UNIVERSITY OF SOUTHERN QUEENSLAND

The Relationship between Activity-Based Costing and the Balanced Scorecard and their Combined Effect on Organisational Performance under Alternative Competitive Strategies

A dissertation submitted by

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For the award of Doctor of Philosophy

September 2007

ABSTRACT

This thesis reports on a study that examines the relationship between costing systems and performance management systems and their combined effect on performance under alternative competitive strategies across a number of industry sectors in Australia. The thesis also examines the relationship between performance and the interaction of strategy, ABC and the BSC. The broad aims of this study are to understand and explain the relationship between costing and performance management systems.

A contingency theoretical framework of management accounting was developed to address the research questions and to inform the relationship of management accounting innovations such as ABC and BSC and their combined effect on performance under alternative competitive strategies in the Australian business environment. A triangulation approach to data gathering is utilised. This includes a structured questionnaire accompanied by structured and semi-structured interviews. Additionally, examination was undertaken to review interviewed firm's websites and publicly available archival documentation. The industry sectors across Australia include retail; services; manufacturing; finance, insurance and real estate; agriculture, forestry and fishing; wholesale; transportation; communication; electric, gas and sanitary services; mining and construction.

The findings reported reveal that cost leader firms that use a combination of ABC and the BSC have greater organisational performance, customer performance and innovation performance compared with differentiator firms. In addition, cost leader firms that use a combination of ABC and the BSC have improved their innovation and financial performance more than those who use ABC without BSC, or those who use BSC without ABC. Furthermore, differentiator firms that use BSC without ABC have improved customer performance when compared with those that use a combination of ABC and BSC. The study also revealed that the use of ABC and the BSC is contingent on strategy, type of business activity and the competitive environment. It was also found that the design of the BSC may also be contingent on the strategy a firm pursues, that is, dependent on strategy is the weighting applied to different perspectives.

Overall, the thesis suggests that contingent factors such as strategy, business activity and increased competitive environment do affect the choice of costing systems such as ABC or Traditional Costing System (TCS) and performance management systems such as BSC or Traditional Performance Measurement (TPM).

CERTIFICATION OF DISSERTATION

I certify that the ideas, results, analyses and conclusions reported in this dissertation are entirely my own effort, except where otherwise acknowledged. I also certify that the work is original and has not been previously submitted for any other award, except where otherwise acknowledged.

_____ _____

Signature of Candidate Date

ENDORSEMENT

_____ _____

Signature of Supervisor Date

Dedication

For my Mum and Dad who don't know the meaning of "can't". Thank you for your tireless support.

And

For my wife Karima, my two sons Mohamed, Mohanad and my little daughter Marwa for their years of patience and support during my PhD Journey.

ACKNOWLEDGMENTS

Achievement and completion of any research needs the support of numerous people. I am grateful to all the people who have contributed in one way or another to this research study.

Particularly, cordial thanks to my supervisor Dr. Wendy James for her endless support, inspiration, and friendship over the years. Words cannot express the patience and assistance afforded to me during this PhD experience, however, gratitude is immeasurable. Secondly, my gratitude must go to Professor Julie Cotter, associate supervisor, for her support, constructive feedback and suggestions, and on-going encouragement during the duration of this thesis. I would like also to thank Dr. Stephen Cox, faculty research advisor at QUT for his help and advice in the statistical element of this thesis. Special thanks to Mrs Chris O'Reilly for her continuous help and editing of my thesis writing. Finally I would like to thank the business librarian Miss Ilona Eberle at USQ for her tireless efforts. Although mere thanks are inadequate, I sincerely thank all of you.

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List of Abbreviations

AAT	
ABC	Activity-Based Costing
ABM	Activity-Based Management
ASX	Australian Stock Exchange
BSC	Balanced Scorecard
BRW	Business Review Weekly database
BWW	Business Who's Who database
CAHK	Ciba Additives Hong Kong
CAS	Cost Accounting System
CFA	Chartered Financial Analyst
CFO	Chief Financial Officer
CIMA	Chartered Institute of Management Accountants
CL	Cost leadership
CPA	Certified Public Accountants Australia
DiFF	Differentiation
DVs	Dependent Variable
EVA	Economic Value Added
GEI	Global Electronics Inc
ICAA	Institute of Chartered Accountants in Australia
ICAEW	Institute of Chartered Accountants in England and Wales
ICAS	Institute of Chartered Accountants of Scotland
IVs	Independent Variable
JIT	Just-In-Time
MAS	Management Accounting Systems
OI	Operating Income
PAC	Planned Contrasts Analysis
PMS	Performance Management Systems
PNA	Professional National Accountants
ROA	Return on Assets
ROI	Return on Investment
TCS	Traditional Cost System
TPM	Traditional Performance Measurement
USQ	University of Southern Queensland

CHAPTER 1

PROBLEM DOMAIN

1.0 Introduction

Increasing competitive pressure in the business environment is forcing decision–makers to obtain more accurate cost information and to utilise multiple-dimensional measures of performance (Ittner and Larcker, 2000; Kaplan and Norton, 1996a,2001). Responding to competitive pressure, organisations are competing progressively more on a variety of product and service dimensions. Quality and cost control has become a qualifying dimension to compete in the market place to satisfy customers' needs (Drury, 2000). Given that, decision-makers are realising that traditional cost allocation and traditional accounting based performance measures are inadequate tools for improved organisational performance (Cooper and Kaplan, 1988a; Kaplan and Norton, 1992).

With the introduction of modern manufacturing technologies, managerial decision makers tend to apply sophisticated management accounting techniques such as Activity-Based Costing (ABC), and performance management tools such as the Balanced Scorecard (BSC) (Kaplan, 1994). Using these techniques, management expect to improve the productivity and efficiency of the organisation, as well as enhance organisational performance. ABC plays a significant role in providing accurate cost information, whilst the BSC assists in improving business performance through its diversified financial and non-financial performance indicators (Cooper

and Kaplan, 1988b; Garg and Rafiq, 2002; Gunasekaran, 1999; Kaplan and Norton, 1992,2001). ABC is a method aimed at increasing the accuracy of cost allocation and is often viewed as a supportive measurement system for successful implementation of the BSC (Maiga and Jacobs, 2003). The BSC is a method that focuses on both financial and non-financial measures to enable organisations to clarify their vision and strategy and translate them into action (Kaplan and Norton, 1992).

Studies conducted by Booth and Giacoble (1997), Innes and Mitchell (1997), Clarke *et al.* (1999) and Shim and Stagliano (1997) have shown that firms that utilise ABC have a greater propensity for enhanced performance than firms using Traditional Costing Systems (TCS). For example, ABC information has been used to enhance organisational performance in a variety of aspects such as pricing, marketing, customer relationship and profitability. Moreover, the accuracy of cost information obtained by ABC can be viewed as a supportive measurement system for successful implementation of the BSC. ABC is a method for allocating cost in a much more efficient and accurate way than that of TCS, and it has been found in previous studies in the US that firms using ABC have increased performance. It has also been found that firms using a BSC following either a cost or differentiation strategy have increased performance, however, it is recognised that different competitive strategies focus on different financial and non-financial indicators to achieve this. For example, cost leader firms will have a slightly different "generic" BSC, as opposed to differentiators, due to the different strategic focus of the two types of firms. It is expected that, given these relationships, there will be a positive effect on organisational performance when firms combine a costing system that will provide

more accurate costing with a BSC that is designed to suit the particular strategy that the firm is pursuing.

1.1 Research Problem

Motivation for this research lies in the criticism of both TCS allocation and traditional performance measures found throughout the management accounting literature. Cost accounting literature has revealed a general consensus regarding the failure of cost accounting systems based on traditional costing methods to provide useful information to support managers' decision-making within the new business environment (Cooper, 1988,1989a,1989b,1990; Cooper and Kaplan, 1988a,1991; Drury, 2000; Gunasekaran *et al.*, 1999). It suggests that ABC is a better cost management system for providing accurate and useful cost information to management so as to achieve an organisation's strategic objectives within the competitive business environment.

Further, due to globalisation, economic and political regulation, technological development and increased customer awareness of product quality and value, organisations face highly competitive environments. Traditional financial accounting based performance measures are no longer adequate for assessing firm performance in this new technological global environment. Kaplan and Norton (Kaplan and Norton, 1992,1993,1996b) suggest that today's firms need to be aware that if they are to fulfil their strategic plans they should adopt a more balanced approach to measuring performance by considering financial and non-financial measures so as to monitor organisational performance, as well as organisational development, learning and customer satisfaction. This, they argue, can be achieved

by adopting a BSC performance management system. Furthermore, existing literature on Management Accounting Systems (MAS) shows a lack of empirical studies that examine the combined relationship between costing systems and performance management systems on performance with competitive strategy. Rather, the literature shows numerous studies that examine each implementation variable separately (Bergin-Seers and Jago, 2007; Debusk and Crabtree, 2006; Ittner *et al.*, 2002; Ittner *et al.*, 2003; Prajogo, 2007). Research in this problem will extend MAS literature, particularly in an Australian context, to explore and understand the relationship between the study's variables and to provide managers with greater understanding of the combined use of ABC and the BSC for organisational performance improvement.

1.2 Aims and Objectives

The rationale of the research is to investigate whether costing systems such ABC or TCS and performance management systems such as BSC or TPM can be used together for improving perceived organisational performance[1] where strategy is included as an independent variable. The competitive strategy adopted by a firm is determined by a firm's current competitive environment. It is expected that differing strategies will require different management accounting techniques to remain competitive. As such, competitive strategy is included in the study in order to determine the effect that not only the competitive environment has on an

[1] The study will investigate the effects of costing systems (ABC or TCS), performance management system (BSC or TPM) and strategy on perceived organisational performance. Common to studies in management accounting, managers were asked to indicate their perceptions of organisational performance in both financial and non financial areas. Given the nature of the question, it is necessary to clarify that the non-financial area of organisational performance measured in the study will be subjective and ordinal as opposed to the financial performance which will be numerical and objective. Subsequently, any reference to organisational performance referred to in the study refers to perceived organisational performance.

organisation's performance, but also how this variable affects the performance when either ABC and/or a BSC is utilised. This research also aims to extend the literature in MAS in evaluating the effect of using such management accounting innovation (ABC and BSC) when firms focus on either cost leadership or differentiation strategy in order to achieve and sustain a competitive advantage. In addition, this study aims to provide guidance to practising managers of the benefits and use of ABC and BSC for improvement of their organisational performance, as well as individual performance items such as financial, customer, innovation and efficiency performance. Furthermore, this research aims to explore some of the contingent factors affecting the use of costing systems such as ABC or TCS, and performance management systems such as BSC or TPM.

1.3 Research Questions

In order to investigate the research problem discussed earlier so as to achieve the aims and objectives of this research, this research considers the relationship between cost accounting systems and performance measurement systems. Further, this research seeks to detect whether firms which focus on cost leadership or differentiation type strategies in the marketplace using ABC and BSC approaches jointly perform better than firms using a singular use of ABC or the BSC. Specifically, this research attempts to answer the following questions:

- Do cost leader firms perform better when they use a combination of ABC and BSC compared to the use of both ABC and TPM?
- Do cost leader firms perform better when they use a combination of ABC and BSC compared to the use of both TCS and BSC?

