

**FACTORS INFLUENCING THE SUCCESS OF ACTIVITY-BASED
COSTING IN THE NELSON MANDELA BAY METROPOLE
MANUFACTURING INDUSTRY**

by

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submitted in accordance with the requirements
for the degree of

MASTER OF PHILOSOPHY

in the subject

MANAGEMENT ACCOUNTING

at the

UNIVERSITY OF SOUTH AFRICA

SUPERVISOR: PROFESSOR HM VAN DER POLL

November 2013

DECLARATION

I declare that “FACTORS INFLUENCING THE SUCCESS OF ACTIVITY-BASED COSTING IN THE NELSON MANDELA BAY METROPOLE MANUFACTURING INDUSTRY” is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

.....
Mr Arthur Reynolds

.....
DATE

ACKNOWLEDGEMENTS

I would like to thank the following individuals for their support and understanding during this research:

- God Almighty for the strength and energy to persevere with my studies.
- My supervisor Professor HM van der Poll for her guidance, advice and willingness to share her knowledge.
- My workplace manager Petrus Moolman for his understanding and enthusiastic support.
- Nikki Solomon for transcriptions of the interviews.
- Sandra Reinbrech for her assistance as independent coder and for guidance on the analysis of the results.
- Keith Richmond for the language editing of this dissertation.
- Jenny Seagreen for the technical and final editing of this dissertation.
- All the participants who kindly set aside their time to participate in this research.

ABSTRACT

Past research on activity-based costing (ABC) success factors has predominantly focused on establishing relationships between known success factors and ABC implementation success. According to the researcher, there is a lack of exploratory studies to establish ABC implementation factors especially in a South African context. This study has explored these factors from literature and attempted to identify any other factors of importance with the use of semi-structured interviews. A total number of 13 interviews were conducted with participants from manufacturing organisations in the Nelson Mandela Bay Metropole using some form of ABC. The findings suggested that ABC may be more beneficial at larger, more diverse organisations but that smaller organisations may also benefit from ABC if product costing accuracy could be significantly improved with ABC and if no major pressure on company resources is incurred. In addition it seems that ABC should be utilised to the fullest extent that is practical for the manufacturing organisation and that the use of supplementary cost-saving mechanisms with ABC may be beneficial. Finally it is recommended that users be fully trained at ABC and that careful consideration of an appropriate ABC software package may increase the likelihood of ABC implementation success.

Key words:

Activity-based costing

Traditional costing

Standard costing

Budgeting

Forecasting

Economics value-added

Investment planning

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CHAPTER ONE

BACKGROUND TO THE RESEARCH

1.1 INTRODUCTION

ABC is a relatively recent innovation in the ever-changing world of management accounting. According to Sohal and Chung (1998), ABC was developed by Kaplan and Cooper of the Harvard Business School in the United States in an attempt to accurately allocate indirect overhead costs associated with each product or service of an organisation. ABC is therefore intended to provide management with accurate information regarding activities and product costs and serves as a decision-making tool (Cagwin & Bouwman, 2002; Cheng, 2013; Harrison & Killough, 2006; Kee, 2003). In contrast traditional costing (TC) systems consider the allocation of overheads on the basis of volume output and do not consider supporting activities relating to a specific product or service (Gunasakeran, 1999; Lind, 2001). Gunasakeran argues that this may result in the over-allocation of overheads to high-volume products and under-allocation of overheads to low-volume products and as a result product costs become distorted. The primary difference between ABC and TC is the contrasting nature of cost drivers utilised between the two systems (Drury, 2007). A major disadvantage of TC is that it does not reflect the cause-and-effect relationship between the fixed indirect costs and the eventual product and customer. This leaves little room for effective product mix decisions and fails to highlight products and services that would ensure competitiveness in the open market (Cokins, 2002). Since these authors have indicated that there is a significant difference between TC and ABC, this may mean that common success factors could differ between TC and ABC.

Plowman (2001) found that 80 percent of companies using ABC experienced these techniques to be successful. He further suggests that the reason for this success is that the resources consumed by activities can be accurately measured and accounted for. He also found that by accounting for activities and measuring actual product and service output a better understanding can be gained of where profits are made, a finding that is confirmed by Duh, Lin, Wang and Huang (2009), who established that variances are more easily explained with ABC. Plowman (2001) further suggests that the consumption of labour and overheads is easy to

measure using both TC and ABC methods, although the remaining overhead allocation is what ABC attempts to clarify. According to him, a third of total costs in manufacturing concerns and as much as two-thirds in service industries represent the overhead portion which has to be accounted for. This may potentially create cost distortions if the correct costing methodology is not used.

Cokins (2002) suggests similar benefits to those mentioned above, in that activities which form operational relationships can be used effectively in making strategic decisions such as product mix and target customer base. Similarly process improvements and quality control are also cited as advantages of ABC. The improvement in processes and quality control seems plausible as the possibility exists that ABC could be used in conjunction with these operational mechanisms.

Research worldwide on this ABC can be found in journals, books and articles. Authors have researched and discussed ABC from different perspectives and conducted surveys in developed countries such as Australia (Baird, Harrison & Reeve, 2004) and the UK (Innes, Mitchell & Sinclair, 2000) and developing countries such as South Africa (Sartorius, Eitzen & Kamala, 2007) and Jordan (Nassar, Morris, Thomas & Sangster, 2009).

Cagwin and Bouwman (2002) investigated the association between ABC implementation and financial performance and found a positive relationship. Sohal and Chung (1998) focused their study on establishing key success factors for ABC implementation by means of two case studies. The research revealed that managerial commitment and employee buy-in are two of the essential factors for the successful implementation of ABC. Nassar *et al.* (2009) also investigated key success factors for ABC implementation but focused their study on Jordan, a developing country. Organisational and contextual factors were identified as key elements for successful ABC implementation.

Sartorius *et al.* (2007) hinted at limited research in this particular field in a South African context. The same study revealed a 12% diffusion rate amongst Johannesburg Stock Exchange (JSE) listed companies and pointed out that high diffusion rates are a result of high fixed costs and a wide range of products (diversification). Rundora, Ziemerink and Oberholzer (2013) found that ABC adopters are generally larger than non-adopters. In addition Rasiah (2011)

suggested that the low diffusion rates in Malaysia can be attributed to organisations preferring to use a costing method with which they are comfortable, a view supported by Velmurugan, Senthil, Nahar and Wan (2010). This may suggest that organisational factors are a contributing factor to ABC implementation success.

Rising fixed overheads and an increasingly competitive global market have forced industries to adopt an attitude of cost management as opposed to merely managing costs (Drury, 2007; Hutchinson, 2010). The achievement of budget is not considered good enough in highly competitive markets today and opportunities for cost reduction should be sought, although not at the expense of customer satisfaction. These opportunities may include not only ABC but also other mechanisms such as process improvements, benchmarking and target costing (Cagwin & Bouwman, 2002; Drury, 2007). These cost management mechanisms expand the focus to target cost reduction and explore opportunities to improve efficiency and maximise profits.

1.2 THE RESEARCH PROBLEM

1.2.1 Background to the research problem

The study by Sartorius *et al.* (2007) outlined the diffusion of ABC in the South African economy and highlighted industries in which the use of ABC is prevalent. Past research (Al-Sayed, Abdel-Kader & Kholief, 2008; Sartorius *et al.*, 2007) frequently pointed to the resource-intensive nature of this costing methodology as a reason for the low diffusion rate. Quantitative studies (Cagwin & Bouwman, 2002; Cinquini & Mitchell, 2005; Fei & Isa, 2010b; Foster & Swenson, 1997; Nolan, 2004; Pavlatos, 2010; Rbaba'h, 2013) in the past attempted to correlate certain factors with successful ABC operations, but evidence of this kind of research in South Africa is scarce, according to the researcher.

1.2.2 Statement of the main research problem

Past research was performed predominantly in a quantitative framework with the focus being on establishing a relationship between known or deemed factors and successful functioning of ABC systems, and it did not fully investigate the possible factors that could contribute to the successful implementation of ABC in manufacturing organisations of the Nelson Mandela Bay Metropole. If these factors can be

discovered by means of a qualitative study, future quantitative studies could build on this and attempt to develop a direct correlation between each factor (or factor groups) and the probability of success using ABC. A suggestion by Fei and Isa (2010a) was made to extend ABC research to developing countries as well as to potential cultural differences between countries, and accordingly there may be a research gap relating to factors contributing to ABC implementation success in a South African context. The in-depth nature of semi-structured interviews could possibly discover other practical issues not commonly discussed in research articles or textbooks. The research problem can therefore be stated as follows:

Additional factors not established from past research that influence ABC implementation success in manufacturing organisations in the Nelson Mandela Bay Metropole

1.3 RESEARCH OBJECTIVES OR PURPOSE OF THE STUDY

The purpose of this research is to establish the factors influencing ABC's implementation success amongst manufacturing organisations in the Nelson Mandela Bay Metropole. In order to answer the research problem, the study undertakes to:

- explore the organisational and external factors that have an impact on ABC implementation success;
- explore the factors relating to the level of ABC usage and how it impacts on ABC implementation success;
- explore the factors relating to the support of ABC and how it impacts on ABC implementation success.

These objectives will form the framework for the literature review and empirical study.

1.4 SIGNIFICANCE OF THE RESEARCH

Based on the objectives, the results from the findings could be significant for the following groups:

- Researchers studying ABC implementation factors using quantitative research. The results from the study should give researchers a basis for postulating

relationships between the enabling factors of ABC implementation success and the degree of ABC implementation success.

- Manufacturing organisations that are planning to move from TC to ABC and that would like to ensure the maximum chance of ABC implementation success. Knowledge of ABC implementation success factors may enable them to increase their chances of success with ABC.
- Manufacturing organisations using ABC but not achieving the success levels they initially desired. New knowledge of ABC implementation success factors may enable them to modify their current structure to allow ABC to be more effective.

1.5 DELINEATIONS AND LIMITATIONS

The study will be based on an extensive literature review and empirical research. The literature review will be a combination of both academic literature (textbooks) and past research in the particular field. The literature review will consider the following subject areas: management accounting, ABC, TC and cost management. Preference will be given to South African research papers but international research will also be included in the literature review on past research. In addition preference will be given to newer research not older than five years although findings may be contrasted with or compared to previous findings from earlier dates. As ABC is a relatively new science, it is worth considering that newer research and books are more likely to provide a clearer understanding of the methodology.

This dissertation will focus primarily on activity-based costing (ABC), activity-based management (ABM) and the other cost management mechanisms such as total quality management (TQM), value engineering and benchmarking. Other aspects of management accounting such as absorption costing, financing, budgeting, forecasting and capital investments may be mentioned in literature, although this is not the focus of this research.

An empirical study using semi-structured interviews will be conducted to ensure primary data is available to address the research problems at hand. As a practical measure and due to the sensitivity of financial information, the interviews will be of a qualitative nature only. This will ensure not only that potential participants are

less reluctant to conduct interviews but also that there are enough available participants to obtain a meaningful sample size, which would determine the validity of the study. The interviews will primarily be one-on-one discussions but may result in the odd focus group if more than one participant wants to share his or her experience on ABC with others. Interviews will be conducted at the participant's place of work if practicable. The interviews will include only Nelson Mandela Bay manufacturing organisations as these organisations will be easily identifiable and will be more easily accessible for the researcher. The population sample will therefore be restricted to manufacturing organisations in the Nelson Mandela Bay Metropole only.

Prior research on the general subject of ABC within South African literature is rare and research specifically focusing on ABC success factors even rarer according to the researcher. The proposed research attempts to relate ABC enabling factors to gainful utilisation of ABC in manufacturing organisations in the Nelson Mandela Bay Metropole. The study, being qualitative, will not attempt to generalise its findings across the entire population or to extrapolate it to the South African manufacturing industry but merely attempt to provide insight into those factors that may result in satisfactory ABC implementation.

1.6 PROPOSED METHODOLOGY

This section will outline the research methodology that will be used for this study although it will be discussed in greater detail in Chapter 4. The research will consist of a literature review and semi-structured interviews.

1.6.1 Literature review

Sufficient literature is available on ABC and the researcher will endeavour to source as much information as possible in order to arrive at a conclusion regarding the research problem. The platforms from which literature sources were obtained will be discussed in detail in Chapter 4.

1.6.2 Semi-structured interviews

A qualitative research design of exploratory nature is suggested facilitated by semi-structured interviews. The sample will be purposively drawn from manufacturing organisations in the Nelson Mandela Bay Metropole that use ABC or have

attempted using ABC. This will enable the researcher to establish heterogeneous ABC implementation factors from a homogeneous population. A further motivation for using the qualitative approach is that ABC adopters are limited in South Africa, according to Sartorius *et al.* (2007).

1.7 RESEARCH DESIGN

A qualitative study is suggested to explore factors contributing to ABC's success in manufacturing industries. Semi-structured interviews will be conducted to collect data. Manufacturing companies will be contacted across Nelson Mandela Bay Metropole. The empirical study will be used in conjunction with a literature review in order to reach a conclusion and to suggest further research areas.

1.8 CHAPTER LAYOUT

Chapter 1: Introduction

The introduction outlines the study, defines the framework for the research project, and provides background information relating to the research. A summary of Chapter 1 is illustrated in Figure 1.1 and indicates how the research objectives are formulated from the research problem.

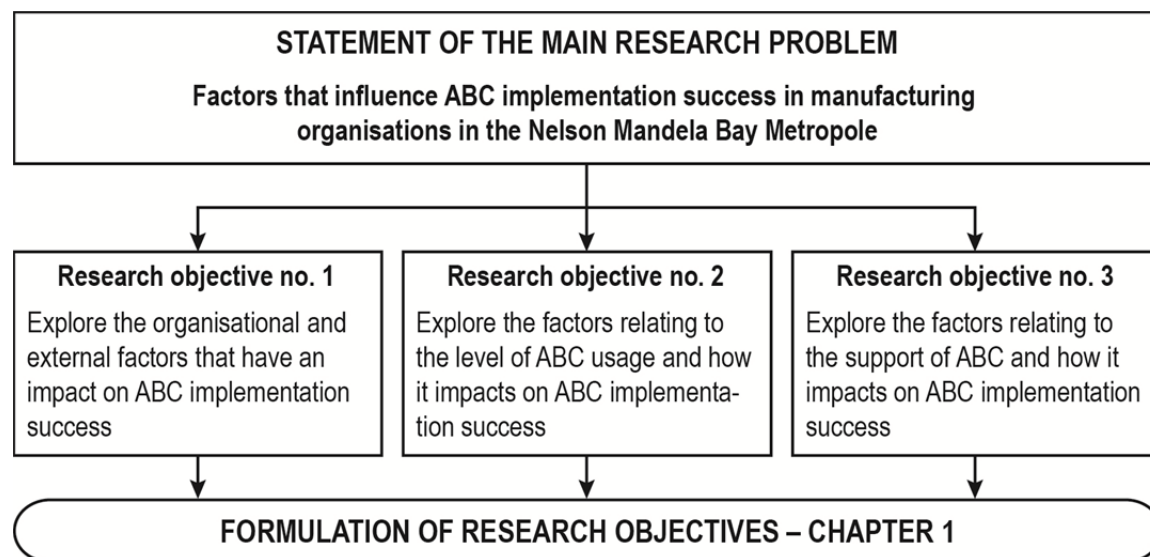


Figure 1.1: Chapter 1 and how it fits into the overall study

Chapter 2: Brief background and literature review on the context and nature of factors influencing ABC

This chapter will focus on the existing academic literature and provide the theoretical framework that will form the basis of this study. The discussion will cover management accounting in general and will concentrate on the fundamentals of cost management with specific reference to activity-based costing (ABC) and activity-based management (ABM). Practical examples along with other secondary examples will be used to demonstrate fundamentals. This chapter should ensure the academic validity of the dissertation and assist in guiding the research. More specifically the following sub-sections will be covered in this chapter:

- The history of ABC and further development over the years.
- A detailed comparison between ABC and TC.
- The link between ABC adoption and company characteristics.
- The different applications of ABC within the organisation.
- The link between cost-saving mechanisms and ABC.

Chapter 3: Literature review on the effect of influencing factors on ABC implementation success

This chapter will focus on past research studies to assist in answering the research problems identified. Contrasting research will be discussed and combined with the empirical study to assist in guiding the researcher to conclusions on the research problem. As mentioned, recent research will have precedence over older research to ensure that current views are discussed. All available South African research found on this subject matter will be discussed, as well as relevant international surveys.

The following sub-sections will be covered in this chapter:

- The effect of business characteristics and nature on ABC success.
- The effect of the different ABC applications on the success of ABC.
- The effect of support structures on ABC success.

Chapter 4: Research methodology

This chapter will include an explanation of the sampling and interview plan design. The method of collection and any secondary data as well as details of the empirical study will be discussed. An in-depth discussion about the interview questions will explain the rationale and the link to the research problem to be answered. Furthermore the steps taken in gathering the data and the response results will be discussed.

The following sub-sections will be covered in this chapter:

- Sampling procedure and research methodology.
- Research instrument design and link to the research problem.
- Interview activities and response from participants.

Chapter 5: Research findings

This chapter will present the results from the interviews and establish whether the findings are consistent with previous research literature. An independent coder will be employed to assist in analysing the results by means of thematic content analysis. Conclusions will be drawn from the data analysis and will provide a basis for Chapter 6: Summary, conclusions and recommendations. The following sub-sections will be covered in this chapter:

- Tabulation of raw data and analysis.
- Discussion of themes that have developed from the semi-structured interviews.

Chapter 6: Summary, conclusions and recommendations

This chapter will summarise all findings and propose further research areas. Conclusions will be made from research literature as well as the empirical study.

1.9 SUMMARY

This chapter has provided the outline for this study. A brief background overview of ABC has served as an introduction for a more detailed discussion in Chapters 2 and 3. This chapter has also stated the research problem and identified objectives for this study. These objectives will be focused on in Chapters 2 and 3 by means

of a literature review of past studies and an empirical study to substantiate the findings from the literature review.

CHAPTER TWO

BRIEF BACKGROUND AND LITERATURE REVIEW ON THE CONTEXT AND NATURE OF FACTORS INFLUENCING ABC

2.1 INTRODUCTION

In the previous chapter a brief overview of ABC was provided along with an outline of the proposed study. In this chapter the history and theoretical background of ABC will be briefly discussed, serving as an introduction for later discussions. ABC differs significantly from TC in the manner by which overheads are allocated, and this theoretically enables an organisation to accurately identify profit- or loss-making products or services (Drury, 2007). As stated in Chapter 1, the objective of this research is to understand or explore the factors that influence ABC implementation success, and how they do so. The factors identified in past literature will be discussed in terms of both context and nature in Chapter 2. For example, the nature (why is it a factor?) of the various information technology (IT) systems within the context (how does it fit into an ABC framework?) will be discussed from past research in Chapter 2. This will include discussions on why organisations have adopted ABC and why ABC was rejected initially or abandoned after implementation. This in turn will provide the framework for a later discussion on the influence of the various information technology (IT) systems (what is the effect on ABC?) in Chapter 3. Figure 2.1 illustrates the process flow towards the research objective. The factors can be broadly categorised as follows:

- Organisational characteristics and nature
- Extent of ABC usage in the organisation
- Extent of ABC support within the organisation

This is in line with the suggestion by Abdel-Kader and Luther (2006) that management accounting systems' success is dependent on the organisational, external and processing factors. Their study attempted to identify the sophistication of management accounting systems and to establish the influence of the factors on the different management accounting systems.

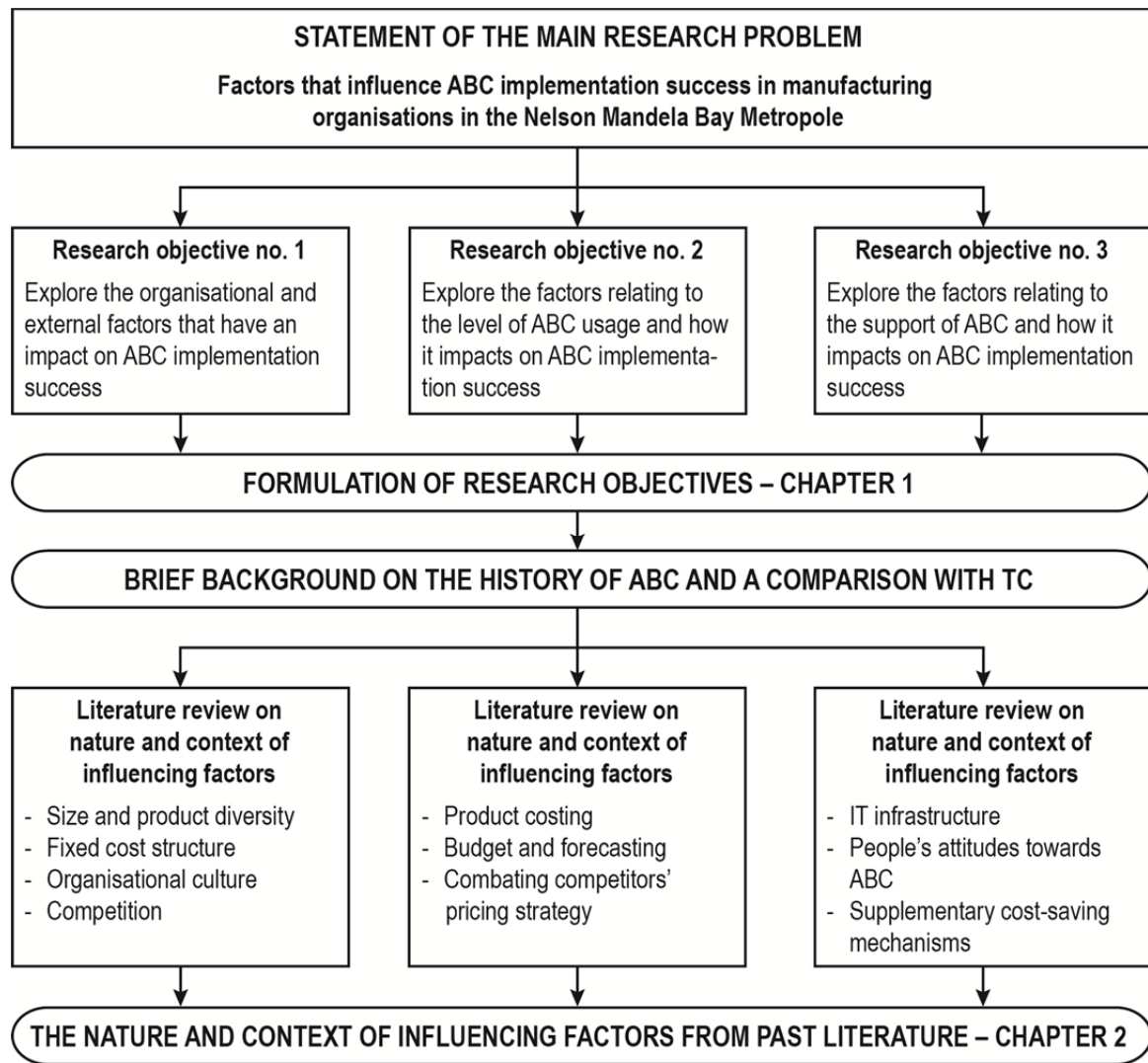


Figure 2.1: Chapter 2 and how it fits into the overall study

2.2 THE HISTORY OF ABC AND FURTHER DEVELOPMENT OVER THE YEARS

In order to gain a full understanding of how ABC developed and how it fits into the cost accounting discipline, it may be worthwhile to look at the origins of cost accounting and why it was deemed necessary to incorporate a cost accounting system if financial accounting already records income and expenses and ascertains profit or losses.

According to Glad and Becker (1994), some attempts were made in the 14th century to ascertain product and activity profitability by artisans working from home. They suggested the need for a more complicated and sophisticated cost accounting system which forced accountants to develop cost accounting systems,

and budgetary controls arrived with the onset of the Industrial Revolution in the late 18th century as factories started to replace these home-grown businesses.

However, Previts and Merino (1998) suggest that these cost accounting systems were not universal and that the majority of manufacturing concerns had their own unique cost accounting system. The lack of theoretical material prior to the 20th century was primarily a result of businesses being hesitant to divulge cost accounting secrets to their competitors (Hume-Schwarz, 2007). He further states that increased competitiveness and the resultant need to drive costs down and save time has seen the slow introduction of cost accounting literature and has resulted in the cost accounting system known today.

Turney (2008) studied the evolution of ABC since it first occurred over 20 years ago and identified several phases of development over the years. A total number of six phases were identified by Turney and he discussed its evolution into the product it is today. Turney further stated that like most innovations the initial element of hype may be replaced with evolution and eventual maturity. The phases are illustrated in Figure 2.2 below demonstrating the changes in the ABC application since its beginning. This figure shows its evolution from being a tool to improve profitability to forming an integral part of strategic management within the organisation, reflecting a change in approach. This holistic approach sees ABC being used as a costing methodology and a decision-making tool for short-term product mix decisions as well as long-term investment decisions.

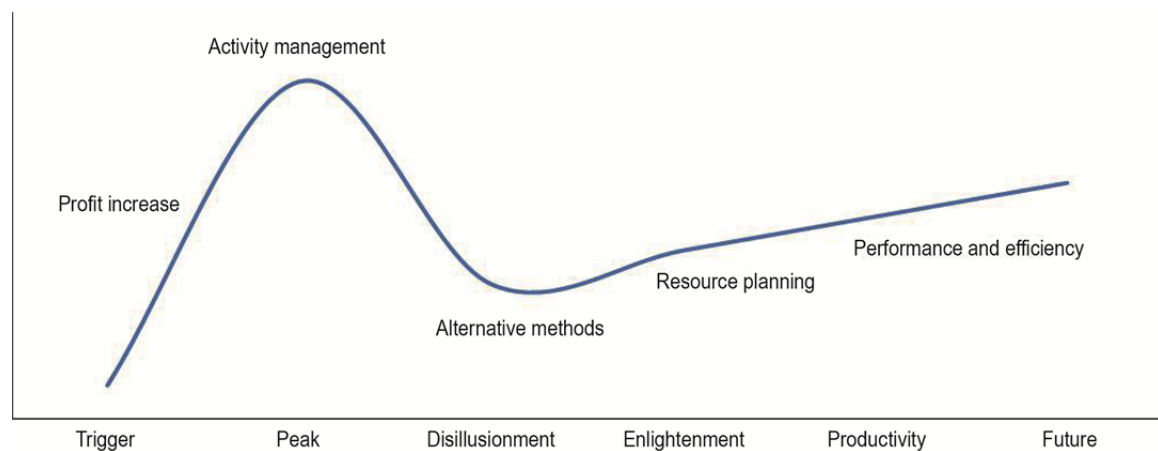


Figure 2.2: ABC maturity development over the years
Source: Adapted from Turney (2008)

Turney (2008) further explains the different phases and points out that the initial focus was on improving product profitability and product mix selection; however, industries soon realised the shortcomings of ABC, and interest declined after a few years. He furthermore discusses the development of ABC over the years and how it has started to incorporate long-term planning and forecasting mechanisms and adapted to become an improved tool for short-term resource planning. In conclusion Turney credits the advent of integrated systems in helping ABC to become the comprehensive costing system it is today. These developments form part of the evidence of ABC success factors that this research study attempts to identify; hence it may be important to understand whether the development of ABC over the years has contributed to ABC implementation success.

