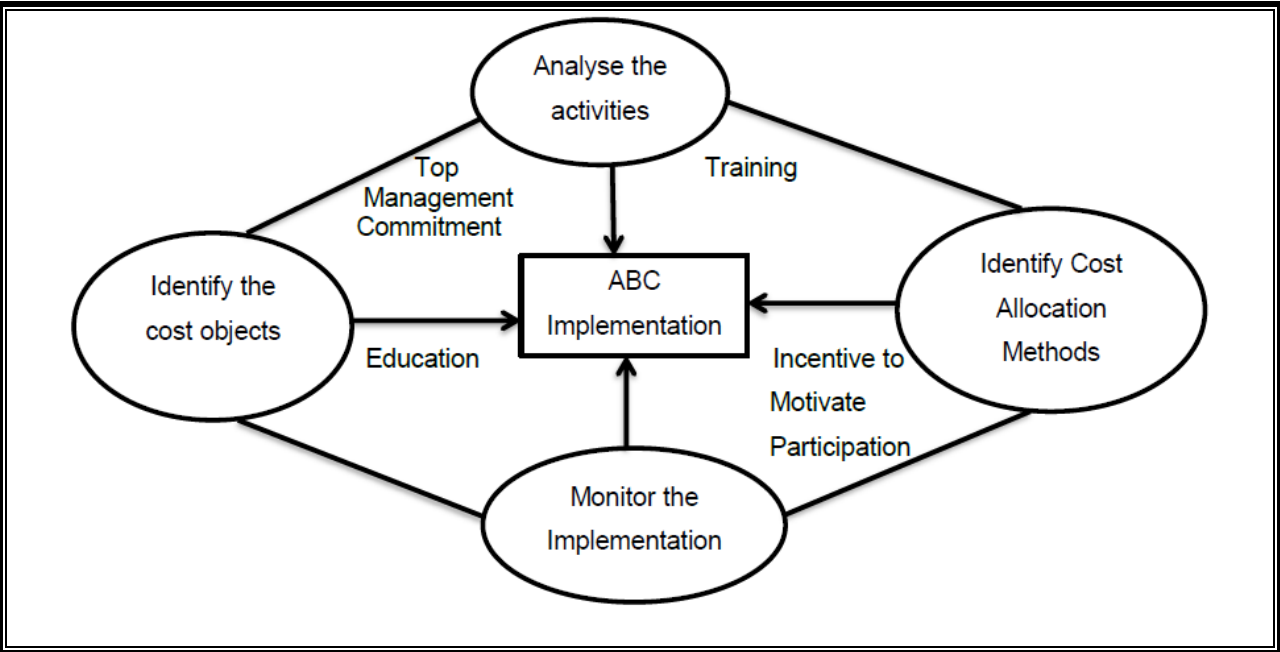
**3.6 FORMULATE THE FRAMEWORK FOR THE ABC SYSTEM IMPLEMENTATION**

The conditions for the successful implementation of ABC depend largely on the organisational and behavioural characteristics of the company (Gunasekaran & Sarhadi, 1998:240). According to a multiple-case study conducted on 5 top American companies, it revealed that top management’s commitment, education and training of employees, and incentives to motivate employees, contribute to the successful implementation of the ABC system.

Various authors have reached agreement on several essential characteristics of a successful implementation of ABC (Innes & Mitchell, 1995; Pohlen & La Londe, 1994; Roztocki *et al.*, 2004:17; Turney, 2012). Mahal and Hossain (2015:69) ascertain that, firstly, the initiative to implement ABC must be strongly supported by top management and secondly, the design and implementation of an ABC system should be the responsibility of a cross-functional team, rather than that of only the accounting department.

According to Gunasekran and Sarhadi (1998), the most common and important steps in the implementation of ABC are: 1) analysing the activities, 2) identification of the cost allocation methods, 3) identification of cost objects, and 4) monitoring the implementation. However, additional steps required, will differ from company to company, depending on the size and the complexity of their operations. The concept of steps in ABC implementation is also evident in a study by Kaplan and Cooper (cited by Suthummanon *et al.* (2011:81)) as: 1) identifying the activities that are consuming the organisation resources, 2) determining the organisation’s key activities and business processes, 3) estimating the cost of the activities, and 4) the business processes that are performed and determining the amount of the activities required. Suthumanon *et al.* (2011:82) therefore concluded that the ABC model consists of resources, activities and cost objects and they are linked by activities and cost drivers. Figure 3.5 presents the implementation of ABC in a manufacturing environment.

**Figure 3-5: Implementation of ABC in a manufacturing environment**



Source: (Gunasekaran & Sarhadi, 1998)

The various factors that play a role in the implementation of ABC as displayed in Figure 3.5 will now be discussed.

#### *Top Management Commitment*

Management style and commitment play a very important role in motivating individuals involved in the introduction of a new information system in an organisation (Stone, 1994). In a study conducted by Glad (1993:29), it was emphasised that “it is also interesting to note that in a number of companies the demand for an ABC system has in fact come from chief executives”. According to Naranjo-Gil, Maas and Hartmann (2009:674), it is the company’s board of directors who needs to make the adoption decision and who will determine the extent of use of new systems.

#### *Education and Training*

According to Gupta and Galloway (2003:137), the best starting point for gathering ABC information is through employees involved in the day-to-day operations, also referred to as front line employees. ABC implementation can have a significant impact on employees, particularly in areas of empowerment and accountability, roles and responsibilities and performance measures. The employees should be equipped and be empowered with the necessary knowledge and the benefits that will be derived from the implementation (Gunasekaran & Sarhadi, 1998:240).

#### *Incentive to motivate employees*

The favourable influence of top management is not necessarily limited to individual participation. However, by focusing on the comfort and wellbeing of employees and valuing their contributions, engender an atmosphere that encourages participation (Hoozée & Bruggeman, 2010:188).

### **3.7 OTHER RELATED ABC METHODOLOGIES**

The design and implementation of new strategic management initiatives have been common amongst businesses. However, cost management systems have been ignored from the discussion (Trussel & Bitner, 1998:36). According to Kaplan and Anderson (2003), several problems arose when companies tried to scale up the ABC approach to enterprise-wide models and to maintain the model so that it reflects changes in activities, processes, products and customers. Notwithstanding, many improvements have been developed to enhance ABC costing. Rezaie *et al.* (2008:1049) ascertain that many companies that have already initiated

ABC are slowly re-engineering other facets of their traditional financial costing systems, based on the ABC approach.

### **3.7.1 Time Driven Based Approach**

In order to address the limitations, disadvantages and shortcomings of the traditional ABC model, Kaplan and Anderson (2003) developed an alternative approach without entirely abandoning the ABC concept. This approach is called Time Driven Activity Based Costing (TDABC). Barros and Ferreira (2017) describe TDABC as a costing system that allocates the resource costs directly to cost centres, using the estimation of two parameters for each group of resources. In their opinion, it is simpler, cheaper and faster to implement. The driver rates are based on practical capacity. Furthermore, Kaplan and Anderson (2003) wished that the evolution of ABC in the 1980's had incorporated the TDABC approach since then. Kaplan and Anderson (2007) have identified some of the reasons why companies have abandoned the traditional ABC costing. These reasons are outlined as follows:

- The information gathering process was too costly and took a long time to consolidate information gathered.
- Where the unutilised capacity was ignored, the ABC system gave incorrect results.
- It was always cumbersome to keep up with the technological changes for the ABC system to be updated frequently.
- It was too costly to process and store data.

TDABC is however addressing the problems encountered with the traditional ABC costing. The TDABC system takes a holistic view of the operations of the company by changing the data collection methods and the way the cost objects are calculated. TDABC uses time as primary cost driver, as all the resources have time that is allocated to them and capacity that can easily be measured (Szychta, 2010:53).

According to Kaplan and Anderson (2003), TDABC requires only two components, namely i) the unit cost of the supplying activity, and ii) time required to perform an activity. The principle is therefore based on time equivalents of production, which can be changed as the factors of production changes.

### 3.7.2 Advantages and Benefits of Time Driven Based Approach

As was mentioned under section 3.4, TDABC was introduced as an enhancement to the traditional ABC model. ABC was not totally abandoned, but critically improved and enhanced. Reddy, Venter and Olivier (2011:1065) outline the advantages of TDABC as: ease of use, accuracy and cost.

**Ease of use:** The TDABC system is easy to implement, and therefore its maintenance is also less frequent and easier. The system does not involve a hierarchy of activities. According to Zhuang and Chang (2014:960), TDABC allows employees to put more focus on generating output and production time, rather than wasting time on non-value adding activities. TDABC separates unused capacity from utilised capacity, so as to do comparisons between the two capacities.

**Accuracy:** Practical capacity is an accurate measure of time taken by the employees. ABC uses a single cost driver rate, while TDABC uses a single time equation.

**Cost:** TDABC implementation is cheaper than ABC implementation. The time taken to identify and map cost drivers are significantly reduced.