- Do cost leader firms using a combination of ABC and BSC perform better than differentiator firms using a combination of ABC and BSC?
- Do cost differentiator firms perform better when they use both TCS and BSC compared to a combined use of ABC and BSC?

These questions are addressed by testing a number of alternative hypotheses. These are more fully developed in Chapter 3—Theoretical framework.

1.4 Motivation for the Research

This research provides a framework that links the relationship between competitive strategy, costing and performance management systems on organisational performance. As such, the framework will provide useful information to managers in industry about the interactions between the three variables to enable them to better understand how ABC and the BSC methods could be expected to jointly improve decision making and the strategic performance of their organisation. The motivation for this research lies in the importance to management and practice as to whether the combined effect of management accounting innovations such as ABC and a BSC improve organisational performance under alternative competitive strategies, or whether a singular use of ABC or BSC improve organisational performance depending on the strategic type pursued. This study is important as it is the first empirical study to examine the combined relationship between costing and performance management systems on performance under alternative competitive strategies across a number of industry sectors in Australia.

There are many studies in MAS research on costing systems and performance; performance management systems and performance; and strategy and performance—

each of these have found varying results. An additional motivation for this study is to combine these vital components and determine their relationship to performance.

In summary, the study's motivations are firstly to provide relevant and topical information to managers about the effect of the types of costing systems and performance management systems given particular strategic typologies and their effect on organisational performance. This information will be particularly useful to Australian managers, but also provide avenues for further investigation with respect to responding to competitive challenges for managers worldwide. Secondly, to further the extant literature which does not focus only on one or two of these components on performance, but rather on their combined interaction on performance. This information will be useful to researchers, teachers, and practitioners alike in their own motivation to ensure timely and relevant information for not only furthering their own research, but also to provide information on the latest trends and successes in the business environment regarding strategic direction, costing systems and performance management systems and their effect on organisational performance.

1.5 Contributions

There are limited studies that investigate the relationship between cost accounting system and performance management systems on organisational performance, however, these are focused on the US business environment—not in the Australian business environment. A recent study by Chenhall and Langfield-Smith (1998) found that, unlike prior surveys, ABC is one of the newer techniques being more widely

adopted in Australia. Furthermore, it was also found that a number of large Australian firms have adopted a variety of management accounting systems that comprise measurement of non-financial areas and that have a more strategic focus on operational decision making than previous systems. Booth and Giacobble (1999) carried out a study on the use of ABC in Australian manufacturing firms and found that, overall, ABC has been introduced as a management accounting technique and is a rapidly growing and dynamic area of innovation in management accounting practice in Australian manufacturing firms. This evidence points to the need for research of Australian firms to assess the effectiveness of these newly-implemented procedures. Hence, the contribution of this research is to not only determine whether firms that focus on lower cost or product differentiation strategies (Porter, 1980) perform better by using ABC and BSC jointly than firms using a singular use of ABC or BSC, but also whether strategy plays a contingent role in this effect.

The major contribution of the research to the existing stock of knowledge of management accounting innovation derives from the emphasis on innovative techniques implemented by management in response to the new global competitive environment. This research provides evidence from Australia to complement Maiga and Jacobs's study (2003) carried out in the US. Maiga and Jacobs's study (2003) tested the combined effect of BSC and ABC on organisational performance based on survey data obtained from a sample of 83 manufacturing business units. They proposed that "the implementation of ABC when combined with BSC is likely to have a significant positive impact on organisational performance" (p. 286). Maiga and Jacobs's results indicate that each of the four BSC perspectives interact with ABC to improve product quality, customer satisfaction and margin on sales,

however, the interaction between the BSC's internal process perspective and ABC on margin on sales was not significant. Overall Maiga and Jacobs's study (2003) presents theoretical foundations and empirical evidence of a complementary or synergetic effect of the BSC and ABC on performance. Subsequently, this research extends Maiga and Jacobs' study, first, by testing whether their results hold in Australia and, second, to extend prior knowledge by considering the impact of cost accounting systems (TCS or ABC) and performance measurement systems (TPM or BSC) on performance under alternative competitive strategies. This study hopes to remedy this deficiency in research.

Academically, the study provides a contingency framework that links the relationship between competitive strategy, costing systems, and performance measurement systems on organisational performance. A contingency theoretical framework is positioned within a multiple paradigm model of social science as put forward by Burrell and Morgan (1979) in order to understand and explain contemporary management accounting practices. Further, this study demonstrates that competitive strategy, business type, and an increasingly competitive environment, are the main contingent factors affecting the use of costing systems such as ABC or TCS, and performance management systems such as the BSC approach or TPM.

1.6 Overview of Research Methodology

This study takes a combined approach toward quantitative and qualitative research by undertaking a mail-out survey combined with a multiple case study approach. The population studied consists of small, medium and large companies at the strategic

business unit level[2] in several major industry sectors in Australia, and is combined with 15 case studies. The literature suggests that it is appropriate to utilise surveys in conjunction with case studies, as case studies allow the researcher to get close to the phenomenon, gather insights, ascertain why things happen, and provide deeper explanations of observations. The primary reason for conducting survey research in the first stage of this study was to answer the research questions and test research hypotheses; this was followed by 15 case studies in the second stage of the study. The researcher believes that conducting case studies in the second stage of this research was essential to further clarify the subject inquiry and to supplement the quantitative data. This also aided the interpretation and enriched the quantitative results.

1.7 Scope of the Research

The study examines the relationship between cost accounting systems and performance measurement systems and their combined effect on performance under alternative competitive strategies across a number of industry sectors Australia-wide. It examines organisational characteristics across industry sectors, rather than within. Industry classification is constructed using the *Business Who's Who* (BWW) of Australia database classification after integrating nine main industries into five industry groups (retail; services; manufacturing; finance, insurance and real estate; and other industries) to limit the length of the questionnaire. "Other industries" consists of agriculture, forestry and fishing, wholesale, transportation, communications, electric, gas and sanitary services, mining and construction, and

[2] The strategic business unit level refers to the competitive business unit of corporations. It is at this level that competitive strategy is pursued and where organisational performance is ultimately achieved (Maiga and Jacobs, 2003).

others which were not classified. Following the scope of this research mentioned above, this study does not examine firms that use traditional costing system and traditional performance measurement with respect to the usage of those systems, but simply whether they use them or not so as to be able to compare the performance with those that use ABC and a BSC. Examining the usage of traditional costing and performance management systems is beyond the scope of the research hypotheses. The study also does not explore the impact of firm structural characteristics on the combined use of costing system and performance management system in improving business performance. Case study interviews were limited to a small number of firms across varying industry sectors. This was because of the limited number of participants who were willing to participate in the case studies. The questionnaire of this study is directed to the Chief Financial Officer (CFO), as he/she is able to provide accurate information about costing and performance measurement data within an organisation.

1.8 Ethical Considerations

Quantitative and qualitative research studies addressing human issues of any manner, whether anonymous or not, need to obtain ethical clearance. Ethical considerations in relation to integrity, confidentiality, and anonymity were addressed for the current study in accordance with the University of Southern Queensland's (USQ) Ethics Policy. This policy states that a student must obtain ethics approval for research involving human participants prior to commencing research to guarantee no detrimental consequences to the research participants and/or their organisations.

Ethical clearance was granted through USQ's Ethics committee before conducting the questionnaire survey and collection of the interview data. The committee did not

receive any objection or any complaint from any of the survey respondents or their organisations. The purpose of the questionnaire survey and the interview was explained to participants, along with assurances of confidentiality of all information provided by the respondents and their organisations. Names of the participants and their organisations are not published in this thesis.

1.9 Thesis Structure

The thesis contains eight chapters that are summarised briefly in this section. Figure 1.1 outlines the thesis structure.

Chapter 2	Review areas of relevant prior research from the literature, providing a summary of the current state of the relationship between ABC, BSC and strategy.
Chapter 3	Present the theoretical framework and thesis hypotheses to be tested.
Chapter 4	Outline the research design for the quantitative and qualitative approaches adopted in the study. Firstly, discuss the quantitative part of the study together with descriptive statistics of the variables. Secondly, describe the qualitative part of the study in management accounting, and the limitations of conducting case studies.
Chapter 5	Present the findings of the quantitative study using both planned contrast analysis and multiple regression analysis.
Chapter 6	Discuss the quantitative findings.
Chapter 7	Present and discuss the case studies findings and link with the survey discussion.
Chapter 8	Summarise the study findings in term of the main findings, contribution to theory and practice, limitations and directions for future research.

Figure 1.1 Thesis structure

The next chapter examines previous and current literature on cost accounting systems, performance management systems, strategy and the relationship between ABC, BSC and strategy.

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

A review of prior relevant literature is an essential feature of any research study. The purpose of this chapter is to provide a review of the literature of ABC and BSC innovations in order to provide background knowledge and support for the issues to be addressed in the study. A further construct, namely strategy, is considered here as an independent variable in the role of ABC and/or BSC adoption on organisational performance. This chapter presents four sections; the first section discusses cost accounting systems, with an emphasis on ABC. Section two reviews the literature relating to the BSC and section three contains a literature review concerning competitive strategy. The final section describes the relationship between these three concepts and their combined effect on organisational performance.

2.1 Cost Accounting Systems

Cost accounting is considered one of the most important sources of management information. It provides useful information for management to make rational economic decisions for the achievement of various economic projects and goals that the organisation may have. Hence, there is a need for an organisation's cost accounting system (CAS) to provide precise cost information to managers so as to

achieve their organisation's strategic objectives. Accurate cost information depends on product costing methods used in an organisation. There are two types of systems that can be used to assign overhead costs to cost objects, TCS and ABC (Drury, 2000).

Since the late 1980s, many companies have responded to the changes in competitive environments by offering high-quality products and services at low prices. These firms have become more customer-driven and have made customer satisfaction an overriding priority (Drury, 2000). These changes in the competitive environment, particularly in the manufacturing industry, are reflected in diminishing direct labour costs, whilst at the same time experiencing an increase in manufacturing overhead costs due to changes in manufacturing technologies such as Just-In-Time (JIT) philosophy, robotics, and flexible manufacturing systems. Sullivan (1991) lists the characteristics of the new manufacturing environment (see Table 2.1) and suggests that, in today's world, manufacturing firms are changing and becoming more information intensive, highly flexible, and immediately responsive to customer expectations.

Table 2.1: The Changes in Manufacturing Environment

Historically	**New paradigm**
High volume, long production runs, long product life cycles	Low volume, short production runs, short product life cycles
Small number of product variations in a domestic market	Large number of product variations in an international market
Large direct labour component; high cost of processing information	Relatively high technology cost; relatively low information processing costs
Small indirect/overhead costs in relation to direct labour	Large indirect/overhead costs in relation to direct labour

Source: Sullivan (1991).

The next section presents a discussion on Traditional Costing System (TCS), its limitations and criticisms. The definition of ABC is also described, as well providing an outline of its functions and effectiveness. The relationship between ABC and performance evaluation is then discussed, followed by the behavioural implications of ABC on organisational performance.