One of the objectives of this study is to establish how this development has impacted on the success of ABC and which application of ABC yields the maximum marginal success. The development of ABC can certainly provide organisations with greater flexibility for ABC usage; therefore this study aims to establish how this is applied in practice and what has been revealed in prior studies conducted to establish ABC success factors.

This section has provided some insight into the history of ABC and its development over the years. It has also briefly highlighted factors leading to the development of ABC and provided a brief history of the increased extent of ABC usage over the years. These factors will be discussed in detail later in Chapter 2. The following section provides a comparison between TC and ABC and the key differences between the two costing methodologies.

2.3 A BRIEF COMPARISON OF ABC AND TC

ABC and TC are two different costing methodologies with a common goal, which is the intention to provide an instrument to establish product costs as accurately as possible (Drury, 2007). In order to understand how and why the two costing methodologies are different it is important to understand the dynamics surrounding each costing methodology. Direct costs for both TC and ABC remain the same. The differences result from the allocation of overheads to products or services. According to Miller (1996), the indirect overheads related to sales and administrative costs are ignored in TC in accordance with International Financial Reporting

Standards (IFRS) IAS 2 (Christian & Ludenbach, 2013). Whilst indirect overheads are ignored in product costing from a financial reporting perspective as per IAS 2 in terms of profitability analysis, it is possible to assign indirect overheads in ABC if sufficient cost drivers can be identified (Miller, 1996). Since it is possible to assign indirect overheads to products, this may be a factor in achieving more accurate product costing, potentially increasing ABC implementation success.

Miller (1996) further states that although ABC considers all costs associated with a product or service to establish the true cost of delivering a product or service, ABC costing can still be used to comply with IFRS by differentiating between allowed direct activities (activities allowed by IFRS) and indirect activities identified by ABC. Miller further identifies another difference between ABC and TC. TC depends heavily on historical data as a basis to develop costing standards. The historical data is considered to be correct and would include any inefficiency from the past. He suggests that this approach does not allow for continuous improvement going forward, as underperforming activities traced to a product or service can be identified and no focus areas are available. Finally, he concludes by stating that ABC costing has a different approach in that even though it may use some historical data as a baseline the information available allows businesses to identify key areas where improvements could be made to further enhance their competitive position in the market. Hence, it is possible that the availability of historical data may assist manufacturing organisations in establishing a baseline for future improvements and as such may be a factor in the successful ABC implementation in manufacturing organisations.

ABC is also different in the manner in which resources are consumed compared to standard costing, as is evident in Figure 2.3. In TC resources are directly allocated to products with a simple plant-wide overhead rate typically based on a single cost driver such as direct labour hours (Drury, 2007). In ABC activity costs are collected in multiple cost pools (or cost centres) and then allocated to each product based on a predetermined cost driver usage per product unit. As will be discussed later, a combination of TC and ABC exists where products consume resources; however these resources are apportioned to each product based on activity usage (as opposed to assigning actual activities), which is described by Cokins (2002) as a form of hybrid ABC system which for the purpose of this study

will be designated as ABC. Figure 2.3 illustrates the basic difference between ABC and TC without considering these hybrid ABC systems.

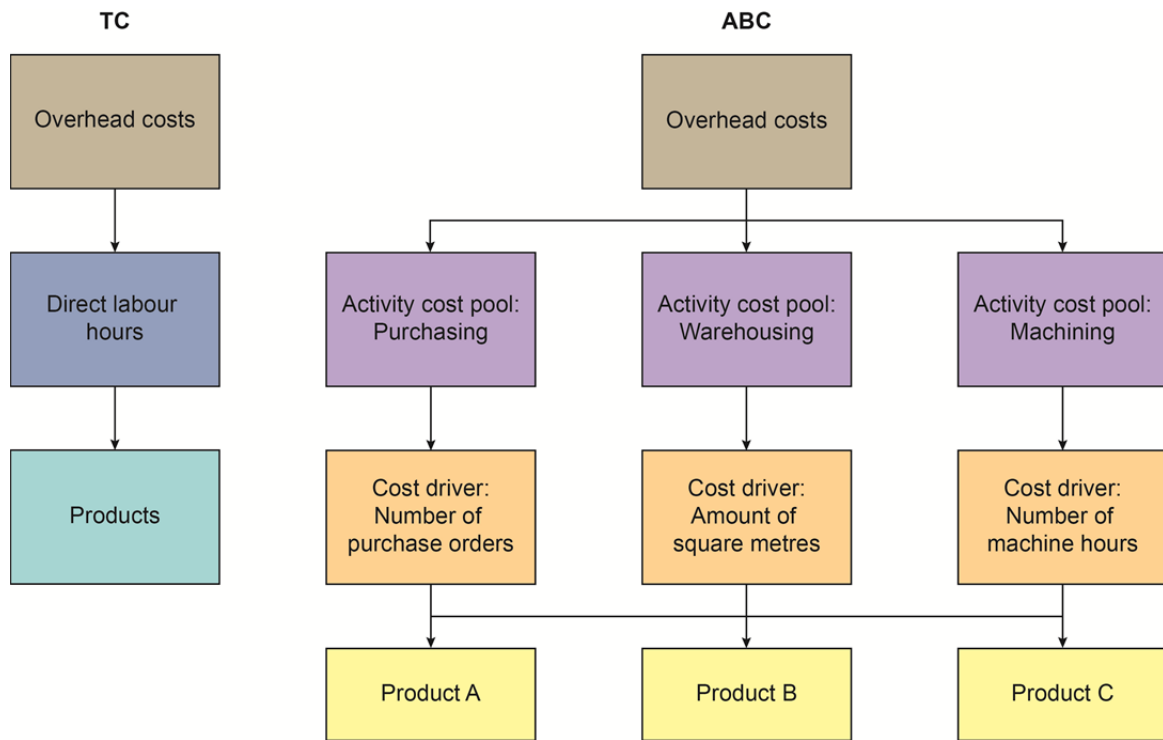


Figure 2.3: Difference between ABC and TC

Source: Adapted from Weygandt, Kimmel and Kieso (2009)

The 2-stage allocation process in ABC from resources to activities and finally to products differentiates it from TC, in which resources are directly allocated to products as illustrated in Figure 2.3. In TC resources or overheads are allocated predominantly using direct labour hours regardless of the underlying relationship with the product or services (Drury, 2007). The extent to which ABC should be applied theoretically to ensure marginal success over TC is not known, and it may be that a hybrid ABC system could result in ABC implementation success similar to what could be achieved with pure ABC in certain instances. This research will endeavour to establish to what extent ABC should be applied to achieve implementation success in manufacturing organisations. As such it may be possible that a limited ABC implementation in certain circumstances could be beneficial for some manufacturing organisations with low resources.

A further important difference between ABC and TC is the different manner by which costs are assigned to products and services by either allocating a cost or tracing a cost back to a product or service (Drury, 2007). In ABC the aim is to trace

as far as practically possible all costs related to a product or service. Tracing of costs may not be possible in all cases if the cost of tracing a cost to a product or service is too high or the measurement is just impractical (Miller, 1996). In this case an apportionment or allocation by machine hours for example would be considered. TC in contrast allocates the majority of overheads by apportionment. As mentioned earlier, in practice a clear definition of what the adoption of ABC entails does not exist, and it can be accepted that any ABC elements used to trace overheads to products can be loosely defined as an ABC system. The extent of ABC elements resident in an organisation costing methodology and how it affects ABC implementation success may be considered to be a factor that needs to be investigated further during the semi-structured interviews.

A study done by Akyol, Tuncel and Bayhan (2005) compared the difference between product costs using TC and product cost using ABC. Product costing was initiated first with TC and then compared with ABC product costing results. They found a significant difference between TC and ABC results demonstrating how an organisation's view on profitability can change significantly after ABC implementation. Cost distortions are unidirectional, with some products being over-costed and other products under-costed using TC. This may be significant for manufacturing organisations as using a predominantly TC methodology could possibly distort product costs and potentially divert focus to the wrong product families. Akyol *et al.* (2005) express this difference in terms of % bias where $\% \text{ bias} = \frac{\text{ABC}}{\text{TC}} \times 100$. Figure 2.4 illustrates the result of the study and illustrates the bias between ABC and TC.

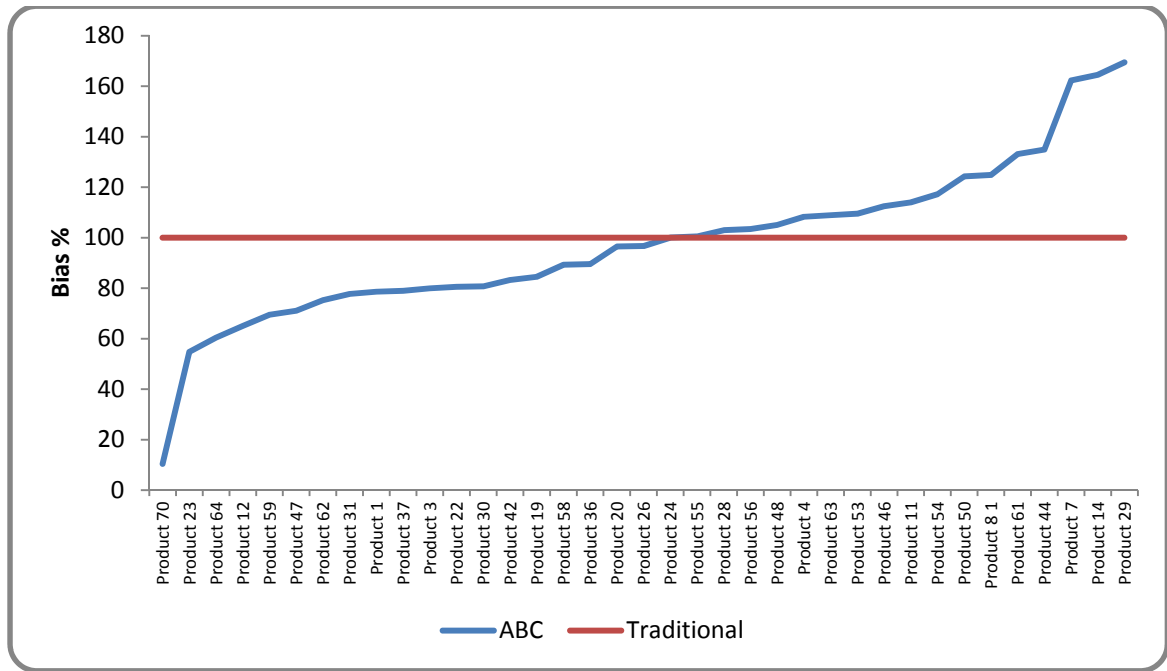


Figure 2.4: S-curve showing different product costs between ABC and TC

Source: Adapted from Akyol *et al.* (2005)

Figure 2.4 graphically illustrates the possible distortion between ABC and TC. It does not however illustrate how intensively ABC was used to apply overheads and how this has affected the distortion between ABC and TC. The study illustrates a significant difference between the two costing methodologies. Akyol *et al.* (2005) provide three scenarios resulting from these differences:

- Products that return a higher ABC cost compared to TC as a result of previously unknown or hidden costs. ABC reveals these hidden costs, and an opportunity exists to manage these costs and to review pricing decisions. This scenario will typically occur in low-volume product ranges.
- Products that return a lower ABC cost compared to TC benefits from TC by incorporating a hidden profit. However, with ABC the product may be priced more competitively to result in increased volumes and potential profit.
- Some products obtain near identical results and implementation of ABC will not benefit the organisation given the high cost of implementing and maintaining ABC.

The study by Akyol *et al.* (2005) does not reveal the extent of overhead allocation that was present and how this has affected the product cost distortion. The

possibility that other factors could cause this distortion may not be discounted, so it is likely that other factors such as the organisation's overhead structure should be considered due to the inherent differences between ABC and TC relating to the treatment of variable and fixed overheads (Drury, 2007). As such, it is plausible that different overhead configurations may have caused different results in Akyol *et al.*'s study.

This section has illustrated the differences as well as the similarities between ABC and TC. TC, however practical and relatively inexpensive, simply may not consider all relevant activities related to a product. It may remain popular due to its simplicity, and in contrast with ABC, which is a vastly more complex costing methodology, may be more accurate but possibly more resource-dependent.

2.4 THE LINK BETWEEN ABC ADOPTION AND COMPANY CHARACTERISTICS

This section will describe the likely nature of organisations adopting ABC and how it may differ between different companies. This section investigates key characteristics of companies successfully utilising ABC. This provides a basis for Chapter 3, where the impact of these factors on ABC will be discussed.

2.4.1 Size and product diversity in ABC organisations

ABC is often used in organisations with a diverse product range as well as frequently new products, due to the difficulty of calculating a standard overhead rate for each product (Ahmadzadeh, Etemadi & Pifeh, 2011; Brierly, 2011). The higher number of products also results in increased activity costs, resulting in an increase in indirect overhead costs. The downside of using ABC in diverse manufacturing concerns is that with increased activity pools associated with an increased number of products, there is a cost implication which prevents some companies from investing in ABC (Brierly, 2011). High product diversity reduces the efficiency of TC to accurately allocate overheads to products (Mullins & Zorn, 1999; Salawu & Ayoola, 2012); hence ABC remains attractive for diverse organisations. Therefore, an important consideration for manufacturing organisations considering ABC implementation is whether their product diversity may allow them to achieve benefit over TC.

Mullins and Zorn (1999) furthermore suggest that TC increasingly distorts indirect or fixed overheads based on the following factors:

- Volume
- Organisational size
- Complexity
- Material diversity
- Number of set-ups

Baird *et al.* (2004) could not find a correlation between business unit size and ABC adoption but rather a need to identify activities and activity costs for decision-making purposes. They established in their study that business unit size is an important factor in activity and activity cost analysis, and that larger organisations require this type of analysis more than smaller entities. However, once full ABC was implemented there was no correlation. Baird *et al.* argues that activity-related information is in greater demand in larger companies and that the greater resources would enable a more effective ABC system than would be the case for smaller companies with fewer resources. They suggest that companies with greater cost distortion would be more likely to adopt ABC compared to companies with stable pricing. This agrees with other research studies that suggest that the availability of resources makes it more likely that ABC would be implemented by larger organisations (Brierly, 2008; Elhanna, 2012; Hall & McPeak, 2011; Nassar, Al-Khadash & Sangster, 2011; Raeesi & Amini, 2013; Rundora *et al.*, 2013). However, it has been suggested that ABC could be beneficial to SMEs (small-to-medium enterprises) if used under the right circumstances (Hall & McPeak, 2011; Jankala & Silvola, 2012). Hence it may be important for organisations to establish the resources they have available and whether a limited ABC implementation would provide enough benefit to justify the investment.

2.4.2 Fixed cost structure in ABC organisations

Before the advent of ABC, fixed overheads costs including office salaries were homogeneously absorbed in product costs with no accountability (Armstrong, 2002; Hutchinson, 2010). According to Armstrong, this has resulted in operational managers often being the key initiators of ABC in order to have accountability across the entire spectrum. He further points to the general attitude of non-office

workers or factory workers as being that the staff department is an “employment shelter” (Armstrong, 2002). Mullins and Zorn (1999) suggest that the greater the proportion of indirect costs in an organisation, the more likely it is that TC would distort products costs. As such ABC treats all fixed overheads as variable and attempts to trace where possible all overheads to product families. It may be doubtful whether ABC organisations are able to track all indirect activities and how much value-adding can be gained from identifying cost drivers for all indirect overheads; therefore it may be important for manufacturing organisations to consider how indirect overheads should be attributed to products.

2.4.3 Competition as an influencing factor in ABC organisations

The advent of global competition has resulted in a need for greater cost calculation accuracy to facilitate cost reduction and provide greater flexibility (Akyol *et al.*, 2005; Brierly, 2011; Duh *et al.*, 2009; Hume-Schwarz, 2007; Pertelle, 2012; Sartorius *et al.*, 2007; Yapa & Konchange, 2012). Cagwin and Bouwman (2002) have established a greater adoption of ABC within manufacturing organisations and that there is a positive relationship between ABC’s financial success and the level of external competition. Ahmadzadeh *et al.* (2011) suggest that the lack of competition for Iranian organisations is one of the reasons for their not adopting ABC. According to Sartorius *et al.* (2007), increased competition gives fewer margins for costing errors, as competition could take advantage of these costing errors and create a competitive advantage, also citing service industries as ideal due to their high level of competition. Velmurugan (2010), however, indicates that a higher level of competition does not necessarily result in higher adoption rates but that it is only one factor of several having an impact on ABC adoption. Since competition has been observed by past researchers as an important driver for ABC adoption, it may be important to establish how much it drives ABC implementation success and whether it results in additional focus on ABC.

This section has discussed the typical characteristics of companies adopting ABC as their costing methodology. Section 2.5 continues with a discussion on the different applications of ABC usage within companies.

2.5 THE DIFFERENT APPLICATIONS OF ABC WITHIN THE ORGANISATION

This section will discuss the different ways in which ABC could be used in an organisation. It will also frequently refer to why these methods are adopted and what the objective is of using them. A later discussion in Chapter 3 will review the impact these factors have on ABC implementation success by observing results from past research.

2.5.1 ABC used in product costing

This section will discuss the nature of product costing within an ABC framework and will focus purely on ABC, ignoring activity-based management (ABM) and activity-based budgeting (ABB). Accurate product costs for decision-making and understanding product/customer profitability remained the most popular reason for implementing ABC (Al-Omiri, 2012; Charaf & Bescos, 2013; Ibrahim & Saheem, 2013; Salawu & Ayoola, 2012; Sartorius *et al.*, 2007). The implementation of ABC within an organisation may not be a simple process and depending on the organisational complexity might be an arduous task. ABC utilises a two-stage allocation process, as with TC, and involves four steps (Akyol *et al.*, 2005; Drury, 2007; Faul, Du Plessis, Niemand & Koch, 2003).

- Identifying relevant activities into the four major types of activities. An activity is a combination of actions (No & Kleiner, 1997).
- Selecting appropriate first-stage cost drivers for assigning costs to activity pools.
- Assigning costs to activity pools and cost centres.
- Collecting actual activity data and assigning the costs of the activities to products by means of second-stage cost drivers.

These four steps will be discussed in detail below.

STEP 1: Identifying relevant activities

Drury (2007) and Faul *et al.* (2003) describe four major types of activities:

1. Unit-level activities

These are activities that relate to activities performed with each individual unit produced. These activities are direct or variable costs, as activities are performed only at the point of manufacturing a single product. Examples of such activities include direct material and variable overheads such as electricity and gas.

2. Batch-level activities

These activities occur only when a group of products are produced as opposed to an individual product. Although the activity is essentially a variable activity that occurs each time a batch of products are produced, the cost per batch is a fixed cost. Examples of batch-level activities are sales orders and set-up costs for each production run.

3. Product-level activities

Product lines incur activities for which costs are collected. These activities do not occur at the production stage but are activities to either support or enhance a product line. In a planning department each engineer may be tasked to focus on improving a certain product family or change a bill of material. Each time an engineer does any work related to a product, such activities will be deemed product-level activities.

4. Plant-level activities

These are activities that relate to supporting functions within an organisation. These activities are all indirect activities such as finance, human resources and plant security. The costs related to these activities are considered to be fixed, as production volume does not influence these activities.

STEP 2: Selecting appropriate cost drivers for assigning costs

The next important step is to identify the various cost drivers for each activity identified in Step 1. A cost driver is a measureable activity cost related to each activity. Each time an activity is performed costs are incurred, and these costs are allocated to such activity. Examples of costs drivers are the number of sales orders (batch-level) and gas consumed (unit-level). These are first-stage drivers and trace costs into cost pools or cost centres. The second-stage drivers affect the accuracy

of ABC most (No & Kleiner, 1997) and are cost drivers to assign costs from the cost pools or cost centres to products.

STEP 3: Assigning costs to activity cost centres

Cost drivers are typically accumulated in cost centres. The number of cost centres varies depending on the complexity and nature of the manufacturing concern. Each cost driver is normally assigned to each own cost centre if its materiality justifies this. For example 1 000 sales orders are processed during a month and the total cost of R1 500 is aggregated into a cost centre. An important consideration is the aggregation to be used for reporting costs incurred (No & Kleiner, 1997). For example, set-up costs could be divided into set-up and movement costs or could be recorded as a single cost only.

STEP 4: Assigning the costs of the activities to products

Costs can be allocated to products only after activities are allocated to cost centres. The cost centre rate can be calculated as follows:

$$\text{Cost centre rate} = \frac{\text{Cost centre cost}}{\text{Cost driver volume}} \text{ (Faul et al., 2003)}$$

Table 2.1 has collected costs for 100 set-ups (60 and 40 for Product A and Product B respectively). The total number of costs collected in the cost centre is R150 000, resulting in a set-up cost of R1 500 per set-up. Therefore Product A will collect R90 000 of set-up costs in addition to the other activity costs identified from the respective cost centres. Based on the 80 000 units produced, a net set-up cost of R1.13 can be calculated ($\frac{R90\,000}{80\,000 \text{ units}}$).

Table 2.1: The link between activities, cost drivers and products

Activities	Cost driver	Product A	Product B	Total
Material handling	Material movements	100	50	150
Material procurement	Number of orders	200	100	300
Set-up costs	Number of set-ups	60	40	100
Quality control	Number of inspections	150	100	250
Production	Direct labour hours	40 000	10 000	50 000

Source: Adapted from Faul *et al.* (2003)

Table 2.1 illustrates the activities and their cost drivers as well as observed activities relating to each of Product A and Product B. In order to calculate product costs for each product the total volume and total activity pool costs need to be considered.

The annual output for each product is as follows:

Product A – 80 000 units

Product B – 20 000 units

The overhead costs for each activity pool are:

	R
Material handling	150 000
Material procurement	50 000
Set-up	150 000
Quality control	250 000
Production	<u>600 000</u>
Total	<u>1 200 000</u>

The total activity cost for each activity pool is now divided by the total number of observed activities to arrive at a cost driver rate that in turn will be used to calculate total activity cost per product line. Table 2.2 summarises the activity rates for each activity and illustrates how resources are consumed by each product.

Table 2.2: Calculation of product costs using ABC methodology

Calculation of activity rates			
Activities	Cost	Cost driver volume	Activity rate
Material handling	R150 000	150 movements	R1 000 per material movement
Material procurement	R50 000	300 orders	R166.67 per order
Set-up costs	R150 000	100	R1 500 per set-up
Quality control	R250 000	250	R1 000 per inspection
Production	R600 000	50 000	R12 per direct labour hour

Calculation of unit costs		
Activities (Cost centres)	Product A	Product B
Material handling (R1 000 × number of material movements)	R100 000	R50 000
Material procurement (R166.67 × number of orders)	R33 333	R16 667
Set-up costs (R1 500 × number of set-ups)	R90 000	R60 000

Activities (Cost centres)	Product A	Product B
Quality control (R1 000 × number of inspections)	R150 000	R100 000
Production (R12 × direct labour hours)	R480 000	R120 000
Total	R853 333	R346 667
Number of products	80 000	20 000
<i>Overhead cost per unit</i>	<i>R10.67</i>	<i>R17.33</i>

Source: Adapted from Faul *et al.* (2003)

This example has a small number of activity pools and ignores indirect overheads such as administration and engineering costs. Since indirect overheads are not considered it may result in a different profit margin for each product. Even though an attempt is made to treat all overheads as direct costs, often some indirect costs may be excluded from cost pools due to practical reasons (Armstrong, 2002; Gunasekaran, 1999). Armstrong found that even in staff department activity allocations there are some indirect portions which may vary between departments and suggests that the accuracy of staff department activity allocations depends on the degree of indirect costs within the activity allocations. Furthermore, Gunasekaran suggests that this is a disadvantage of ABC and that it is nearly impossible to have a direct link from all indirect overheads in most cases. He advises that ABC companies should attempt to include all indirect costs in the activity calculation as far as possible. This may suggest that manufacturing organisations with a large indirect overhead structure could have difficulty in implementing ABC and that this may have an impact on ABC implementation success.

This section has described how ABC is used as part of product costing. ABC adopters are likely to use this element but there may be a lack of understanding on the extent of indirect cost allocation to activity pools and the portion of indirect cost that remains an arbitrary assumption. It is plausible that an understanding of this factor may form the basis of establishing its impact on accurate and transparent activity/product costs and its potential to be used as a decision-making mechanism.

2.5.2 ABC used as part of budgeting and forecasting

Budgeting and forecasting are used in ABC by making projections on activity levels for each activity (Armstrong, 2002; Kee, 2003). This form of budgeting or forecasting is called activity-based budgeting (ABB) (Abdel-Kader & Luther; 2006, Shane, 2005) and provides for an extension of ABC, facilitating a tool for operational planning. It is a form of zero-based budgeting whereby indirect activities such as staff activities are budgeted together with an activity rate (Shane, 2005). Abdel-Kader and Luther (2006) indicate that ABB is used more frequently than ABC in companies and is occasionally used in conjunction with TC. Shane (2005) suggests that ABB increases transparency and allows management to control activity costs and identify areas where savings can be realised. A study by Mansor, Tayles and Pike (2012) has established that management rates ABC highly as part of the budgeting and forecasting process by providing improved information. This may suggest that the use of ABB may enhance decision making and that the use of ABC alone would not be as efficient as using it in conjunction with ABB. This possibility will be explored further in Chapter 3 from literature and during the empirical study.

2.5.3 ABC used as a decision-making tool in investment planning and other short- to medium-term decisions

The previous section demonstrated how activity costs and ultimately product costs can be identified using ABC and how these product costs may differ significantly from previous estimates using TC or process costing. This may be of no value, however, if organisations are not able to react on the information that is presented to them. It is possible that not all organisations utilise this information even if it is available to them. Byrne, Stower and Torry (2009) have identified six stages of implementation:

- A feasibility study or initiation of ABC
- Allocation of resources to ABC
- Analysis of activities and cost drivers but not used for decision making
- Accepting ABC with occasional decision making
- Common use of ABC in daily activities
- Extensive use of ABC and integration into financial and other systems

This may be important to understanding why manufacturing organisations would choose a certain implementation level and how this would affect the success obtained from ABC.

Due to the inability of ABC in the past to respond to short-term decision making, Kee (2003) focused his study on the more short-term operational planning and cost control by developing a modified ABC model with activity costs that are able to be flexed in line with operational requirements. Kumar and Mahto (2013) have suggested that strategic decision making is assisted by ABC through the additional information ABC provides. A further study by Kee (2004) investigated the possibility of using combined product mix and capital investment decisions by utilising a modified ABC model from which a project's net present value (NPV) can be established with different product mix scenarios. The use of similar investment planning models in combination with ABC may be useful for making correct investment decisions based on ABC by estimating an accurate NPV as a result of accurate product cost estimations.

Nolan (2004) illustrates in Figure 2.5 that decisions can be made on profitability information that is based on different hierarchical levels.