The underlying motive for TDABC is to improve decision making processes by providing quality information that can be utilised to improve business processes within the company. Information provided should be influential and factual and information that builds trust with the users.

In a study conducted by Sarokolaei, Savis, Maradloo and Dahaj (2013:338), it was found that a TDABC approach eliminates the activity identification phase and there is therefore no need to assign costs to multi-purpose activities. This model avoids distributing and collecting questionnaires, which are commonly utilised when developing a traditional ABC method. This is costly and time consuming.

In order to successfully implement TDABC and effectively benefit from its use, it is necessary to integrate it with systems providing operating data. Therefore, companies who do not have integrated information operating systems cannot successfully implement TDABC and benefit from its use (Szychta, 2010:58).

According to Kaplan and Anderson (2003), TDABC has the following advantages:

- It generates and highlights the inefficiencies in the process,
- It is easy to estimate the unit costs and it can be implemented quickly,

- It can be updated with ease to align with the changes in the operations, and
- The TDABC model is generally similar for companies in the same industry.

Kaplan and Anderson (2003) concluded that TDABC simplifies the traditional costing method in that:

- The cost drivers are presented as a one-time equivalent driver;
- Usage of standards resulting in less information collected;
- The number of activities is reduced.

In a study conducted by Kaplan and Anderson (2003), reference is made to a company where the number of activities was reduced from 1 200 to 200.

### **3.7.3 Disadvantages and Weaknesses of the Time Driven Based Approach**

The disadvantages or weaknesses in a TDABC approach is, according to Szychta (2010:57), that the TDABC calculations are primarily based on estimates and the results of activity cost calculations can therefore be misleading, resulting in ineffective decisions being made.

### **3.7.4 Steps in implementing a Time Driven Based Approach**

There are two basic steps in implementing a TDABC approach. According to Kaplan and Anderson (2003), these are:

- Firstly, calculating a capacity cost rate by estimating the practical capacity of the required resources and their related costs, and
- Secondly, estimating the time it takes to perform the activities.

According to Reddy, Venter and Olivier (2011:1063) these two basic steps can be expanded to include the following detailed steps when implementing a TDABC approach:

- **Identify the activities:** in this phase all the activities that are performed by Company A are identified. This includes the identification of core activities.
- **Determine the capacity cost rate:** this step involves determining the cost of the resources used to perform a task. According to Kaplan and Anderson (2007) this, in simple terms, includes the salaries and wages of employees performing the task, equipment utilised, cost

of technology, and facilities' costs. The capacity cost rate can then be calculated using the following formula:

$$Capacity\ Cost\ Rate = \frac{Cost\ of\ Capacity\ supplied}{Practical\ Capacity\ of\ resources\ supplied}$$

- Estimate the activity time:** this step involves the estimation of time that employees take to complete a task. It is the responsibility of line management to assist with the estimated operational time by using a simplified method, which gives more accurate results (Szychta, 2010:53). In order to construct the time equation, it is important to define the basic activities of a process and all its corresponding variants.

The time equation formula is as follows:

$$Employee\ Capacity = Working\ Hrs\ in\ a\ day \times No.\ of\ working\ days\ in\ a\ month$$

- Determine the cost driver rate:** in TDABC the cost driver rate is simply the results of multiplying the estimated time to complete a single unit of product and the capacity cost rate.

Zhuang and Chang (2014:962) compiled a table of contrasting differences between ABC and TDABC. These are outlined in table 3.2 below.

**Table 3-2: Comparison between ABC and TDABC**

Cost Item	ABC	TDABC
Cost Allocation	Two Stage	One Stage
Determination of the Drivers	Subjective	Objective
Transparency	Not Transparent	Transparent
System Update	Time Costly	Flexible
Cost Consideration	Per season/ year	By-event
Informative	Less Precise	Precise info
Capacity Forecast and Planning	Neglected	Utilizes further

Source: (Zhuang & Chang, 2014)



### **3.8 SUMMARY**

This chapter's aim was to address the second secondary objective of the study as set out in Chapter 1 (refer page 7) of conceptualising the literature on ABC costing and understanding the background of ABC and TDABC and in turn exploring the benefits and disadvantages of implementing these costing methodologies.

This chapter demonstrated that ABC has been successfully implemented in various industries. The benefits derived from ABC differ from organisation to organisation. First, ABC assists companies to carefully analyse costs, making planning easier and contributing to decision making. However, it was also found that ABC did not always meet the expectations of organisations in the manner by which data was collected and reported. It was becoming too expensive to keep the ABC systems up to date.

On the other hand, although ABC has its advantages, these do not outweigh the limitations and for this reason Kaplan and Anderson (2003) developed and enhanced the existing ABC system to overcome the challenges that were encountered with the traditional ABC system. TDABC was found to be more relevant, as it only requires two parameters, i.e., the practical capacity and the estimated time it takes to perform activities.

The following chapter will address the implementation of the TDABC framework within Company A and thus compare the results to the existing costing method.

## **CHAPTER 4**

### **4 EMPIRICAL CASE STUDY ON TIME-DRIVEN ACTIVITY-BASED PRINCIPLES**

#### **4.1 INTRODUCTION**

The main purpose of this chapter is to address the main objective of this study (refer chapter 1, page 7) and secondly to address the third secondary objective of developing and applying a costing framework through an activity-driven operational accounting system for Company A.

Firstly, the current costing method will be visited and the results calculated, followed by an introduction of the proposed costing method. The difference between the two methods will then be compared.

#### **4.2 EMPIRICAL CASE STUDY**

Company A was established in 1923, and is one of the state-owned companies in the Republic of South Africa. It has a great role to play in the economy of South Africa, including the South African Development Community (SADC) in the supply of electricity to the customers. Most of Company A's sales are in South Africa with other Southern Africa countries accounting for a small percentage. Approximately 95% of the electricity used in South Africa is generated by Company A. Company A generates, transmits and sells electricity to the various industry sectors approximately industrial (3000), mining (1000), commercial (49000), agricultural (84000) and more than four million residential customers. Company A's main objective is to provide sustainable solutions to grow the economy and improve the quality of life of the people of South Africa and the region. .

To this end, Company A has been faced with serious financial constraints. This has resulted in cost cutting strategies being implemented within the Company at all operational levels. Against this background, an optimal costing framework is even more important. A time-driven activity-based accounting framework is proposed within the company. There are a number of valid reasons why Company A should consider devising a TDABC costing framework. These reasons include:

- It is flexible enough to analyse costs by cost objectives other than products such as processes.
- Where value adding activities are identified, the activity based accounting framework will provide a more accurate measurement of costs, thus helping managers to improve product design decisions, better customer support decisions and fostering value-enhanced projects.

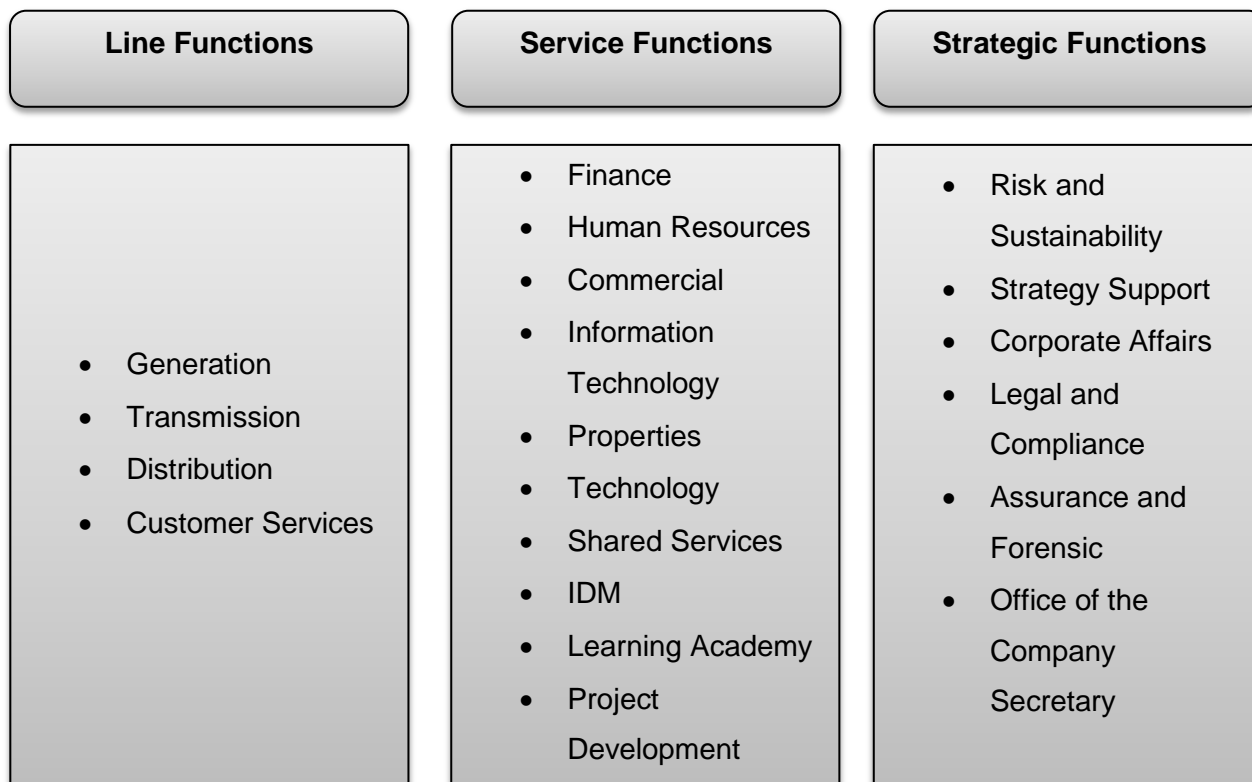
- By eliminating all the non-value adding activities, better information can be utilised to identify the cost of unused capacity and maintain a separate accounting for this cost and such information can be used to identify areas where process improvements are required.