2.1.1 Traditional Costing Systems

Cost accounting systems characteristically include two processes: first, cost accumulation, which means collecting costs by some categorisation such as materials or labour, or by activities performed such as order processing or machine processing. The second process is cost allocation which traces and reassigns costs to one or more cost object such as activities, processes, departments, customers, or products (Horngren *et al.*, 2002). Cost allocation is used to assign overhead costs (indirect costs) to cost objects because overhead costs cannot be traced directly to cost objects as they are common to several cost objects. Conversely, direct costs can be traced directly to a product or service by using cost tracing.

Cost allocation literature confirms that TCS cost allocation bases use volume drivers, such as direct labour cost and machine hours. This is in contrast to an ABC system allocation base which uses a cause-and effect allocation relationship based on the activities consumed by cost objects (Drury, 2000; Horngren *et al.*, 2003; Kaplan and Atkinson, 1998a). TCSs were designed primarily for meeting external financial accounting requirements (Drury, 2000). TCS's extensive use of arbitrary cost allocations in relation to assigning indirect costs to cost objects are sufficiently

accurate for meeting external financial accounting requirements, but not for decision-making requirements (Drury, 2000).

2.1.1.1 The Failure of Traditional Costing Allocations

Recent studies have criticised TCS allocation methods because they fail to provide accurate cost information (Cooper, 1989b; Cooper and Kaplan, 1988,1991,1992; Drury, 2000; Mishra and Vaysman, 2001). TCSs are divided into two approaches: full absorption and variable costing. Both traditional methods trace overhead costs to cost objects by using volume drivers, such as direct labour hours, machine hours and/or direct labour cost. This treatment is inadequate for overhead cost allocation and can result in cost distortions, especially in an organisation where a large proportion of overhead costs is higher than labour cost (Cooper, 1988; Raffish, 1991). Gunasekaran *et al*. (1999) point out that TCS distorts cost information by allocating overhead costs based on an inappropriate basis for today's manufacturing/service organisation. Further, Cooper (1988) argues that using volume-related allocation bases alone to trace costs to products, distort reported product costs if some of the product-related activities are unrelated to volume.

Mishra and Vaysman (2001) indicate that overhead costs include activities which are not directly traceable to individual products (for example, setup, material handling, engineering support, research and development effort, and supervisory labour), but are common to all products. Furthermore, TCS allocates only manufacturing costs, and does not allocate non-manufacturing costs such as administrative costs, marketing costs and so on, to cost objects. As a result, TCS leads to inaccurate cost

information for decision making in relation to operational policies. Horngren *et al.* (2002) argue that TCS works best where there is a reasonable and dependable relationship between the single cost driver and all the indirect resource costs being allocated and when the cost of providing activity–cost information exceeds the benefits of that information. TCS is most effective when the overhead cost resources are not significant—an uncommon situation in today's complex business environment—and, to reiterate, TCS works well with quite simple production and operating systems.

Rapid development in the business environment, such as innovation, new technology, automation and product differentiation make the problems of cost allocation based on TCS more severe (Langfied-Smith *et al.*, 1998). Changes in the business environment in general, and in the manufacturing environment in particular, have incurred an increase in overhead costs relative to labour costs. Raffish (1991) points out that direct labour accounts for five to 15 percent of the costs, and material accounts for 45 to 55 percent; whereas overhead accounts for 30 to 50 percent in today's manufacturing environment. In such environments, costs are driven by many activities which may be unrelated to production volume (volume drivers) because goods do not consume most support resources in proportion to their production volumes. In other words, most resources are not proportional to the volume of product-units produced (Gunasekaran, 1999; Johnson and Kaplan, 1991).

Gunasekaran (1999) states that the cost of activities performed directly on the product unit, such as direct labour, fits with the assumptions of TCSs that product causes cost, whereas it does not work with activities that are not performed directly

on the product units—such as machine set-up—which are performed on batches of product, rather than product unit. Moreover, Horngren *et al.* (2002) indicate that the lack of a good cause-effect relationship between costs allocated and actual resources consumed based on TCS will result in incentives for managers to incorrectly use resources, resulting in misleading cost information.

From the above, it can be argued that TCS does not provide accurate information about the consumption of the different resources, nor the activities of the organisation (Cooper, 1989b; Cooper and Kaplan, 1992; Johnson and Kaplan, 1991). Ultimately, the information based on TCS leads to a distortion of product and service costs which can mislead strategic decisions related to pricing, marketing, customer and profitability. Overall, a review of the cost accounting literature has revealed a general consensus regarding the failure of cost accounting systems based on traditional costing methods to meet the requirements of businesses which operate in today's competitive markets (Cooper, 1988,1989a,1989b,1990b; Cooper and Kaplan, 1988,1991; Drury, 2000; Gunasekaran *et al.*, 1999). As an alternative cost allocation system, ABC has been put forward as a better cost management system for providing accurate and useful cost information to management so as to achieve an organisation's strategic objectives (Cooper, 1988; Cooper and Kaplan, 1988). The ABC system emerged in the late 1980s; it uses a cause-and-effect cost allocation relationship which assigns overhead costs to cost objects based on the activities consumed by the products or services (Cooper, 1988,1989a; Cooper and Kaplan, 1992; Drury, 2000)

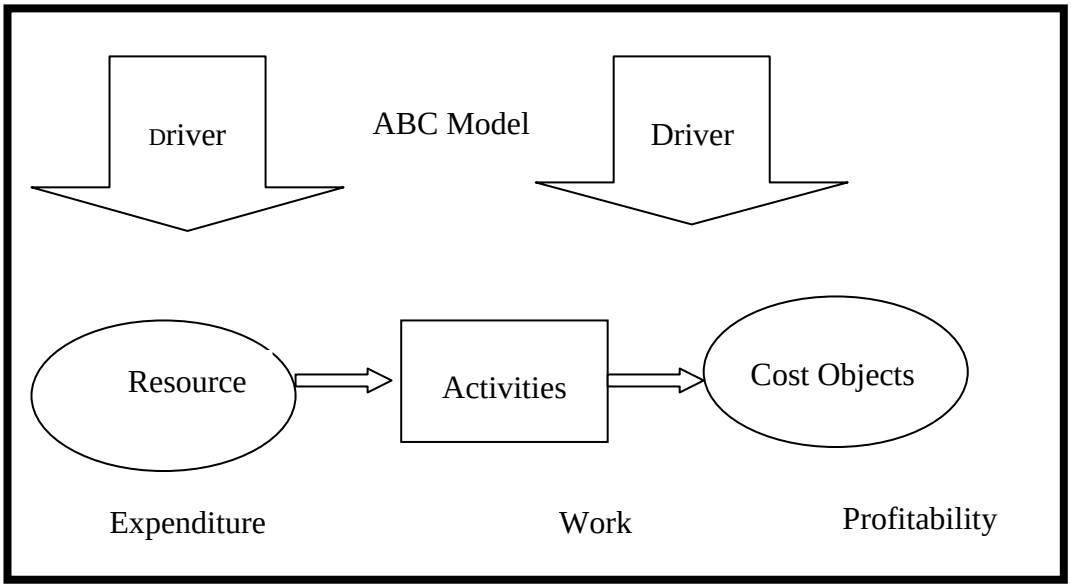
2.1.2 Activity-Based Costing

Among one of the most important challenges that attracts the attention of managers today is the accuracy of cost information. With reliable cost information, managers are able to make better strategic decisions. ABC has been presented as a more reliable cost management system for providing accurate cost information (Cooper, 1989a,1989b; Cooper and Kaplan, 1988; Drury, 2000; Gunasekaran, 1999; Langfied-Smith *et al.*, 1998; Turney, 1991; 1996). ABC is described as "A two-stage allocation process that fully allocates costs to products, customers or some other ultimate cost object" (Noreen, 1991). It is a method for allocating costs based on the number of activities consumed by cost objects. ABC assigns cost activities based on their use of resources, and assigns cost to cost objects, such as products or customers. Further, ABC recognises the causal relationship of cost drivers to activities.

Gunasekaran *et al*. (1999) express the viewpoint that ABC allows costs to be assigned to products by the actual activities and resources consumed in producing, marketing, selling, delivering and servicing the product. Taylor (2002) explains that ABC and TCS look at the firm in a different way. ABC considers all of the costs of a firm, unlike TCS which tends to disregard non-manufacturing costs like sales, distribution, research and development, and administration. The main components of an ABC system are the resources, activities and cost objects (see Figure 2.1). 'Resources are "where" and "what" the organisation spends its money on, such as all people costs, facilities, raw materials and utilities' (Taylor, 2002, p. 51). Activities are the actions that are completed, such as producing the product, performing quality

testing, and visiting customers. Cost objects can be products, customers, or other services offered by the firm.

Figure 2.1 Three Main Components of an ABC System



Source: Taylor, (2002).

Figure 2.1 illustrates the way in which resources link with the cost objects through activities. It also indicates that activities consume resources; and customers, products and projects consume activities. ABC assumes that activities cause costs and that cost objects create the demand for activities, whereas TCS assumes that products cause costs (Horngren *et al.*, 2002). Indeed, not all overhead costs are incurred at the unit-level as TCS assumes—some costs are incurred by batches and others by products. With ABC (as well as TCS) the cost of unit-level activities such as direct labour, direct materials, energy costs and expenses are assigned to the product, service or customer by using unit-level bases (volume drivers). The cost of batch-level activities such as the cost of setting up a machine or ordering purchases are common costs for all the units in the batch. ABC systems use batch-level bases to assign these costs, whereas TCS uses volume drivers.

The cost of product-level activities such as maintaining product specifications and performing engineering change can be assigned to individual products, but the costs are fixed. ABC systems use product-level bases such as number of active parts to assign these costs to products, while TCS uses volume drivers. The cost of facility-level activities such as general administrative staff, plant management and property costs are common to all products and services. ABC suggests two alternative treatments for costs at the facility-level. Firstly, allocate facility level costs to the product using an arbitrary basis, for example, machine or labour hours (Cooper, 1990a). Secondly, ignore these costs and write off directly to the profit and loss account (Drury, 2000). ABC links all the costs of firm to the activities that are performed, and relates all of these activities to outputs such as products made, customers serviced, or projects completed (Taylor, 2002).

ABC implementation literature shows that the ABC system is in use in both service and manufacturing sector organisations (Brewer *et al.*, 2003; Innes and Mitchell, 1990a). Adopters of ABC express how the system leads to more effective decision making about product and service pricing and profitability, capital investment justification and performance measurement. In relation to this aspect, Cotton *et al.* (2003) point out that organisations might be able to use an ABC system for multiple purposes, such as stock valuation, product or service pricing, production or service output decisions, cost reduction and cost management, budgeting, new product or service design, customer profitability analysis, activity performance measurement and improvement and so on, although this is generally referred to as ABM.

Sohal and Chung (1998) explain that the highest adoption rate of ABC in Australian manufacturers was found amongst the food, beverage and tobacco industry (25 per cent), and the majority of these companies believed that they had achieved five particular goals: more accurate product costing, better cost management, better cost control, better allocation of overhead, and more accurate cost information. Sohal and Chung (1998) also conducted a case study based on Ciba Additives Hong Kong (CAHK[1]) which is part of the Additives Division of Ciba Specialty Chemicals. They found that the ABC system developed at CAHK provided more accurate costs, enabling management to better analyse the customer base and provide improved services. It also enabled CAHK to promote more appropriately relevant product lines and make better business decisions, particularly those relating to outsourcing (Sohal and Chung, 1998).