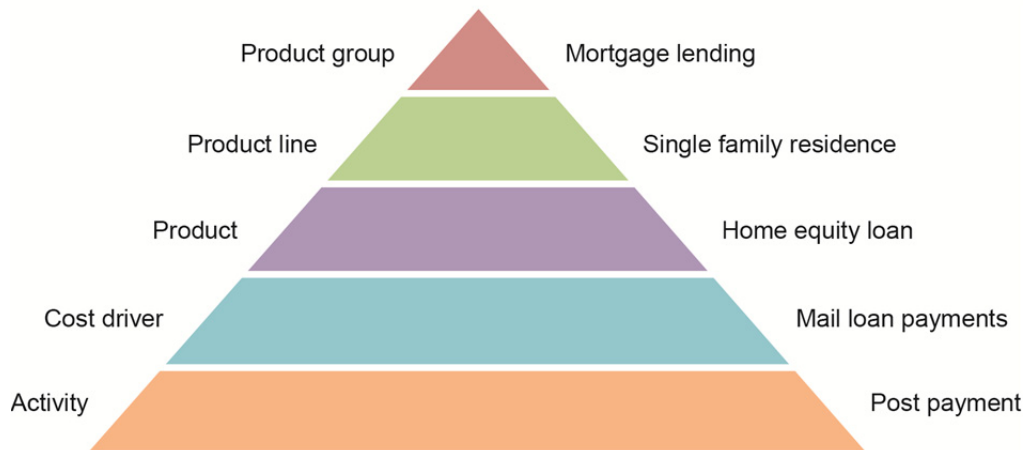


Figure 2.5: ABC product hierarchy demonstrating different cost level comparisons by decision making

Source: Adapted from Nolan (2004)

This figure illustrates the different levels on which profitability can be monitored. This may be useful for manufacturing organisations when deciding on product mix selection as well as focusing on less profitable products by drilling down from customers all the way to individual activities.

2.5.4 The use of ABC to combat competitors' pricing strategy

Velmurugan (2010) suggests that one of the main factors for ABC implementation success is a link to competitors' strategy. He suggests that when low resource products can be identified with ABC it enables the organisation to lower its price to increase its market share. Sartorius *et al.* (2007) suggest that increased competition results in decreased product life cycles and therefore increases the frequency of pricing decisions. They agree that companies in South Africa face great pressure not only from competitors but also from suppliers and that ABC was adopted to simplify negotiations by improved understanding of product costs. If being able to compete with direct competitors is a motivating factor for organisations to adopt ABC, then it may be possible that the use of ABC to combat competitors' pricing strategies could be beneficial and therefore enhance ABC implementation success in manufacturing organisations. This possibility will be further explored in Chapter 3 and from the empirical study.

2.6 THE NATURE OF SUPPORT WITHIN ABC ORGANISATIONS

This section will discuss the various support structures within an ABC system and how they fit within an ABC framework. This will form the basis for later investiga-

tions on the impact of these support mechanisms on the successful implementation of ABC.

2.6.1 Information technology (IT) infrastructure and its role in ABC

This section will illustrate the various ways by which IT platforms can support ABC and how they differ in functionality. This forms the basis for further discussion in Section 3.3.1 on the effectiveness of these IT platforms in ABC and activity analysis. Al-Sayed *et al.* (2008) have identified five different platforms that may be used for ABC:

- Spreadsheets
- Databases
- In-house developed software
- Specialised ABC packages
- ABC module in existing enterprise resource planning (ERP) systems

These platforms are distinctly different and may be an enabling factor for ABC implementation.

2.6.1.1 Spreadsheets

Spreadsheets are easy to use and are commonly used by accountants (Power, 2004). According to Power, spreadsheet packages have been in use since 1979 and enabled businesses to analyse data cost-effectively and quickly. The flexibility of spreadsheets enables users to use spreadsheets for a number of applications without resorting to expensive, specialised programs. It may be useful for ABC analysis, and Al-Sayed *et al.* (2008) have found that 22% of all ABC organisations use it as their main IT tool for data capturing and analysis. The use of spreadsheets to calculate ABC product costing can be illustrated in Table 2.3 from data presented in Section 2.5.1.

Table 2.3: ABC product cost calculation using a spread sheet

		1,200,000				
Activities	Cost driver	[Column E] Overhead costs (ZAR)	[Column F] Product A	[Column G] Product B	[Col F + Col G] Total	[Col E / Col H] Cost driver rate
Material handling	Material movements	150,000	100	50	150	1,000.00
Material procurement	Number of orders	50,000	200	100	300	166.67
Set-up costs	Number of set-ups	150,000	60	40	100	1,500.00
Quality control	Number of inspections	250,000	150	100	250	1,000.00
Production	Direct labour hours	600,000	40,000	10,000	50,000	12.00
Annual output			80,000	20,000	100,000	

Per unit cost	10.67	17.33
Total cost	853,333	346,667
Activities	[Col F × Col I] Product A	[Col F × Col I] Product B
Material handling	100,000	50,000
Material procurement	33,333	16,667
Set-up costs	90,000	60,000
Quality control	150,000	100,000
Production	480,000	120,000

As shown in Table 2.3, this calculation can be easily done for a simple example with two different products and five activity types. Spreadsheets may have their drawbacks though. Sajaniemi (2007) suggested that spreadsheets are hard to audit and that errors are difficult to detect and often go unnoticed, with the result that erroneous numbers are deemed to be correct and carried forward to other analysis. As a result there could potentially be pitfalls when spreadsheets are used exclusively for ABC calculations hence it may be important for manufacturing organisations implementing ABC to carefully consider the role of spreadsheets for their ABC costing model.

2.6.1.2 Databases

Ritchie (2002) describes databases as a collection of data typically stored in tables. These databases are often used in conjunction with spreadsheets to retrieve master data from tables. A database is often relational (two-dimensional) as op-

posed to the flat structure that may be found in a spreadsheet database. In ABC this would be, for example, activity rates for a specific product or volume produced during a specific time period. The advantage of using databases is that they can be used as a relational database and can be accessed by multiple users at the same time (Ritchie, 2002). Although this may seem like a logical extension of common spreadsheet usage, its incremental benefit when combined with ABC may be unknown and will be further explored in Chapter 3.

2.6.1.3 In-house developed software

According to Al-Sayed *et al.* (2008), 11% of all ABC adopters use custom-designed in-house software for ABC analysis. Aho (2006) used a case study to demonstrate the effectiveness of using a custom-designed ABC database system. By eliminating expensive license fees he was able to create an ABC system with similar functionality to commercial products at a lesser cost. It has to be stressed that his case study focused on a small- to medium-sized company and that the ABC system had to be linked with other existing databases. The system was developed within a month due to other IT architecture that had already been developed at the time. This case study illustrates that ABC implementation was enhanced by developing a low-cost ABC system from an existing database system; therefore it may be considered an important factor in achieving ABC implementation success for smaller manufacturing organisations.

2.6.1.4 Specialised commercial ABC packages

Similarly it is possible to buy off-the-shelf ABC software packages that can provide similar benefits to in-house developed software, but it is likely to be at a higher cost (Henricks, 1999). It is plausible that commercialised ABC packages could be of benefit only to larger organisations with greater resources and that manufacturing organisations should be careful before considering these ABC software packages.

2.6.1.5 ERP systems

An ERP system is an interconnected database linking all the different modules together and providing information resource sharing (Huijuan, Yuqian & Guoping, 2011). According to Hansen and Mowen (2006), an ERP system provides the ABC database with real-time information where often predetermined activity rates

may distort the ABC calculation. These systems, even though serving a different purpose, have the ability to supplement each other. It may potentially enhance the accuracy of ABC if an ERP system is implemented in conjunction with an existing ABC system, so increasing ABC implementation success in manufacturing organisations.

Akyol *et al.* (2005) found some weaknesses in the IT system after the implementation of an ABC system, whilst Nassar *et al.* (2009) revealed that the level of information technology available is an important consideration for companies considering ABC, in terms of reducing processing time and cost. These findings suggest that careful consideration of ABC software is likely to have a significant impact on ABC implementation success in manufacturing organisations.

Al-Sayed *et al.* (2008) established that a large portion of companies used non-ERP packages to support ABC, as depicted in Figure 2.6.

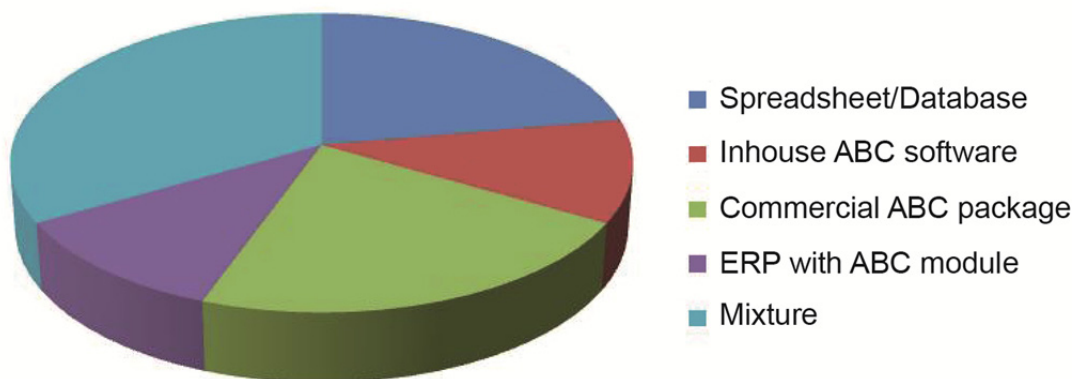


Figure 2.6: Software used in ABC implementation

Source: Al-Sayed *et al.* (2008)

Figure 2.6 shows that although a combination of IT software was found to be the most popular, it gives no indication of which software type is most effective for ABC use. Hence establishing the correct combination of software packages may be beneficial and could potentially enhance ABC implementation success in manufacturing organisations.

2.6.2 User attitudes and management support

Although having the ideal IT software would seem to go a long way towards ABC implementation, it may be people who limit ABC implementation. ABC is associated with headcount reduction due to the transparency that ABC provides about staff

activities and efficiency, and this may result initially in apprehension amongst staff when ABC is adopted (Armstrong, 2002; Gunasekaran, 1999). The importance of staff satisfaction with ABC is deemed to be important by Byrne *et al.* (2009) and Pike *et al.* (2011), who suggest that user satisfaction is the strongest measure of perceived ABC implementation success. Users are also not consistent in their opinions about ABC, and it is suggested that ABC implementers and management may illustrate some bias towards ABC as opposed to general users, who might have unsubstantiated negative perceptions about ABC (Cagwin & Bouwman, 2002; McGowan & Klammer, 1997).

Even amongst general management, lack of management support has been cited by past authors as a factor limiting ABC implementation success (Govender, 2011; Xu, 2012). It seems that the negative perception by general users may be due to the lack of training, and that knowledge may increase the user's confidence in the ABC system (Govender, 2011; Khozein, Dankoob & Barani, 2011; Nassar *et al.*, 2009; Nassar, Al-Khadash, Sangster & Mah'd, 2013; Velmurugan, 2010; Yapa & Konchange, 2012). If it can be understood how user attitudes towards ABC affect implementation success and how these perceptions can be changed with training, this may go a long way towards improving chances of ABC implementation success.

2.6.3 Supplementary cost-saving or management mechanisms

Activity-based management (ABM) is a further development of ABC that attempts to manage and control those activities used in product costing (Armstrong, 2002). It is often used in the absence of ABC and provides a measure to control activity costs; alternatively it is used in conjunction with ABC to analyse product margins in search for improvements, or used as part of the balanced scorecard, where non-financial performance measures are analysed (Armstrong, 2002; Kumar & Mahto, 2013). Furthermore, cost management expands the focus to target cost reduction and explores opportunities to improve efficiency and maximise profits. According to Drury (2007), cost management includes the following approaches:

- Life-cycle costing relates to the accumulation of all costs throughout the product life cycle, including pre-manufacturing costs and cost of abandonment.

- Target costing uses the perceived selling price as a base to establish a target cost for a product or service.
- Kaizen costing follows target costing during the manufacturing phase to constantly identify opportunities for cost reduction.
- Tear-down analysis involves an examination of competitor products to establish opportunities for cost reduction.
- Value engineering compares perceived value of each component to the actual cost to explore opportunities for cost reduction or process improvements.
- ABM relates to ABC without the actual activity-based product costing.
- Business process re-engineering reviews the existing business structure and processes and investigates ways to improve.
- Total quality management (TQM) involves all segments of the business striving for constant quality improvement. TQM has been linked to ABC by Duh *et al.* (2009) and Manalo and Manalo (2010), citing the ability of ABC to identify activities relating to rework costs and to link quality management with cost management using ABC.
- Value-chain analysis aims to satisfy customer needs and reduce costs by investigating the link between each activity, and it establishes means to improve the effectiveness of each activity.
- Benchmarking relates to the comparison of best practices with key activities within the organisation.
- Environmental cost management is important for industries to preserve their image amongst the general public, and it involves managing costs that are related to environmental costs.
- A just-in-time system (JIT) aims to produce quality goods at exactly the required time.

Therefore, it may be important for manufacturing organisations to consider which supplementary cost-saving mechanisms can enhance ABC implementation success.

Carenzo and Turolla (2010) have demonstrated that business size plays a role in the adoption of cost management mechanisms, including ABC and TQM. They further suggest the following as factors for adopting these cost management mechanisms:

- Business unit size
- Organisational structure
- Business complexity, including product range diversity
- Organisational culture
- Industry type

These factors are consistent with the adoption factors for ABC in South Africa and suggest that other cost management mechanisms are likely to accompany ABC (Sartorius *et al.*, 2007). If there is a link between adopting these cost-saving mechanisms and ABC, it is possible that supplementary cost management mechanisms might have an influence on the effectiveness of ABC in manufacturing organisations.

2.7 SUMMARY

In this chapter the history and evolution of ABC have been discussed. ABC has come a long way in the last 28 years and has seen numerous developments during its lifetime. It has evolved from a separate product costing system into an integrated system that is often used as part of the organisation's strategic activities. These developments, such as ABB and ABM, may have contributed to enhancing ABC implementation success in manufacturing organisations. The difference between ABC and TC was also discussed and the required implementation steps were illustrated. The extent of cost distortion between ABC and TC may not always be significant in all circumstances, and it may be that factors such as indirect overhead structure could have an influence on whether ABC is beneficial compared to TC. The difficulty of allocating indirect fixed overheads may imply that the successful implementation of ABC could depend on how successfully and practically manufacturing organisations are able to identify cost drivers for indirect fixed overheads.

The chapter concluded with a discussion on the nature and context of ABC contributing factors. From the literature it is suggested that ABC may be more beneficial to manufacturing organisations with large product diversity and greater resources, as ABC is deemed to be more resource-intensive, and cost distortion is greater with increased product diversity. Increased competition seems to drive organisations to use ABC and may increase the focus on more intensive ABC

usage, therefore using ABC to its maximum potential. The use of ABC to drive pricing strategies could be beneficial to a manufacturing organisation and may assist the organisation to establish a competitive advantage by identifying non-value-adding or excessive activities and allowing price reductions. An important observation from literature is that important capital investment decisions may be more accurately calculated with ABC and that this may result in correct approval or rejection of capital investments based on NPV. The different ABC software provides manufacturing organisations with a choice of several systems; hence this could be an important factor to consider prior to ABC implementation, as costs and accuracy of systems may have an impact on product costing and ultimately decision making. Having the best ABC software could be worth little if user attitudes do not allow ABC to be used to its maximum potential. It is likely that training could provide improvement in user attitudes and skill levels. Finally the role of other cost-saving mechanisms may be important to help support ABC objectives. The impacts of these findings will be discussed in Chapter 3, and the empirical study will test ABC users' perceptions and experiences on ABC.

CHAPTER THREE

LITERATURE REVIEW ON THE EFFECT OF INFLUENCING FACTORS ON ABC IMPLEMENTATION SUCCESS

3.1 INTRODUCTION

This chapter investigates the effect of influencing factors on the successful implementation of ABC from past literature. The first part of this chapter will review factors contributing to the successful implementation of ABC from an organisational and industry perspective. The literature will focus on evidence of the success of ABC worldwide and how the influence of organisational variables and the impact of culture have contributed to the success of ABC. A further investigation will be done to look at the link between ABC usage intensity and evidence of ABC success from its different applications. Finally the characteristics ensuring the continued success (post-implementation) of ABC will be analysed. Cinquini and Mitchell (2005) suggest that any claims of successful ABC implementation are mostly circumstantial and only represent a likelihood of success. They argue that the only conclusive evidence would be proof of a financial benefit from ABC implementation and that other success measures are purely subjective. Similarly Cagwin and Bouwman (2002) have investigated the association between ABC implementation and financial performance and the factors contributing to financial performance improvement. The study revealed a 23% diffusion rate of ABC, with manufacturing concerns reporting higher diffusion rates than non-manufacturing or service entities. In addition 78% reported the use of other cost mechanisms, such as JIT. The study did reveal a positive association between ABC and financial performance, however, but only with certain enabling factors. This is significant, as knowledge of these enabling factors may assist industries when deciding on implementing an ABC system. The remainder of the chapter will focus on these factors in detail and on the impact of ABC in the past, as identified from research. Figure 3.1 shows how Chapter 3 fits into the overall study.

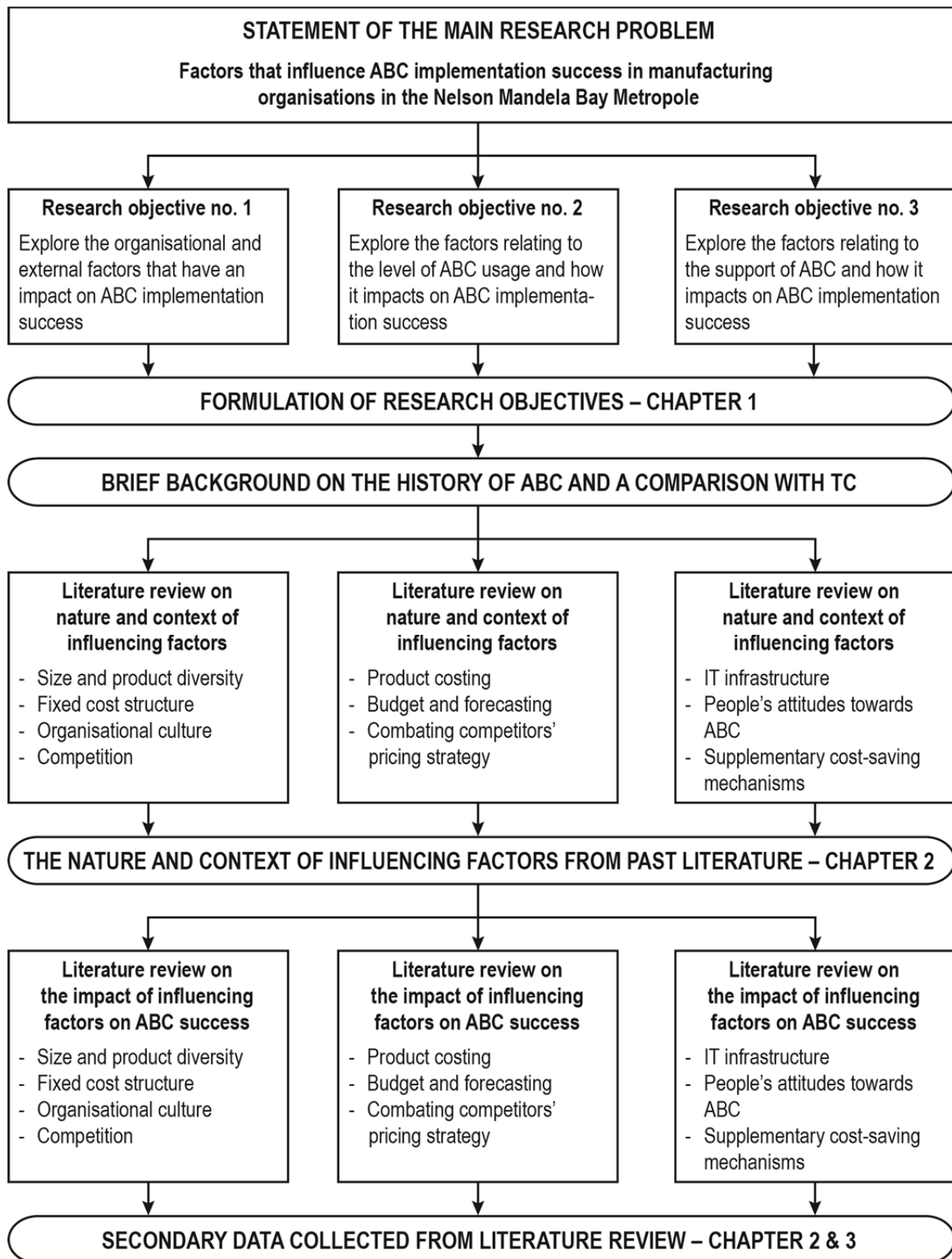


Figure 3.1: Chapter 3 focus and how it fits into the overall study

3.2 THE NATURE OF THE BUSINESS ENVIRONMENT AND HOW IT AFFECTS ABC

In this section the impact of the inherent nature of the organisation on ABC implementation success will be discussed. In Section 3.2.1 the effect of the organisation's size and the diversity of the product range will be discussed. In Section 3.2.2 the effect of the fixed overhead structure on ABC success will be investigated. Section 3.2.3 discusses the impact of the organisation culture on ABC.

3.2.1 The effect of size and product diversity on ABC

Elhamma (2012) has established that there is a positive relationship between organisational size and the effectiveness of ABC. The suitability of larger organisations to support ABC implementation is commonly cited in literature as an important factor for ABC success (Baird *et al.*, 2004; Brierly, 2008; Elhamma, 2012; Hall & McPeak, 2011; Mullins & Zorn, 1999; Nassar *et al.*, 2011; Raeesi & Amini, 2013; Rundora *et al.*, 2013). Hutchinson (2010) shows that greater product mix complexity yields higher net operating income compared to TC and time-based accounting methodologies. As stated by Hutchinson, this study did not consider the different implementation costs (effect on EVA) and additional maintenance costs associated with ABC and suggests that ABC may not perform better under all circumstances especially when product mix variety is low. It may therefore be important for smaller manufacturing organisations considering ABC to take cognisance of other factors such as available resources to sustain the perceived benefit from ABC implementation. Figure 3.2 indicates that with an increase in product mix complexity a marginal profit increase is to be expected compared to other costing methodologies such as TC and time-based accounting.

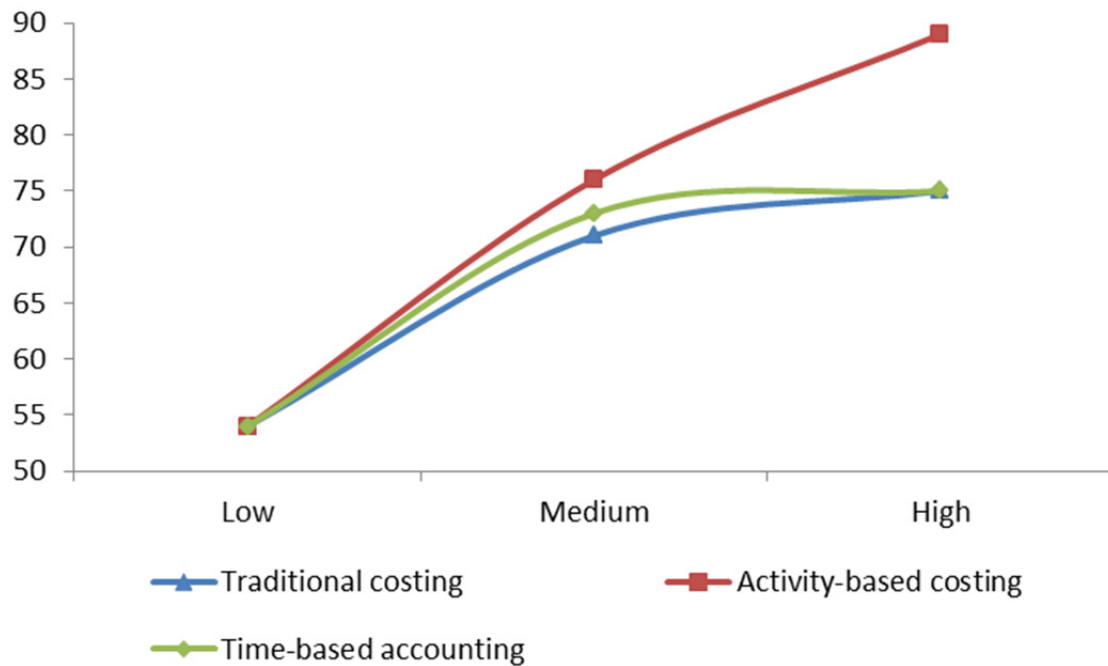


Figure 3.2: Product mix complexity and the differences in operating performance
Source: Adapted from Hutchinson (2010)

Figure 3.2 illustrates that with low product mix complexity there is little difference between the three costing methodologies and operating performance, but as product mix complexity increases ABC results in improved performance over TC and TBA. Similarly Duh *et al.* (2009) found that cost distortions are greater with increased product mix complexity. This may be of significance to manufacturing organisations as it is plausible that less diverse organisations may not achieve the same benefit with ABC over TC.

3.2.2 The effect of the organisation’s fixed overhead structure on ABC

Hutchinson (2010) has suggested that the greater fixed overhead costs are in a company, the more likely it is that ABC and TC estimations would differ. His study revealed that it is product mix complexity and not the fixed overhead structure that drives the improvement in operating income compared to TC. So while it is likely that companies with high fixed overheads would adopt ABC, he suggests that this in itself does not seem like a contributing factor for ABC success as high fixed overheads is often linked to higher product mix complexity. However, whilst it seems that a high amount of fixed overheads are a contributing factor to ABC adoption, its application remains problematic in practice (Hutchinson, 2010;

Sartorius *et al.*, 2007). The effect of fixed overheads on ABC implementation success may need to be established because if a high amount of fixed overheads are a contributing factor to ABC adoption but assigning it to product families is problematic, it may be that this very same reason for adopting ABC could result in ABC not being successful.

One of the main reasons for rejecting ABC is the problem of identifying suitable cost drivers for activities for support departments such as finance and human resources (Sartorius *et al.*, 2007). The costs associated with these departments are inherently fixed in nature and identifying cost drivers for each can become a complex exercise, and the continued recording of product-specific activities can create an additional workload. This has led to companies excluding ABC from product costing consideration or merely allocating support function fixed overheads using an arbitrary overhead rate. Norris (1993) used semi-structured interviews to obtain user perceptions of ABC and has established that cost drivers are often questioned by ABC users. These users would ideally like ABC to extend to the entire overhead structure of the organisation. The feeling of some users, according to Norris, is that cost drivers should have been agreed with users prior to implementing and that this affects the view of users on the accuracy of overhead allocations using ABC. The identification of an agreement on cost drivers may assist manufacturing organisations to implement ABC successfully from the beginning.

The problematic nature of tracing service department overhead costs has been acknowledged by Kaplan and Anderson (2003), who recommend the use of time-driven activity-based costing (TDABC) that essentially streamlines ABC and considers unused capacity. They point out the problems that arise from a case study on a bank's brokerage department that had to employ 14 full-time people just to collect and process ABC-related information and suggest that many organisations update ABC information only when practical. Whilst 14 full-time people may be excessive as in this instance, it may be that with service department cost driver allocation an activity in itself is created. This brings to question how far organisations are prepared to venture in order to establish linkages between indirect overhead costs and specific products. This may be important for manufacturing

organisations to consider given the resources available to them and if a limited ABC implementation can provide benefit over TC.

Fixed manufacturing overheads, on the other hand, remain less problematic where it is possible to allocate depreciation and factory rental fairly simply with cost drivers such as machine rate and floor space usage. Hutchinson (2010) suggests that manufacturing overheads have become the largest product cost component. Furthermore, although his study suggests that it is product mix and not manufacturing overheads that differentiate ABC from TC, he does suggest that increased manufacturing overheads increase this difference. Therefore, it seems that manufacturing organisations may need to consider cost drivers for all manufacturing overheads to increase the benefit of ABC implementation.