As mentioned in Chapter 1 (refer page 3), for the purposes of this study, Company A incurs costs at a certain level, and these costs are divided amongst the divisions on an estimated cost basis, using a 3-factor formula.

### 4.3 DIVISIONS OF COMPANY A

As mentioned in Chapter 1 (refer paragraph 1.3, page 3), Company A's product and services are rendered to the customers through the value chain of Division A (generator of electricity), Division B (transmits electricity), Division C (distribute electricity to end users) and Division D (provides customer related activities). For the purposes of this study, the Service Functions and Strategic Functions are grouped and referred to as support functions. These support functions are fulfilled by the non-licenced divisions that physically resides in a licenced division (refer Figure 1-1).

**Figure 4-1: Company A's Line Functions, Service and Strategic Functions**



Source: Company A Corporate Plan

**Division A:** produces the electricity through its base-load plants, peaking plants and self-dispatch abled generation. Most of the power stations are coal fired. Within Division A, there are various types of plant portfolios maintained by Company A, namely: gas turbine, pumped storage, hydroelectric, coal and nuclear.

**Division B:** responsible for developing new infrastructure in the supply of electricity. It transmits large amounts of electricity (measured in megawatts) from power stations to substations.

**Division C:** operates and maintains Company A's electricity network. It aims to distribute electricity at smaller scales to residential customers, and ensuring the reliable supply of electricity that meets customer expectations.

**Division D:** is the custodian of revenue in Company A. The division is responsible for managing the process of recovery and protection of revenue against theft and other losses.

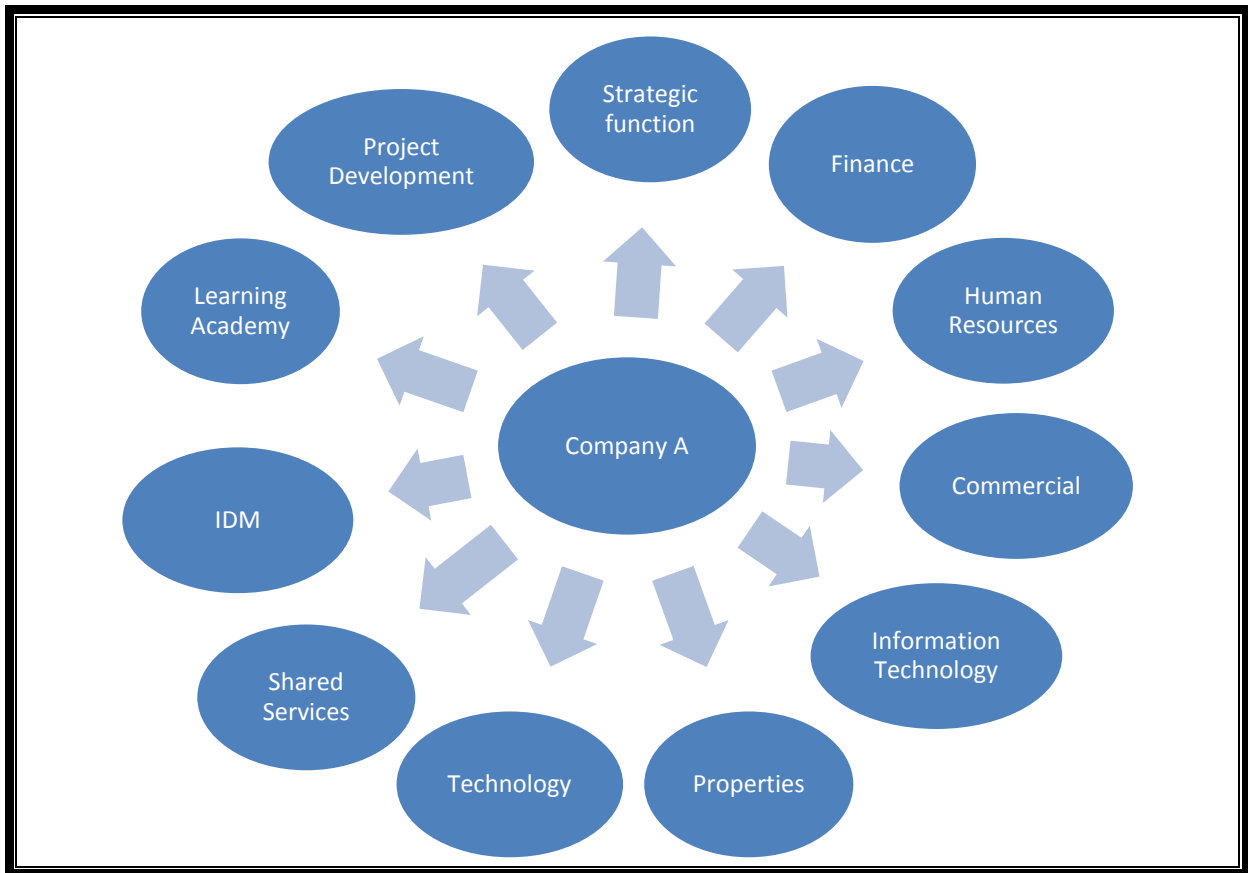
Company A's main aim is to strengthen its financial position through demand stimulation, increase sales growth and improving efficiencies. This is the reason that it should embark on cost containment initiatives which includes devising a methodology that will be reflective of the business operations.

#### **4.4 SUPPORT FUNCTIONS OF COMPANY A**

Company A is made up of 11 support functions (shown in Figure 4.2), which are included as corporate overhead costs. These are internal service function costs, associated with supporting line divisions in delivering the core business, namely: strategic function, finance, human resources, commercial, information technology, properties, technology, shared services, Integrated Demand Management (IDM), learning academy and project development.

IDM and project development are excluded in the function of overhead allocation methodology. This is because the IDM- and project development cost (refer Figure 4-2, page 44) are directly absorbed within the division they relate to. Project development costs are allocated through direct assessment to Division B and Division C. Direct assessment is the reallocation of costs between the departments (internal charges between departments). IDM, on the other hand, are 100% directly allocated to Division D and it is for this reason that IDM and project development cost do not form part of the overhead cost allocation.

**Figure 4-2: Support Functions of Company A**



Source: Researcher's own construct.

The main role of the Support Functions of Company A is to render core essential services that support the company, but these support functions do not form part of the core activities of Company A. The costs incurred by the support functions are regarded as corporate overheads and include *inter alia* employee costs, depreciation, general expenses, materials, interest and tax. All the cost that cannot be directly allocated to the divisions, is also treated as corporate overheads. These costs relate to the basic transaction processing and reporting, routine advice, business support and strategic analysis.

Each one of these support functions will now be discussed.

**Strategic Function:** The main purpose of the strategic function is to assist the CEO to oversee and manage the corporate performance of Company A. It includes overseeing the following functions (refer Figure 4-1, page 42): Risk and Sustainability, Strategy Support, Corporate Affairs, Legal and Compliance, Assurance and Forensic and Office of the Company Secretary.

The sections under the Strategic Function will be explained below:

- The ***Risk and Sustainability*** function oversees and measures sustainable business performance and ensures stakeholder confidence by providing climate-friendly and innovative approaches to supply electricity, ensuring a safe work place and protecting the environment by measuring the carbon footprint.
- The ***Strategy Support*** function is responsible for marketing Company A as a top global power company that is trusted, valued and highly regarded by its stakeholders.
- The ***Corporate Affairs*** function is responsible for managing external reputation and communications, using current and relevant communication channels.
- The ***Legal and Compliance*** function ensures that the company conducts its business within its licence to operate by ensuring good corporate governance.
- ***Assurance and Forensics*** function provides services that are designed to help Company A achieve its objectives, by monitoring the effectiveness of good corporate governance, risk management and control.
- ***Office of the Company Secretary*** function provides services that are designed to help Company A in achieving its objectives through ensuring the application of the secretariat's best practises by maintaining an effective decision making process for the Board of Company A.