Innes and Mitchell (1990a) highlight the way Alpha[2] Plant used ABC to redesign their costing system to cope with market competition. Alpha uses ABC because the existing TCS failed to reflect accurate product cost (i.e. absorbed all overheads allocated based on direct labour). This effect was more severe due to decreasing direct labour cost (up to five per cent of product cost). The main aim of using ABC at Alpha is to provide accurate cost information which allocates the overhead cost reasonably. As a result of the introduction of ABC, Alpha is able to consider product volume effect on product costing. Subsequently, the cost of product with small volume has significantly changed. For instance, a small volume product cost was increased by 30 per cent compared to the cost allocated using TCS. This finding

[1] CAHK was charged with marketing and distribution of additives products in the South East Asia region and provided both technical and managerial services.
[2] Alpha's the UK microwave plant licensed from its USA parent which is a multi-national corporation in the electronics sector. The plant implemented a full ABC system in May 1989.

suggested that those products with a lower number of components had a decrease in cost at the expense of those with a large number of components due to the inherent weakness of the TCS. The benefits of ABC information also informs Alpha's managers where they are spending money and where resources are being consumed.

Brewer *et al.* (2003) discuss how Global Electronics Inc. (GEI[3]) was frustrated with its old cost system (standard cost system which assigned overhead cost to products based on direct labour dollars) because of the inability to compete with the lower prices offered by its competitors on high-volume products. GEI found that the ABC system rectified the shortcomings of the old system. In 1999, GEI's profitability revealed a decline, with operating losses reaching $100 million on sales of approximately $650 million. The drop of operating income resulted in management concern about the accuracy of its old cost system in identifying which of the company's products was profitable and which were not. As a consequence of inaccurate cost information, GEI was unable to offer competitive prices to consumers because high-volume products and/or less complex products were being over costed and the low–volume products and/or more complex products were being under costed. In 2002, GEI implemented an ABC system to rectify the shortcomings of the old costing system. The ABC system resulted in an improvement in product cost accuracy and greater product cost visibility relative to the direct labour-based cost system. In addition, at a strategic level, this contributed to better marketing and product mix decisions, and at the plant level, ABC improved relations with GEI customers. There have been numerous studies that have investigated the implementation of ABC in organisations; Table 2.2 lists some of these.

[3]GEI is aU.S Corporation located in Florida; it has three U.S fabrication facilities and an assembly and test facility in Kuala Lumpur, Malaysia.

Table 2.2: ABC Implementation Issues

Study	Industry / Country	Motivation for adopting ABC	Benefits for adopting ABC	Reasons for rejecting ABC
Booth and Giacoble (1997; 1999)	Manufacturing Firms / Australia	• Overhead/ indirect costs perceived to be important. • High number of product lines. • Problems with current costing system. • Awareness of ABC literature. • High overhead/indirect costs.	• More accurate profit analysis by product. • More accurate product costing. • Better allocation of overhead. • Improved cost control. • Better cost management.	• Unclear and uncertain benefits deriving from the new system. • High costs and low benefits. • Current system working well. • Other priorities /commitments in the business unit.
Innes and Mitchell,(1997)	Largest financial institution / UK	• Cost reduction. • Improve cost control to enhance budgetary procedures. • Intense competitive pressure.	• Improved cost control. • Positive cost reduction. • Improved pricing decision. • Relevant to customer focus. • Performance measurement & improvement.	• Irrelevant to the business. • Level of detail provided by ABC was unnecessary. • No pressure to introduce. • Lack of resource staff.
Clarke *et al*, (1999)	Manufacturing firms/ Ireland	• More accurate product cost information. • Improved cost control and insights into cost behaviour.	• More accurate cost data. • Improved cost control and management.	• Control of overhead is already adequate. • Lack of management commitment. • Lack of understanding of ABC data.
Shim and Stagliano, (1997)	Manufacturing firms/ U.S	• Important source of information for decision making.	• Better determination of product costs. • Better determination of product-line profitability.	• Insufficiently knowledgeable and trained on ABC. • Negative cost/benefits relationship. • Existing system serve adequately.

Source: Developed by the author

Implementation of ABC requires a complex, comprehensive process that is costly and time-consuming. Although the ABC system has enormous potential benefits, as shown in the previous discussion, it is not appropriate if the new system is likely to cost more than the benefits derived. Further, worldwide ABC adoption rates appear to be relatively low because of the many problems and difficulties (limitations) associated with introducing ABC—such as identifying activities, data collection and selection of cost drivers. These are related to managerial aspects and technical aspects of the ABC system of associated implementation costs.

2.1.2.1 ABC Implementation and Difficulties

Empirical and case studies in Australia, USA and some European countries provide some understanding about the reasons for the low adoption rate of ABC and identify the difficulties and problems incurred in implementing an ABC system (Clarke *et al.*, 1999; Corrigan, 1996; Groot, 1999; Innes and Mitchell, 1990b,1997). Innes and Mitchell (1990b) conducted three case studies in UK companies. They found that the high set-up costs associated with the initial design of the ABC system, which involved a considerable amount of management's and the accountant's time, time and effort needed to identify cost drivers, and the need for additional accounting staff to provide the information required for implementing ABC was a significant reason for the low adoption. Clarke *et al.* (1996) carried out a survey on the cost of implementing an ABC system in large Irish manufacturing firms; they revealed that 52 percent of firms identified assigning cost to activities as one of the most common problems encountered during the design and implementation of ABC. An additional 43 percent believe cost

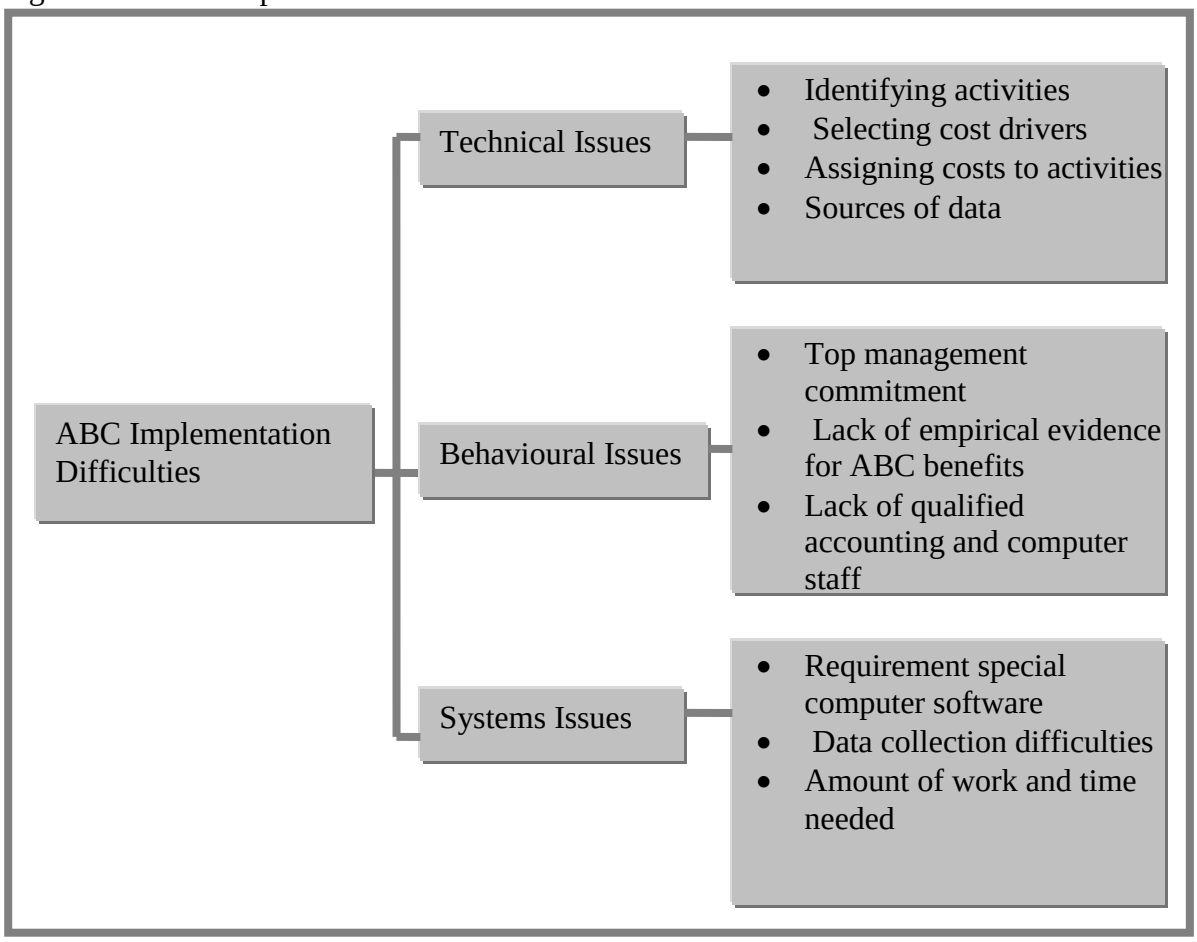
drivers to be the most common obstacle. In addition, over one-third of respondents indicated inadequate computer software and difficulties in defining activities as specific problems. Further, they report that satisfaction with existing overhead allocation systems, lack of management commitment, lack of acceptance or understanding of ABC by management, difficulty in identifying cost pools and drivers, lack of internal expertise, and lack of computer software as the main problems non-adopter firms faced in adopting ABC.

Shim and Stagliano (1997) reveal that 50 responding companies of 141 US manufacturing firms did not expect to implement ABC. Many of these firms were not sufficiently knowledgeable, nor had the necessary trained staff in ABC systems to enable them to make an implementation decision. The other main reasons for not implementing an ABC system were negative cost/benefit relationships for 15 firms, and for 14 firms, current systems seem to serve adequately. In Australia, Corrigan (1996) reported that only 213 of manufacturing firms—14 percent of the surveyed firms—had considered ABC and ultimately rejected it. The main reason for rejecting the ABC system was the uncertainty of benefits and the high cost relative to perceived benefits. Some companies believed that they already had an effective costing system in place, or that they had more important priorities.

The information presented in Table 2.3 indicates that ABC is no different from other costing systems in that it has both strengths and weaknesses. Clarke *et al*. (1999) point out that ABC is not free from implementation problems and difficulties, and highlights that implementation is the most difficult stage in adopting a new management

accounting innovation such as an ABC system. Figure 2.2 presents the ABC implementation difficulties.

Figure 2.2: ABC Implementation Difficulties



Source: Developed by the Author.

Figure 2.2 illustrates ABC implementation difficulties that resulted in the rejection of an ABC system in some firms (Booth and Giacobbe, 1997,1999; Clarke *et al.*, 1999; Innes and Mitchell, 1990b,1997; Shim and Stagliano, 1997). These difficulties can be classified into different categories such as technical issues, behavioural issues and systems issues. Studies by Booth and Giacoble (1997), Innes and Mitchell (1997), Clarke *et al*. (1999) and Shim and Stagliano (1997) reveal that some firms have rejected

ABC adoption because of difficulties in implementation (as shown in Table 2.3) such as defining activities, selecting cost drivers, top management commitment, data collection and lack of qualified accounting and computer staff.