3.2.3 The effect of organisational culture and strategy on ABC

This section will discuss the influence of organisational culture on ABC as well as how the different competitive strategies can affect the usefulness of ABC. Porter (1980) identifies three different generic strategies:

- Cost leadership
- Differentiation
- Focus

Cost leadership is a strategy employed by companies to obtain market share by attempting to have the lowest possible price in the targeted customer market. This is typically achieved by distributing fixed overheads across a high number of products, a strategy called economies of scale or attempting to reduce the manufacturing overheads per product by eliminating value-adding activities. Differentiation does not attempt to reduce costs to the minimum but focuses on providing a unique product that customers can identify with and is deemed to be unique and superior by default. These two strategies can be combined with either a narrow or a wide customer base (focus) that defines how large the market segment should be (Porter, 1980). The importance of this in relation to ABC is that it needs to be understood how this would affect the implementation success of ABC and whether ABC adopters need to consider their overall strategy when adopting ABC.

At first glance it could be easily assumed that cost leadership and ABC partnership would yield the better result. However, Pavlatos (2010) has concluded that innovative organisations (prospectors) are more likely than defenders to successfully implement ABC. His study shows that organisations with a differentiation strategy are more likely to adopt ABC than cost leadership companies. He suggests that companies with a differentiation strategy are likely to obtain more benefits from ABC due to the increased complexity and uncertainty arising from having to innovate continuously. This may be questionable though, because if cost leadership organisations were to continue to focus on activity costs in order to ensure maximum efficiency they would likely achieve similar results. This is confirmed by Elhamma and Fei (2013) as well as Yapa and Konchange (2012), suggesting that prospectors and defenders have a similar chance of success with ABC. Therefore it may be concluded that ABC implementation success is likely to be achieved by both prospectors and defenders to a similar degree, and that it is likely that the way in which ABC is utilised to gain a competitive advantage is probably more important.

A study by Baird *et al.* (2004) measured organisation culture (innovation, outcome orientation and tight vs. loose control) as a contributing factor to ABC adoption and also found consistency with results from past research (Al-Omiri, 2012; Pavlatos, 2010). They conclude that organisations with greater innovation (differentiation strategy) as well as a focus on driving down costs are more likely to adopt ABC and to continue using it. This could suggest that manufacturing organisations using ABC as a leveraging tool to gain a competitive advantage may achieve greater success with ABC.

3.2.4 The effect of external competition on ABC

In a study conducted in China amongst manufacturing companies, Fei and Isa (2010b) did not find a positive association between ABC success and competitive strategy, despite increased competition being a commonly accepted reason for adopting ABC. Conversely, in a study on 18 automotive plants, Anderson *et al.* (2002) found that there is a strong relationship between competition and a focus on accurate product costing with a link between the number of cost drivers used and external competition. Similarly Byrne (2011) found that the level of competition is a contributing factor in ABC implementation success, specifically in organisa-

tions that had implemented ABC for a long time. Byrne suggests that although there may be a link between external competition and accurate product costing, it is other contributing factors such as training and the level of ABC usage that combine towards accurate product costing. However, Dierynck and Roodhooft (2010) suggest that accurate cost information can be detrimental if both the organisation and the competitor have accurate cost information. This may mean that increased competition may not be necessarily a positive contribution in all cases; however, it may still be a factor in ABC implementation success depending on individual circumstances.

3.3 THE LEVEL OF ABC USAGE AND HOW IT AFFECTS THE EFFECTIVENESS OF ABC

The purpose of this section is to establish how the level of ABC usage impacts on the overall performance of the organisation and how it facilitates the achievement of competitiveness in the open market. Specifically the following facets will be discussed:

- The usefulness of ABC in product costing and how the level of overhead allocation affects the accuracy of ABC (Section 3.3.1)
- The impact of ABC as part of the decision-making process in capital investment decisions relating to new product lines (Section 3.3.2)
- The usefulness of ABC in attempting to combat competitors' pricing strategies (Section 3.3.3)
- The ability of ABC to work together with other cost-saving mechanisms (Section 3.3.4)

3.3.1 The usefulness of ABC in product costing

As mentioned earlier in the second chapter, Akyol *et al.* (2005) conducted a study of an ABC implementation in a sanitaryware company with a view to comparing the results with the previously used process costing methodology. This study has some similarities to the study conducted by Lind (2001) comparing process costing and ABC, but in contrast Akyol *et al.* (2005) conducted their study on a practical situation as opposed to the theoretical model of Lind (2001). The objective for the study was to determine as far as possible all activities relating to products and to

accurately measure cost for each product. These results were contrasted as displayed in Table 3.1.

The following summarises the study of Akyol *et al.* (2005):

Production of sanitaryware follows a 5-phase route: bulk preparation, pressure casting or classic casting and finally glazing. During the bulk preparation phase the bulk is prepared from a predetermined recipe that in turn is delivered to either the pressure casting or the classic casting departments depending on the final required specification. The pressure casting department is mostly automated, with the resultant shorter cycle times, and the classic casting department has a longer cycle time due to its dependence on manual labour. The result of each department is despatched to the glazing department for polishing afterwards, where products are sent to the tunnel oven. The end product is either sent to the packaging department or scrapped based on inspection results after the baking process. As mentioned earlier, the organisation initially used process costing to apply overheads to its products. It used four basic cost pools to group labour and overhead costs: direct labour, electricity, packaging, and indirect overheads.

The ABC implementation required two basic steps. The first step was to identify the activities relating to each product, and the second step was to calculate the unit cost of each activity. Conversion costs such as electricity and rental were applied to each activity based on how each activity consumes these resources. For each activity an activity driver was established to assign the correct number of activities to each product. ABC was not applied during the bulk preparation phase. Akyol *et al.* (2005) suggest that where there is no output difference between the two costing methodologies, ABC is not required. The classical casting department with the traditionally longer cycle time has far fewer activities than the pressurised casting department with the traditionally shorter cycle time. This could be a possible reason for the 80% of products identified in the study representing a significant variance compared to the previously used process costing methodology. This may be significant as it shows that ABC in low activity processes might not provide any benefit over TC. Although the study by Akyol *et al.* (2005) comprised only a few cost pools (Figure 3.3), the different activities within these cost pools resulted in the cost distortion.

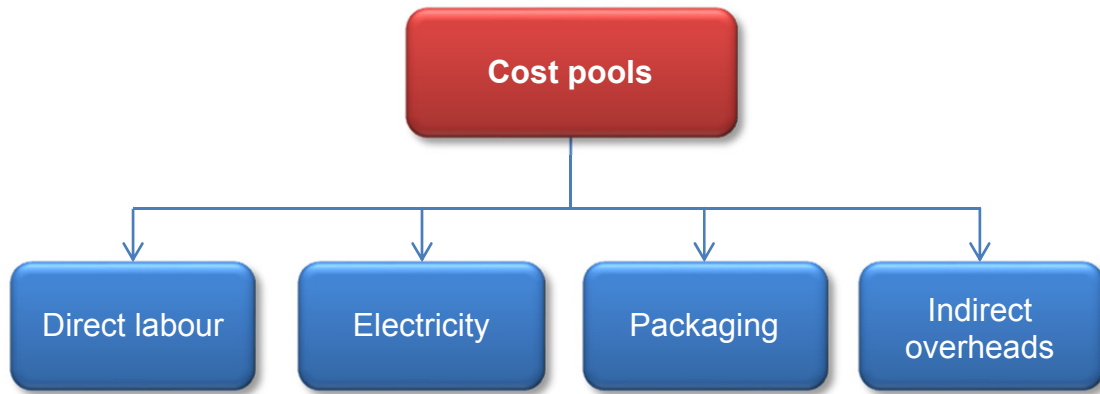


Figure 3.3: Sanitary ware company cost pools

Source: Adapted from Akyol *et al.* (2005)

TC applies overheads exclusively on the basis of cycle time and does not consider any activities or the cost associated with such activities (Drury, 2007), and in this specific example the one department with the longer cycle time but simpler activity structure would have applied proportionally more overheads than the department with the shorter cycle time but more activities. The challenge for manufacturing organisations is likely to be able to understand under which circumstances ABC becomes an attractive option over TC when considering activities within a manufacturing environment.

The identification of such activities provides further opportunities for eliminating wasteful activities or simplifying the process. For example; the study by Jelsy and Vetrivel (2012) was able to identify a 72% improvement in the performance of a spinning mill in Hong Kong; and Walker and Wu (2000) identified a number of activities in the book manufacturing industry with differences between TC and ABC up to 271%.

These are significant numbers and might demonstrate that discrepancies between the two costing methodologies do exist across different industries and that it is indeed possible to identify these costs with ABC and use it in decision-making. The flexibility to view different cost objects in terms of customer profitability is likely to provide additional information for decision-making (Gunasekaran, 1999). All this cost and activity cost information may not necessarily be beneficial though, as Akyol *et al.* (2005) as well as Turney (2008) have pointed out that where cost estimations are similar the use of ABC may be detrimental due to the high implementation and maintenance costs associated with ABC. The challenge may be to

understand when TC would suffice and how far the manufacturing organisation should identify activities in order to gain an advantage over TC. Table 3.1 shows the various cost drivers that were identified from activities in Akyol *et al.*'s study.

Table 3.1: Sanitary activities and cost drivers by department

Activity	Cost driver
Classical casting	
Moulding	Process time
Assembly hole drilling	Number of assembly holes
Reworking	Number of outputs
Cleaning of equipment	Process time
Function hole drilling	Number of function holes
Carrying	Number of processed units
Pressurised casting	
Moulding	Number of moulds
Lateral hole drilling	Number of outputs
Set-up	Number of incoming units
Cutting excess material	Number of incoming units
Reworking	Number of incoming units
Carrying	Number of outputs
Assembly hole drilling	Number of assembly holes
Ring preparation	Number of incoming units
Sub-component washbasin drilling	Number of sub-components
Washbasin drilling	Number of washbasins
Rework back of products	Number of outputs
X-Patch control	Number of outputs
Fetching WIP	Number of incoming units
Assisting other departments	Number of incoming units
Filling in some forms	Number of incoming units
Mould check-up	Number of incoming units
WIP control	Number of incoming units
Personnel control	Number of incoming units
Water hole drilling	Number of processed units

Activity	Cost driver
Glazing	
Maintenance	Number of parts
Hand glazing	Parts weight
WIP transfer	Number of parts
Reworking	Number of parts
Closet shaking	Number of closets
Planning	Number of units planned
Routine controls	Number of units planned
Data entry	Number of units planned
Tunnel oven	
Tunnel oven activity	Number of parts
Transfer to oven	Parts weight
Transfer from oven	Number of parts
Heat control	Number of parts
Security control	Number of closets
Planning	Number of units planned
Routine controls	Number of units planned
Data entry	Number of units planned

Source: Adapted from Akyol *et al.* (2005)

Table 3.1 illustrates how cost drivers were developed for each activity in the study by Akyol *et al.* (2005) and how activities can vary across different processes. The difference between classical casting and pressurised casting is illustrated by the number of activities required. The importance of the number of activity drivers may need to be investigated and how this relates to ABC implementation success.

Walker and Wu (2000) conducted a study in a book manufacturing organisation in an attempt to assign fixed overheads (indirect costs) to product costs. The research was conducted as a result of a concern in the book manufacturing industry that products differ in how they utilise planning resources and that indirect costs get absorbed in the cost pools with the effect that products are either over-costed or under-costed using TC. The reason for this is that the longer the proposed job is estimated to be, the more indirect overheads are applied to the product regardless of level of detail. The focus of the study was therefore on the planning phase or activities and to fairly assign activity costs to products using ABC. The normal ABC methodology was applied:

- The identification of the job to which ABC should apply
- The identification of direct costs for the particular job
- The identification of indirect cost pools related to the particular job
- The selection of a cost allocation basis for indirect cost assignment
- The calculation of an activity unit rate per indirect activity.

The following summarises the study of Walker and Wu (2000):

In the book planning department the direct costs constitute only a small portion of overall costs with the result that there are greater risks that indirect or fixed overheads could be over-applied or under-applied. Indirect cost pools, namely utilities, cost of floor space, cost of technology and indirect labour, were already in existence, so the next step was to identify key tasks and to apply time values to the key tasks. The next step was to group the key tasks in groups of three: retrieval of job, actually performing the job, and finally despatching the job to production. The first group (T_I) and the third group (T_{III}) were classified as repetitive jobs with a constant time applied for each group ($T_I = 12$ minutes and $T_{III} = 15$ minutes) as these activities did not vary across the different jobs. The activities for the second group (T_{II}) were split between repetitive and non-repetitive jobs. The repetitive jobs (10, 12, 13, 15, 16 and 20) were performed in conjunction with T_7 . The importance of this study is that the success of ABC in this particular case is dependent on correct time studies in order to assign cost drivers. Table 3.2 shows the observations from the different activities and the methodology behind these assignments. The results are likely to be significantly different if incorrect observations were made or if times are assumed.

Table 3.2: Book planning activities

Non-repetitive job	Formulae for total time	Methodology
T₆ – Reading job paperwork	6 minutes (repetitive)	Observed
T₇ – Review customer copy	$0.007192 \times \text{number of pages}$	Observed as a constant time for reviewing textbook
T_{8,11} – Halftones sizing	$0.0383 \times \text{number of halftones}$	Time depends on number of halftones
T₉ – Insert section	$0.25 \times \text{number of inserts}$	Time depends on number of inserts
T₁₄ – Consider cover or jacket	$0.2 \times \text{cover/jacket}$	Time depends on number of covers/jackets
T_{17,18,19} – Art request	6 minutes (constant)	Observed (if required)

Source: Adapted from Walker and Wu (2000)

Table 3.2 illustrates how activities can differ in terms of measurements and unit basis. Walker and Wu (2000) observed 32 jobs over a period of 3 days and established a minor difference in actual time measured compared to planned time (1.21 hours less than planned). This observation confirmed the accuracy of the time observations and provided a tool to compare these results with the TC method previously applied in the book manufacturing industry. The comparison illustrates the effect of inaccurate costing. Job no. 18 was estimated to be \$226.88 with the TC method and turned out to cost only \$63.36, representing a difference of \$163.52 (or 72%). This is the amount a customer has to pay additionally for the product which could have an adverse effect on competitiveness in the open market. In contrast Job no. 26 was underestimated by \$290.25, which negatively affects profitability. This may ultimately prove to be detrimental to overall gross margin if the product mix suddenly changes and the majority of products are under-costed, especially in the manufacturing industry.

The effect of over- and under-costing of products was also observed by Akyol *et al.* (2005) in a study mentioned earlier in the chapter. The case studies presented (Akyol *et al.*, 2005; Walker & Wu, 2000) illustrate complex ABC models with multiple cost drivers and show that an intensive ABC system can be beneficial. Therefore it may be important for manufacturing organisations to consider implementing ABC as part of product costing as intensively as practically possible in order to gain a significant advantage over TC.

3.3.2 The impact on ABC implementation success if used as part of the forecasting and budgeting process

This section will discuss how ABC implementation success is influenced by its use in forecasting and budgeting and the difference it makes to the overall usefulness of ABC. According to Shane (2005), using ABC in the budgeting and forecasting process allows management to control costs by managing activities and benefits the organisation in the following ways:

- It enables staff to be used in the most cost-effective way.
- It enables contract personnel to be used, depending on operational requirements.
- It allows management to identify non-value-adding activities to eliminate them.
- It identifies most expensive and least expensive activities in order to create focus areas.
- It allows management to gauge the overall efficiency of the organisation.
- It provides management with a cost base from which to improve the use of other measures such as value-added engineering.
- It provides management with the ability to justify the budget with an objective cost base.

The controlling of the costs and the abovementioned benefits of using ABB may result in ABC being used to its fullest potential by allowing comparability and identifying focus areas, hence increasing ABC implementation success in manufacturing organisations.

Comparing activities amongst salaried staff between actual and budgeted or forecast seems to create uncertainty amongst staff members as these previously absorbed fixed overheads are now measurable and the staff department now becomes accountable for their overhead costs (Armstrong, 2002). Kee (2003) argues that an alternative ABC system differentiating between committed and flexible cost driver rates would be more beneficial for planning purposes. He argues that traditional ABC may fail to determine an optimum product mix where excess capacity is available and may not be useful unless it is modified to accommodate unused capacity. In conclusion ABB combined with ABC may provide organisations with the flexibility to plan in changing circumstances, if used correctly, thus allowing

manufacturing organisations to react to changes in forecast volumes, so enhancing the use of ABC.

3.3.3 The usefulness of ABC as a decision-making tool for capital investments and other short- to medium-term decisions

Harrison and Killough (2006) conducted a study on the effectiveness of ABC on the decision-making process. The study tested the effect of decision-making when based on the costing methodology utilised. Participants were given a computer game type simulation mimicking real-life decisions, whereby they had to make decisions based on information provided from either TC or ABC. The study found that although there was no significant difference in the time taken for making decisions, the ABC group managed to increase profits from their decisions, and the TC group netted a loss. The results are shown in Figure 3.4. Therefore, manufacturing organisations may need to take cognisance of the possible increase in profits through the use of ABC in decision-making.



Figure 3.4: Decision-making ABC vs. TC
Source: Adapted from Harrison and Killough (2006)

Figure 3.4 illustrates a link between user commitment and relative ABC success over TC. This might illustrate that if information is more transparent with ABC compared to TC, ABC is more likely to succeed. The use of ABC for analysing customer profitability analysis (CPA) has been endorsed by Smith and Dikolli (1995), who suggest that ABC assists in identifying how resources are allocated

to each customer, hence increasing transparency of information. They suggest that CPA with ABC would result in fewer cost distortions amongst customers. It seems that the use of CPA compliments ABC and that ABC implementation success is improved as a result (Stratton, Lawson & Hatch, 2009; Wegman, 2009). Hence there may be contributing factors to ABC implementation success by incorporating CPA as a decision-making tool in addition to ABC.

Lind (2001) has investigated the impact of ABC on the coal mining industry, in particular underground coal mining. Lind suggests that due to the significant fixed overheads present in coal mines, ABC would improve product costing accuracy. This is compatible with the finding of Sartorius *et al.* (2007) that companies with higher fixed overheads have a higher ABC diffusion rate than companies with a lower fixed overhead percentage.

Lind (2001) is of the opinion that ABC assists in the decision-making process, especially with regard to life-cycle costing, for which he recommended an NPV approach in considering equipment acquisitions over the lifetime of a project. He argues that ABC ensures that all costs are correctly identified and allocated. Lind studied the underground mines using the more traditional process costing method, observing three different mining methods: drill and blast, continuous mining, and longwall mining. An NPV model focusing on continuous mining and longwall mining were subsequently developed. The results were compared with an initial study from Falconer (1989) and shown in Table 3.3.

Table 3.3: Comparison between process costing and ABC in mining industry

Costing methodology	Continuous mining	Longwall system
Process costing with Falconer (1989) original data	R26 million	(R12 million)
Process costing with Lind (2001) updated data	R111 million	R81 million
ABC costing with Lind (2001) updated data	R143 million	R97 million
Percentage increase	22%	17%

Source: Adapted from Lind (2001)

Lind (2001) points out that if a decision had had to be made on the longwall system based on the Falconer study it would have been rejected. In a similar study Tsai, Chen, Liu, Chen and Shen (2011) established that significant capital investments

could be declined by TC due to the non-consideration of indirect overheads in TC. In their case study an investment decision for a new machine yielded a lower NPV than the current equipment with TC but a substantially higher NPV with ABC. This may be significant as long-term decisions made on large investments could be accepted or rejected based on the costing methodology that was applied.

In this section some key findings relating to decision-making have been discussed from prior research. The overall conclusion is that in the right conditions ABC could possibly enhance the decision-making process in both the short term and the long term, and that for ABC to truly succeed, these decisions may depend on the commitment and overall adoption of ABC within the organisation.

3.3.4 The improved results from ABC when used to combat competitors' pricing strategies

Charles and Krumwiede (2011) found that an organisation that emphasises a low price strategy obtains improved results when ABC and ABM are used in conjunction with other cost-saving mechanisms and sound budgeting techniques such as using ABB. Their study found that organisations using a low-price strategy are more likely to benefit from ABC than organisations using a different focus. This is achieved by eliminating excess waste and activities that do not add value to products. The use of ABC in conjunction with competitive strategy was found by Yapa and Konchange (2012) to be beneficial for ABC implementation. Therefore identifying such non-value-adding activities with ABM could result in cost reductions and may enable manufacturing organisations to either lower their selling price to obtain a larger market share or increase their profits.

3.4 ORGANISATIONAL SUPPORT OF ABC AND HOW IT AFFECTS ABC

This section will discuss how support within an organisation influences the successful implementation of ABC. Specifically the impact of IT support, internal staff support and cost management mechanisms other than ABC will be discussed.

3.4.1 The impact of IT infrastructure on ABC

Al-Sayed *et al.* (2008) investigated the effect on ABC success of the availability of the ABC module within an ERP system, as well as the impact on ABC success of

the capacity to support ABC. They studied the effect of the IT infrastructure on ABC and attempted to answer the following:

- The effect of the IT infrastructure on the overall success of ABC.
- The effect of the IT infrastructure at the ABC assessment phase on the decision to implement ABC.
- The effect of the IT infrastructure on the level of activity management within the organisation.
- The effect of IT-related problems on ABC.

The study suggests that in-house developed software and a dedicated ABC module within an ERP system are considered more favourable than other systems such as spreadsheets for ABC implementation success. However it was found that in assessing ABC for acceptance, spreadsheets were considered the preferable solution due to the high cost associated with dedicated ABC systems. It was also found that the level of ABC usage is significantly related to the sophistication of ABC, a view that is supported by Yapa and Konchange (2012). Finally it was found that the use of a dedicated ABC module within an ERP system is seldom used in practice and that ABC is mostly practised in another software package. However, Huijuan *et al.* (2011) have suggested that a dedicated ABC module in an existing ERP system may save time and resources. Hence, manufacturing organisations may also need to consider their available resources when considering ABC software, as this may impact on the efficiency of the ABC costing model, and therefore be a factor in achieving ABC implementation success.

3.4.2 The impact of people's attitudes towards ABC

In Section 2.3.3 past research has shown that organisations with certain people characteristics are more likely to adopt ABC than other companies. This section will discuss the potential impact of people's attitudes towards ABC on the successful implementation and continuous operation of ABC. Sohal and Chung (1998) have identified total management commitment and an ABC project team with similar beliefs and a positive attitude as key to the successful implementation of ABC from case studies done. The use of an ABC project team was also found by Yapa and Konchange (2012) to be a key factor for ABC implementation success. Byrne *et al.* (2009) found that people's attitudes towards ABC implementation

are generally favourable and consider ABC to be a success; however the findings were more favourable in ABC operations which were well into their implementation stages and had already started to experience some tangible benefits. However, it seems user attitudes within the same organisation do differ, which is why some authors such as Cagwin and Bouwman (2002) only used internal auditors in their study, as they considered that the differences in attitudes between ABC project leaders and the general users could cause different results from their study. This is supported by Velmurugan *et al.* (2010), who suggested that training other users may assist in removing the resistance against ABC. Therefore it is possible that user attitudes in manufacturing organisations can affect the successful implementation of ABC, especially if not all key personnel are positive about ABC.

User attitude with top management support is in some cases considered a success measure in itself (Al-Omiri, 2011; Appah & Bariweni, 2013; Fei & Isa, 2010a; McGowan & Klammer, 1997; Yapa & Konchange, 2012), which may mean that it is likely that positive people support within the organisation will improve the chances of ABC implementation success. This is confirmed by Xu (2012), who found that lack of cooperation within an organisation may be detrimental to ABC implementation success. Pike, Tayles and Mansor (2011) and Xu (2012) found that user attitudes may be linked to ABC system design. Xu (2012) found that accurate input information may improve cooperation within the organisation. This suggests that user attitudes could possibly be changed by adopting the correct system and ensuring input data is correct, thereby increasing the probability of ABC implementation success in manufacturing organisations.

3.4.3 The potential of other cost-saving mechanisms to support ABC

ABC is often praised as a transparent costing methodology assisting management in establishing correct product costs, identifying activities, making decisions and ultimately improving financial performance (Akyol *et al.*, 2005; Cagwin and Bouwman, 2002; Harrison & Killough, 2006). However, the study by Cagwin and Bouwman (2002) of financial performance improvements with ABC showed a greater improvement in financial improvement if other cost-saving methodologies such as JIT and TQM were used in conjunction with ABC. Similarly Jelsy and Vetrivel (2012) found that ABC can assist in lean manufacturing, which is a cost-

saving technique. However, it may be debatable whether ABC is successful purely as a stand-alone product or whether it benefits from the influence of other costing methodologies or even depends on these costing methodologies for its success.

In contrast, Turney (2008) notes that ABC came in for criticism in the early part of the 1990s due to its inability to support TQM. However, due to advances in ERP systems, it has evolved from being only a historical system into one that enables an entity to look forward and utilise it as a planning and budgeting tool, thus making it more compatible with other cost-saving mechanisms. This suggests that there is an increasingly positive relationship between ABC and other cost mechanisms. Fullerton and Wempe (2008) conducted a study showing a positive relationship between non-financial performance measures, lean manufacturing and financial performance. Similarly Khataie and Bulgak (2013) have established a positive relationship between the use of ABC and lean manufacturing by suggesting that ABC can identify non-value-adding activities. Naslund (2013) has established that for lean manufacturing to work effectively, management support and cultural factors are important; these are factors that have been identified by past research as important to ABC. If synergy can indeed be created by combining the different cost mechanisms, it might be useful for organisations to focus on the combinations that have the largest positive effect on the eventual EBIT or bottom line. Consequently this study intends to establish how and which cost-saving mechanisms influence ABC implementation success.

3.5 SUMMARY

Chapter 3 has discussed the key characteristics that enable successful ABC implementation and investigated the factors that lead to ABC success. Smaller and less diverse manufacturing organisations may not achieve the same benefit with ABC, and it may be worthwhile for these organisations to take cognisance of available resources and establish if there are significant benefits to obtain from ABC implementation. ABC implementation success is likely to be achieved by both prospectors and defenders to a similar degree, and it is likely that the way in which ABC is utilised to gain a competitive advantage is more important. In addition, manufacturing organisations with a high indirect fixed overhead ratio are likely to find the identification of cost drivers problematic, and may therefore find that ABC product costs are not necessarily more accurate than TC estimations. In

contrast increased manufacturing overheads seem to be less problematic, and ABC might be more beneficial in organisations with a higher manufacturing overhead ratio. In addition it seems advisable to attempt to identify cost drivers for all manufacturing overheads to potentially increase the accuracy of the product costing. A possible challenge for manufacturing organisations is to be able to understand under which circumstances ABC becomes an attractive option over TC when considering activities within a manufacturing environment. Ultimately it may be beneficial for manufacturing organisations to consider implementing ABC as part of product costing as intensively as practically possible in order to gain a significant advantage over TC.

The use of ABB with ABC may assist in controlling activity costs by comparing actual activity costs with budgeted or forecast estimations, thereby facilitating continuous improvement in manufacturing organisations. In addition ABB may allow manufacturing organisations the flexibility to adapt to a changing landscape. Manufacturing organisations may need to take cognisance of the possible increase in profits through the use of ABC in decision-making. The use of CPA as a decision-making tool may assist manufacturing organisations in identifying and focusing on problematic customer product lines. The use of ABC could potentially be decisive for critical investment decisions, as incorrect decisions may result in lost opportunity or future losses if product costing is not correctly estimated. The use of ABM could result in reduced product costs and may enable manufacturing organisations to compete with external competitors by identifying non-value-adding activities.