**Finance:** The main purpose of the finance function is to deliver financial excellence and efficient practices to the business, whilst maintaining financial control. Finance aims to become a unified team committed to providing optimal financial services to the organisation. The department is focused to be a disciplined department where policies and procedures to be followed are outlined. There is continuous interaction with stakeholders across the entire organisation.

**Human Resources (HR):** This is the custodian of people management within Company A. It is mandated to empower and partner managers to recruit, develop and retain skilled and accountable employees. HR is committed to building skills not only internally to Company A, but also to the outside communities.

**Commercial:** The main function of commercial is to ensure all funds spent externally are in line with the company's budget. The aim is to enable Company A to achieve world class competences and performance in the areas of: i) Procurement; ii) Inventory Management; iii) Warehousing and Logistics; iv) Supplier Management and Development; and v) Contract Negotiations. It provides an appropriate platform to facilitate effective and efficient performance to ensure the right product/service at the right time without causing production interruptions.

**Information Technology (IT):** Information Technology is a function required to link customers with the efficient delivery of information technology and communication services. It aims to ensure effective and secure information systems for efficient management.

**Properties:** It provides the real estate function to Company A. It manages all the properties that fall outside the construction and operational footprints and the land, for future growth.

**Technology:** The aim of this function is to provide assurance regarding the integrity of the company's plant assets. It provides technical support that allows the operation and maintenance of Company A's asset base. It is responsible for the company's research and development, engineering support function and asset management costs.

**Shared Services:** It includes costs of all the centralised functions, including: recruitment, accounts payable, payroll and transactional services.

**IDM (Integrated Demand Management):** The current role is to be the administrator and implementer of the NERSA-funded demand management programme. It provides assurance regarding the electricity supply in South Africa, and plays a significant part in the implementation of solutions to mitigate the risks to security of electricity supply.

**Learning Academy:** It provides classroom training on technical- and health and safety topics that are aimed at Company A meeting its technical and health and safety key performance indicators (KPI's). A cost linked to the provision of training is the provision of accommodation and catering for participants at the training events.

**Project Development:** This function is responsible for researching opportunities to increase Company A's capacity. Only those projects, which are deemed feasible, are pursued further.

The next section will describe the current costing approach of Company A.

#### **4.5 CURRENT COSTING APPROACH OF COMPANY A**

As highlighted in Chapter 1 (refer page 3), the current costing approach of Company A specifies that costs should be recovered based on a 3-factor formula. Company A uses a 3-factor formula to allocate the overhead costs of the Support Functions and there is no direct relationship between the cost incurred and the basis used to allocate these costs. The 3-factor formula is effectively an average of: i) the employee costs, ii) revenue, and iii) net assets per division as a percentage of the total.

Company A's current costing framework is driven by the following principles:

- Aiming to follow a strategic approach to achieve the objectives of Company A,
- That no profit or loss should be created through interdivisional transactions, and
- An alignment to the regulatory requirements.

#### 4.5.1 Existing Costing Approach of Company A for 2018

The support functions provided service to the four divisions of Company A for the financial year 2018 and incurred costs amounting to R7,657,169, as published in the financial report. All costs are recovered from the licensees (refer Figure 1-1, page 4) and all departments, not linked to a licensed division, must allocate their costs to a licensed division as per NERSA reporting requirements, based on a specific cost driver and allocation method. This links to the principle highlighted above that Company A's current costing framework is aligned to the regulatory requirements.

These support function costs need to be allocated to the line functions (divisions of Company A) as per the current approach of using a 3-factor formula (refer Table 4-1 below).

**Table 4-1: Support Functions Cost**

<b>SUPPORT FUNCTION</b>	<b>ACTUAL COSTS R'000</b>	<b>BUDGETED COSTS R'000</b>	<b>VARIANCE R'000</b>
Strategic Functions	1 704 033	1 719 148	15 115
Finance	105 624	115 343	9 719
Human Resources	310 790	338 784	27 994
Commercial	670 395	650 069	(20 326)
Information Technology	3 040 357	3 037 589	(2 768)
Properties	731 338	358 492	(372 846)
Technology	221 237	200 621	(20 616)
Shared Services	356 426	567 149	210 723
Learning Academy	516 969	750 238	233 269
	<b>7 657 169</b>	<b>7 737 433</b>	<b>80 264</b>

Source: Researcher's own construct.



The existing costing structure is performed by following the 3-factor formula (refer Table 4-2 below), whereby:

- The employee cost for each division is calculated. This includes permanent staff members, contract workers, and graduates in training.
- The net asset value is calculated as: total assets per division less the current liabilities.
- Revenue, i.e., revenue earned by each division for electricity sales locally and internationally.

The first step involves calculating the aggregate of the elements above for each division. The table below illustrates total employee costs, revenue and net assets for Company A for the financial year 2018.

**Table 4-2: 3-factor Formula**

ACTIVITY	UoM	DIVISION A	DIVISION B	DIVISION C	DIVISION D	TOTAL DIVISIONS
1. Employee Cost	R'000	9 192 187	1 409 959	8 627 330	1 585 915	20 815 391
2. Revenue	R'000	1 583 520	12 639	687 276	189 193 707	191 477 142
3. Net Assets	R'000	250 985 867	158 849 859	121 986 900	98 584 548	630 407 174
		<b>261 761 574</b>	<b>160 272 457</b>	<b>131 301 506</b>	<b>289 364 170</b>	<b>842 699 707</b>

ACTIVITY	UoM	DIVISION A	DIVISION B	DIVISION C	DIVISION D	TOTAL DIVISIONS
1. Employee Cost	%	1.1%	0.2%	1.0%	0.2%	2.5%
2. Revenue	%	0.2%	0.0%	0.1%	22.5%	22.7%
3. Net Assets	%	29.8%	18.9%	14.5%	11.7%	74.8%
	%	<b>31.1%</b>	<b>19.0%</b>	<b>15.6%</b>	<b>34.3%</b>	<b>100.0%</b>

Source: Researcher’s own construct.

The total for each division is then divided by the total of the divisions, resulting in a percentage allocation of the support functions costs. For example, the calculation of Division A:

Division A:  $9,192,187 + 1,583,520 + 250,985,867 = 261,761,574$ , then  $261,761,574 / 842,699,707 = 31.1\%$

The total overhead cost of R7,657,169 is then allocated to divisions (refer Table 4-3 below) using the percentages as calculated and illustrated above (refer Table 4-2). For example, the calculation of Employee cost:

Employee cost:  $R7,657,169 \times 2.4701\% = R189,139$

Employee cost – Division A %:  $9,192,187/20,815,391 = 44.1605\%$

Employee cost – Division A R-value:  $44.1605\% \times R189,139 = R83,525$

**Table 4-3: Support function overhead cost allocation based on 3-factor formula**

ACTIVITY	UoM	DIVISION A	DIVISION B	DIVISION C	DIVISION D	TOTAL DIVISIONS
1. Employee Cost	R'000	83 525	12 812	78 392	14 410	189 139
2. Revenue	R'000	14 389	115	6 245	1 719 104	1 739 852
3. Net Assets	R'000	2 280 577	1 443 385	1 108 431	895 786	5 728 178
		<b>2 378 490</b>	<b>1 456 312</b>	<b>1 193 068</b>	<b>2 629 300</b>	<b>7 657 169</b>

ACTIVITY	UoM	DIVISION A	DIVISION B	DIVISION C	DIVISION D	TOTAL DIVISIONS
1. Employee Cost	%	44.2%	6.8%	41.4%	7.6%	100.0%
2. Revenue	%	0.8%	0.0%	0.4%	98.8%	100.0%
3. Net Assets	%	39.8%	25.2%	19.4%	15.6%	100.0%

Source: Researcher’s own construct.

Note: There might be slight differences when multiplying the percentages in Table 4-2 with the total overhead cost of R7,657,169 due to Table 4-2 only reflecting percentages to one decimal.

As is evident from the above calculations, there is no direct relationship between the costs incurred and the basis used, i.e., the 3-factor formula, to allocate these costs. The disadvantages for using this 3-factor formula can therefore be summarised as:

- Using only employee costs (refer Table 4-3): Division A will absorb the highest proportion of overheads based on employee costs. The reason for this is because Division A has the highest number of employees, thus high employee costs. Division A has 44.2% of the employee cost (83,525/189,139) compared to the Division B: 6.8% (12,812/189,139), Division C: 41.4% (78,392/189,139) and Division D: 7.6% (14,410/189,139).

- Using only revenue (Refer Table 4-3): Division D will absorb the highest proportion of the overheads, because it has the highest revenue. This is due to the customer services section that is responsible for electricity sales and revenue management. Division D has 98.8% revenue (1,719,104/1,739,852) compared to the Division A: 0.8% (14,389/1,739,852), Division B: 0.0001% (115/1,739,852) and Division C: 0.4% (6,245/1,739,852).
- Using only net assets (Refer Table 4-3): Division A will absorb the highest proportion of the overheads, because Division A has the highest net assets - the fleet of power stations. Division A has 39.8% net assets (2,280,577/5,728,178) compared to the Division B: 25.2% (1,443,385/5,728,178), Division C: 19.4% (1,108,431/5,728,178) and Division D: 15.6% (895,786/5,728,178).