2.1.2.2 ABC and Organisational Performance

Many organisations have found that increased performance can best be achieved by implementing an ABC system (Compton, 1996). ABC is used to improve organisational performance through a variety of strategic analyses methods that are not usually available through TCS. Improving organisational performance can be enhanced by adopting ABC, for example, by more accurately assigning costs to products, services, and customers. ABC information has been used for management operating decisions which have impact on profitability and, ultimately, shareholder value (Garg and Rafiq, 2002; Ittner *et al.*, 2002; Kennedy and Affleck-Graves, 2001).

Empirical evidence by Kennedy and Affleck-Graves (2001) suggests a significant improvement in firm performance in terms of both market and accounting based measures for ABC firms compared with their matched non-ABC firms. Further analysis suggests that ABC adds to firm value through better cost control and asset utilisation, coupled with greater use of financial leverage. Ittner *et al.*, (2002) use a cross-sectional sample of manufacturing plants to obtain evidence about the extent of use of ABC. This study found that the use of ABC is associated with higher quality levels and greater improvements in cycle time and quality, and is indirectly associated with manufacturing

cost reductions through quality and cycle time improvements**.** Anand *et al's* (2005) study on Activity-Based Management (ABM[4]) practices in India found that firms who have adopted ABC were significantly more successful in capturing accurate cost information for value chain analysis compared with non-adopted firms. Further, the extent of ABM adoption in the service sector had not been found to be significantly different from that of the manufacturing sector**.**

Associated with the above, ABC plays a vital role at the managerial level in providing accurate cost information which improves product and service costing, thereby enhancing pricing decisions, product mix and transfer pricing. ABC also analyses activities by distinguishing the activities that add value from those that do not add value to the organisation or its outputs. This turns managers' decisions in the right direction for information needed to reduce costs by designing products and processes that consume fewer activity resources which, in turn, increases the efficiency of existing activities; eliminating activities that do not add value to customers; and improving coordination with customers and suppliers (Ittner *et al.*, 2002).

Narayanan and Sarkar (2002) carried out a field study at Insteel Industries in South Carolina. In this study it was found that Insteel undertook a number of process

[4] The terms ABC and ABM (Activity-Based Management) are frequently substituted for each other, which has lead to some confusion; however, both terms have technically different meanings. "ABM focuses on the management of activities within business processes as the route to continuously improve both the value received by customers and the profit earned in providing that value" (Dierks and Cokins, 2001). ABC, on the other hand, is a method for allocating costs based on the number of activities consumed by cost objects (such as product, service or customer) and it integrates causal relationships between cost objects and activities, as well as between activities and resources (Dierks and Cokins, 2001). Turney (1992) points out that ABC produces the information whilst ABM uses this information in various analyses designed to yield continuous improvement.

improvements that resulted in significant cost savings. Furthermore, Insteel displayed a higher propensity to discontinue or increase prices of products and discontinue customers that were found comparatively unprofitable. As such, Narayanan and Sarkar (2002) provide empirical evidence that ABC influences both strategic and operational managerial decisions. Cagwin and Bouwman (2001) investigate the improvement in financial performance that is associated with the use of ABC. The results show that there indeed is a positive association between ABC and improvement in financial performance (ROI) when ABC is used along with other strategic initiatives, when implemented in complex and diverse firms, when used in environments where costs are relatively important, and when there are limited numbers of intra-company transactions.

However, the length of time implementing ABC might affect the result of organisational performance because, in most cases, potential benefit on implementation of ABC will not be realised immediately (Cooper and Kaplan, 1992)—this aspect was considered when measures were constructed for ABC items in the survey. As the previous discussion has revealed, firms that utilise ABC have the propensity to have greater performance than those firms using TCS. Moreover, the accuracy of cost information obtained by ABC can be viewed as a supportive measurement system for successful implementation of the BSC (Maiga and Jacobs, 2003).

2.1.3 Summary

TCS assumes that the allocation of indirect resource costs should be proportional to the volume of the products that are produced or number of services that are provided. ABC rejects the idea of traditional consumption that product and services directly consume resources. Rather, ABC is based on the premise that products and services consume activities, and activities consume resources. The literature shows that ABC offers many significant benefits over TCS, such as more accurate product, service and customer costs, more cost information for performance measurement and management's decision-making, improved cost control, cost reduction and increased competitive capability and profitability. Nevertheless, there are some technical, behavioural and systems problems associated with ABC implementation. Further, ABC information has been used to enhance managerial and organisational performance in a variety of aspects such as pricing, marketing, customer relationship and profitability. Moreover, the accuracy of cost information obtained by ABC can be viewed as a supportive measurement system for successful implementation of the BSC. The next section provides a detailed discussion on performance management systems with an emphasis on the BSC.

2.2 Performance management systems

A Performance Management System (PMS) is needed as a management tool to clarify goals, document the contribution toward achieving those goals, and document the benefits received from the investment in each program (Kaplan and Norton, 2001). Neely *et al.* (1995) define a PMS as "a set of metrics used to quantify both the efficiency and effectiveness of action". It is argued that the main role of PMS is developing strategy, evaluating the achievement of organisational objectives, and compensating managers (Ittner and Larcker, 2000). Performances measures can be represented by a single-dimension such as financial performance, or it can be multi-dimensional and include both financial and non-financial measures. In this regard Hoque *et al.* (2001) found that a positively and significantly correlated relationship between using multiple measures of performance and computer-aided manufacturing processes, and the intensity of market competition.

Ittner and Larcker (2000) suggest that corporate strategy, value drivers, organisational objectives and the competitive environment should be used as criteria for selecting appropriate performance measures. In addition, Wouters *et al*. (1999) reveal that among the factors that have impacted on the suitability of strategy and performance management choice is the type of industry. Therefore, an individual firm may need different performance measures because of its business processes. Fitzgerald *et al.* (1991) suggest that there are two basic types of performance measures in any

organisation— those that relate to results (competitiveness, financial performance), and those that focus on the determinants of the results (quality, flexibility, resource utilisation and innovation). This section discusses two types of performance management systems, traditional performance management and the BSC.

2.2.1 Traditional Performance Management Systems

Traditional Performances Measures (TPM) are accounting-based and focus solely on financial criteria such as return on assets (ROA), or return on investment (ROI), to evaluate an organisation's performance (Hoque *et al.*, 2001). These financial performance measures are no longer adequate for assessing future performance since financial performance measures are lag indicators and give little or no guidance to future performance (Kaplan and Norton, 2001). Since the reported financial information related with the firm results are based on historical data, it is difficult to establish the relationship between managers' action and financial information. Therefore, traditional performance measures are historical, incomplete and narrow in focus (Banker *et al.*, 2000; El-shisini, 2001; Hoque and James, 2000; Kaplan and Norton, 1992,1996c; Otley, 1999). Also, any corrective action is future oriented and, therefore, it is difficult to identify which action leads to a particular result.

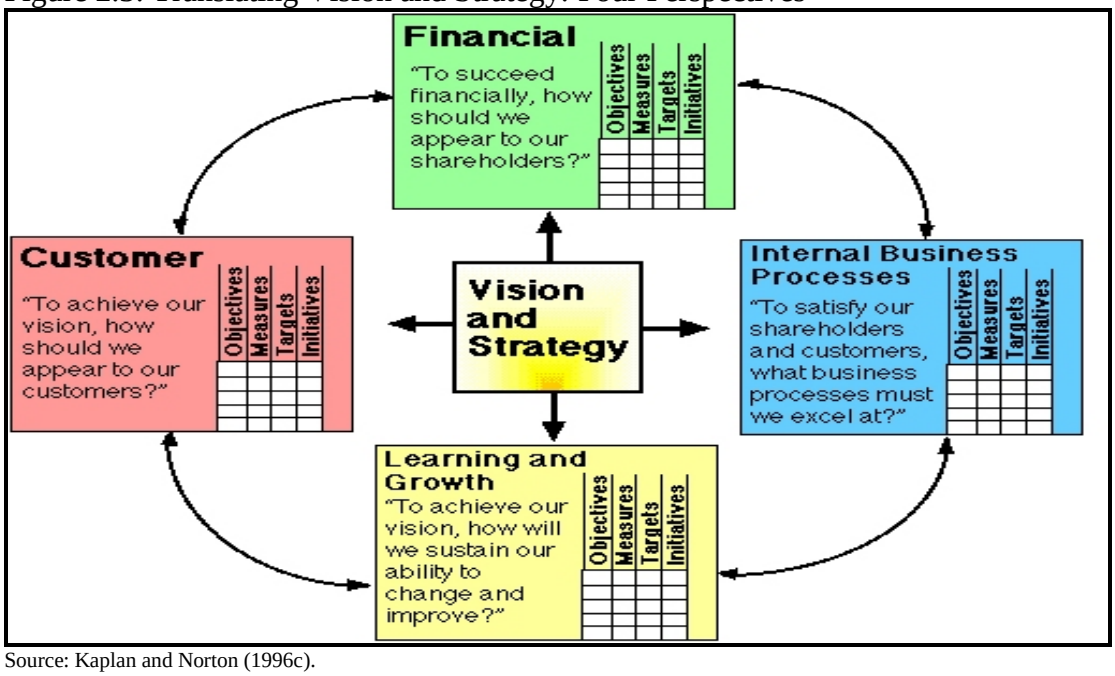
As previously mentioned, today's business organisations operate in highly competitive environments. Kaplan and Norton (1992; 1993; 1996c) suggest that today's management needs to be aware that if they are to fulfil their strategic plans, they should adopt a more balanced approach to measure organisational performance by considering financial and

non-financial measures. Significant attention is now being given by academics and managers to building a more extensive and linked set of measures for appraising and directing corporate and divisional performance. This attention has been influenced largely by Kaplan and Norton's notion of the BSC.

2.2.2 Balanced Scorecard Performance Management systems

The BSC is a contemporary PMS which focuses on both financial and non-financial measures that enable organisations to clarify their vision and strategy and translate them into action (Kaplan and Norton, 1996a). The BSC supplements traditional financial accounting measures with three other perspectives—customers, internal business processes, and learning and growth (Kaplan and Norton, 1992,1996c), as shown in Figure 2.3.

Figure 2.3: Translating Vision and Strategy: Four Perspectives



Source: Kaplan and Norton (1996c).

Figure 2.3 illustrates the four components of the BSC approach. These components reflect four types of measures: financial perspective, customer perspective, learning and growth perspective, and internal business process perspective. The four perspectives of the BSC are discussed below.

Financial perspective: This perspective measures the ultimate results that the business provides to its shareholders using profitability indicators such as OI, ROI, and Economic Value Added (EVA) and revenue growth. Many arguments have been presented opposing the use of financial performance measures due to their traditional short-term focus which can, in turn, lead to dysfunctional behaviour. However, Kaplan and Norton (1992; 1993) state that financial measures have their place. Improvements to quality, response time, productivity or new products are only of benefit when they result in increased sales, reduced expenses and increased asset turnover.