The effectiveness of ABC may depend on the ABC software utilised. Manufacturing organisations may need to consider their resources and requirements during the initial stages of ABC implementation to ensure that ABC implementation provides marginal benefits over TC. The use of an efficient system may also assist in improving user attitudes and ultimately improve ABC implementation. It is likely that ABC implementation success in manufacturing organisations is not dependent only on the ABC system itself but that other cost-saving mechanisms such as TQM and target costing may assist ABC in achieving its objectives.

The following chapter will discuss the research methodology used for this study.

CHAPTER FOUR

RESEARCH METHODOLOGY

4.1 INTRODUCTION

Chapter 4 will discuss the research methodology used for this research. In addition to the literature review an empirical study will be used to provide a thorough investigation into the ABC success factors. This chapter will discuss the research design and rationale, sampling methods and data collection as well as the research instrument and data analysis. Figure 4.1 illustrates the development of the research and how Chapter 4 is linked with the overall objectives.

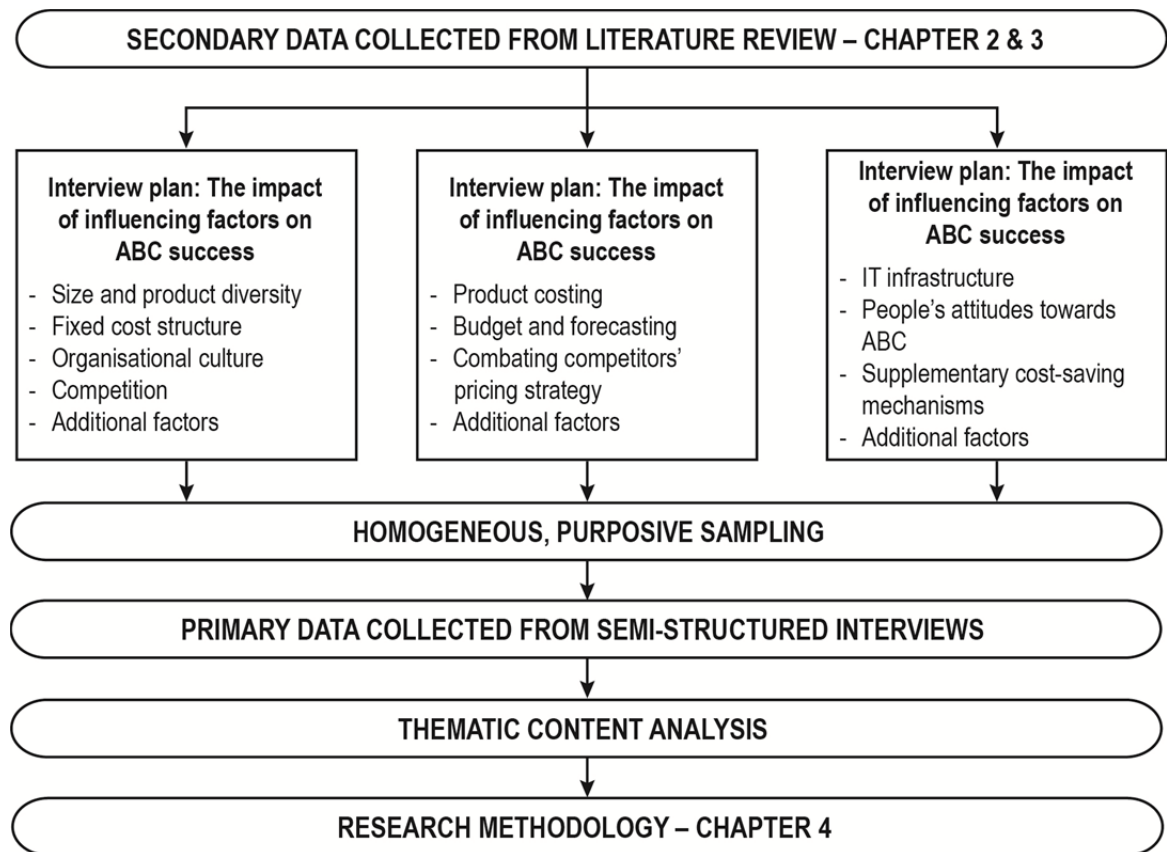


Figure 4.1: Chapter 4 focus and how it fits into the overall study

4.2 LITERATURE REVIEW

A literature review was conducted in Chapters 2 and 3. Literature was collected from the following platforms:

- The UNISA Institutional Repository (<http://uir.unisa.ac.za>) offers research material related to inputs from UNISA scholars and academics.
- A list of subject-related books, articles and journals was identified via Google Books and Google Scholar, and these comprised most of the literature reviewed (<http://books.google.com> and <http://scholar.google.co.za>).
- Emerald Business Management and Economics eBook Series collection (<http://www.emeraldinsight.com>)
- Topic-related material requested from the Accounting librarian.

The literature review investigated the nature of ABC as well as factors influencing the success of ABC.

4.3 RESEARCH DESIGN

A qualitative research paradigm was used for this research. Qualitative research is preferable in cases where quantitative studies are not able to properly explain a phenomenon as it is still not properly understood and a hypothesis difficult to formulate (Packer, 2010). Past research on ABC was almost always quantitative in nature. The objective of this study is to explore and understand the factors influencing ABC implementation success in manufacturing organisations. The study should also shed some light on how organisations measure ABC success and how they rate the importance of each factor. For the purpose of this study an exploratory research design is relevant as the purpose is to discover factors influencing ABC success in manufacturing organisations and to develop a research framework for future studies. Marshall and Rossman (2011) suggest that if the purpose is to develop future hypotheses and to discover phenomena that may not be well understood, it is an exploratory research design that should be used.

4.4. RATIONALE FOR CHOICE OF RESEARCH DESIGN

Quantitative studies in the past attempted to correlate certain factors with successful ABC operations. However, evidence of this kind of research in South Africa is scarce, according to the researcher. Furthermore, as these studies were performed in a quantitative framework the focus was on establishing a relationship between known or deemed factors and successful functioning of ABC systems, and the studies did not fully investigate the possible factors that could contribute to the

successful implementation of ABC. If these factors can be discovered by means of a qualitative study, future quantitative studies could build on this and attempt to develop a direct correlation between each factor (or factor groups) and probability of success using ABC.

The in-depth nature of semi-structured interviews could possibly discover other practical issues not commonly discussed in research articles or textbooks. Wengraf (2004) explains a semi-structured interview as an interview with questions prepared in advance; however these questions need to be supplemented with follow-up questions and probing. He further suggests that semi-structured interviews afford the researcher a smaller sample size as more information can be collected from participants. Although it may be likely that these established factors do influence the successful implementation of ABC and that these factors may have to be tested, by default the possibility of a number of additional contributing factors should probably not be discounted. Different participants may provide different perspectives that were not envisaged by the researcher at the beginning of the research process. The objective is not to provide a blueprint for organisations to implement ABC but rather to broaden the knowledge base in terms of factors that may need to be considered prior to ABC implementation.

4.5 RESEARCH INSTRUMENT

An interview plan (Appendix D) was developed as a guide to the semi-structured interviews. The research plan contains an introduction and three key focus areas or categories. Each category includes further sub-questions, with the initial questions targeting prominent factors identified from literature, and with the closing questions probing other possible factors. Additional questions were added as more factors were discovered. The categories were developed from factors identified in the literature and were divided into three broad categories: nature, utilisation and support. The factors identified under each category are summarised below in Table 4.1.

Table 4.1: Factors identified in past literature

Category	Factor
Nature	<ul style="list-style-type: none">• Organisational size (Elhamma, 2012; Rundoara <i>et al.</i>, 2013)• Product diversity (Brierly, 2011; Duh <i>et al.</i>, 2009)• Competition (Cagwin & Bouwman, 2002)• Fixed overhead structure (Sartorius, 2007)
Utilisation	<ul style="list-style-type: none">• ABM (Baird <i>et al.</i>, 2004; Kumar & Mahto, 2013)• Extent of manufacturing overhead allocation (Drury, 2007; Walker & Wu, 2000)• Decision-making use (Harrison & Killough, 2006)• ABB (Kader & Luther, 2006; Shane, 2005)• Capital investment decisions (Tsai <i>et al.</i>, 2011; Kee, 2004)
Support	<ul style="list-style-type: none">• IT systems (Huijuan <i>et al.</i>, 2011; Yapa & Konchange, 2012)• Management support (Govender, 2011; Sohal & Chung, 1998)• User attitudes (Al-Omiri, 2011; Fei & Isa, 2010a)• Other cost-saving mechanisms (Cagwin & Bowman, 2002)

The interview plan was designed with the abovementioned categories in mind. Each factor was considered and incorporated into the interview plan. Each category concluded with a probe to identify additional factors not considered or identified in theory. The objective is to identify as many factors as possible from the perspective of the participant as experienced in practice.

4.6 SAMPLING

The sample of participants was drawn from manufacturing companies in the Nelson Mandela Metropole. The Nelson Mandela Bay Business Chamber (www.nmbbusinesschamber.co.za), one of the largest business directories of Nelson Mandela Bay businesses, was used as a starting point to obtain participants for the research study. Purposive, homogeneous sampling was used to obtain a sample of 18 organisations, all of which were in the manufacturing industry and had indicated by telephone or email that they were using elements of an ABC system to some degree. An attempt was made to contact all manufacturing organisations in the Nelson Mandela Bay Business Chamber to establish possible ABC adopters. The 18 organisations constitute these ABC adopters and as such formed the basis for the sample. The participants were all actively involved with ABC and were generally at management level or accountants. According to Yin

(2010), purposive sampling is used when the most relevant cases can be identified. Therefore the approach was to identify ABC adopters and to continue interviews until the point of data saturation. Furthermore, it was decided to use homogeneous sampling by selecting only manufacturing concerns, which according to Wengraf (2004) reduces variation in results and enables comparability. The participants indicated that they represented companies that could be broadly categorised into the following categories:

- Companies that indicated they were using a pure or near-full ABC costing methodology.
- Companies using a hybrid ABC system and identifying it as an ABC system. Cokins (2002) describes a hybrid ABC system as a standard costing system with additional cost pools for assigning costs to products.
- Companies using ABC principles such as identifying activity drivers but that did not identify them as ABC elements. According to Brierly (2011), these can be defined as ABC adopting organisations. These are typically smaller companies that have attempted accurate costing and shelved a plant overhead rate in favour of considering different activity or machine costs for the different products.

A much larger sample (>20) would not be possible to obtain since this is limited by the number of manufacturing industries using ABC in this area. Data was collected until data saturation became evident after around 9 interviews, and this resulted in a final number of 13 interviews conducted. This is considered adequate considering the small target population. Guest, Bunce and Johnson (2006) conducted a study to establish at which point data saturation would be reached in a homogeneous study using semi-structured interviews. Their findings revealed that data saturation can be reached between 6 and 12 interviews if the data is collected properly and the groups are generally homogeneous. The researcher is of the opinion that the interview plan was designed well enough to establish ABC implementation factors within each participant's organisation and that the average length of the interviews provided enough time to collect information without saturating the participant.

4.7 DATA COLLECTION

The study was conducted by means of semi-structured interviews. The interviews were mostly conducted at the participant's place of work and mostly during working hours. The interviews ranged from 32 to 62 minutes, with an average duration of 45 minutes. All the interviews were recorded with a digital voice recorder, and additional notes were taken by the researcher. All the interviews except one were conducted in person, face to face. One of the interviews was done telephonically and involved two participants. The digital voice recordings were transcribed by a transcription professional.

4.8 DATA SATURATION

Data saturation was tested by identifying when new codes evolved from each interview. Data saturation is the point where no new information can be collected from the research (Hennink, Hutter and Bailey, 2011). By interview no. 4, 72% of all new codes had been discovered, and fewer than 10% arose from the last four interviews. No new codes were discovered from the last interview. The researcher is therefore confident that based on this analysis the sample size is sufficient. Figure 4.2 illustrates the development of codes during the process of conducting interviews.

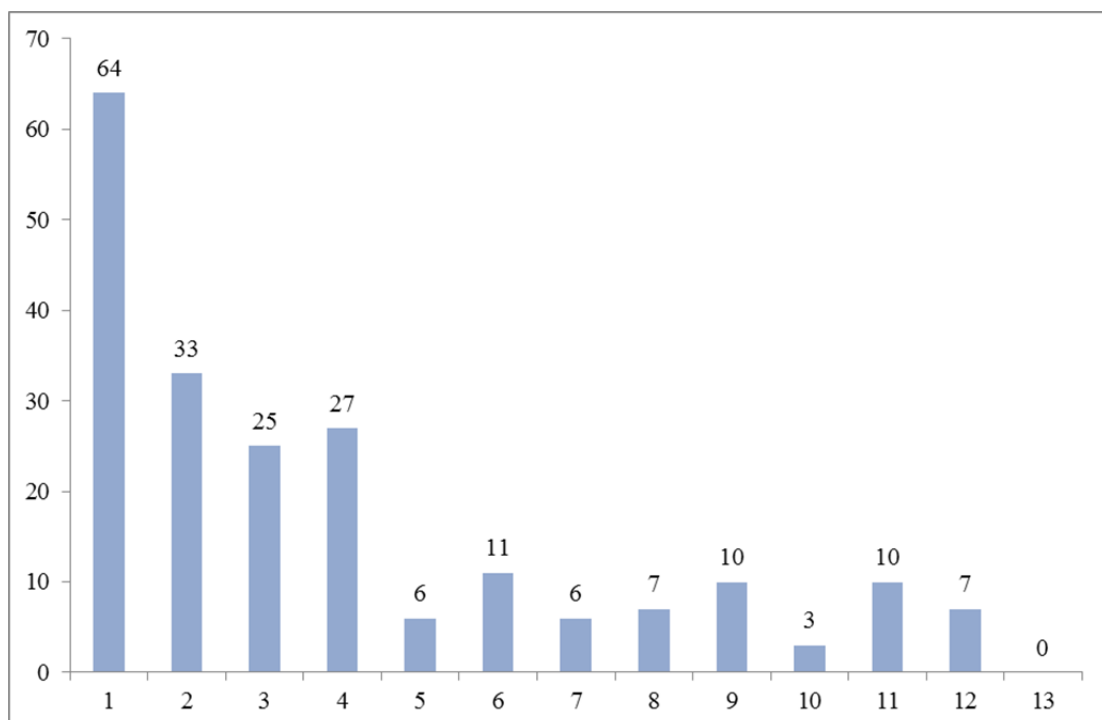


Figure 4.2: Development of new codes with each interview

Figure 4.2 shows that the majority of new codes were discovered during the first four interviews and that only a few codes were discovered towards the end of the interviews.

4.9 DATA ANALYSIS

A combination of deductive and inductive qualitative content analysis augmented by descriptive statistics was used to analyse the data. The analysis was conducted using the transcripts of the 13 semi-structured interviews. This section outlines the analysis techniques used to derive at the final research report. In order to fully understand the context that each participant was articulating, each transcript was thoroughly studied by initially reading through each one and then focusing on each response to the interview questions. Manual coding was used for the content analysis to avoid considering out-of-context phrases. For this purpose a spreadsheet (attached as an appendix on CD) was considered appropriate for analysing transcripts. Initially each code (or theme) was derived deductively from past literature. New themes were allowed to be developed inductively from the interviews. Each theme and question in the discussion guide was used as a basis from which to work, by listing the questions down the left-hand column of the spreadsheet. The second column was used for more detailed themes arising from each question the respondents were asked. Each column contained verbatim information from the respondents, with each respondent having a unique column.

Whilst reading through each transcript, the researcher populated each participant's column with their verbatim responses that were relevant to the themes. This enabled a comparison across participants on their views and opinions relating to each theme. An additional column was inserted where the number of verbatim comments that arose for each theme was inserted, providing a code frame. This enabled themes to be combined, which allowed coding to be simplified. Although coding is generally used to evaluate the importance of each theme, a simple count of the number of responses was not consistently used as a basis for the importance of the topic as often something was said out of context. Therefore, in order to obtain the importance of each topic a combination of the coding and the content relevance was used by the researcher and the independent coder; that is, an integrated view of the verbatim comments and the context was utilised allowing for subjectivity while using a basis of scientific analysis.

4.10 RESEARCH RESULTS

The themes that emerged from the study are tabled in the results of the semi-structured interviews in Table 5.1. These themes will be discussed in detail in Chapter 5. In addition all findings from past literature and the semi-structured interviews are summarised in Table 6.1, providing a comprehensive overview of the research study.

4.11 VALIDITY OF RESEARCH FINDINGS

According to Silverman (2009), validity relates to representing the truth which accurately reflects the situation it was collected from. He further suggests the following ways of ensuring validity:

- The comparative method relates to finding all data relating to the same participant on the same topic. In this research multiple instances of quotations from the same participant were assigned to individual codes where possible as confirmation of the initial finding.
- Comprehensive data treatment refers to the relevancy of all data under each generalisation or finding. The use of themes and sub-themes as well as confirmation of findings with the independent coder ensures that relevant data is accurately reflected in themes and sub-themes. Findings were compared with past literature to confirm accuracy of instances.
- Deviant case analysis refers to the identification of anomalies in the collected data set and whether these will have an effect on the overall findings. Insignificant findings were considered and occasionally mentioned as part of the results discussions in Chapter 5. This may include some contrary findings from participants, and findings were considered on the basis of relevance to the overall topic.
- The use of tabulations refers to the use of quantification in qualitative research. The number of mentions from participants was used as a strong basis to support generalisations and findings from the research.

Based on the above criteria, the researcher feels confident that the research adheres to the principle of validity and that the truth is represented through the interviews conducted with participants.

4.12 RELIABILITY OF RESEARCH FINDINGS

Reliability is described by Silverman (2009) as the level of consistency relating to the assignment of categories to similar findings by either the researcher or by other observers. In order to achieve reliability, an independent coder was employed by the researcher to formulate codes to assign to findings from the interviews. These assignments of codes were agreed upon between the researcher and independent coder frequently at intervals of four interviews. Although themes were mainly derived inductively from the research objectives, the development of sub-themes and codes was done mutually between the researcher and independent coder. An independent coding letter of confirmation is attached in Appendix F. As a result the researcher is confident that the research findings were derived in a methodical and systematic manner that was consistent throughout the process.

4.13 LIMITATIONS OF RESEARCH FINDINGS

It is likely that more manufacturing concerns using ABC exist in the Nelson Mandela Bay Metropole, but the possibility exists that contacts within these organisations are either hesitant to discuss their costing methods or do not know enough about the topic and prefer to exclude themselves from the population. These research findings do not measure the extent of success related to each factor or the weight of each factor, but this was never the aim of this study. It may be that future studies will explore this relationship within a quantitative framework and develop a model or construct as a result of its findings.

4.14 ETHICAL CONSIDERATIONS

Ethical clearance (Appendix E) was obtained from the ethics committee prior to conducting the interviews. All participants were formally requested to participate in the research study by means of a request for permission form. Each participant was asked to sign the consent form (Appendix C) giving permission to do the research as well as acknowledging the context and nature of the research.

Pseudonyms were used for both people and organisations. The transcriber was asked to sign a confidentiality agreement relating to the voice files and transcriptions (Appendix G).

4.15 SUMMARY

Chapter 4 has discussed the research methodology used for this study. The qualitative paradigm and limited population necessitated a semi-structured interview approach. The participants were selected from a limited population of manufacturing organisations using elements of ABC. Although participants were not all necessarily experts in the field of ABC, they were all key personnel with regard to product costing and analysis of their respective companies. The data were analysed using a combination of thematic and content analysis and with the assistance of an external coder. The following chapter will present the results from this study in the form of themes and the subsequent analysis.

CHAPTER FIVE

RESEARCH FINDINGS

5.1 INTRODUCTION

The main objective of this research was to understand the factors that have an influence on the successful implementation of ABC. In order to achieve this objective a literature review was conducted in Chapter 2 and Chapter 3. In order to confirm the findings from research, a qualitative study was conducted by means of semi-structured interviews with 13 participants working in manufacturing industries in the Nelson Mandela Bay metropolitan area. The research was conducted in this manner to ensure open-ended responses from participants and to investigate participants' perceptions of factors they considered important for ABC implementation success. Although all participants were from manufacturing organisations, they were all working in different segments of the economy and were therefore able to provide distinctly different perspectives on the topic of ABC. Chapter 5 will discuss the results obtained from the empirical study through the semi-structured interviews and relate this to the literature review. Each theme and sub-theme evolving from the interviews will be discussed in full, in addition to any specific narratives from participants. These themes were agreed upon between the researcher and the independent coder. Each sub-theme contains codes which will form the basis of discussion. Table 5.1 summarises all the themes and sub-themes. All codes are discussed separately under the sub-themes.

Table 5.1: Themes and sub-themes identified from semi-structured interviews

Themes	Sub-themes
<p>Theme 1: ABC implementation and the inherent nature of the organisation and industry it exists in</p>	<ul style="list-style-type: none"> • Product diversity and the organisational size and its role in the successful implementation of ABC • The drive to be the best in the business and the role ABC plays
<p>Theme 2: The intensity of ABC usage as a factor in ABC implementation success</p>	<ul style="list-style-type: none"> • The use of ABC in capital investment decisions • The use of ABC as a benchmarking tool to compete with other industries and plants within the organisation • Using ABC in budgeting and forecasting • The link between ABC value-adding and a better understanding of product profitability

Themes	Sub-themes
Theme 3: ABC and pressure on company resources and time	<ul style="list-style-type: none"> • The extent of ABC usage and practical issues preventing ABC from reaching its potential • The extent to which manufacturing overheads can be attributed to products by means of activity cost drivers • The extent to which indirect fixed overheads can be attributed to products by means of activity cost drivers
Theme 4: ABC support structures as an enabling factor for fulfilling its potential	<ul style="list-style-type: none"> • ABC and the link with other quality and cost-saving mechanisms • Support from management and operational staff and its effect on ABC • The importance of ABC training and analytical skills on ABC success • The effect of IT/ERP systems on ABC success

5.2 ANALYSIS OF RESULTS

The study is divided into three categories, and each category with its sub-theme responses will be discussed. These categories are closely linked to the objectives as stated in Chapter 1. Each theme will be discussed in detail along with the respective sub-themes.

5.3 THEME 1: ABC IMPLEMENTATION AND THE INHERENT NATURE OF THE ORGANISATION AND INDUSTRY IT EXISTS IN

Theme 1 comprises all sub-themes relating to the nature and characteristics of the organisation and as such is closely linked to the first sub-objective, which is to explore the organisational and external factors that may influence the successful implementation of ABC. This theme is divided into two sub-themes, namely product diversity and organisational size, as well as how organisational drive can influence the adoption and successful implementation of ABC.

5.3.1 Sub-theme 1: Product diversity and organisational size and its role in the successful implementation of ABC

The majority of participants suggested that ABC is practised in a diverse environment in their respective organisations. *“In most of the plants, the product diversity is fairly [large].”* [1] Brierly (2011) suggested that ABC is often practised in diverse

organisations as a result of establishing an overhead rate for each different product. A small minority of participants indicated success with ABC despite the organisation not being diverse. However, it is still agreed by most participants that ABC becomes crucial if the number of activities per product is high and the production process for each product is complex. Baird *et al.* (2004) established that larger, more diverse organisations require ABC more than smaller organisations and this is confirmed by Participant [11]: *“The plant side of our business, ABC would, for instance, not be used as extremely or to the same extent as what it would be used in your merchant business. On the plant side, you’ve got four, five input costs. On the merchant side, you all of a sudden have twenty-seven different factors that now need to be taken into consideration so the more complex the business model, the more [suitable] ABC is.”* [11] Some participants stated that products do have distinctly different activities and cost structures, and that would increase the importance of ABC as the high and low contributors need to be identified. *“Now, all those different revenue lines, they all have different activities and they all have different costs associated with them and based on that we use ABC per revenue stream or per product line.”* [3]

Although participants acknowledge that ABC would be more beneficial with increased product diversity, this may be dependent on the ability to identify suitable cost drivers. *“It’s quite difficult to identify cost drivers if you have a wide range of processes for each category of product.”* [10] Sartorius *et al.* (2007) suggested that the difficulty in identifying cost drivers is a major reason for South African organisations to reject the use of ABC. According to participants, a common problem that increased product diversity brings is the challenge of accurate costing when common lines are shared across different product groups, which results in possible cost distortions. The feeling from participants is that despite ABC and its accuracy relating to product costs, it can create problems that may need to be considered when applying ABC in a diverse organisation. *“So from a costing point of view for us, it’s I think it’s the same thing that gives you an accurate cost is what makes you pull out your hair every day.”* [1]

The general feeling from participants is that ABC would be more beneficial to larger organisations and that smaller organisations simply would not care enough to investigate every single costing element. A diverse portfolio along with complexity levels were mentioned as key factors in the importance of ABC and the additional benefit that would be obtained from implementing ABC. As a single

participant mentioned, if an organisation structure is simple enough for TC, then ABC would likely not be necessary. *“If your business lends itself to a simple standard costing, ABC has got no place in simple businesses. In complex business, it’s the only way you should run your business.”* [11]

This sub-theme concerned participant perceptions of how organisational size and product complexity affects ABC implementation success. It was established that greater benefit with ABC than with TC is more likely if the organisation is larger and more complex, and the product range is more diverse. This is consistent with past research (Baird *et al.*, 2004; Brierly, 2011; Hutchinson, 2010; Mullins & Zorn, 1999; Raeesi & Amini, 2013; Rundora *et al.*, 2013) and confirms that organisations should consider this as a factor during the assessment phase. The next sub-theme will investigate how the competitive environment and drive within the organisation impacts on the successful implementation of ABC.

5.3.2 Sub-theme 2: The drive to be the best in the business and the role ABC plays

A competitive benchmarking culture seems to drive most of the participants interviewed. *“...the cost information we don’t share that widely inside the plant but [on a monthly basis] you get the rankings from the plants compared to other plants around the world.”* [1] The use of ABC is influenced, according to some participants, not only by external competition, for which it serves as a benchmark, but also by internal competition, which acts as a driver for ABC. *“It’s very much a driver within [the company] so I think there’s always a bit of internal competition to see which plant can achieve the status of best of best for a certain process or activity or a function or something along those lines.”* [1] One participant even suggested that ABC would be an incentive for the benefit of his sales staff and not only the company. *“... this is another reason why I have to do, I have to improve it because, really, it’s absolutely, vitally important for me because [I don’t want the company] to get short-changed but I also don’t want the staff to get short-changed. We must have a decent accurate, very accurate, costing based system which will be good for all of us, from sales point of view, from commission point of view and for the company.”* [5]

Most participants believe that accurate costing increases their organisation’s competitive position and that knowledge of their costing enables them to compete

against other similar organisations. *“The organisation plays a successful role in the market because our products are accurately costed, I believe they’re accurately costed, I believe it enables us to be competitive in the marketplace, to have an understanding of our cost in the marketplace which is absolutely vital because we’re in a very competitive industry and as a result [!] believe we’re a very successful company.”* [6] This enables organisations to be flexible and to have leverage in industries where price can be determined by the organisation. *“I think [because we are] flexible to a certain extent, we are able to gain more market share with certain products. So I think it’s good to have a fixed rate but it must be a fixed rate that is slightly flexible in our industry. We have this fixed price but, like in the blinds, we would go and we would give a small discount.”* [7] This confirms the suggestion by Sartorius et al. (2007) that greater competition provided a reduced margin for error and that ABC assists in controlling these errors. In addition it is suggested that with customers becoming more knowledgeable, ABC is becoming necessary not only to increase market share but also to ensure that current market share does not get reduced. *“I can just think, from any perspective, of things becoming more competitive, information’s more readily available to customers, to users, so you really need to compete hard to at least protect your market share and, inherently in that, there is a more focus for better decisions and so ABC becomes important in providing better information to make those critical decisions. Over the last couple of years, definitely, you can justify the importance. It’s almost become a tool where you stay in the game, it’s not a mind blowing exercise where you can capture huge advantages, almost become a necessity.”* [10] This confirms the results from the study by Dierynck and Roodhooft (2010), which established that it becomes more difficult to protect market share if the customer has more knowledge of the organisation’s product cost structure.