There is furthermore no consistency in applying the 3-factor formula, as the four divisions are differently structured. As calculated in Table 4-2, Division D absorbs the highest proportion (34.3%) of the total overhead costs, because it is the division earning the highest revenue (22.5%). Division A on the other hand, has the highest net asset base (29.8%) when compared to Division D (11.7%). Division D however, has the highest revenue, with a lower net asset base when compared to Division A. This allocation method can result in misrepresentation of costs that might lead to inaccurate cost management decisions that could be detrimental to the operations of Company A.

In order to alleviate the identified shortcomings of a 3-factor formula (existing costing system), the following section will explore the development of a TDABC framework for Company A.

#### **4.6 DEVELOPING A TDABC FRAMEWORK FOR COMPANY A**

As highlighted in Chapter 3 (page 36), TDABC is a simple process and easy to apply. According to Kont and Jantson (2011), the contrasting difference between the traditional ABC and TDABC, is that implementing an ABC system is costly and it requires regular updates, whereas TDABC can be updated more quickly and the implementation is also less costly.

The next section will therefore develop a TDABC framework for Company A. The steps required for the implementation of a TDABC framework were presented in Chapter 3, paragraph 3.7.4 (page 38) as:

- Identify the activities: in this step the activities in Company A will be identified,
- Determine the capacity cost rate: this will be determined by estimating the practical capacity of the resources required and their related costs,

- Estimate the time taken to perform the activities: the time it takes employees to perform tasks will be estimated, and
- Determine the cost driver rate: the estimated time will be multiplied by the capacity cost rate.

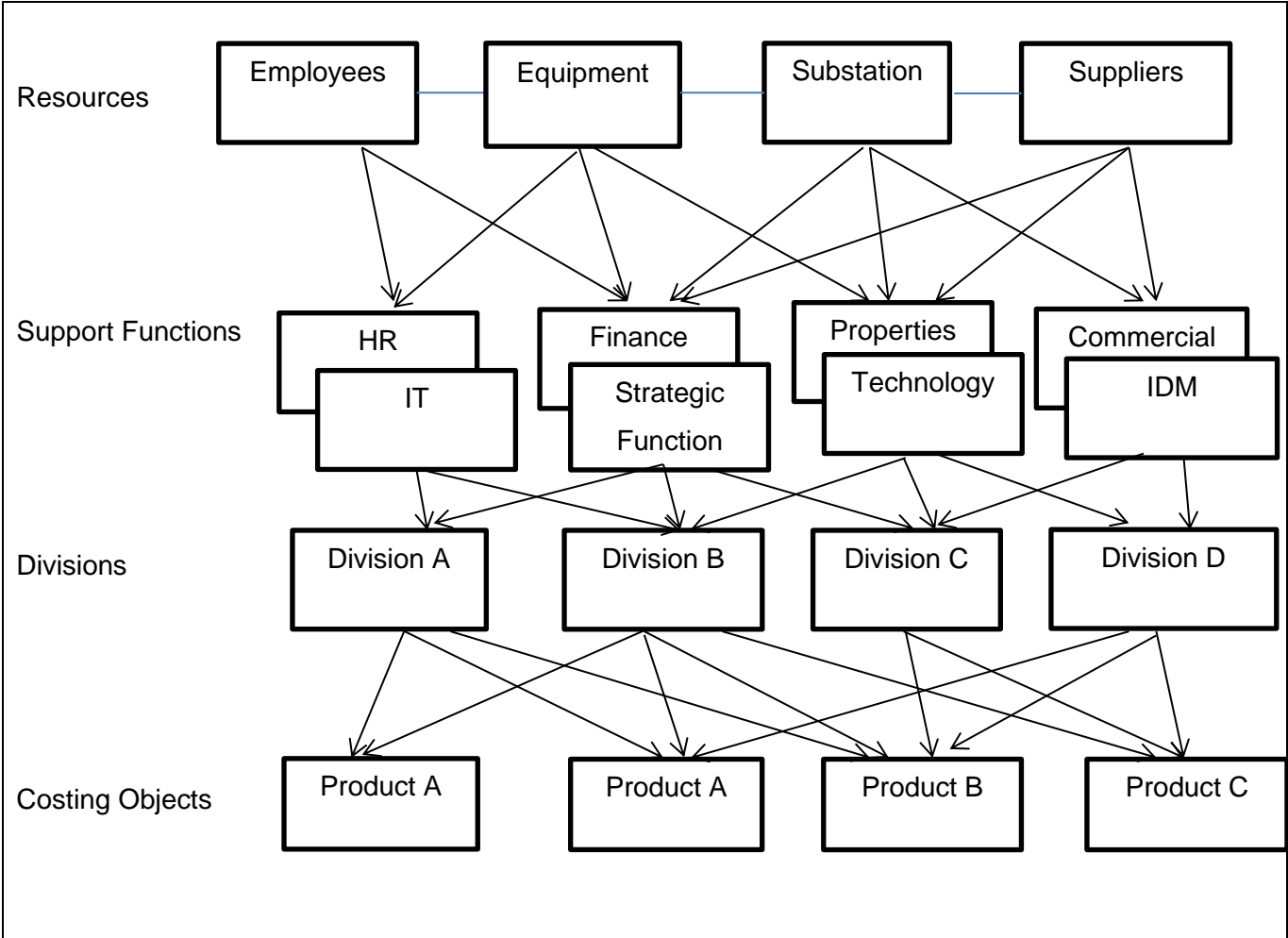
#### **4.6.1 Step 1: Identify the activities for Company A**

The resources to be used to structure the TDABC model are presented in Figure 4-3. Company A's departments are divided according to the enterprise structure (refer Figure 1-1, page 4), i.e., support functions and then divisions, also referred to as line functions of business.

- As mentioned previously, the support functions provide the support to the core business of Company A.
- Divisions are those dealing directly with the generating, transmission and distribution of electricity to the end user. Customer service renders customer related services.

According to Kaplan and Anderson (2003) the flow of resources should be presented up to forming the cost objects.

**Figure 4-3: TDABC resources**



Source: Kaplan and Anderson (2003)

The activities for Company A are scattered across all the support functions. For the sake of simplicity for this study, activities identified for each support function were simplified by grouping it in five major activities. These major groups of activities were classified in a manner that are self-explanatory and give a clear indication of activities performed in each support function. For example, activities were grouped in the Table 4-4 below:

**Table 4-4: Major activities for Company A**

<b>Strategic Functions</b>	<b>Finance</b>	<b>Commercial</b>
<i>Stakeholder Relations</i>	<i>Support, enhance business decisions</i>	<i>Materials Management &amp; supply chain management</i>
<i>Assurance and Forensic Services</i>	<i>Manage Debt Levels</i>	<i>Tactical sourcing</i>
<i>Legal Advisory</i>	<i>Financial Analysis, Reporting and Compliance</i>	<i>Contract Management</i>
<i>Marketing, Branding &amp; communication</i>	<i>Process Control and Assurance Services</i>	<i>Risk, policy Governance management</i>
<i>Business Productivity Programm</i>	<i>Interface Financial Markets, Lenders and Investors</i>	<i>Supplier management, strategy planning &amp; SD&amp;L</i>
<b>Human Resources</b>	<b>Shared Services</b>	<b>Technology</b>
<i>Employee Engagement and Culture</i>	<i>Billing, cash flow management</i>	<i>Engineering framework and operating system</i>
<i>Recruitment, Retention &amp; Workforce composition</i>	<i>Processing Payments</i>	<i>Quality Control</i>
<i>Compensation, Remuneration and Benefits</i>	<i>Customer relations</i>	<i>Research and Development</i>
<i>HR operations and effectiveness</i>	<i>Recruitment transational processing</i>	<i>Outage Management Services</i>
<i>Workforce Planning</i>	<i>Fleet Management</i>	<i>Asset management Activities</i>
<b>Properties</b>	<b>Learning Academy</b>	<b>Information Technology</b>
<i>Asset management Activities</i>	<i>Core Competency development,</i>	<i>Design, Improvement &amp; modelling of processes</i>
<i>Facility, construction Management</i>	<i>Training and Development</i>	<i>Business Solutions</i>
<i>Infra Structural Acquisition</i>	<i>Skills Development and talent management</i>	<i>Information Technology Infrastructure Management</i>
<i>Land Development</i>	<i>Coordinate, standardise &amp; integrate learning processes</i>	<i>IT Delivery &amp; Communication Services</i>
<i>Legal, statutory compliance</i>	<i>Optimise Learning Costs</i>	<i>Research &amp; Develop IT Strategies</i>

Source: Researcher's own construct.