Customer perspective: Considering and focusing on the customer perspective becomes a priority for top management in a competitive business environment. Hence, the BSC demands that managers translate their mission statement on customer service into specific measures that reflect customer concerns such as time, quality, performance, service, and satisfaction (Kaplan and Norton, 1992). Time refers to lead or throughput time. Lead time measures the time required for the firm to meet its customers' needs. For existing products, lead-time is the time taken to fill customers' orders. For new products, lead-time represents the time to market, or how long it takes to bring a new product from the product definition stage to start of shipments (Kendall, 1998).

A number of aspects can be a measure of quality such as on time delivery, customer complaints and percent of shipments returned due to poor quality**.** For instance, on time delivery can be a measure of the quality of the service provided. The percentage of shipments returned due to poor quality and/or customer complaints can measure the quality of the products that are sold. These quality measures are not only designed to indicate the quality of the products, but also the processes that are employed in their production (Kendall, 1998). Performance and service of the organisation concentrate on how the organisation's products are valued in the eyes of its customers.

Internal business perspective: To meet organisational objectives and customers' expectations, organisations must identify the key business processes at which they must excel. Key processes are monitored to ensure that outcomes will be satisfactory (Kaplan and Atkinson, 1998b). These internal measures flow from the business processes that have the greatest effect on customer satisfaction, for example, factors that affect cycle time, quality, employee skills, and productivity. In addition, Kendall (1998) reveals that measures which can be used to evaluate internal performance could comprise the number of defects detected prior to shipping, the amount of rework required, or the amount of scrap left over from production.

Learning and growth perspective: This perspective looks at the ability of employees, the quality of information systems, and the effects of organisational alignment in supporting accomplishment of organisational goals. Processes will only succeed if adequately skilled and motivated employees, supplied with accurate and timely information, are driving them. In order to meet changing requirements and customer

expectations, employees may be asked to take on dramatically new responsibilities, and may require skills, capabilities, technologies, and organisational designs that were not previously available (Kaplan and Atkinson, 1998b; Kaplan and Norton, 1993). This perspective includes indicators that can measure these factors.

By combining the financial, customer, internal process and learning and growth perspectives, the BSC helps managers understand, at least implicitly, many interrelationships. This understanding can help managers transcend traditional notions about functional barriers and ultimately lead to improved decision making and problem solving (Kaplan and Norton, 1992). Further, by utilising the BSC, firms can establish management goals and managers can take whatever actions are necessary, and adapt their behaviour to accomplish those goals. The BSC can serve as the focal point for the organisation's efforts, defining and communicating priorities to managers, employees, inventors, and even customers (Kaplan and Norton, 1993).

2.2.2.1 The Balanced Scorecard and Organisational Performance

A study by James and Hoque (1998) examined the effect of the BSC on organisational performance by firms following various strategic typologies. They found that firms following a cost focus type strategy tend to utilise more financial based measures, whilst firms that followed a product differentiation type strategy had more non-financial predictors. For both type strategic typologies it was found that organisational performance was improved with the use of a BSC. Hoque and James (2000) also studied the relationships between BSC usage, organisational size, product life-cycle stage,

strength of market position and organisational performance in Australian manufacturing firms. They report a significant association between size and BSC usage as size increases, and that organisations find it more practical and useful to place greater emphasis on a BSC that supports their strategic decision-making. In addition, firms that have a higher proportion of new products have a greater tendency to make use of measures related to new products, whereas they found a negative association between a firm's market position and BSC usage. A study by Bergin-Seers and Jago (2007) explores the measurement of performance in small motels in Australia. The study indicates that owner-managers who operate successful motels utilise a balanced approach to performance measurement by utilising a number of measures to monitor results and review management activities.

Debusk and Crabtree (2006) conducted a survey to determine if organisations implementing the BSC have improved their performance. The results of the survey show firms that implemented the BSC had improved their performance, and regular users of the BSC were from a variety of industries from manufacturing to service organisations to non-profit organisations. Further, results from Maiga and Jacobs's study (2003) show that there is an interaction between the four BSC perspectives and ABC on product quality, and also found that customer satisfaction is a significant positive function of interaction between the four BSC perspectives and ABC. In addition, margin on sales was identified as an additional significant positive function of the interaction between BSC customer, financial and learning and growth perspectives and ABC, although the interaction with BSC in internal process perspective and ABC was not significant. It is expected that the timeframe in BSC implementation might affect the result of

organisational performance as the potential benefit of the BSC is not realised immediately—subsequently, this was included as a variable when measures were constructed for the BSC. However, despite the benefits of the BSC in providing an effective way for firms to develop a multidimensional view of performance measurement, the BSC approach is not without its shortcomings.

2.2.2.2 Limitations of the BSC

As discussed earlier (section 2.2.1), financial performance measures alone are incomplete and narrow in focus for guiding and evaluating organisations' performance. They are lagging indicators that fail to capture the relationship between managers' actions and financial information. Financial performance measures are based on historical data and tell some, but not all, of the story about past actions and fail to provide adequate guidance for actions to be taken today and the days thereafter to create future financial value. Likewise, many non-financial measures, including customer satisfaction and employee skills, can hold similar disadvantages, particularly non-financial measures (such as cross-sell ratio) which are lagging indicators. Similarly, the effectiveness of the BSC will suffer if built-in non-financial measures are not linked to or aligned with the firm's strategic objectives. Kaplan and Norton (1996b, p. 55) concede these potential limitations and argue that "Scorecards built upon lagging, non-strategic indicators represent only a limited application of the full power of the BSC".

A BSC is more than an ad hoc collection of financial and non-financial measures, it contains outcome measures. The performance drivers of outcomes, linked together in

cause-and-effect relationships, and intended not only as a strategic measurement system but also as a strategic control, can align department and personal goals to overall strategy (Kaplan and Norton, 1996a). However, Nørreklit (2000) critiqued that, rather than a logical relationship as claimed by Kaplan and Norton, there is no such cause-and-effect relationship between some of the suggested areas of measurement. Specifically, no cause and effect exists between customer satisfaction and loyalty, and between loyalty and financial results as claimed. Nørreklit's (2000) viewpoint is that a loyal customer is satisfied, while a less loyal customer is less satisfied—thus the relationship is, in essence, part of the concept and, therefore, is alogical. Nørreklit also expressed concerns about the BSC as a strategic model: he argued that the control model is a hierarchical top-down model not rooted in the environment or in the organisation, which makes it questionable as an effective strategic management tool.

First and foremost, BSC must be balanced. If it does not include both financial targets and non-financial targets, it will lose its usefulness. Likewise, if correct measures are not included in the BSC, firms will find it difficult to deploy. The propensity exists for the usefulness of BSC to be diminished when excessive measures and numerical data is incrementally added to the functionality. An additional major limitation is that it does not guarantee improvements in the drivers considered crucial to the success of the organisation. Therefore, for organisations to ensure success of the BSC they should continuously review their operations, including regular reassessment of their main drivers, since a static BSC will eventually result in the measurement of incorrect or redundant information.

2.2.4 Summary

The BSC is a performance measurement system that consists of a set of measures that enables top management to obtain a vast yet comprehensive view of the business. It is used for converting strategy into action. The BSC includes financial measures that inform results of actions already taken. In addition, it complements financial measures with operational measures on customer satisfaction, internal business processes and the learning and innovation perspective operational measures that are the drivers of future financial performance. It is important, however, that any BSC designed for an organisation is matched with that of the organisation's strategy. Following are some of the many strategic options an organisation can pursue.

2.3 Strategy

Organisational strategy is classified at a number of different levels: corporate strategy, which refers to an organisation's overall strategy; competitive strategy, which encompasses methods used by a firm to compete within a given market environment to achieve corporate goals; and operational strategy (Collis and Montgomery, 2005). Operational strategy refers to methods used within an organisation to achieve management goals and objectives. Operational strategy can refer to production, or specialisation strategies such as customer focus (customer service differentiation) and manufacturing strategies, for example, JIT. Competitive strategy, on the other hand, looks at how the firm will manoeuvre and 'play' within a particular competitive

environment. Normally viewed at the business unit level, it incorporates typologies that focus on, for example, product or service differentiation, or both (Porter, 1980). For the purpose of this study, competitive strategy will be referred to as simply strategy at the business unit level. There are a number of strategic typologies which, although termed differently, include the usage of various accounting practices to accomplish the goals of the firm by focusing not only on the internal factors, but also on the external competitive environment (Govindarajan and Shank, 1992; Miles and Snow, 1978; Porter, 1980).

2.3.1 Govindarajan and Shank—Build, Hold and Harvest Strategies

One method for identifying organisational strategy is the mission typology at the business unit level. This method, introduced by Govindarajan and Shank (1992), is one where the mission can either be to Build, Hold or Harvest. These missions constitute a continuum, with pure build at one end and pure harvest at the other. The build mission implies goals of increased market share, even at the expense of short-term earnings and cash flow, whilst in the harvest mission, management aims to maximise short-term earnings and cash flow, even at the expense of market share. This spectrum can be seen as broadly mapping onto a continuum between prospectors and defenders which are the typologies identified by Miles and Snow (1978) and discussed below (Chapman, 1997).

2.3.2 Miles and Snow—Defender, Prospector, Analyser and Reactor Strategies

Miles and Snow (1978) identified patterns of behaviour within single industries and developed four archetypes of firms which follow particular behaviour types. The first

type that Miles and Snow (1978) introduce is known as ‘defenders’. These are organisations that have constricted product-market areas and managers are generally specialised in the product or service type that the organisation produces. A defender organisation has a narrow focus and rarely makes major adjustments to its technology, structure or methods of operations; its primary attention is on the cost efficiency of its operations, emphasising stability, and earning the best profit possible given its internal environment.

The second type of organisation identified is ‘prospectors’. This type of organisation searches continuously for market opportunities and regularly experiments with possible new trends and innovations. They are “creators of change” and, as such, generally focus attention on product innovation and market opportunities, emphasising creativity over efficiency and maintaining flexibility (Miles and Snow, 1978, p. 101).

Thirdly, Miles and Snow (1978) identify ‘analysers’. These firms are those which operate in “two types of product-market domains” (p. 155). The first is one that is relatively stable and the other dynamic. This then seems to incorporate both the ‘defender’ and ‘prospector’ type of organisation, in so much as the first area concentrates on being cost efficient and the second area concentrates on watching their competitors closely so as to determine the possibility of introducing new products or services as rapidly as possible.

The fourth, usually unsuccessful, type identified by Miles and Snow (1978) is the ‘reactor’. This type of firm has not been consistently described in research (Slater and

Narver, 1993). Reactor type organisations appear to be inefficient in so much as they "rank below" the defender in their attitude regarding growth and the intensity of the market (Slater and Narver, 1993, p. 40). Miles and Snow suggest that the "reactor is a residual strategy, arising when one of the other three strategies is improperly pursued" (p. 178)—they appear to be aware of environmental uncertainty, but are unable to respond effectively. This type of organisation, because it has no direct strategic direction, tends to make no adjustment until absolutely necessary by being forced to do so by environmental pressures (Miles and Snow, 1978).