It seems that the simple apportioning of overhead costs is not enough and that this may prevent companies from gaining a significant advantage. *“We look at history because the only reason we doing it this way was because, like I said, we had to obviously compete with the likes of the [competitor] because previously we worked on allocation of times so everybody’s times would have been apportioned.”* [13] In contrast some participants stated that it is impossible to use competitors’ pricing strategy as a driver for ABC because circumstances differ from one organisation to another, and they believe that service and quality should be

balanced with price in order to obtain competitive sustainability. However, the general feeling from participants is that competition and the need to sustain a competitive advantage remains a prime motivator for adopting ABC. *“... for me it would be one of the key drivers to implement a detailed activity based costing system to ensure that we not overselling ourselves or underselling ourselves in this competitive market, that’s very important.”* [6] Cagwin and Bouwman (2002) established a positive relationship between ABCs financial success and the level of competition, so increased competition may result in more success from ABC than from TC.

The inherent contributing factors relating to organisational characteristics were discussed in this theme. Based on participant perceptions and past research larger, more diverse organisations are more likely to adopt ABC; however some participants felt that ABC would be more successful and manageable with less product diversity. It may be possible that although product diversity increases the complexity of ABC, cost distortion is greater between ABC and TC when product complexity is increased, and therefore diverse organisations would most likely benefit more from ABC. Finally the competitive nature of organisations plays a significant role in driving ABC not only from external competitors but also between business units from the same organisation or plants based in different locations. The following theme will discuss the participants’ perceptions of how the effectiveness of ABC changes with different levels and applications of ABC.

5.4 THEME 2: THE INTENSITY OF ABC USAGE AS A FACTOR IN ABC IMPLEMENTATION SUCCESS

Theme 2 comprises all sub-themes that relate to the effectiveness of ABC as a decision-making tool and as such is closely linked to the second sub-objective, which is to explore the factors relating to the level of ABC usage and how it impacts on ABC implementation success.

5.4.1 Sub-theme 1: The use of ABC in capital investment decisions

Identifying key drivers from ABC assisted most participants in making capital investment decisions. According to participants, inefficiency in certain processes can be identified and profit margins can be increased. *“The other aspect of ABC*

that also aided us was the fact that it enabled us to see that we were not extracting enough oil from the fruit ... we still incurring the costs but we losing out on the sales because we getting less oil from [the old machines] so based on that we've actually decided to look into purchasing new machines." [2] In addition to increased profit margins and volumes, it was noted by participants that ABC identifies inferior quality, and this enables new machinery to be bought knowing that the correct decision was made. *"You've got a better product that's being cut and you've got a better lines coming out of the machines because it's a newer machine. I wouldn't say it affects the labour because they still using the same amount of guys so I wouldn't say it affected the productivity as such, it's more on the product side, your quality, it would affect the quality of the product where you would find that a lot of the machines are older, the quality that they actually produce is actually, no matter what you do, is not up to standard."* [8] Therefore it is plausible that capital investment decisions with ABC could additionally be enhanced with ABM and TQM by identifying machines relating to activities which do not perform to the required standard anymore.

According to participants, an important facet of the use of ABC in capital investment decisions is the need to conduct time studies. As the use of new machinery comes with promises of increased outputs, reduced cycle times or additional business, it was stressed by participants that for ABC to be utilised with capital investment projects it is important to conduct time studies to derive at standards for future comparison. A note was made by Participant [1] that the use of automated measuring equipment benefited their company because of the real-time measurements as opposed to ad-hoc measuring of activity costs. The use of an off-line database for obsolete products was also considered to be important by Participant [9], who mentioned that this database is often used as a basis or starting point for new products. A prominent issue derived from the interviews is the use of evaluation of products right through their respective life cycles to establish variances from the actual costing. If ABC has been used as an initial decision-making tool for these capital investment decisions, the activity variances can be compared with initial estimations. *"... we would, we track. Throughout the programme we continue to track our profitability. It's not an initial decision, it's a constant evaluation."* [2]

Although the majority of participants were in favour of ABC being used for capital investment decisions, one participant was not convinced. *“You don’t make capital investments based on ABC. You need to look at the big picture, look at the potential and then manage the operations around that.”* [11] The participant furthermore suggested that using ABC in capital investment decisions can prevent decision-makers from neglecting to see the strategic benefits from a particular investment if they are too focused on identifying profitability using ABC. Tsai *et al.* (2011) and Lind (2001) established that there is a significant difference in NPV between ABC and TC, and it seems that most participants would consider ABC important for capital investment decisions:

“It’s difficult to get ABC really involved in capital investments but you will definitely look at if there’s a new technologies or a new products, you’ll look at ... and if there’s specific lines that needs to be created for those products, you’ll definitely ... you can use calculations like net profit value so you’ll look at a couple of years and bring it forward, so to do that you’ll try and assign specific cost to specific products.” [10]

5.4.2 Sub-theme 2: The use of ABC as a benchmarking tool to compete with other industries and plants within the organisation

The use of ABC for benchmarking purposes was considered an important aspect in general by participants. Most of the participants that used ABC for benchmarking purposes tended to focus on improving efficiency by using ABC as an identifying tool. They suggested that whilst it is not always possible to increase the selling price of the product unit, cost can be driven down in certain areas, as Participant [1] stated. *“You need to make the most of what you get.”* [1] The general feeling amongst participants was that although it is not possible to know what other companies do in terms of processes, it is important to understand their own processes and to remain competitive by ensuring maximum efficiency. This may ensure that variable costs are managed and profit margins are sustained.

In addition to ensuring efficiencies using ABC as a measuring tool, some participants indicated that they were using ABC to drive competitive strategy. By identifying large contributors, strategy can be directed towards driving sales numbers towards the large contributors. *“You need to understand if your [Product*

A], which is your biggest seller, is losing money and your [Product B] can make money and you can drive strategy around the [Product B].” [2] Participant [2] further stated that it is only possible to ensure that these strategic decisions are the best decisions if one can ensure the product profitability is correct by using ABC. The participant stated that these decisions are made on different hierarchical levels similar to the structure proposed by Nolan (2004). One participant mentioned that intensive ABC usage would help their company to identify where their strong points are and turn their focus onto them. Another participant indicated that because they were not using ABC as intensively as would be desired, it becomes problematic when comparing operational standards with other similar plants across the world due to the discrepancies in terms of overhead costs internationally. This sentiment was shared by another participant, who suggested that because they were unsure about the margins due to low ABC implementation, this prevented them from reviewing pricing strategies. Sartorius *et al.* (2007) have suggested that pricing decisions increase in frequency with increased competition. This may indicate that ABC is an important tool to leverage pricing decisions to gain a competitive advantage. In summary, participants supported the view of Charles and Krumwiede (2011) and Velmurugan (2010) that ABC can be used to eliminate inefficiencies and also to drive cost down to remain competitive. This is confirmed by Participant [11]: *“It’s all a case of managing that variable portion of your business in order to become is what ABC does for you, it adds or erodes the bottom line, but the tool is there to add to the bottom line and take any inefficiency out of the system.”* [11]

5.4.3 Sub-theme 3: Using ABC in budgeting and forecasting

On the topic of budgeting and forecasting, participants had a fairly varied view on how it should be conducted in relation to ABC. Whilst most would agree that it is advantageous for the organisation, it was sometimes mentioned as problematic. This was associated with changes in volumes and product mix combined with inflexibility in production shift patterns. A problem highlighted by Participant [1] is the sharing of resources between business units. This creates a problem for the efficient business unit that has to carry the inefficient business unit. *“... it’s difficult to sometimes explain to someone getting emotional about it and, as I say, there’s arguments about why am I paying for his underperformance? This comes up at least twice a year, I would say.”* [1] Participant [11] noted the challenge of com-

paring activity cost drivers with budget and forecast numbers. *“... if you’re going back to a ABC costing module is quite challenging.”* [11] The same participant noted that analysing historical cost is important and that he felt that most organisations just used a historical base, which is not ideal. Some participants’ group activity budgets by product families, a technique that they suggest makes the budget process easier. Another aspect of ABC budgeting and forecasting that is recommended by participants is that cost allocations should be made by following clear guidelines and not changing the techniques constantly. According to participants, activity cost drivers should be measured prior to the budget process to enhance comparability with actual numbers. According to Participant [11], this is necessary to avoid starting off on the wrong base. *“... if you don’t get back to the ABC basics, you could be on a totally wrong base.”* [11]

The use of comparability to ensure good control of business has been cited by some participants as important. This can be assured only by using the same methodology used for actual costs; therefore if ABC is used as a costing methodology in order to achieve comparability, it has to be used for budgeting and forecasting purposes as well. *“... if you do have a quite accurate plan and you know where you’re heading to, you consistently measure against that plan, it is still a useful tool even from a budget perspective.”* [10] Although some elements of the budget are attempted as a zero-based budget, it is generally felt that producing a complete zero-base is not practical in the real world and that certain fixed costs will be carried over, presumably as a result of not using ABC to apply those overheads.

The results confirm findings from past research that suggested that ABB assists organisations in identifying non-value-adding activities and improves the control of activity costs (Kader & Luther, 2006; Shane, 2005).

5.4.4 Sub-theme 4: The link between ABC value-adding and a better understanding of product profitability

The importance of ABC in being able to provide profitability information on different hierarchical levels was considered very important by participants. *“The ability to really measure profitability of each of [those] call car lines, even down to sales models, becomes quite critical for us.”* [2] Nolan (2004) illustrated the benefit of using hierarchical analysis to identify profitability on different levels. The key for

these organisations is to be able to identify those products that provide good margins and focus on increasing volumes if possible. *"Then it's a question of producing those products that's profitable as possible so there's definitely been a shift."* [10] Whilst it is not always possible to decide on product mix decisions due to customer demands, participants stressed that it becomes even more important to know which products are not-profitable and to be able to continuously monitor these problematic products with ABC.

ABC was promoted as beneficial when it could be used as a measuring instrument against set standards by investigating activity costs against historical costs and by comparing actual activity performance with time studies. Some mention was made that monitoring and understanding these activities across the entire value chain are beneficial to the organisation. This practice of ABM (Armstrong, 2002; Kumar & Mahto, 2013) is believed to provide management with a diagnostic tool, a view that is reflected by Participant [2], who emphasised the importance of being able to monitor costs. *"I think as a lean organisation, you recognise that systematically you have got to control it, you can't put people in to monitor your costs so you have got to develop an activity-based costing system that gives you at least up to a certain level again an immediate measurable result that you can monitor the organisation by."* [2]

Increased pressure from customers for transparent costing was mentioned as a key driver by participants for understanding product profitability and the use of ABC. ABC assists participants in pricing negotiations by motivating possible increases with transparent costing. It also enables organisations to identify the areas contributing to a loss-making situation. The ability of ABC to monitor good and bad contributors accurately was deemed to be very important by participants. *"... So our activity-based costing in its, well, in the form it's in, provides us with a very, very good view of, subject to market demand of course, where we can actually drive it, increase profitability into the business."* [2] Participants mentioned that identifying good and bad contributors enables the organisation to either drive strategy towards good contributors (if possible) or to reduce overhead costs by focusing on activities. *"... so with ABC costs or activity-based allows us to separately analyse what the costs are, can we save in certain areas and then, based on that, we can work out is it feasible for us to carry on with the product?"* [3]

The use of the TC system was not advised by participants. They explained that accuracy would suffer as a result, and explaining variances would become problematic. Mention was made that a sudden change in product mix could result in a loss of profits and that confidence would be lost on profitability numbers. The inability of TC to truly differentiate between good and bad contributors could result in focusing on the wrong product lines or areas. This is supported by Cokins (2002), who suggests that the use of TC will provide cost distortions with increased overheads, and by Plowman (2001), who suggests that product mix decisions can be better made with the use of ABC. The essence and importance of ABC and cost transparency is stated by Participant [1] in relation to the possibility of using only TC: *“It’s like saying you take away all the gauges on your car and only have a speedometer. It’s probably going to work for you for a while but at some point something’s going to go wrong and you not going to know what went wrong.”* [1]

This theme captured the views of participants on how the intensity and variety of ABC usage can affect the successful implementation of ABC. The overwhelming view of participants is that value-adding from ABC increases with increased intensity of ABC. It seems that the more information organisations have on product profitability, the more useful ABC becomes as a decision-making tool. ABM and ABB are both considered to be beneficial and perhaps necessary when ABC is adopted in organisations. Whilst this provides a sense of what participants perceive to be an ideal ABC system, there are constraints and hindrances in their own organisation that prevents ABC from reaching the desired level; a theme that will be discussed in the next section.

5.5 THEME 3: ABC AND PRESSURE ON COMPANY RESOURCES AND TIME

Theme 3 comprises all sub-themes that relate to the effectiveness of ABC as a decision-making tool and as such are closely linked to the second sub-objective, which is to explore the factors relating to the level of ABC usage and how this impacts on ABC implementation success. Although theme 2 illustrated that ideally ABC should be used as intensively as possible, there may be inhibiting factors that prevent ABC from reaching its potential.

5.5.1 Sub-theme 1: The extent of ABC usage and practical issues preventing ABC from reaching its potential

The majority of participants agreed with past literature (Armstrong, 2002; Kaplan & Anderson, 2003) that ABC should be practical enough to operate and that it should be used to the extent where it is still a workable solution. “... use the maximum extensive cost pools that you could possibly use.” [9] The majority of participants indicated that grouping activity costs or applying arbitrary percentage costs in shared lines is often necessary and practical. Activity cost driver rates involving similar equipment are mentioned by participants as a means of simplifying the ABC process. Often cost driver standards are applied across the entire organisation where these cost drivers are well understood and easily measurable. It was also noted by one participant that if cost drivers are not properly understood, this would create difficulty in setting a competitive pricing strategy. Some participants were of the opinion that a combination of ABC and TC is ideal to identify problem areas without complicating activity cost monitoring. “There has to be a happy medium between analysing things to death, every drop of oil that you use on a part and just going ... thumb sucking your way through business, you can't do that either.” [5] An efficient ABC system with few people is possible, according to Participant [1], assuming that the ABC model is set up properly and a proper IT system is in place. This may be essential to ensure that the ABC model is implemented as practically and efficiently as possible, as confirmed by past literature (Akyol *et al.*, 2005; Al-Sayed *et al.*, 2008; Huijuan *et al.*, 2011; Nassar *et al.*, 2009; Yapa & Konchange, 2012). The support of IT systems for ABC will be discussed later on as a separate sub-theme.

An issue that prevents the accuracy of ABC is the matter of input factors in the ABC system. It is believed that during pressure times mistakes are made and due care is not necessarily taken to ensure that data used for cost driver activities is accurate, contributing to incorrect cost information. “... then the answers start coming through that yes but we don't always book the hours as accurately as we should be.” [1] According to participants, this carelessness contributes to skewed results and focusing on the wrong activity areas. The accuracy of the ABC system is mentioned as important to prevent having to explain variances that do not really exist.

The overriding impression that the researcher received from participants is that ABC is applied to what the organisation felt was practical at the time, although some participants were keen to intensify their use of ABC/ABM but were prevented from doing so by lack of resources and skills. Most participants implemented ABC in a manner that suited their organisations practically. *“I would be wrong to say that we apply activity-based costing to everything because, again, like I said in the beginning, it’s ... as much as we strive to be theoretically, absolutely, by-the-book efficient and cost every little activity that we do, in practice that’s not the case so do we make use of it one hundred per cent? No.”* [5] Organisations develop their own standards not necessarily according to the ideal ABC model. Many participants felt that there is a point in overhead allocation with ABC where it becomes detrimental, a topic that will be discussed in the next sub-theme.

5.5.2 Sub-theme 2: The extent to which manufacturing overheads can be attributed to products by means of activity cost drivers

Assigning manufacturing overheads by attempting to identify all possible cost drivers was not considered to be a value-adding process. Whilst participants were generally in agreement that ABC provides a more accurate costing method, the extent to which overheads should be applied should not exceed what is reasonably practical or where there is no obvious relationship between product and overhead. The general observation by the researcher was that participants felt that excessive overhead allocation creates frustration and that cost drivers should be selected economically to a point where this can still be practically linked to a product. *“If you had to go extremely intense with the same resources, you will spend so much time trying to allocate cost that you actually won’t get around to doing something value adding, to doing something about the result that you achieved. You will spend more time achieving the result than actually looking at the result and trying to either improve it or see where you can go from it.”* [1]

An observation was made that in selecting cost drivers, the impact on not only the product but also the entire organisation should be considered. In addition, as Participant [5] has noted, ABC becomes problematic with changing resource demands, especially if the ABC costing model does not consider drastic changes in volumes. *“Now everything changes because of the lower volume so you almost*

need to have an activity-based costing model on various volumes, almost like on a sliding scale based on volumes as well because a simple variable, changing one simple variable like a volume, has a profound effect on all these other things and that volume is just one of the sliders that I could maybe tweak. In the same way there are a number of other ones.” [5] According to participants, the practicality of cost driver allocation may also extend to the lack of resources and the need for experts to identify these cost drivers. This confirms findings from past literature that larger organisations with greater resources are likely to be able to implement ABC more successfully (Brierly, 2008; Elhamma, 2012; Hall & McPeak, 2011; Nassar, Al-Khadash & Sangster, 2011; Raeesi & Amini, 2013; Rundora *et al.*, 2013). Practically, the allocation of resource costs for shared resources for different products remains problematic and is often treated as an arbitrary cost allocation. In summary, although the allocation of manufacturing overheads is ideally done as comprehensively as possible, there is a limit to identifying cost drivers, a view that is aptly supported by Participant [2]. “... *there comes a certain point where your activity-based costing gets weak. It loses [its] relationship to the product.*” [2]

5.5.3 Sub-theme 3: The extent to which indirect fixed overheads can be attributed to products by means of activity cost drivers

The researcher noted the view of participants that attempting to attribute indirect fixed overheads to products does not add significant value to ABC in general. The allocation of these costs tends to create more work, and there is a general dislike for allocating of fixed costs that are not manufacturing-related. “*Personally for me it’s a bit of a pet hate.*” [1] As Participant [1] noted, it may be that costs that are of little significance could create the most work in terms of allocating these costs. The participant also noted that although some portion of fixed costs should be allocated to the product, it remains a cost that will be incurred regardless. Participant [5] commented that whilst it could work in a perfect environment with 100% capacity utilisation, in practice this is not the case. The difficulty of attempting to allocate the indirect fixed portion – “... *the guy cutting grass, how do you allocate his time?*” [13] – as well as the general perception that costs are carried by all products with no weighting seem to add to the negative perception of participants in this particular area. It was noted, however, that although allocating indirect overheads is problematic due to external market pressure, there is a continuous look

at identifying cost drivers for products. Similarly Hutchinson (2010) and Sartorius *et al.* (2007) found that the identification of product links to fixed overheads costs may be a contributing factor to ABC adoption, although it remains problematic in application.

Whilst indirect overheads relating to administration costs are generally not considered, according to participants and past literature (Sartorius *et al.*, 2007), there are attempts to allocate semi-direct costs such as warehousing costs by means of a specific driver, as per Participant [1], although the driver rate is not specifically measured. *“We tend to do it based on whatever the best driver is we can find so something like warehousing we may allocate on that the tonnage that runs through the warehouse. We haven’t got a clear driver, we tend to use an average cost of production and share it like that.”* [1]

A consideration related to large organisations, mentioned by Participant [1], is that the allocation of indirect fixed overheads is largely pointless if supporting functions are centralised unless support functions are allocated specifically amongst the various plants. *“... if you had to run each division as a separate plant, you’d probably have two-and-a-half times the head count we have, so at the end of the day your finance guys perform functions for everybody so, yes, everybody should share in that cost, but as I say it depends on how you allocate it and quite often it doesn’t follow the workload.”* [1] However, some participants indicated that if the fixed cost structure was to change, this should be considered in the ABC costing model. This is illustrated by a comment from Participant [2]. *“... fixed cost are their deemed nature, supposedly fixed, so in the end, the ability to properly reflect your profitability if your fixed costs are changing is critical.”* [2]

This section has discussed the sub-themes relating to the practical issues in the process of getting ABC to provide the maximum benefit. In Theme 2, the view was obtained from participants that ideally ABC should be able to provide as much information as possible and that comparability with standards and budgets increases value-adding with ABC. However, under Theme 3 it was established that although ideally all costs should be treated as variable, in practice this may not always be possible and that there may be areas where no working solutions can be found. In general, indirect fixed overheads are excluded from ABC costing models, with the possible exception of drastic changes in the fixed overhead

structure, especially if the additional fixed overheads can be attributed to additional business. Furthermore, a lack of resources and general input errors prevented some organisations from extending ABC to its maximum practical intensity.

The next theme will discuss how the support within an organisation may affect the implementation of ABC.

5.6 THEME 4: ABC SUPPORT STRUCTURES AS AN ENABLING FACTOR FOR FULFILLING ITS POTENTIAL

Theme 4 comprises all sub-themes that relate to the effectiveness of ABC as a decision-making tool and as such is closely linked to the third sub-objective, which is to explore the factors relating to the support of ABC and how this impacts on ABC implementation success.

5.6.1 Sub-theme 1: ABC and the link with other quality and cost-saving mechanisms

ABC was closely linked to other cost-saving mechanisms by the majority of participants. Although technical knowledge surrounding these cost mechanisms was generally lacking, there were two prominent issues that emerged from the interviews with regard to ABC and supplementary cost-saving techniques, namely the issue of tracking operational efficiency and TQM. Equipment maintenance tracking was often mentioned as a mechanism that enables ABC to identify inefficient activities. The use of a separate engineering tracking module was cited as a means of identifying actual activity costs, which in turn provides the possibility of comparing with observed activity times. This technique is illustrated by Participant [1]. *“... it will give you the total cost breakdown or activity time breakdown by process, by equipment for the tyres so you can ... it helps understand why you either have high or low costing there.”* [1] Improved efficiencies are also linked to decreased downtime, which in turn has a positive effect on ABC, possibly because ABC does not consider inefficiencies or idle capacity. This is consistent with past research that established that lean manufacturing supports ABC by focusing on improving inefficient activities (Fullerton & Wempe, 2008; Jelsy & Vetrivel, 2012). Cohesion between the engineering and finance departments resulting from frequent update meetings on process efficiencies were deemed to be important by a participant.

TQM was mentioned briefly by some participants as a method to identify activities that deliver poor quality products. Cagwin and Bouwman (2002) established that financial performance with ABC improves when combined with JIT and TQM, a view that is supported by Participant [9]. *“Your total quality management, if you want to improve your quality, obviously your product will be improved and your costing can also improve in a way so it does help and it does affect your ABC and your benchmarking, your engineering.”* [9] In summary, there may be a link between ABC and supplementary cost-saving mechanisms, and this is probably best described by Participant [10]. *“I would say ABC gives you information so ABC can actually ... you get a better understanding of what is driving your costs, and then you can look at techniques to target maybe specific costs with those methods that you just mentioned now, like lead manufacturing, six sigma, but ABC will be the tool to give you visibility on which areas to focus on, so I almost say that ABC will guide those type of decisions and techniques that you will implement.”* [10]

5.6.2 Sub-theme 2: Support from management and operational staff and its effect on ABC

Participants suggested that lack of support by management has left finance teams with the entire decision-making with regard to ABC. There is a general expectancy by management that they will provide the resources and that finance has to somehow coordinate the process. One participant pointed out that in order to achieve desired results, management tend to provide more labour and resources with no consideration for cost savings which are still ultimately expected. *“... [because] he’ll throw labour at it and time.”* [8] However, management are occasionally hesitant to allocate resources required for ABC, as one participant suggested. *“... but I don’t see them giving me the additional resources, if that’s what you’re asking, to be able to do that.”* [8] The lack of support from management, perhaps due to their lesser involvement, might have led them to not really understand the dynamics surrounding the organisation’s product costs. These findings confirm findings from past literature suggesting that lack of management support may negatively influence ABC implementation success (Govender, 2011; Sohan & Chung, 1998; Xu, 2012).

Perhaps small management teams tend to have a different outlook and are more actively involved in the ABC process, as one participant mentioned. Even from a finance perspective it was suggested that cost accountants should be actively involved in the production process and should not merely attempt to analyse product costs from their offices. The successful nature of Participant [7]'s business was attributed to the involvement of all staff. *"Everybody would get involved, the factory staff, the office staff and we would take everybody's input into consideration."* [7] Not everybody supports ABC but in general the feeling is that the key users such as finance and sales will tend to understand its value more than people that are less involved in the process. This was cited by Participant [13] – *"... so it's just that communication between us"* [13] – as a lack of communication between the main users of ABC and the rest of the operational staff. As Participant [10] suggested, it is not only management that needs to provide their commitment but also how other people in the organisation work together to make ABC a success. *"Management needs their commitment, first of all, and show how it will benefit the organisation, so if ABC is a new idea and not something that you actually doing to a large extent in any case by looking closely at your profit margins, then it will not be successful because the success will depend on the people's effort and how well they actually perform the tasks related to ABC."* [10] This confirms findings from Xu (2012) that suggest that lack of inter-departmental support may hinder ABC implementation.

Some mention was made of the reluctance of production staff to cooperate on costing matters as they perceive their job to be the production of volume and they do not want to be involved with the detailed aspects surrounding costing. *"... I stand on their floor and irritate them; I wouldn't say they would be supportive."* [8] Participant [11] relates this to the lack of ownership by users as an inherent constraint in effectively implementing ABC. *"Attitude, attitude. It's the inherent constraint is attitude. Knowing what you have to do or not, making it your business to know what you have to be monitoring."* [11] In summary, the lack of support from management and operational staff is considered a hindrance by some participants, who occasionally cite as a reason the lack of knowledge of the importance of ABC; this will be investigated further in the next sub-theme. Nassar *et al.* (2009) and Velmurugan (2010) suggest that the negative perception by general users

may be due to the lack of training and that knowledge may increase the user's confidence in the ABC system.