The activities were aligned to the support functions as reflected in Table 4-4. As mentioned previously, these activities were compiled from Company A's enterprise structure. To gather this data and compile these activities the following was done:

- Semi-structured interviews were conducted with the divisional heads of Company A to gather the main activities performed in each support function.
- The value chain of activities in Company A was used to gather the activities performed by each support function.

The grouping of sub tasks to major activities has been provided and accepted by management as a true reflection of the complete set of tasks by the support functions.

#### **4.6.2 Step 1: Estimating the practical capacity for Company A**

According to Somapa *et al.* (2012) estimating the time taken to perform an activity, requires the resources to be aligned to each activity line. Thereafter, the time taken per activity should be multiplied by the cost rate of the service function that it relates to.

The time per unit is an estimate of the time that workers actually spent doing their work with the available resources within a cost centre or service function. Firstly, according to the Basic Conditions of Employment Act, each employee of Company A is required to work 8 hours a day. This equates to a 40 hour shift for a 5-day week (8 hours x 5 days = 40 hours). Kaplan and Anderson (2003) argued that no matter which method is applied to measure practical capacity, a rough estimate is accepted as a fair estimate. Managers and supervisors of Company A were consulted to estimate the practical capacity.

The employee capacity formula is as follows:

$$\text{Employee Capacity} = \text{Daily working hours} \times \text{No. of working days in a month}$$

The capacity of the various service functions was calculated in Table 4-5 below. The theoretical capacity was obtained by multiplying the total number of employees in each support function by the working hours in a day and the working days in a particular year. The calculation below (refer Table 4-5) is an indication of the total employee capacity in hours that is available in Company A's support functions. The March 2018 number of employee extract has been utilised for this purpose.

**Table 4-5: Theoretical employee capacity calculations**

<b>Support Functions</b>	<b>No. of Employees</b>	<b>Working Hours in Day</b>	<b>Working Days in Year</b>	<b>Practical Capacity</b>
Strategic Functions	1071	8	252	2 159 136
Finance	1265	8	252	2 550 240
Human Resources	432	8	252	870 912
Commercial	548	8	252	1 104 768
Information Technology	729	8	252	1 469 664
Properties	353	8	252	711 648
Technology	1675	8	252	3 376 800
Shared Services	713	8	252	1 437 408
Learning Academy	321	8	252	647 136
				<b>14 327 712</b>

Source: Researcher’s own construct.

The divisions (lines of business activities) were aligned to the support functions as reflected in Figure 4-3. As mentioned previously, these were gathered from Company A’s enterprise structure. In order to determine the allocation of employees’ time in each support function to Divisions A to D, the following methods were used:

- Semi-structured interviews were conducted with the divisional heads of Company A to gather the percentage time each function renders its services to the different divisions, and
- The support functions’ resource consumption of activities was allocated based on the percentages they consume.

These percentages have been provided and accepted by management as a true estimate of percentage time taken to complete each task by the support functions.



**Table 4-6: Support function capacity split by percentage**

Support Functions	Functions	Division A	Division B	Division C	Division D
<b>Strategic Functions</b>	Stakeholder Relations	25%	25%	25%	25%
	Assurance and Forensic Services	15%	15%	25%	45%
	Legal Advisory	15%	15%	25%	45%
	Marketing, Branding & communication	10%	10%	35%	45%
	Business Productivity Programm	25%	25%	25%	25%
<b>Finance</b>	Support, enhance business decisions	25%	25%	25%	25%
	Manage Debt Levels	0%	0%	0%	100%
	Financial Analysis, Reporting and Compliance	25%	25%	25%	25%
	Process Control and Assurance Services	15%	45%	25%	15%
	Interface Financial Markets, Lenders and Investors	25%	25%	25%	25%
<b>Human Resources</b>	Employee Engagement and Culture	25%	20%	25%	30%
	Recruitment, Retention & Workforce composition	25%	20%	25%	30%
	Compensation, Remuneration and Benefits	25%	15%	35%	25%
	HR operations and effectiveness	25%	15%	35%	25%
	Workforce Planning	15%	25%	35%	25%
<b>Commercial</b>	Materials Managent & supply chain management	20%	25%	45%	10%
	Tactical sourcing	20%	25%	35%	20%
	Contract Management	40%	20%	30%	10%
	Risk, policy Governance management	25%	25%	25%	25%
	Supplier management, strategy planning & SD&L	25%	25%	25%	25%
<b>Information Technology</b>	Design, Improvement & modelling of processes	30%	20%	35%	15%
	Business Solutions	30%	20%	25%	25%
	Information Technology Infrastructure Management	30%	20%	25%	25%
	Information Technology Delivery & Communication	30%	20%	25%	25%
	Research & Develop IT Strategies	30%	20%	25%	25%
<b>Properties</b>	Asset management Activities	25%	25%	25%	25%
	Facility, construction Management	25%	25%	30%	20%
	Infra Structural Acquisition	35%	20%	25%	20%
	Land Development	30%	30%	20%	20%
	Legal, statutory compliance	25%	25%	20%	30%

Support Functions	Functions	Division A	Division B	Division C	Division D
<b>Technology</b>	Engineering framework and operating system	30%	20%	35%	15%
	Quality Control	30%	20%	35%	15%
	Research and Development	40%	25%	20%	15%
	Outage Management Services	20%	20%	30%	30%
	Asset management Activities	40%	25%	25%	10%
<b>Shared Services</b>	Billing, cash flow management	15%	25%	20%	40%
	Processing Payments	15%	25%	35%	25%
	Customer relations	0%	0%	20%	80%
	Recruitment transational processing	25%	25%	25%	25%
	Fleet Management	25%	25%	25%	25%
<b>Learning Academy</b>	Core Competency development,	20%	25%	30%	25%
	Training and Development	20%	25%	30%	25%
	Skills Development and talent management	25%	25%	25%	25%
	Corodinate, standardise& intergrate learning procc	25%	25%	25%	25%
	Optimise Learning Costs	25%	25%	25%	25%

Source: Researcher's own construct.

#### 4.6.3 Step 3: Estimating the capacity cost rate for each activity for Company A

In calculating the capacity cost driver rate, the theoretical capacity method or the simplified method can be utilised to estimate practical capacity.

The capacity cost rate formula (as indicated in Chapter 3, refer page 38) is summarised as follows:

$$\text{Capacity Cost Rate} = \frac{\text{Cost of Capacity supplied}}{\text{Practical Capacity of resources supplied}}$$

The capacity cost rate was calculated using the formula above.

According to Reddy *et al.* (2012), the cost of the capacity supplied refers to the resources used to perform an activity per each line of business. Table 4-1 reflects the support functions' cost for Company A. The actual cost will be used as the cost of the capacity supplied. These costs will not change if Company A decides to implement the TDABC method.

The actual support function cost (reflected in Table 4-1, page 47) was used as the cost of the capacity supplied, while the theoretical employee capacity hours, as presented in Table 4-7 (page 55), were used to estimate the capacity cost rate per hour, per support function.

**Table 4-7: Capacity cost rate per hour**

<b>SUPPORT FUNCTION</b>	<b>COST OF CAPACITY R'000</b>	<b>HRS PER SERVICE FUNCTION '000</b>	<b>COST RATE PER HOUR</b>
Strategic Functions	1 704 033	2 159	789
Finance	105 624	2 550	41
Human Resources	310 790	870	357
Commercial	670 395	1 104	607
Information Technology	3 040 357	1 469	2 070
Properties	731 338	711	1 029
Technology	221 237	3 376	66
Shared Services	356 426	1 437	248
Learning Academy	516 969	647	799
	<b>7 657 169</b>	<b>14 323</b>	

Source: Researcher’s own construct.

These estimates were needed to calculate the cost rate per hour within each support function.

The capacity split by cost was determined as follows (refer Table 4-8):