Porter (1980) identifies three strategic approaches to outperforming other firms in an industry: Cost leadership; Differentiation; and Focus. This research utilises Porter's classification of competitive strategy as it is the most cited method within studies of competitive strategy and performance (Guthrie *et al.*, 2002; Nayyar, 1993; Smith and Niemela, 1997; Wai-kwong *et al.*, 2001).

2.3.3 Porter—Cost Leadership, Differentiator and Focus Strategies

Porter (1980) identifies three strategic approaches to outperforming other firms in an industry. They are firstly, overall cost leadership, secondly, differentiation and, thirdly, focus.

2.3.3.1 Cost Leadership Strategy

The cost leadership strategy aims to achieve overall cost leadership in an industry through a set of necessary procedures aimed at this objective. Cost leadership requires the firm to focus on those variables that will help it achieve and maintain a low-cost position in its industry. A cost strategy requires careful attention to operational detail, stability in product lines, a relentless substitution of capital for less efficient labour, and a strong emphasis on formal profit and budget controls. A cost leader, however, cannot ignore the bases of differentiation but it is not the major focus (Porter, 1980).

A firm with a successful low cost strategy has the ability to design, produce, service and market a comparable product or service more efficiently than its competitors (Porter, 1990). Some organisations, such as Toyota, are very good not only at producing high quality autos at a low price, but also have the brand and marketing skills to use a premium pricing policy. Further, cost leadership should not be regarded as low cost and low quality. According to Porter, cost leadership is the same quality at a lower price. An example of cost leadership in an Australian context would be Aldi supermarkets in that they offer the same range of goods as a usual supermarket but do not have all of the brands available at Woolworths or Coles supermarkets. Nevertheless, they insist on high quality merchandise. For example, instead of ten different brands of jam, they will have one brand but the quality is good and the price is significantly lower than a comparable quality of their competitors. Porter (1985) points out that for success in cost leadership strategy, it requires a considerable market share advantage or preferential access to raw materials, components, labour, or some other important input. Without one or more of

these advantages, the strategy can easily be impersonated by competitors. In TV firms, for example, cost leadership requires efficient size picture tube facilities, a low-cost design, automated assembly, and global scale over which to amortise research and development.

2.3.3.2 Differentiator Strategy

The second strategy Porter (1980) promotes is one of differentiation—creating something that is perceived industry wide as being unique. This can either be by product, brand image, technology, and customer service or dealer network. Differentiation strategies do not allow a firm to ignore costs; however, they are not its primary focus (Porter, 1980).

A firm with differentiation strategy has the ability to provide unique and superior value to the buyer in terms of product/service quality, special features, or after-sale service (Porter, 1990). For example, Gillette competes with a differentiation strategy in disposable razors by exploiting its superior technology, reputation, and broad distribution (Collis and Montgomery, 2005). Additionally, according to Johnson *et al.*, (2006) a differentiation strategy seeks to provide products or services benefits that are different from those of competitors and that are widely valued by buyers. An example is where USQ has developed a research centre for fibre composites. By doing so, they have differentiated themselves from other universities who do not have that competence. The aim here is to attract research funding on the basis that no competitors can offer the same service because they do not have the same level of expertise. A good example in

the retail sector is the David Jones Food Hall in Sydney, where very quality goods are sold for a premium.

2.3.3.3 Focus Strategy

The final strategy Porter (1980) offers focuses on a particular buyer group, segment or product line, or geographic market, that is, creating a market niche. Although the low cost and differentiation strategies are designed at achieving their objectives industry wide, the entire focus strategy is built around servicing a particular market. A firm pursuing a focused strategy attempts to serve a particular target very well and, in doing so, simultaneously develops one of the other two functional strategies (Porter, 1980).

For the purpose of this study, Porter's classifications were used to identify firms as following either a cost leadership or differentiation strategy and to determine the effect of combining ABC and a BSC on perceive organisational performance for firms following either of the two alternative competitive strategies.

2.4 The relationship between ABC, BSC and Strategy

As discussed, ABC is a method for allocating cost in a much more efficient and accurate way than that of TCS; also discussed were the benefits of firms using a BSC. It has been found in previous studies in the US that firms using ABC have increased performance (Shim and Stagliano, 1997). It has also been established that firms using a BSC and

following either a cost or differentiation strategy have increased performance, although it was noted that different competitive strategies focused on different financial and non-financial indicators to achieve this. For example cost leader firms will have a slightly different "generic" BSC as opposed to differentiators, due to the different strategic focuses of the two types of firms. It is expected that, given these relationships, there will be a positive effect on organisational performance when firms combine a costing system providing more accurate costing with a BSC that is designed to suit the particular strategy that the firm is pursuing.

Cost leader firms attempt to maintain a stable base of customers and products by competing primarily on competitive price, supported by their focus on efficient operations. Improving efficient operations can be achieved by an emphasis on the BSC's internal business process perspective, which comprises indicators such as ratio of good output to total output and on-time delivery. Firms that aim to be a low cost supplier of products or services and achieve their competitive advantage must have accurate cost information in order to become cost leader firm. As mentioned in the literature, ABC is a useful management tool for organisations to have accurate cost information for cost objects such as services, products and customers. Conversely, traditional costing systems (TCS) fail to provide adequate information to enable managers to determine the cost objects and to make optimal decisions regarding the allocation of scarce resources.

Kaplan (2001) points out that assigning resources expense to activity and process costs provides the first link between ABC and the BSC. This link arises in the operational excellence component of the scorecard's internal perspective. So the cost measurement

in the BSC's internal perspective should come from a properly constructed ABC model. Measurement of customer profitability is the second link between ABC and the BSC. Liberatore and Miller (1998) attempted to develop a framework on the relationship between ABC and the BSC to a firm's distribution channel strategy. In this framework the authors focused on how ABC and the BSC can both contribute to the development and monitoring of a firm's distribution channel strategy. They argue that ABC information can provide more accurate analysis of the true costs and, therefore, profits, of alternative distribution channels than can TCS. ABC also facilitates more accurate future projections on the profitability of alternative distribution channels. In this regard, it can enhance a firm's ability to craft an effective distribution channel strategy. At the same time, the more accurate assessment of costs obtained by an ABC system can also improve the accuracy of the performance measures of a BSC. Further, the authors clarified that the net profit of different distribution channels is a typical financial performance measure, and it can be more accurately assessed using an ABC system than a TCS. Thus, the capability to develop more accurate performance measures represents one complementary aspect of the relationship between an ABC system and the BSC.

A study by Olson and Slater (2002) determined whether benefits can be derived from matching an emphasis in the scorecard to strategy type. Among their findings is that high-performing low-cost defenders place greater emphasis on the financial perspective than do low-performing ones. High-performing low-cost defenders also place significantly lower emphasis on both the customer and the innovation and growth perspectives than low performers do. This suggests that attempting to get close to their customers and pursing innovation and market growth detract from low-cost defenders'

quest for efficiency. Further, they found that high-performing differentiated defenders place more emphasis on the customer perspective than low performing ones. It also found that high-performing differentiated defenders place greater emphasis on the innovation and financial perspectives than do low performers. Given these findings, in contrast to previous arguments, it may be found that the "Balanced" scorecard may in actual fact not be intended to balance, that is, it could actually be a deliberate strategic alliance with the firm's performance management system.

Chenhall and Langfield-Smith (1998) found that firms which emphasised differentiation strategies benefited from the use of management accounting innovation and reliance on non-financial information, and this ultimately resulted in better performance. Recently, Prajogo (2007) examined the individual impact of differentiation and cost leadership and their interaction effect on quality performance for manufacturing and non-manufacturing sectors in Australia. The findings of this study indicated that product quality was predicted by differentiation strategy, but not cost leadership strategy. It also found that the relationship between differentiation strategy and quality is moderated by the effect of cost leadership whereby the higher the cost leadership, the stronger the effect. Shank (1989) and Lynch and Cross (1992) argue that firms emphasising differentiation strategies that use traditional accounting performance measures are unlikely to have sufficient evidence for assessing how production processes support a variety of customer-focused strategies.

Associated with the above discussion, it is expected that combined use of ABC and the BSC is particularly suitable for those firms which follow a cost leadership strategy and

this will help perpetuate the firm's low cost position. Further, Maiga and Jacobs (2003) argue that the implementation of ABC when combined with the BSC is likely to have a significant positive impact on organisational performance. They found that although product quality, customer satisfaction and margin on sales were significant positive functions of the interaction between BSC perspectives and ABC, the interaction of the BSC's internal business process perspective and ABC was not significant. Many researchers have found varying results, but none have specifically linked ABC, performance management systems and strategy to performance. Thus, this study seeks to detect the combined relationship between costing systems and performance management systems by answering the following fundamental questions:

- Do cost leader firms perform better when they use a combination of ABC and BSC compared to the use of both ABC and TPM?
- Do cost leader firms perform better when they use a combination of ABC and BSC compared to the use of both TCS and BSC?
- Do cost leader firms using a combination of ABC and BSC perform better than differentiator firms using a combination of ABC and BSC?
- Do cost differentiator firms perform better when they use both TCS and BSC compared to a combined use of ABC and BSC?

2.5 Conclusion

This chapter reviewed related literature on cost accounting systems and performance management systems relevant to this research. Overviews of cost accounting systems that can be used to assign overhead costs to cost objects were given. The traditional costing system concepts were discussed and the failure of traditional costing system was presented. ABC, implementation and difficulties and its impact on performance were discussed in detail. Performance management systems were discussed, with an emphasis on the BSC approach and performance and limitations of the BSC. Explanations of strategic typologies were also presented. Finally, the chapter addressed the relationship between ABC, the BSC and strategy and their effect on performance. The following chapter will further develop these constructs and their relationships through the development of a theoretical framework which will provide a consideration for this study in order to address the research questions.

CHAPTER 3

THEORETICAL FRAMEWORK

3.0 Introduction

This chapter develops a theoretical model based on the theory that forms a cohesive framework to better understand and inform contemporary management accounting techniques in the Australian business environment. A contingency theoretical framework is positioned within a multiple paradigm model of social science as put forward by Burrell and Morgan (1979). This study aims to understand the role of management accounting innovation in organisations across a range of industrial sectors in the Australian business environment. The study firstly considers the sociological viewpoint, that is, the respective philosophical, ontological and epistemological assumptions. This is to ensure that the researcher has a sound understanding of the relevant theory which may inform the impact of sophisticated management accounting techniques (such as ABC) and performance management systems (such as the BSC) on performance.