5.6.3 Sub-theme 3: The importance of ABC training and analytical skills to ABC success

The importance of training all users in ABC was stressed by participants during the interviews. It was noted by participants that operational staff need to be able to understand how all the processes affect each other, and that to be proficient in only one area is not going to help with the successful implementation of ABC. It was suggested that ABC needs to be overviewed by people with analytical skills who have logical thinking. *"... people that do ABC costing have to have ... they have to be logical."* [11] Participant [12] noted that although he had studied ABC as a theoretical subject, the use of ABC comes from practical experience. *"I'm still young in this whole game too so all my knowledge is just from studies but we are open to using it properly."* [12] Production staff in particular seem to be struggling with the concepts of ABC and how this is applied in the production environment, an area identified as important for training purposes. A key challenge is getting operational staff not only to understand the dynamics surrounding ABC but also to realise the importance of correctly applying ABC. Incorrect analysis could cost organisations money, as one participant noted. *"... definitely, it could be negative if you don't look at it properly. It could cost the company more."* [7]

The importance of training and analytical skills was stressed by some participants, who insisted that having a perfect ABC system cannot work if data is not analysed. From discussions it seems important that not only do financial people need to be trained in ABC but operational staff also need to gain an understanding of why ABC is important and how small data input errors can affect important decision-making. Past literature suggested training is a factor having a significant impact on the successful implementation of ABC (Govender, 2011; Khozein *et al.*, 2011; Nassar *et al.*, 2009; Nassar *et al.*, 2013; Velmurugan, 2010; Xu, 2012; Yapa & Konchange, 2012). Hence training may be an important consideration for ABC adopters in the manufacturing industry. The final sub-theme will discuss the effect of IT systems on ABC implementation success.

5.6.4 Sub-theme 4: The effect of IT/ERP systems on ABC success

The final sub-theme will discuss participants' perceptions of how IT systems have impacted the implementation of ABC and what they perceived to be the ideal IT system for ABC.

Using a proper ERP system was identified by participants as important in analysing ABC. The use of separate accounting and operational systems is not considered to be ideal as accounting information cannot be related back to operational performance. *"That's a proper ERP system that also integrates properly with your accounting programme because we use Pastel so the two don't talk."* [12]. It is suggested that with increased ABC usage a proper ERP becomes even more important. *"You have to get a complete ERP system. If you want to implement ABC in a manner that the question is posed, you'll have to know exactly what the heartbeat of the business is constantly."* [11]

Reference is often made to SAP AG, an ERP system that most of the participants seem to be using in their organisations. The use of SAP AG was cited as a means to provide visibility, and one participant suggested that companies move to SAP AG because it closely resembles an ABC system. It was observed that ERP systems do not provide too much detail resulting in what one participant called *"splitting hairs"*. [1] The ability of the ERP system to provide details from all the modules was stressed by some participants in order for the ABC system to be fully integrated. An observation was made from that perspective about the use of a central server for their ERP system simplifying problem-solving. Although it was noted that seamless integration of ERP systems has a positive impact on ABC, it does not eliminate input errors resulting from manual input methods. Participant [2] commented that within their organisation not all the partner companies use the same ERP system and that this proved to be problematic when looking at margins from a hierarchical perspective. This resulted in standardisation across the globe, a move that enabled them to make decisions on a global scale, although he mentioned that the ability of SAP AG, which had previously been used, remained stronger for the purpose of ABC. In addition to a strong ERP system, it was noted that using a very good IT support team does assist in increasing the functionality of ABC systems.

It was noted by Participant [1] that they had previously employed an in-house ABC system that allowed flexibility in adjusting activity costs as appropriate, and that they were quite familiar with the system. This confirms findings from Aho (2006) that in-house systems may provide some benefits over an ERP system in terms of flexibility. Participant [11] suggested that having a dedicated ABC system is probably necessary only if your variable costs exceed 50% of the organisation's overall costs. The observations by the participants are in line with the study by Al-Sayed *et al.* (2008), who established that ERP systems and stand-alone ABC systems are more effective especially where complexity is high.

The use of spreadsheets was frequently referred to as an easier way to manipulate data – *"I think it's easier to manipulate data in [Microsoft Excel] than it is to sometimes work through the system"* [1] – and for analysis purposes. However, participants suggested that with increased complexity the use of spreadsheets becomes problematic and would not work as a stand-alone system, as mentioned by Participant [10]. *"So the first decision must be ABC will work for us and will add benefit and then look at is our organisation small enough to maybe use [Microsoft Excel]? If it's not, if it's quite complex, different product types, then you'll have to use more than just [Microsoft Excel]."* [10] Al-Sayed *et al.* (2008) suggested that spreadsheets, due to their low cost, are more frequently used in the assessment stage of ABC.

The study of Al-Sayed *et al.* (2008) found that using a mixture of IT packages was the most popular strategy. The majority of participants in this study used a combination of ERP systems and spreadsheets. Their perception is that this provides them with the integration of the ERP system and the flexibility of spreadsheets. Participants lacking a sophisticated ERP system were looking at upgrading their current system to an ERP system. In summary, it was learnt from participants and past research that having an ERP system, especially in a complex environment, may be important but that spreadsheets still have an important role to play in relation to ABC. Ultimately the ideal ABC software package for a manufacturing organisation may depend on the specific requirements relating to the organisation, as suggested by past research (Govender, 2011; Khozein *et al.*, 2011; Nassar *et al.*, 2009; Nassar *et al.*, 2013; Velmurugan, 2010; Yapa & Konchange, 2012).

5.7 SUMMARY

In Chapter 5 the results from the semi-structured interviews have been discussed under the different emerging themes. These themes were related back to past research that enables the researcher to achieve the research objectives. It was found that ABC becomes more critical although problematic with greater complexity and product diversity. The use of ABC also becomes more problematic as complexity increases. The common practice for organisations is to extend their overhead allocation to a point of no relationship between overhead and product.

It was established from the literature review that ABC is enhanced when combined with activity-based budgeting and forecasting. The use of standards was deemed to be important from literature and amongst participants. In addition it was deemed to be important to use zero-based budgeting in the majority of overheads although it is not always practical. Other cost-saving mechanisms support ABC by providing information on inefficient activities and focusing on continuous improvements. This is likely to be achieved only with sound communication between the relevant operational and financial departments.

Perhaps the foremost reason for adopting ABC is the need to gain a competitive advantage over similar organisations, and when using ABC is essential to reduce activity costs and strategise by viewing product profitability on different hierarchical levels. If possible it enables management to drive strategy towards sales of profitable products or to focus on reducing inefficiencies amongst poor contributors.

The lack of support from management and other staff remains a problem for some organisations. Management is sometimes reluctant to allocate resources to facilitate ABC and expect the finance departments to drive the entire ABC system. By distancing themselves from ABC, finance teams' hands are tied when attempting to drive the process of improving efficiencies. The lack of analytical skills from management and finance also contributes to problem areas not being identified. Similarly operational teams sometimes consider ABC as an impediment. The provision of training was recommended by some participants to alleviate the problem.

The use of a proper IT/ERP system was strongly recommended by participants, some of whom suggested that the lack of a proper ERP system prevents their

organisations from intensifying ABC usage. However the use of spreadsheets was still recommended for analysing purposes as it provides a flexible tool for scenarios. An in-house system linked with the existing ERP system was also suggested as a working solution and perhaps even ideal.

This section concludes the analysis of the results from the empirical study as well as the literature review. The following chapter will discuss the findings relating to the objectives as well as recommendations relating to ABC implementation and how ABC enabling factors should be considered. Finally a recommendation will be made for future studies relating to ABC.

CHAPTER SIX

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1 INTRODUCTION

This chapter will review significant findings in respect of the stated objectives in Section 6.2, present a summary of significant findings in Section 6.3, summarise the conclusions from this research study in Section 6.4 and provide recommendations from findings in this study in Section 6.5. Finally suggestions for future research will be provided in Section 6.6. This research investigated the factors that have an impact on ABC implementation success and used a combination of the literature review and an empirical study by means of semi-structured interviews with participants from manufacturing organisations in the Nelson Mandela Bay Metropole. An attempt was made to explore these factors from different perspectives. The interview plan used for the semi-structured interviews was designed to prompt participants to think about and reveal their practical experience of ABC and how it affected their respective business environments. Participants were encouraged to talk about the problems and challenges with ABC and to describe what they would consider to be an ideal ABC system. The design of the interview plan was also influenced by a research framework from past research that predominantly focused on relating ABC success to enabling factors, using mostly quantitative studies. The research objectives were derived from these studies, and the way in which these objectives were achieved will be discussed in Section 6.2.

6.2 SIGNIFICANT FINDINGS IN RESPECT OF RESEARCH OBJECTIVES

This section will discuss the findings in respect of the stated objectives and how these objectives were achieved. The impact of organisational characteristics will be discussed in Section 6.2.1. The extent of ABC usage and its impact on ABC success will be discussed in Section 6.2.2 and finally the manner in which ABC supporting mechanisms influence the successful implementation will be discussed in Section 6.2.3.

6.2.1 Objective 1: Impact of organisational characteristics on ABC success

This objective was established to ascertain how the inherent characteristics, external factors and culture within the organisation can affect the successful implementation of ABC. Organisations with a more diverse product portfolio tend to be more enthusiastic adopters of ABC mainly due to the difficulty that is encountered in allocating overheads with the more widely adopted TC method (Ahmadzadeh *et al.*, 2011; Brierly, 2011). There is a downside though to adopting ABC in organisations with high product diversity. High implementation costs associated with ABC and the need to establish cost drivers for each product create problems that result in frustration for ABC users, confirming findings by Brierly (2011). The sharing of resources amongst different product families results in conflict between different business units, where operational line managers are hesitant to be responsible for other business units' cost. ABC seems to be ideal for large, complex and high diversity organisations, but these organisations need to take cognisance of the fact that although ABC may be necessary for achieving accurate product costing, it may also be detrimental if the use of supporting mechanisms and the intensity of ABC usage are not leveraged to provide a balance between creating a benefit over TC and practicality.

Organisations with a high percentage of fixed overheads (direct and indirect) tend to be more attracted to ABC, such as service industries (Sartorius *et al.*, 2007), although in practice fixed overheads are often not treated as variable overheads as would be the case in an idealistic ABC scenario. This may be increasingly relevant when considering indirect overheads such as administration costs. However, some organisations do successfully assign fixed overheads that can be reasonably accurately attributed to product lines; this has proven to be less problematic and useful than attempting to allocate indirect overheads and may provide more benefit in relation to indirect overheads.

Organisational culture seems to be directly linked to the desire of organisations to be the best in the business and to compete not only with external competitors but also amongst themselves (Cagwin & Bouwman, 2002). Organisations using ABC and having a competitive culture amongst themselves may tend to use ABC as a

tool to achieve best results amongst business units by targeting activity costs and using this as a measure to compare the different business units.

6.2.2 Objective 2: Impact of level of ABC use in implementation success

This objective was established to identify how intensively ABC should be used to create a benefit and at which point it becomes impractical. It was found that in practice the theoretical model of ABC may not always be achievable. ABC may be practical only to the point where there are no issues with identifying cost drivers. As soon as no distinct relationship can be established between product and overhead, there should possibly be no allocation. Therefore a recommendation is made to exclude indirect overheads from ABC that will typically be treated as sunk costs and excluded from the ABC model. Allocating some shared costs on an arbitrary basis may still be feasible, especially if it is product-related, and this seems to be the norm amongst manufacturing organisations. It is suggested that ABC should not consider idle capacity and that with fluctuating volumes this could create a problem with allocating fixed manufacturing overheads.

The use of ABB as part of ABC is suggested to be important to effectively manage activity costs, confirming findings from past research (Abdel-Kader & Luther, 2006; Shane, 2005). It may be important to compare actual activity outputs with activity outputs set as the standard for the particular period. The use of historical costs seems to be common, but maybe the majority of the budget should be zero-based in order to eliminate past inefficiencies and to establish a flexible target. A practical solution that was identified is to simplify the budget and forecasting process by grouping activity outputs by product family or business unit and to assign overhead costs on that level. The separation of business units could create ownership and accountability. An important discovery from the research is that irrespective of the level of ABC implementation, it is vital to ensure that similar measuring standards are used between actual and budget/forecast. Budgeting and forecasting using ABC also seems to facilitate more accurate cash flow planning by identifying activities that can be reduced during low volume periods and by increasing focus on activities that add little value in order to sustain a cash balance even in periods of low turnover.

The use of ABC as part of the capital investment process creates an important tool for organisations to decide on new investments by establishing an accurate NPV. Although not always practised by ABC adopters, using historical activity data from existing product lines can ensure that the marginal profitability of the prospective investment is not overstated (a risk) or understated (lost opportunity). In the case of a lack of historical activity data, the use of time studies to simulate the data for the new investment is essential to ensure the correct margin is calculated for the proposed investment. These findings from participants agree with past research, suggesting that the use of ABC with capital investment decisions may enhance ABC implementation success (Kee, 2004; Lind, 2001; Tsai *et al.*, 2011).

The use of benchmarking across industries and globally within the organisation may be important to establish a competitive advantage and adhere to best standards. Although it is not always possible to increase revenue by raising selling prices, most organisations would focus on achieving improved efficiencies and look internally at using their own resources to the best of the abilities. These findings from participants agree with past research that suggests that the use of ABC to identify non-value-adding activities may enable the organisation to lower its price and therefore be more competitive (Charles & Krumwiede, 2011; Velmurugan, 2010; Yapa & Konchange, 2012). The use of ABC may be effective to decrease operating cost by focusing on areas of inefficiency. The use of product profitability analysis on different hierarchical levels (product family, customer, plant) may enable organisations to focus on low margin groups and perhaps drive their strategy towards high-profit product lines or customers. These findings from participants conform with Nolan's (2004) suggestion that ABC should be used to analyse profitability on a hierarchical basis. This is likely not to be practical, according to the research, but being informed may assist in strategic planning and focus. From an inter-company perspective, the use of a standard may create a measuring instrument by which plants can be compared realistically based on activity outputs regardless of expense structure as overhead cost cannot be directly compared in different economies.

6.2.3 Objective 3: Impact of support structures on ABC implementation success

This objective was established to explore how the support of the ABC costing model can affect the successful implementation of ABC. The support by management and staff within the organisation is possibly a very important factor contributing to ABC success, according to participants and past research (Govender, 2011; Sohal & Chung, 1998; Xu, 2012). Management seems to distance themselves from ABC and expect the finance team to provide solutions to ensure that the expected net result is reached at the end of the period. The involvement of management may be essential as this would make them realise when and which resources are required for ABC. It appears not only that it is important for management to be involved but also that it is likely management needs to have proper analytical abilities and financial acumen normally associated with management accountants in order to support ABC. The organisation may need to work in synergy to ensure everyone knows the importance of ABC and to ensure that focus is sustained on ABC-related measures as a lack of analysis even with the most sophisticated system can result in failure of ABC implementation. Operational staff seem to be more resistant from a support perspective, but a culture of competition within the organisation along with training on ABC fundamentals may ensure that activity targets are met and a competitive advantage is sustained. The importance of training was mentioned by a number of participants and confirms findings from past research (Govender, 2011; Khozein *et al.*, 2011; Nassar *et al.*, 2009; Nassar *et al.*, 2013; Velmurugan, 2010; Xu, 2012; Yapa & Konchange, 2012).

ABC as a stand-alone costing mechanism is not likely to succeed without the assistance of other cost tracking and quality mechanisms. Activity costs are likely to be associated with machines and equipment, and the tracking of efficiencies relating to these machines as well as maintenance history will assist ABC in establishing continuous improvement, especially in areas of concern. This may possibly be enhanced with sufficient communication between finance and engineering departments. Additionally a technique such as TQM could assist ABC in providing information on products with poor quality records and linking this with ABC by tracking why profit margins have changed over time. These findings from participants confirm some of the findings from past research that suggest ABC may need other cost-saving mechanisms in order to reach its full potential (Cagwin

& Bouwman, 2002; Fullerton & Wempe, 2008; Jelsy & Vetrivel, 2012; Khatale and Bulgak, 2013).

Finally the impact of IT and ERP systems cannot be underestimated. Using a proper ERP system may be essential, especially within complex organisations. This is because in an ERP system all modules such as the inventory, production and finance modules are likely to be linked, and information can be established from a financial drill-down perspective all the way to the operational level (Hansen & Mowen, 2006). A proper ERP system does not seem to guarantee effective ABC analysis and may need to be supported by a robust IT support team, and it may also be important to ensure that base data is captured correctly, a potential pitfall identified by some participants and Xu (2012). Spreadsheets may have a role in ABC, and their ease of use and ability to configure different scenarios could make it a powerful tool to use in conjunction with an existing ERP system. The exclusive use of spreadsheets is not recommended for complex systems as there may be potential for errors that could lead to erroneous decision-making.

6.3 SUMMARY OF FINDINGS

The significant findings from past literature and the semi-structured interviews are summarised in Appendix H. All significant findings are linked to any of the three research objectives. Confirmatory findings were found for the majority of factors identified in the literature, and some new findings were obtained from participants. These findings may be able to provide a platform for future research in a quantitative methodology. The extent of the impact of these factors was not established from this exploratory study. This may be of benefit to manufacturing organisations that intend implementing ABC and provide a guideline for successful ABC implementation.

6.4 CONCLUSIONS

Based on the concluded research, it may be important for a prospective ABC organisation to be aware of the factors that enable ABC to be a success and justify the additional cost and resources necessary for ABC. Accordingly the following conclusions can be drawn from the research:

- ABC implementation success may be more likely in larger, diverse manufacturing organisations, especially with multiple cost drivers/activity drivers.
- Competition may play a large role with regard to ABC implementation success in manufacturing organisations, especially if ABC is used to combat competitors' pricing strategies.
- The use of ABB and ABM may enhance ABC implementation success in manufacturing organisations by providing comparability with standards and managing activity costs.
- Capital investment decisions using ABC in manufacturing organisations may ensure that the correct decisions are made and provide a basis for comparability throughout the product life cycle.
- The likelihood of ABC implementation success in manufacturing organisations may be increased with greater identification of cost drivers for manufacturing overheads.
- Excessive identification of indirect fixed overheads may be detrimental to ABC implementation success in manufacturing organisations due to possible time and resource constraints.
- Positive user attitudes and management support may enhance the successful implementation of ABC in manufacturing organisations.
- The identification of the correct ABC software prior to ABC implementation may increase the likelihood of ABC success in manufacturing organisations.

This concludes the findings from past literature and the empirical study. The following section will discuss some recommendations based on the research results.

6.5 RECOMMENDATIONS FOR MANUFACTURING ORGANISATIONS INTENDING ABC ADOPTION

The research revealed that the use of experts on ABC in implementing an ABC model may be essential to establish a base system. Company resources and complexity may have to be considered, as the additional benefit from ABC may

be greater when product diversity is high and direct manufacturing overheads form a large part of overall costs. On implementation organisations should probably consider using the best available ERP systems or perhaps consider an in-house ABC application that can be integrated with an existing ERP system. It is recommended that the allocation of activity drivers should probably not exceed what is practically possible and that standards be set for cost driver allocation. This should be a standard that is used globally if the company forms part of an international organisation, in order to facilitate comparisons with similar plants on a global scale. It is suggested that indirect overheads that cannot be practically allocated to products should not be included in the scope of ABC but rather be absorbed by all products. It seems to be important for ABC users, including management, to be trained on the dynamics surrounding ABC and to ensure that key staff members have the analytical skills to analyse ABC. A competitive environment amongst business units may create opportunities for these business units to streamline activity outputs by competing with other business units, perhaps on an incentive basis.

In conclusion, it seems that there is no standard template for achieving a benefit from ABC and that it would differ between organisations. In short, success with ABC may be achieved by leveraging organisational resources to the extent to which ABC remains practical and not according to some individual's idealistic views.

6.6 SUGGESTIONS FOR FUTURE RESEARCH

Research to establish cause and effect between ABC success factors and implementation success will assist in creating a theoretical model for prospective ABC organisations to use to establish their suitability for ABC and any changes that could be made to gain success from ABC compared to TC. The exact relationship between ABC enabling factors was not measured in this study, and a quantitative study in a South African context could further enhance this study by providing a weighting factor relating to each enabling factor.

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APPENDIX A: REQUEST FOR PERMISSION

26 March 2013

Name: _____

Tel no: _____

Email address: _____

Dear _____ ,

My name is Arthur Reynolds and I am doing research with HM van der Poll, a professor, in the Department of Management Accounting towards an MPhil Management Accounting degree at the University of South Africa. We have funding from UNISA in the form of a post-graduate bursary. We are inviting you to participate in a study entitled:

“Factors influencing the success of activity-based costing in the Nelson Mandela Bay Metropolitan manufacturing industry.”

The aim of this study is to identify those factors that facilitate the successful functioning of activity-based costing (ABC) in manufacturing concerns within the Nelson Mandela Metropolitan.

Your organisation’s contact details were obtained from the Nelson Mandela Bay Business Chamber (www.nmbbusinesschamber.co.za) and you were selected to participate in the research since you conform to the following criteria:

- Your organisation can be defined as a mass-production company or close corporation and provides tangible products as opposed to services or once-off projects.
- Activity-based costing (ABC) is practiced or utilised in some form at your organisation. This may range from a moderate or ad-hoc ABC application to a fully-fledged ABC system.

- You have some knowledge or hands-on experience on ABC and will be able to provide a reasonable background on your experience with ABC in your organisation.

The study involves audiorecorded, semi-structured interviews. The questions will cover three basic topics namely:

- The inherent nature of the organisation and its impact on the proper functioning of ABC. You will be asked questions regarding the dynamics of your organisation specifically how it relates to ABC and how a different environment may yield different results from ABC.
- The various applications of ABC within the organisation and how these are affecting the success of ABC. This section will discuss the context in which ABC is used within your organisation. You will be asked on practical examples of the various applications regarding ABC in your organisation.
- The support within the organisation for ABC both from a systems perspective and from a people perspective. You will be questioned on people's attitudes relating to ABC and how this has impacted the proper functioning of ABC. The supporting systems and other cost mechanisms such as value-added engineering, TQM and benchmarking etc. will also be discussed during this section.

The interview is semi-structured therefore these areas form a basic guideline for the interview however other questions may be asked as the discussion evolves. The interview should take around 30 minutes but could be as long as 45 minutes depending on how the discussion develops. It would be advisable to prepare for a 1hour meeting to ensure enough time for introductions and the interview. It will be appreciated if you are prepared for at least a 30minutes in-depth discussion on the above mentioned topics in order for the research project to benefit from the interview. There will be only around 12-15 interviews depending on when data saturation is reached. There are only a small number of organisations using ABC in the Nelson Mandela Bay Metropolitan and your input is vital for this research project to succeed.

ABC is not a well-researched topic in South African literature according to the researcher and there are a small number of studies to guide organisations on the factors necessary to successfully implement ABC. Your participation will enable the researcher to complete his research project and provide valuable insight on the dynamics of ABC in South Africa and specifically the Nelson Mandela Bay Metropolitan.

If you would like to be informed of the final research findings or should you require any further information or want to contact the researcher about any aspect of this study, please contact Arthur Reynolds on (082) 054 7336 or 31713238@mylife.unisa.ac.za.

Yours sincerely

Arthur Reynolds

APPENDIX B: PARTICIPANT INFORMATION SHEET

26 March 2013

Dear Prospective Participant

My name is Arthur Reynolds and I am doing research with HM van der Poll, a professor, in the Department of Management Accounting towards an MPhil Management Accounting degree at the University of South Africa. We have funding from UNISA in the form of a post-graduate bursary. We are inviting you to participate in a study entitled:

“Factors influencing the success of activity-based costing in the Nelson Mandela Bay Metropolitan manufacturing industry.”

WHAT IS THE AIM/PURPOSE OF THE STUDY?

The aim of this study is to identify those factors that facilitate the successful functioning of activity-based costing (ABC) in manufacturing concerns within the Nelson Mandela Metropolitan.

WHY AM I BEING INVITED TO PARTICIPATE?

Your organisation’s contact details were obtained from the Nelson Mandela Bay Business Chamber (www.nmbbusinesschamber.co.za) and you were selected to participate in the research since you conform to the following criteria:

- Your organisation can be defined as a mass-production company or close corporation and provides tangible products as opposed to services or once-off projects.
- Activity-based costing (ABC) is practiced or utilised in some form at your organisation. This may range from a moderate or ad-hoc ABC application to a fully-fledged ABC system.
- You have some knowledge or hands-on experience on ABC and will be able to provide a reasonable background on your experience with ABC in your organisation.

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

The study involves audiorecorded, semi-structured interviews. The questions will cover three basic topics namely:

- The ***inherent nature of the organisation*** and its impact on the proper functioning of ABC. You will be asked questions regarding the dynamics of your organisation specifically how it relates to ABC and how a different environment may yield different results from ABC.
- The ***various applications of ABC*** within the organisation and how these are affecting the success of ABC. This section will discuss the context in which ABC is used within your organisation. You will be asked on practical examples of the various applications regarding ABC in your organisation.
- The ***support within the organisation*** for ABC both from a systems perspective and from a people perspective. You will be asked on people's attitudes relating to ABC and how this has impacted the proper functioning of ABC. The supporting systems and other cost mechanisms such as value-added engineering, TQM and benchmarking etc. will also be discussed during this time.

The interview is semi-structured therefore these areas forms a basic guideline for the interview however other questions may be asked as the discussion evolves. The interview should take around 30 minutes but could be as long as 45 minutes depending on how the discussion develops. It would be advisable to prepare for a 1hour meeting to ensure enough time for introductions and the interview. It will be appreciated if you are prepared for at least a 30minutes in-depth discussion on the above mentioned topics in order for the research project to benefit from the interview. There will be only around 12-15 interviews depending on when data saturation is reached. There are only a small number of organisations using ABC in the Nelson Mandela Bay Metropolitan and your input is vital for this research project to succeed.

CAN I WITHDRAW FROM THIS STUDY?

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

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

ABC is not a well-researched topic in South African literature according to the researcher and there are a small number of studies to guide organisations on the factors necessary to successfully implement ABC. Your participation will enable the researcher to complete his research project and provide valuable insight on the dynamics of ABC in South Africa and specifically the Nelson Mandela Bay Metropolitan.

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

It is understood that in visiting your workplace during work hours may be inconvenient to you. The researcher endeavours to be as flexible as possible and provide you with as much notice as would be reasonably possible and to be flexible in terms of interview dates and times. Another possible risk would be unforeseen circumstances at your place of work where your presence or action is immediately required during this interview session. In this instance the interview will be postponed to a later date. To mitigate this potential risk you will be advised to arrange the interview either in your office or to be available on your mobile phone.

In this instance the interview will be postponed to a later date that is convenient for you.

WILL WHAT I SAY BE KEPT CONFIDENTIAL?

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

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

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

HOW WILL INFORMATION BE STORED AND ULTIMATELY DESTROYED?

Hard copies of your answers will be stored by the researcher for a period of 5 years in a filing cabinet at home for future research or academic purposes; electronic information will be stored on a password-protected computer. Future use of the stored data will be subject to further Research Ethics Review and approval if applicable. Information will be destroyed by shredding and formatting of electronic media after the 5year period has expired.

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

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

HAS THE STUDY RECEIVED ETHICAL APPROVAL?

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

HOW WILL I BE INFORMED OF THE FINDINGS/RESULTS?

If you would like to be informed of the final research findings or should you require any further information or want to contact the researcher about any aspect of this study, please contact Arthur Reynolds on (082) 054 7336 or 31713238@mylife.unisa.ac.za. Should you have concerns about the way in which the research has been conducted, you may contact Professor HM van der Poll at Vdpolhm@unisa.ac.za.