**Table 4-8: Capacity split by cost**

Support Functions	Functions	Time in HRS	Cost	Division A	Division B	Division C	Division D
<b>Strategic Functions</b>	Stakeholder Relations	540	426 008	106 502	106 502	106 502	106 502
	Assurance and Forensic Services	324	255 605	38 341	38 341	63 901	115 022
	Legal Advisory	324	340 807	51 121	51 121	85 202	153 363
	Marketing, Branding & communication	216	255 605	25 560	25 560	89 462	115 022
	Business Productivity Programm	540	426 008	106 502	106 502	106 502	106 502
<b>Finance</b>	Support, enhance business decisions	510	21 125	5 281	5 281	5 281	5 281
	Manage Debt Levels	383	15 844	-	-	-	15 844
	Financial Analysis, Reporting and Compliance	638	26 406	6 602	6 602	6 602	6 602
	Process Control and Assurance Services	383	15 844	2 377	7 130	3 961	2 377
	Interface Financial Markets, Lenders and Investors	638	26 406	6 602	6 602	6 602	6 602
<b>Human Resources</b>	Employee Engagement and Culture	218	77 698	19 424	15 540	19 424	23 309
	Recruitment, Retention & Workforce composition	174	62 158	15 540	12 432	15 540	18 647
	Compensation, Remuneration and Benefits	174	62 158	15 540	9 324	21 755	15 540
	HR operations and effectiveness	174	62 158	15 540	9 324	21 755	15 540
	Workforce Planning	131	46 619	6 993	11 655	16 316	11 655
<b>Commercial</b>	Materials Managent & supply chain management	166	100 559	20 112	25 140	45 252	10 056
	Tactical sourcing	221	134 079	26 816	33 520	46 928	26 816
	Contract Management	331	201 119	80 447	40 224	60 336	20 112
	Risk, policy Governance management	166	100 559	25 140	25 140	25 140	25 140
	Supplier management, strategy planning & SD&L	221	134 079	33 520	33 520	33 520	33 520
<b>Information Technology</b>	Design, Improvement & modelling of processes	220	456 054	136 816	91 211	159 619	68 408
	Business Solutions	367	760 089	228 027	152 018	190 022	190 022
	Information Technology Infrastructure Management	367	760 089	228 027	152 018	190 022	190 022
	Information Technology Delivery & Communication	220	456 054	136 816	91 211	114 013	114 013
	Research & Develop IT Strategies	294	608 071	182 421	121 614	152 018	152 018
<b>Properties</b>	Asset management Activities	216	53 464	13 366	13 366	13 366	13 366
	Facility, construction Management	216	53 464	13 366	13 366	16 039	10 693
	Infra Structural Acquisition	287	71 285	24 950	14 257	17 821	14 257
	Land Development	359	89 107	26 732	26 732	17 821	17 821
	Legal, statutory compliance	359	89 107	22 277	22 277	17 821	26 732
<b>Technology</b>	Engineering framework and operating system	675	44 247	13 274	8 849	15 487	6 637
	Quality Control	1013	66 371	19 911	13 274	23 230	9 956
	Research and Development	506	33 186	13 274	8 296	6 637	4 978
	Outage Management Services	506	33 186	6 637	6 637	9 956	9 956
	Asset management Activities	675	44 247	17 699	11 062	11 062	4 425
<b>Shared Services</b>	Billing, cash flow management	129	103 394	15 509	25 848	20 679	41 358
	Processing Payments	129	103 394	15 509	25 848	36 188	25 848
	Customer relations	129	103 394	-	-	20 679	82 715
	Recruitment transational processing	129	103 394	25 848	25 848	25 848	25 848
	Fleet Management	129	103 394	25 848	25 848	25 848	25 848
<b>Learning Academy</b>	Core Competency development,	142	146 268	29 254	36 567	43 880	36 567
	Training and Development	142	146 268	29 254	36 567	43 880	36 567
	Skills Development and talent management	142	146 268	36 567	36 567	36 567	36 567
	Corodinate, standardise& intergrate learning proces	142	146 268	36 567	36 567	36 567	36 567
	Optimise Learning Costs	142	146 268	36 567	36 567	36 567	36 567

Source: Researcher's own construct.

Following the grouping of the departmental activities into five major activities and allocation of time to each department, the overhead costs was divided amongst the divisions based on the capacity cost rate and the time required to complete the activities.

In order to clarify the calculation, the allocation between Division A and the strategic function is considered and presented in Table 4-9 as an example:

**Table 4-9: Example of Capacity split by cost of the strategic function**

Strategic Functions	Company % split	Total cost	Company Share	Division A % Share	X	Division A Share
<i>Stakeholder Relations</i>	25%	1 704 033	426 008	25%	X	106 502
<i>Assurance and Forensic Services</i>	15%	1 704 033	255 605	20%	X	51 121
<i>Legal Advisory</i>	20%	1 704 033	340 807	20%	X	68 161
<i>Marketing, Branding &amp; communication</i>	15%	1 704 033	255 605	20%	X	51 121
<i>Business Productivity Programm</i>	25%	1 704 033	426 008	25%	X	106 502

Source: Researcher’s own construct.

- The company % split (refer Table 4-6) was multiplied by the total overhead cost allocation of the strategic function (refer Table 4-7) e.g. for a stakeholder relations function (25% x R1,704,033 = R426,008.25).
- Each activity share of the costs was then multiplied by the capacity % of Division A per activity (refer Table 4-6) e.g. stakeholder relations function (25% x R426,008.25 = R106,502).

**4.7 TRADITIONAL COSTING SYSTEM VS TDABC**

As was mentioned in Chapter 3 (refer paragraph 3.7, page 35), the costing results between TDABC and ABC would be different due to varying methodologies applied. The calculation of the two methods resulted in both favourable and unfavourable variances between the divisions of Company A.

**Table 4-10: TDABC compared to 3-factor model**

ACTIVITY	UoM	DIVISION A	DIVISION B	DIVISION C	DIVISION D	TOTAL DIVISIONS
TDABC	R'000	1 942 473	1 601 872	2 061 617	2 051 206	7 657 169
3-Factor Model	R'000	2 378 490	1 456 312	1 193 068	2 629 300	7 657 169
		(436 016)	145 561	868 550	(578 094)	0

Source: Researcher’s own construct.

The above table (refer Table 4-10) compares the existing costing method of Company A (the 3-factor model) with the proposed TDABC method. Under the existing costing method, Division A and Division D absorbs higher overhead costs to the value of R436,016 and R578,094, respectively. Division B and Division C, on the other hand, under absorbs overheads of R145,561 and R868,550 respectively. Division A recovers almost 18% (R436,016/R2,378,490) more, Division B 10% (R145,561/R1,456,312) less, Division C a margin of 73% (R868,550/R1,193,068) less and Division D 22% (R578,094/R2,629,300) more costs under the existing 3-factor allocation method.

Under the current 3-factor costing model, the divisions with the higher revenue and higher net asset base absorb a portion of other divisions’ overhead costs. The study clearly reveals that the 3-factor formula currently used (refer paragraph 4.5.1, page 47), in allocating the support functions costs to the divisions, leads to large discrepancies when compared to the TDABC approach. This results in adverse divisional results being reported and also results in inaccurate decision making due to the wrong overhead cost allocation method.

It can therefore be deduced that by selecting an incorrect cost allocation methodology leads to wrong allocation of overhead costs. Licensed divisions (Division A, Division B, Division C and Division D) of Company A that are currently unprofitable may become profitable when using the TDABC method.

## 4.8 SUMMARY

The main objective of this chapter was to develop and apply a costing framework through an activity driven accounting system within Company A. This study demonstrated how the TDABC method can be utilised in Company A to allocate the costs related to the support functions to the licensed divisions. It became apparent that when applying the principles of TDABC, that it is cheap and easy to implement. It involves identifying fewer activities, takes less time process and because of these reasons the implementation cost is low. First, TDABC assists companies to carefully analyse costs and in turn contributes to improve decision making. It became clear that non-value adding activities can be easily identified and eliminated, as each process activity is reviewed in order to calculate the capacity cost rate and capacity.

The current costing method of Company A was analysed and compared to the proposed TDABC method (refer Table 4-10, page 61). This was achieved through the analysis of functions within the support functions, as they render to the main operational departments: Divisions A to D.

When the two methods were compared, it was determined that Division D and Division A are subsidising other divisions by consuming higher overhead costs under the current 3-factor costing method. The study revealed that it is because Division A and Division D have the higher revenue and net asset base under the existing method. Should Company A consider TDABC, the study found that the overhead costs allocated to Division A and Division D will be lower.

By implementing the TDABC framework, it can assist Company A in improving the effectiveness of decision making processes. This will result in Company A understanding which divisions consume larger portions of the support functions' costs.

The final chapter will provide conclusions and recommendations to the study.

## **CHAPTER 5**

### **5 CONCLUSIONS AND RECOMMENDATIONS**

#### **5.1 INTRODUCTION**

The main purpose of this chapter is to address the final secondary objective of making recommendations from the findings gathered from Company A and thereby supporting the company in evaluating the value of an optimal costing system by selecting the most relevant costing tool for decision-making (refer chapter 1, page 7). The main objective of this study is to investigate the application of an activity-driven operational accounting framework in an electricity distributing company: Company A.

The rest of the chapter will flow as follows: firstly the research objectives will be discussed (refer section 5.2 below), followed by a research synopsis (refer section 5.3), recommendations (refer section 5.4), addressing the limitations of the study (refer section 5.5) and secondly to conclude with the recommendations of further research of this study (refer section 5.6).

Chapter 4 presented the findings of the comparison between the existing costing system and an activity-driven accounting framework in Company A. It was concluded that the TDABC method was superior to the traditional cost accounting methods, which resulted in cross compensation among divisions with overhead recovery. The next section will review the research objectives set in chapter 1.

#### **5.2 RESEARCH OBJECTIVES**

The research objectives were set in chapter 1 (refer page 7) and was presented as a main objective, supported by secondary objectives.