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

Best regards

Arthur Reynolds

APPENDIX C: PARTICIPANT CONSENT FORM

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

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

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

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

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

I agree to the recording of the semi-structured interview

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

Participant name & surname (please print)

Participant signature Date

Researcher's name & surname *Arthur Reynolds*

Researcher's signature Date

Witness name & surname (please print)

Witness's signature Date

APPENDIX D: INTERVIEW PLAN

SECTION A – INTRODUCTION

My name is Arthur Reynolds and I am going to conduct a semi-structured interview with you specifically discussing activity-based costing (ABC) in your organisation. Please note that you are not obliged to answer any question. If you choose to do so you may withdraw from the interview at any stage. As this research aims to establish factors influencing the success of ABC this interview will be divided into three distinct phases: The first phase will focus on the nature of the company and the impact on ABC. The second phase will investigate how ABC is utilised in your organisation and finally the interview will conclude with a discussion on systems and personnel support with regard to ABC. There are some specific sub-questions during each phase, however, as this is a semi-structured interview other questions may be triggered depending on responses. I just want to reiterate that your personal details will remain confidential. The interview should take around 30-45 minutes. We are now going to start the interview process.

SECTION B – INTERVIEW QUESTIONS

1. *How* has the **nature** of your organisation influenced the application of ABC?
 - a) *What* role does your organisation's size and product diversity play in the successful application of ABC?
 - b) *How* would the importance and effectiveness of ABC change if your organisation's fixed cost structure were to change?
 - c) *Why* would you consider your organisation to be an ideal candidate for ABC if at all and which **inherent characteristics** in your company do you consider to be ideal for the successful application of ABC? Please consider organisational culture, management structure, direct competition or any other company characteristic that could possibly have a **positive** impact on ABC.
 - d) *What* are the **inherent characteristics** that you would consider to be detrimental to the successful application of ABC? Please consider organisational culture, management structure, direct competition or any other company characteristics that could possibly have a **negative** impact on ABC.

2. How is ABC **utilised** in your organisation?

- a) *What* role does ABC play in applying overheads to the different products and services in your organisation with regard to product costing?
- b) *How* has this affected your view on which products/services are good contributors and which products/services are less good contributors compared to if you were going to use standard costing?
- c) In *what way* is ABC utilised in the **budgeting and forecasting process** and *how* has this enhanced (if any) the accuracy and relative comparability with actual numbers?
- d) To *what extent* is ABC considered in **capital investment decisions** and to *what extent* has it influenced **EVA (economic value added)** in the past?
- e) *How* is ABC used to combat **competitors' pricing strategy** and maintaining a competitive advantage over similar organisations?
- f) *What* are the primary areas in your organisation where ABC is not practised and what is your view on the merits of implementing ABC in these areas? Why do you say this?
- g) *What* are the areas in your organisation that would be affected positively or negatively if your organisation would decide to implement a very intensive ABC system using the same resources, i.e. infrastructure and labour force? Why do you say this?
- h) *What* are the areas in your organisation that would be affected positively or negatively if your organisation would decide to revert to simple standard costing using the same resources, i.e. infrastructure and labour force?

3. *How* is ABC **supported** in your organisation?
- a) *How* would you describe the support from management towards ABC and the way it affects the successful implementation of ABC?
 - b) *How* would you describe your IT infrastructure in general and its relationship with ABC?
 - c) *What* is the general attitude of users of ABC in your company and what influence has this had on the development and utilisation of ABC in your company?
 - d) *How* is ABC supported by other cost-saving mechanisms such as TQM, value engineering and, benchmarking?
 - e) *What* are the inherent constraints according to you preventing ABC from functioning to its maximum potential in your company?
4. Is there anything else you could tell me about ABC in your company?

APPENDIX E: ETHICAL CLEARANCE



Ref #: 2013/CEMS/SAS/0001

ETHICS REVIEW COMMITTEE: SCHOOL OF ACCOUNTING SCIENCES

Mr. A Reynolds (student number 31713238)

Supervisor: HM van der Poll (staff number 01125346)

This is to certify that the application for ethics clearance submitted by

A Reynolds (31713238)

for the study

Factors influencing the success of Activity-Based Costing in the Nelson Mandela Bay Metropolitan manufacturing industry submitted for Ethics Clearance in the fulfillment of the Degree of MPhil(Accounting Sciences)

Decision:

Application approved

The application for ethics clearance for the above mentioned research was reviewed by Prof HC Wingard and Prof HM van der Poll on 10 April 2013 in compliance with the Unisa Policy on Research Ethics. **Ethical clearance has been granted.** Please be advised that the research ethics review committee needs to be informed should any part of the research methodology as outlined in the Ethics Application (Ref. Nr: 2013/CEMS/SAS/0001), change in any way.

The Research Ethics Review Committee wishes you all the best with this research undertaking.

Kind regards,

Prof HC Wingard, Chair of the SAS Ethics Review Committee

Department of Financial Accounting, Unisa

wingahc@unisa.ac.za

10 April 2013



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APPENDIX F: INDEPENDENT CODING LETTER OF CONFIRMATION

INDEPENDENT CODING LETTER OF CONFIRMATION

PO Box 121
Ferndale
2160
Tel: +27 11 024 0402
Cell: 083 321 2251
Fax: 086 676 3845
E.mail: sandra.reinbrech@librasquared.com
Website: www.LibraSquared.com



16 July 2013

Dear Mr Reynolds

INDEPENDANT CODING OF INTERVIEWS CONDUCTED

This serves to confirm that I have read, coded, and evaluated the transcripts of interviews given to me in the context of your research paper titled "Factors influencing the success of activity-based costing in the Nelson Mandela Bay Metropolitan manufacturing industry".

I confirm that I have independently coded 13 unedited transcripts (raw data) of interviews conducted by yourself, with various leaders in the manufacturing industry. I have read each interview in the context of finding the factors that influence the success of activity-based costing. In addition, I have provided advice and guidance on the analysis of the transcripts through content analysis in an excel spreadsheet.

I trust that my assistance has been helpful and look forward to reading your findings and research paper.

Yours faithfully

Sandra Reinbrech

APPENDIX G: TRANSCRIPTION CONFIDENTIALITY AGREEMENT

CONFIDENTIALITY AGREEMENT

I, Nikki Solomon hereby declare that I understand and agree to the following conditions with regards to the transcription of the audio recordings.

1. I understand that the audio recordings are received for the purpose of transcribing records of interviews held with the participants in a research study.
2. I understand that the identity of the participants and any departments discussed as well as the content of the interviews are confidential and may not be revealed.
3. I undertake to treat all audio recordings as confidential content to which only I will have access. I will keep the audio recordings and any copied material securely.
4. I will return all copies back to the researcher on completion of the transcription.

NAME (TRANSCRIBER): Nikki Solomon

COMPANY: Nikann Transcription and Typing Solutions

SIGNATURE: 

DATE: 23/03/2013

NAME (RESEARCHER): Arthur Reynolds

INSTITUTION: UNISA MPhil Degree student

SIGNATURE: 

DATE: 26/03/2013

APPENDIX H: SUMMARY OF RESULTS

Factor (Objective)	Finding : Effect on ABC implementation	Reason(s) cited	Past research	Confirmatory findings from participants	Quotes from participants
ABC & TC discrepancy (1)	ABC implementation success may be more likely with greater differences between ABC and TC cost estimations	The benefit from ABC over TC may need to be significant enough to justify possible high implementation and maintenance costs	Akyol <i>et al.</i> , 2005; Turney, 2008	[1], [3]	"...you'll have your bulk line, which is like your big concentrates and your nectars and your essential oils, etcetera, also peel, just like the ordinary waste and off cut, then you'll have your retail line which is more like your [Company B] juices and our own brand juice and then you'll have the cut off peel which is literally the waste which we sell to dairy farmers and to other areas. Now, all those different revenue lines, they all have different activities and they all have different costs associated with them and based on that we use ABC per revenue stream or per product line" [3]
Accurate costing desirability (1)	ABC implementation may become beneficial with greater emphasis on the accuracy of product costs	ABC is more relevant when greater accuracy of product costs is required	Al-Omiri, 2012; Charaf & Bescos, 2013; Ibrahim & Saheem, 2013; Sartorius <i>et al.</i> , 2007, Salawu & Ayoola, 2012	[4], [6], [12]	"I think if you had to go from a group owned to probably a family business, it would impact because a family business you probably not [going to] look at it [ABC] in so much detail. You [going to] worry what goes into your pocket at the end of the month or the end of the year and it would probably live with it that way..." [1]
Competition: External (1)	There may be a positive relationship between ABC implementation success and level of external competition	1. Increase flexibility and improved accuracy of ABC over TC as a result of decreased margin for costing errors	Byrne, 2011; Cagwin & Bouwman, 2002; Sartorius <i>et al.</i> , 2007	[2], [13]	"That competitive environment that we're in, and everyone's taken a different view of how to attack the markets and our own market, means that ABC becomes quite critical in that environment and that's an inherent characteristic, that's the competitive environment that we're in." [2]

Factor (Objective)	Finding : Effect on ABC implementation	Reason(s) cited	Past research	Confirmatory findings from participants	Quotes from participants
Competition: Internal (1)	Increased competition within an organisation may drive ABC implementation success	Internal competition may drive different departments or plants to be the most efficient in their activities	Not cited	[1], [4], [10]	<i>"It's very much a driver within [Company A] [for ABC] [it's like a] best of best practice so I think there's always a bit of internal competition to see which plant can achieve the status of best of best for a certain process or activity or a function or something along those lines..." [1]</i>
Complexity (1)	Increased complexity may hinder ABC implementation success	The assignment of cost drivers for OH may be problematic in complex organisations	Hutchinson, 2010; Sartorius <i>et al.</i> , 2007	[1], [3], [10], [13]	<i>"...if there's different processes and your resources, they're not mutually exclusive so they can contribute to different type of technologies, different type of product types, it is quite difficult out of that pool to allocate specifically amongst products." [10]</i>
Customers (1)	There may be a positive relationship between ABC implementation success and level of costing details required by customers	The greater detail required by customers may result in greater drive relating to ABC usage	Manalo & Manalo, 2010	[4], [12]	<i>..it's becoming more and more difficult to motivate, but I have to get an increase and because your customer wants then an open book and they want to see the allocations of their costs and whether they're only paying for their portion of the cost, that is why it is becoming more important for us to apply [ABC]." [4]</i>

Factor (Objective)	Finding : Effect on ABC implementation	Reason(s) cited	Past research	Confirmatory findings from participants	Quotes from participants
Organisational size (1)	Benefit with ABC is more likely in larger organisations	<ol style="list-style-type: none"> 1. Greater distortion of product costs with TC with increased organisational size 2. Greater resources enable larger organisations to implement a more effective ABC system 	Baird <i>et al.</i> , 2004; Brierly, 2008; Elhamma, 2012; Hall & McPeak, 2011; Mullins & Zorn, 1998; Nassar <i>et al.</i> , 2011; Raeesi & Amini, 2013; Rundora <i>et al.</i> , 2013	[1], [2], [5], [9]	"Based on your company's infrastructure at the moment, it's cash on hand at the moment, it's cash flow situation and it's the nature of the industry that you're in, is it feasible and I think therein lies the difference and those, for me, would be the inherent constraints preventing ABC from functioning to its maximum potential in our company." [5]
Product diversity (1)	Benefit with ABC is more likely in diverse organisations	<ol style="list-style-type: none"> 1. Difficulty of calculating OH with TC 2. Increased activity costs resulting in more indirect OH costs hence increasing need for ABC 3. Increased activity cost pools may result in higher implementation costs 4. Greater distortion of product costs with TC with increased product diversity 	Ahmadzadeh <i>et al.</i> , 2011; Brierly, 2011; Duh <i>et al.</i> , 2009; Hutchinson, 2010; Mullins & Zorn, 1999; Salawu & Ayoola, 2012	[1], [2], [3], [4], [7], [8]	"I think if we were more diverse, yes, it would play a more[of a role]...because at the moment the only reason why I need it [ABC] is because I've got two, maybe three, different types of products, if I can put it like that, and some of it uses common lines which makes it difficult to allocate cost to a specific customer. So I think the more diverse, the more you need it [ABC]." [4]
SMEs and ABC (1)	The successful implementation of ABC at SMEs are dependent on the suitability of ABC and may be more accurate	Successful implementation of ABC in SMEs depends on the correct circumstances and the nature of the business	Hall & McPeak, 2011; Jankala & Silvola, 2012	[9], [10]	"[If organisation were smaller] I think it would be clear to allocate resources to that one type of product so it would have been easier to identify specific cost drivers of which you'll then use as a basis to allocate your fixed cost..." [10] "That is the number one reason why activity based costing fails, it's a lack of analytical abilities within management to be able to define the right costs. You know the old penny wise, pound foolish? A lot of pennies make a lot of pounds. When you got a big capital portion, you have to...the variable costs become the pennies because it's everywhere." [11]
Users with analytical skills (1)	ABC implementation success may be improved with the availability of people with analytical skills	People with analysing skills may be able to identify non-value-adding activities	Not cited	[8], [9], [11]	

Factor (Objective)	Finding : Effect on ABC implementation	Reason(s) cited	Past research	Confirmatory findings from participants	Quotes from participants
ABB (2)	ABB may increase ABC implementation success	1. ABB assists in identifying activity cost variances which may otherwise be missed without ABB 2. ABB assists in identifying non-value adding activities which may otherwise be unnoticed without ABB	Abdel-Kader & Luther, 2006; Shane, 2005	[1], [2], [3], [6], [9], [10], [13]	<i>"ABC is critical in the budgeting process 'cause it analyses all the cost per product, what the sales is [going to] be, what our margin is..." [3]</i>
ABM (2)	The use of ABM may increase the chances of ABC implementation success	ABM may supplement ABC by assisting in managing activity costs	Armstrong, 2002; Kumar & Mahto, 2013	[1], [2], [3], [4], [6], [10], [11]	<i>"I think as a lean organisation, you recognise that systematically you've [got to] control it, you can't put people in to monitor your costs so you've [got to] develop an activity based costing system that gives you at least up to a certain level again an immediate measurable result that you can monitor the organisation by..." [2]</i>
Capital investment decisions (2)	The effectiveness of capital investment decision-making ABC may be enhanced if capital investment decisions are combined when used in conjunction with ABC	In the event of product cost differences large investments could be accepted or declined, which may have significant impact on organisational market share	Kee, 2004; Lind, 2001; Tsai <i>et al.</i> , 2011	[1], [2], [3], [4], [5], [6], [9], [10], [12], [13]	<i>"...we've got a fairly, I would say, complex energy management system in the plant. They've got a lot of measuring equipment on compressed air, on water, on electricity in different areas, different machines. They trying to expand this network every year with a little bit, adding on every year a little bit so even there it's...they come up with fairly interesting ways of trying to save energy. It's nice because you can directly see the impact on different production units, you see it in the standard, you can measure it so it's definite...it [ABC] plays a unique role in, at least, in capital investment." [1]</i>

Factor (Objective)	Finding : Effect on ABC implementation	Reason(s) cited	Past research	Confirmatory findings from participants	Quotes from participants
Decision-making use (2)	The organisation may be more likely to achieve ABC implementation success when used as part of decision-making	Profits may be improved when using ABC as a decision-making tool as opposed to TC	Harrison & Killough, 2006	[1], [2], [3], [6]	"I still tend to lean toward it [ABC] being beneficial because you need to know which product is your money maker and which one is the...you have for strategic reasons or for...to keep a customer." [1]
Extent of ABC consideration and focus (2)	Excessive focus on ABC may be detrimental to ABC implementation success	1. Excessive allocation of cost drivers for all overheads may be of little benefit when significant amounts of additional resources are required 2. Some processes may gain little benefit from ABC even when ABC is used successfully elsewhere in the organisation	Armstrong, 2002; Kaplan & Anderson, 2003	[1], [2], [3], [4], [5], [10], [13]	"...it is a negative to trying to apply activity based costing in this business where there's a certain point where you've [got to] say that there isn't a relationship anymore between the product and the cost." [2]
Extent of indirect fixed OH allocation (2)	1. Lack of consideration of indirect fixed overheads may result in cost distortions; hence allocating indirect fixed overheads as part of the ABC costing model could be beneficial and reduce cost distortion 2. Excessive allocation of indirect fixed overheads may be detrimental to ABC implementation success if not directly traceable to products 3. ABC implementation success may be improved by dividing supporting functions into customer or product specific areas	1. Activities relating to indirect overheads may differ between product families 2. Excessive allocation of cost drivers for indirect fixed overheads may be of little benefit when additional resources are considered 3. Supporting departments divided into product families or customers may increase product costing accuracy with ABC	Armstrong, 2002; Gunesekaran, 1999; Kaplan & Anderson, 2003; Norris, 1993	[1], [2], [3], [4], [5], [6], [9], [10], [11], [13]	1. "...the higher the fixed cost, I would say the more important it is to at least do a type of ABC analysis." [10] 2. "...we can fairly accurately allocate our cost up to a variable level but once we start getting to the fixed costs, it, for me it becomes a bit left pocket, right pocket. Whether I'm sending the cost to truck or to passenger, I'm still [going to] incur the cost. " [1] 3. "I think if your admin functions maybe are structured say, for instance, by product, by customer or by product type, that there's specific teams within a finance department or a HR department, supports may be specific line or a specific product type then it would be possible but if your structure of your admin and their supporting functions are just commonly spread, I don't think it would be feasible to do it further." [10]

Factor (Objective)	Finding : Effect on ABC implementation	Reason(s) cited	Past research	Confirmatory findings from participants	Quotes from participants
Extent of manufacturing OH allocation (2)	The likelihood of accurate costing may be improved with increased intensity of cost driver allocation for manufacturing overheads	Less arbitrary allocations for manufacturing OH may increase product cost accuracy	Akyol et al., 2005; Walker & Wu, 2000	[1], [2], [3], [4], [6], [7], [8], [9], [10], [11], [12], [13]	"...activity based costing we actually we analyse it quite far. [INDISTINCT] the whole organisation runs on that because we need to get down to single units from large changes." [11]
Flexing of activity costs (2)	The effectiveness of short-term decision-making with ABC may be enhanced if activity costs are flexed in line with operational requirements	The deemed inability of ABC to respond to short-term decision-making due to non-consideration of unused capacity	Kee, 2003	[1], [5], [11]	"Now everything changes because of the lower volume so you almost need to have an activity based costing model on various volumes, almost like on a sliding scale based on volumes as well because a simple variable, changing one simple variable like a volume, has a profound effect on all these other things and that volume is just one of the sliders that I could maybe tweak." [5]
Hierarchical information (2)	ABC implementation success may be enhanced when profitability information is available in different hierarchical levels	Different circumstances may result in the need for hierarchical analysis, e.g. decision-making if a entire product family or customer should be continued	Nolan, 2004	[1], [2], [4], [10], [12]	"...the ability to really measure profitability of each of those what we call car lines, even down to sales models, becomes quite critical for us" [2]
Product life-cycle (2)	ABC implementation success may be enhanced if ABC is used to compare activity costs across the product life-cycle	The monitoring of activity costs across the entire product life-cycle may result in activity improvements and prevent eroding of activity standards	Not cited	[1], [2], [9], [10], [13]	"Throughout the programme we continue to track our profitability. It's not an initial decision, it's a constant evaluation." [2]

Factor (Objective)	Finding : Effect on ABC implementation	Reason(s) cited	Past research	Confirmatory findings from participants	Quotes from participants
Standards (2)	The use of standards across the organisation may enhance ABC implementation success	The use of standards across an organisation may simplify ABC implementation and may provide comparability across the organisation	Not cited	[1], [2], [4], [5]	"...like the drive shaft that compare us to Brazil, whatever, and then we...our billing cost is normally more but that was also because we haven't implemented the ABC costing properly because we would then use a plant wide on an assembly type of thing. So I think if we use it properly it would help us more when comparing us to other people." [4]
Strategy & ABC (2)	ABC implementation success is enhanced when combined with competitive strategy	Non-value-adding activities may be identified by ABC, which could enable the organisation to lower its price and gaining market share	Charles & Krumwiede, 2011; Velmurugan, 2010; Yapa & Konchange, 2012	[2], [3], [6], [7], [8], [9], [13]	"I can just think, from any perspective, of things becoming more competitive, information's more readily available to customers, to users, so you really need to compete hard to at least protect your market share and, inherently in that, there is a more focus for better decisions and so ABC becomes important in providing better information to make those critical decisions. Over the last couple of years, definitely, you can justify the importance. It's almost become a tool where you stay in the game, it's not a mind blowing exercise where you can capture huge advantages, almost become a necessity." [11]
Value chain (2)	The ability to identify an organisation's value chain may enhance the successful implementation of ABC	Activities can be identified at different stages during the value chain, which may benefit the use of ABC	Not cited	[1], [2], [3], [10]	"I think what makes it important to our type of organisation, we're a manufacturing concern, you can identify a specific value chain from purchasing of raw materials, the process of converting raw materials into finished goods and then also the delivery of getting it to the customer. From that sense, that components are they're quite substantial in your absolute terms as in your rand or euro based so just from the nature of our manufacturing concern and the value chain, there is merit for ABC." [10]

Factor (Objective)	Finding : Effect on ABC implementation	Reason(s) cited	Past research	Confirmatory findings from participants	Quotes from participants
ABC project team (3)	The formation of an ABC project team may increase the likelihood of ABC implementation success	The focus of the project team may ensure that ABC is implemented and maintained as intended	Sohal & Chung, 1998; Yapa and Konchange, 2012	Not cited	
Accuracy of source data (3)	ABC implementation success may be enhanced with improved accuracy of source data	The accuracy of source data may ensure the accuracy of the ABC system	Xu, 2012	[1], [10], [12]	<i>"Everything [relating to ABC] relies on specifications coming from our tyre engineers. They are the guys who specify how...the length of a component, the thickness of a component, the size, shape, quantity to use, everything and the other leg of it is in industrial engineering. They are really the guys who make sure that the time it takes to run X number of components or several hundred metres of a component or something, that that is accurate." [1]</i>
IT systems : ERP (3)	The use of ERP systems may enhance the accuracy of ABC	Real-time integrated information may enable an ERP system to be more accurate than stand-alone systems	Hansen & Mowen, 2006	[1], [2], [4], [5], [6], [11], [12]	<i>"You have to get a complete ERP system. If you [want to] implement ABC in a manner that the question is posed, you'll have to know exactly what the heartbeat of the business is constantly." [11]</i>
IT systems : General (3)	ABC implementation success may be enhanced with careful consideration of best available IT system	Best available IT system to eliminate processing time and cost	Akyol <i>et al.</i> , 2005; Al-Sayed <i>et al.</i> , 2008; Huijuan <i>et al.</i> , 2011; Nassar <i>et al.</i> , 2009; Yapa & Konchange, 2012	[1], [3], [4], [6], [10], [11], [12]	<i>"I would say it's [ABC needing few heads] because you using a standardised system within the group so your IT support generally sits centrally. If one company experiences a problem, everybody's generally experiencing the same problem so it's not...they not running ten systems for ten production facilities. It's one system, everybody runs off the same system, you just different company codes or cost codes within that system." [1]</i>

Factor (Objective)	Finding : Effect on ABC implementation	Reason(s) cited	Past research	Confirmatory findings from participants	Quotes from participants
IT systems : In-house (3)	The use of custom in-house developed software may be beneficial for SMEs implementing ABC and may be more easily understood by ABC users	1. The possible reduction in implementation costs may render the implementation of ABC possible for SMEs 2. In-house system design may be more purposively adapted for a specific business environment	Aho, 2006	[1], [3], [9]	"...this is a product that was designed specifically for [their company] and they write the programmes and do everything that is related to our finance so it's very customised." [9]
IT systems : Spreadsheets (3)	The use of spreadsheets may be beneficial for ABC implementation success	ABC analytics may be more easily done with spreadsheets	Not cited	[1], [2], 4, [5], [6], [8], [13]	"So the first decision must be ABC will work for us and will add benefit and then look at is our organisation small enough to maybe use excel? If it's not, if it's quite complex, different product types, then you'll have to use more than just excel." [10]
Other cost-saving methodologies (3)	Supplementary cost-saving mechanisms may enhance the successful implementation of ABC	Other cost-saving mechanisms may assist ABC to identify activities for improvement and to drive down activity costs	Cagwin & Bouwman, 2002; Fullerton & Wempe, 2008; Jelsy & Vetrivel, 2012; Khatale and Bulgak, 2013	[1], [3], [4], [9], [10], [11], [12]	"Your total quality management, if you want to improve your quality, obviously your product will be improved and your costing can also improve in a way so it does help and it does affect your ABC and your benchmarking, your engineering. " [9]

Factor (Objective)	Finding : Effect on ABC implementation	Reason(s) cited	Past research	Confirmatory findings from participants	Quotes from participants
Training (3)	Training of users may improve the chances of ABC implementation success	User perceptions may be changed and ABC knowledge improved with training	Govender, 2011; Khozein <i>et al.</i> , 2011; Nassar <i>et al.</i> , 2009; Nassar <i>et al.</i> ,2013; Velmurugan, 2010; Xu, 2012; Yapa & Konchange, 2012	[4], [6], [8], [10], [12]	"At the end of the day they wouldn't even know what the ABC really is, they'd just be punching in the hides at a certain process, punch in whatever chemicals were used and then the management team would then have to look at the ABC in detail so for them it wouldn't, obviously, they wouldn't know what it was all about and they just have to be properly train in those areas." [12]
User attitudes : Cost driver agreement (3)	ABC implementation success may be negatively affected if cost drivers are not agreed and understood by all key users	Cost drivers that are not agreed with key users may be viewed as inaccurate	Norris, 1993	[3], [11]	"...you cannot cost to a market if you don't understand the cost drivers." [11]
User attitudes : Difference between users (3)	ABC implementation success may be affected negatively if user attitudes towards ABC differ amongst them	ABC implementers and management may be biased towards the ABC system and fail to address the shortcomings	Al-Omiri, 2011; Appah & Bariweni, 2013; Cagwin & Bouwman, 2002; Fei & Isa, 2010b; McGowan & Klammer, 1997; Yapa & Konchange, 2012	[1], [2], [3], [6], [8], [9], [10], [11], [12], [13]	"The more people work with the programme [ABC] see the benefits of it, I think they would want to abide by it and to use it properly." [12]
User attitudes : Management support (3)	ABC implementation success may be negatively affected with lack of management support	Management may provide resources and guidance	Govender, 2011; Sohal & Chung, 1998; Xu, 2012	[3], [4], [8], [9], [10], [11], [13]	"Management will support IT and better intelligence to improve visibility on products or anything else so if you make a request to say you're interested in a specific tool so that you can allocate a cost more specifically, it is always well supported." [10]

APPENDIX I: LANGUAGE EDITING

2 Glen Eden Park
520 Town Bush Road
Montrose
Pietermaritzburg
4 October 2013

Mr Arthur Reynolds
Port Elizabeth

Dear Mr Reynolds

EDITING OF YOUR DISSERTATION

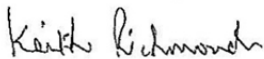
This letter is to record that I have edited your dissertation for the MPhil in Management Accounting entitled "Factors influencing the success of activity-based costing in the Nelson Mandela Bay Metropole manufacturing industry".

My editing was done electronically in MS Word, using change-tracking mode, and included the following:

- checking spelling and punctuation
- adhering to conventions of diction, grammar and syntax used in written English
- checking consistency of capitalisation and abbreviation
- checking numbering of chapters, subsections, tables and figures
- modifying language to enhance the expression of intended meaning where possible
- making notes in comment boxes with queries or suggestions
- checking consistency of formatting, including of bibliographic entries
- checking in-text citations against details in the bibliography

I did not alter the substantive content of your dissertation in any way or the quoted comments of your research participants.

Yours sincerely



Keith Richmond

BA Hons in Applied Linguistics (Unisa)

MA in English Literature (UNP)

MPhil in Adult Education (UCT)

Full Member of the Professional Editors' Group