##### **5.2.1 Main Objective**

The main objective was to investigate the evaluation of an activity-driven operational cost accounting framework in Company A. In order to address this objective, a TDABC model for an electricity distributing company was required, as one did not already exist. The TDABC model for an electricity distributing company was developed by following Kaplan and Anderson's (2003) TDABC model for the manufacturing industry. Following Kaplan and Anderson's (2003) approach, a qualitative case analysis technique was applied to this study. The result of the case analysis was a TDABC model that was applicable to an electricity distributing company. As outlined in Chapter 4, the TDABC is a more suitable costing method, as it is more beneficial and



appropriate for decision making across the divisions of Company A. It was found that the 3-factor formula currently used, has no direct relationship between costs incurred and the basis used to allocate those costs, i.e., the division with the highest factor being either revenue, net assets or employee cost, absorbed the higher portion of overheads.

The TDABC method eliminated the cross compensation of overhead recovery between the divisions. For example Division A and Division D absorbed lower overhead costs when TDABC was used, whereas these two divisions absorbed higher overhead costs using the 3-factor formula method (refer Table 4-10) as a result of the allocation of costs using the 3-factor formula (employee cost, net asset value and revenue).

The misallocation of costs could result in the management of Company A making wrong decisions.

It can therefore be concluded that the main objective was reached.

### **5.2.2 Secondary Objectives**

In this study the various secondary objectives were achieved.

The first secondary objective was to identify and present the appropriate research methodology to address the research objectives. This secondary objective was achieved as detailed in Chapter 2. In order to address the research methodology, the qualitative, quantitative and mixed research approaches were explained. The various research design approaches were explored and analysed. The case study method was found to be appropriate for this study. The population and site selection, data collection methods and data analysis were described and relevance made to the study of Company A.

The second secondary objective was to conceptualise the literature on ABC costing and understand the background of ABC and the emergence of TDABC, as detailed in Chapter 3. An introduction to ABC and the emergence of TDABC was therefore presented in Chapter 3.

The third secondary objective was to develop and apply a costing framework through an activity-driven operational accounting system for Company A. This was conducted and presented in Chapter 4. Company A's support functions were identified and activities summarised in five major categories. The existing costing framework, as utilised by Company A was presented, followed by the development of a TDABC framework for Company A. The results between the two costing methods were compared.

The fourth secondary objective was to make recommendations from findings of this study. This will be done in the rest of Chapter 5.

### 5.3 RESEARCH SYNOPSIS

The TDABC model for an electricity distributing company was developed and the model demonstrated that it could be viable in an electricity distributing company. The results obtained from the TDABC model were compared to the 3-factor formula currently used, and it revealed that Company A was in need of an accounting system that will assist in reaching its objectives. The following should be highlighted:

**Incorrect pricing and tariff application:** Incorrect cost allocation methods, specifically for Company A, will lead to an incorrect tariff application to NERSA. This could lead to unsatisfied customers that could search for alternative sources of electricity.

**The reputation of the company may be negatively affected:** The image of the company is important as lenders of finance associate better with a company with a solid reputation. Rating agencies may lower the company's credit ratings as a result of poor performance due to the loss of customers.

**Segment reporting:** Profitable and unprofitable divisions may not be easily identified, as there will be subsidising of costs amongst the divisions. This could lead to poor decisions, whereby a profitable division is closed instead of an unprofitable division.

### 5.4 RECOMMENDATIONS AND PERCEIVED BENEFITS

The recommendations are based on the findings of the study, while the perceived benefits Company A could obtain, will be discussed in consideration of a proposed implementation of the TDABC in Company A. Although the principles of ABC are known within Company A, the practicality of implementing it is still lacking, especially because the current costing system (3-factor formula) does not resemble the principles of ABC nor TDABC. The data pertaining to TDABC was gathered through the informal interviews conducted and the observation of the processes in Company A.

The following recommendations can be made:

- It is suggested that management should firstly commit and appreciate the application of the principles of ABC. This will ensure that the implementation of TDABC will be easier.

- It is recommended that Company A discontinues the use of the 3-factor costing formula. To illustrate whether the implementation of TDABC can be beneficial for Company A, the results of the current 3-factor formula costing system and the newly developed TDABC were compared (refer Table 4-10). From these results, it is clear that Company A is in need of an alternative cost accounting system as opposed to the 3-factor formula costing system. TDABC provides the ability to measure costs at an activity level, thereby allowing management to make optimal decisions as they are able to define activities and in turn grasping how long it takes to produce each unit of production or completing a task. This is the information that the 3-factor cost accounting system lacks resulting in time wasted on non-value adding activities.
- Company A has traditionally been viewed as the sole source and supplier of electricity. However with the recent emergence and introduction of the Independent Power Producers (IPP's) to the market, competition is emerging and drawing closer to Company A. It is for this reason that Company A has to develop, implement and maintain a costing system that will ensure optimal decision-making that will support the company in reaching its objectives. This recommendation is supported by a finding from the study conducted by Rezaie, Ostadi and Torabi (2008:1047) that, due to the increase in competition in the markets, a number of companies have since adapted to the changing environment by improving their competitive advantage, one of which is the implementation of activity-driven cost accounting system.

Through the implementation of an activity-driven cost accounting framework, Company A may achieve the following benefits:

### **Benefit 1**

By using the TDABC framework, it will drive management to continually review, benchmark and improve the processes in order to remain competitive and be amongst the top performing power utilities in the world.

### **Benefit 2**

Company A will be able to direct and channel the resources and efforts where they are needed the most, thus assisting in allocating a cost per each key activity.

### **Benefit 3**

Company A could actively collaborate with their suppliers in achievement of cost reduction and related business requirements for mutual benefits.

#### **Benefit 4**

Management will be able to gain new insights into activity performance through the continual improvement processes.

#### **Benefit 5**

It will assist in actively identifying the bottlenecks and be able to deal with bottlenecks accurately.

The development of the TDABC framework identified various elements that can be useful in Company A's decision making processes. The time it takes to perform a task within the support functions, the capacity available, the major activities within each support function and the capacity cost rate. The framework will assist Company A in the allocation of costs per the activities performed within the set time limits.

This study developed a practical TDABC model for an electricity distributing company. A unique overhead cost allocation method for each support function of Company A was determined and demonstrated how the principles of TDABC can be applied to such support function. This process allowed for the calculation of capacity cost rates of activities for all the departments.

In addition, this study also provided true support functions' cost information to Company A as opposed to the costing information provided by the current 3-factor formula. It suggests that the TDABC method can be applied in the electricity distributing company, and may allow for greatly improved financial analysis that includes more accurate and complete cost information.

The study therefore revealed that the application of a TDABC method to an electricity distributing company is not only feasible, but also could result in tangible benefits with informative benefits which could assist in an effective decision making process.

#### **5.5 LIMITATIONS OF THIS STUDY**

For the purposes of the evaluation and developing of a time-driven activity cost accounting framework for Company A, an effort has been made to collect and analyse data as much as possible to validate well balanced and comprehensive findings for this study. Without invalidating the findings of this study, there have been limitations in approaching this study, which will be described hereunder.

### **5.5.1 Study design**

The procedures selected for this study was considered to be adequate for the purposes of the study. A purposive sample consisted of mainly managers in the Centre of Excellence of Company A. However, due to Company A's embargo on employee appointments, the desired number of the sample was not reached. For this study, the senior managers that assisted are assumed to have the knowledge in all around Company A.

### **5.5.2 Impact limitation**

This study has resulted in a time-driven activity based costing framework in an electricity distributing company. However, this framework cannot be copied directly for use in another company as companies are structured differently. The basis of recommendations and findings can however be widely used to develop a framework of companies operating in different industries.

### **5.5.3 Data limitation**

It has been assumed that the information drawn from Company A's accounting system is true and reflect the actual results of financial year 2018. The data used for comparison of the TDABC and 3-factor formula was based on the 2018 financial year budgeted and actual results. Various functional managers of support functions have been interviewed, however due to tight schedule and commitments of other functional managers, interviews could not be conducted with them.

Where interviews could not be conducted, Company A's intranet was a used to gather data. However, for the purposes of this study, the interviews conducted and information gathered is assumed to be the true reflection of the departmental operations.

## **5.6 RECOMMENDATIONS FOR FURTHER RESEARCH**

The literature review revealed that the implementation of an operational cost accounting framework (TDABC) in electricity distributing companies was still limited. Too much effort of activity driven accounting frameworks has been directed and concentrated towards manufacturing industries and service industries. This study leaves an opportunity of further developments and research in the field of TDABC in electricity distributing companies.

Topics for further investigation:

- Future research on this topic should include determining whether the TDABC method can be applied to other electricity supplying companies, such as the IPP's, which operate the following sources of new and renewable energy power producing methods including landfill gas, biomass, solar PV, and Wind.
- Furthermore, the possible application of TDABC methods to other energy sectors, such as oil and gas industries, integrated power utilities and renewable energy, could be investigated.
- Finally, it would also be valuable to conduct a study that combines TDABC with a price sensitivity analysis, which would integrate both costing and pricing aspects in an electricity distributing company. Pricing and tariff increase has always been a challenge within Company A.

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