The approach the researcher initially adopted to investigate the research phenomena is one of an ‘open mind’, and one that was aware of the alternative sociological paradigms and their theoretical connotations. It is believed that greater insight can be attained by an approach that encompasses theories from a range of different research paradigms, thus, not constraining potential explanations to only one view of the social world. Review of management accounting innovation literature revealed that

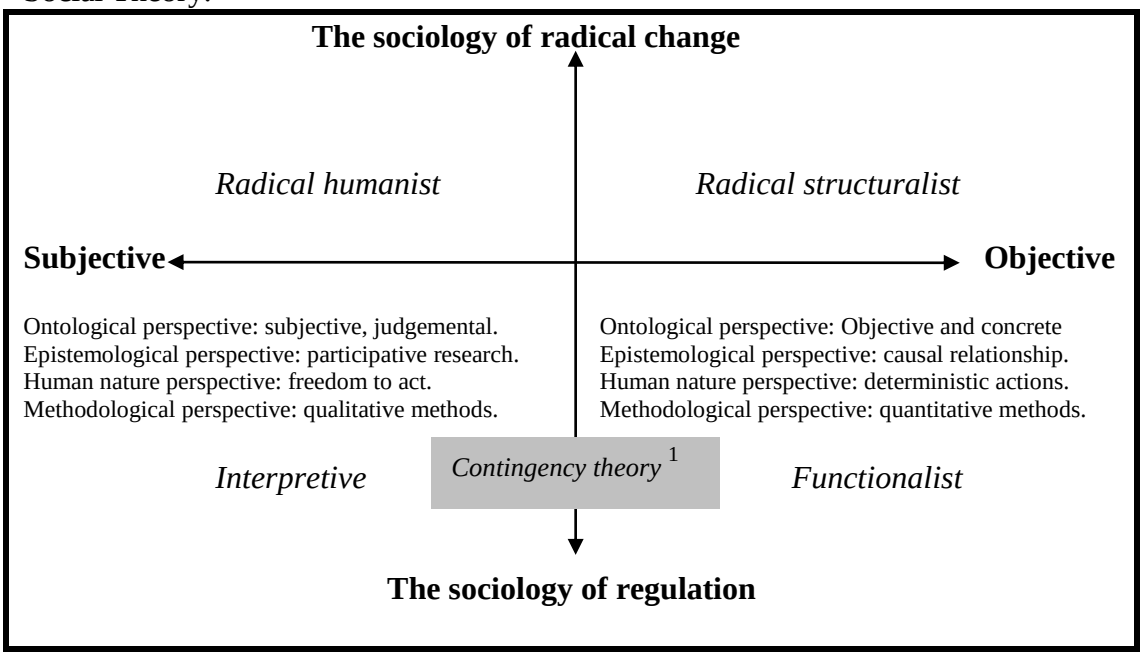
the role of management accounting techniques and the usage of multiple-dimensional measures of performance in the competitive business environment within different types of organisations is varied. For example, ABC information is viewed as a supportive measurement system for successful implementation of the BSC to improve the productivity and efficiency of the organisations, as well as enhancing managerial and organisational performance.

An initial investigation revealed a number of fundamental issues in the context of adoption of management accounting innovation. In light of these issues it was determined that contingency theory would most appropriately inform the adoption of contemporary costing accounting techniques and the usage of multiple-dimensional measures of performance. The purpose of this chapter is to explain the derivation of this choice and how this theory helps inform the relationship between ABC and the BSC as a component of management accounting innovation within a competitive strategy in the context of the Australian business environment, in particular, all industry sectors. In doing so, this chapter will firstly describe a social science model developed by Burrell and Morgan (1979) that simplifies the complexities of the various sociological viewpoints. This model has attracted the attention of several authors (Cooper, 1983; Dillard, 1991; Hopper and Powell, 1985; James, 2001; McManus, 2006). Following this discussion, based on insights taken from the literature, this chapter develops a theoretical model informed by theory that forms a cohesive framework in order to understand and explain contemporary management accounting techniques in the Australian business environment.

3.1 Dominant Social Science Paradigms

Burrell and Morgan's (1979) model is one of many models that have attempted to define paradigms in social and organisational theory. Burrell and Morgan developed four paradigms for organisational analysis by intersecting subjective-objective debates in the theory of social science with consensus-conflict debates in the theory of society. The four paradigms are labelled functionalist, interpretive, radical humanist and radical structuralist and take into account major theoretical viewpoints—economics, philosophy, politics, psychology and sociology—as indicated in Figure 3.1.

Figure 3.1 Burrell and Morgan's (1979) Four Paradigms Philosophical Framework of Social Theory.



Source: Adapted from Burrell and Morgan (1979).

According to Burrell and Morgan (1979), the paradigms are founded upon mutually exclusive views of the social world. Each stands in its own right and generates its

[1] The researcher's interpretation places contingency theory in both the interpretative and functionalist paradigms of the Burrell and Morgan model.

own distinctive analyses of social life. A paradigm is a set of beliefs and feelings about the world and how it should be understood and studied, not only in choices of methods, but ontologically and epistemologically (Denzin, 1978; Denzin and Lincoln, 2000). In order to determine the appropriate paradigm, it is essential to examine the ontological and epistemological characteristics of the research context. Ontology is a branch of metaphysics that deals with the nature of being or existence, and epistemology is the nature of the relationship between the knower and the known or knowable. They lead to methodology, which is the technique of how knowledge is gained. In regard to the horizontal subjective/objective dimension of the philosophical framework, when investigating social science Burrell and Morgan suggest that it is useful to conceive four sets of assumptions related to ontology, epistemology, human nature and methodology (see Figure 3.2).

Figure 3.2: Underlying Assumptions of the Subjective/Objective Continuum

The Subjective-Objective Dimension		
The subjectivist approach to social science		The objective approach to social science
Nominalism	Ontology	Realism
Anti-positivism	Epistemology	Positivism
Voluntarism	Human nature	Determinism
Idiographic	Methodology	Nomothetic

Source: Burrell and Morgan (1979).

Burrell and Morgan (1979) also suggest that studies related to organisational phenomena tend to approach their field via assumptions about the nature of the social world and how it should be studied. Assumptions are made about the very essence of

the phenomena under study' (ontology), where nominalism[2] assumes that nothing functions with the exception of subjective cognition and realism or reality (Burrell and Morgan, 1979; Dillard and Becker, 1997; Riahi-Belkaoui, 1996). The grounds of knowledge (epistemology), where anti-positivism does not admit that general underlying causal relationship and positivism of which traditional accounting research in organisations is enriched, sees understanding of the tangible and social world as achieved through an accumulation of activities by researchers investigating for cohesiveness and causal relationship (Burrell and Morgan, 1979; Dillard and Becker, 1997; Jackson, 2000). The relationship between human beings (human nature) is established where voluntarism believes that human beings have the essential free will to perform as they choose, and determinism advocates that human actions are determined by the external environment (Burrell and Morgan, 1979; Dillard and Becker, 1997; Jackson, 2000). Finally, the way in which one attempts to investigate and obtain 'knowledge' about the social 'world' (methodology) is based on the positions taken with respect to the other philosophical viewpoint, that is, idiographicity (Burrell and Morgan, 1979; Dillard and Becker, 1997; Jackson, 2000).

In contrast, the vertical dimension—radical change/regulation—can best be described as concerning two alternative views of society. The regulation countenance outlines a view of society as steadfast, cohesive and organised, where any disorder of the balance is determined as a solitary case. Conversely, radical change pertains to the idea of continuous disharmony that precedes change, where society is seen as being inequitable and the focus is on power, conflict and domination.

[2] The researcher discusses the subjective approach to social science, that is, nominalism, anti-positivism, voluntarism and idiographicity. The discussion does not include explanations pertaining to the assumptions found under the objective approach to social science as these are simply the opposite to the subjective approach and would result in repetitive discussion of an antonymous nature.

3.1.1 The Radical Humanist Paradigm

The radical humanist paradigm is characterised by radical change and subjective dimensions. The radical humanist paradigm seeks radical change, liberation, and potentiality, and stresses the role that different social and organisational forces play in understanding change. Hopper and Powell (1985) stress that the continuum of the subjective/objective dimension in Burrell and Morgan's research (1979) is especially important in analysing the two radical approaches. Similarly, the functionalist and interpretive paradigms in schools of thought vary along this dimension. Radical humanist approaches have been influenced by the early writings of Karl Marx, and radical humanist thought is firmly entrenched in Marxist ideology, along with the idea of class struggle, alienation, and emancipation. The division between the two radical approaches stems from the focus on individual cognition which is apparent in the humanist perspective, and power relationships evident in the structuralist perspective.

The radical humanist view in accounting focuses on explaining the social order from a nominalist, antipositivist, voluntarist, and ideographic perspective and places emphasis on forms of radical change (Riahi-Belkaoui, 1996). Most accounting researchers adopt this paradigm using critical theory in the field of financial accounting. While this paradigm has not been widely adopted in management accounting research, areas that have been examined from a critical perspective include: financial and administrative changes in the British health service (Broadbent *et al.*, 1991); the U.S. health service (Chua and Degeling, 1993); and the performance-related pay system in a British-based electronics company (Procter *et*

al., 1993). From a critical perspective, management accounting is considered in light of how the language of accounting alienates and subjugates the working class, and is distorted and biased towards the capitalist class.

3.1.2 The Radical Structuralist Paradigm

The radical structuralist paradigm is characterised by the radical change and subjective dimension. Based on this paradigm, social reality is considered an actuality, and theorists see inherent structural conflicts within society that generate constant change through political and economic crises (Burrell and Morgan, 1979). This has been the fundamental paradigm of Marx, Engles, and Lenin; they believe that radical change is built into the nature of societal structures. However, the radical structuralist view in accounting would challenge the social order from a realist, positivist, deterministic, and nomothetic standpoint. Thus, structuralist accountants will hold an objective view of the social world, but focus on contradictions and crisis tendencies created by the accounting process (Riahi-Belkaoui, 1996). Unlike the radical humanists, where emphasis is on super-structural phenomena such as ideology and distorted consciousness, the radical structuralist in accounting focuses on the link between accounting and the economic and political relations of domination (Riahi-Belkaoui, 1996). Further, Hopper and Powell (1985) identify the areas of conflict as including control structures, relationships between classes and surplus value. From this perspective, society is viewed as being made up of external objects and relationships, which are separate from individuals. Individuals' actions are viewed as being primarily determined by the environment. A number of management accounting researchers have applied this paradigm by using labour

process theory[3] including: Armstrong (1985), Hopper and Armstrong (1991), Knights and Collinson (1987), Oakes and Covaleski (1994), Roslender (1990), and Wardell and Weisenfeld (1991). These authors argued that management accounting plays an integral part in the control of the labour process.

3.1.3 The Functionalist Paradigm

The functionalist paradigm is characterised by the objective and regulation dimensions. This paradigm rests upon the assumption that society has a real, concrete existence and a systematic character, and is directed toward the generation of order and regulation (Burrell and Morgan, 1979; Hassard, 1991). The functionalist view in accounting focuses on explaining the social order, in which accounting plays a role from a realist, positivist, determinist, and nomothetic standpoint. It is concerned with effective regulation on the basis of objective evidence (Riahi-Belkaoui, 1996). The functionalist paradigm has been the dominant approach adopted by accounting researchers (Dillard and Becker, 1997). This perspective tends to view the role of accounting in organisations in economic terms. The focus of research from this approach is on accounting systems in the environments within which they reside, and much of the research is grounded in systems or neoclassical economic theory, in which agency theory represents one example.

From this functionalist perspective, accounting information is seen as assisting managers make rational, economic decisions (Covaleski and Dirsmith, 1990). The focus of this sociological paradigm is on the technical/rational aspects of accounting

[3] For full details of the labour processes theory refer to Braverman (1974)

and suggests that the role of accounting in organisations is neutral and impartial. Accounting is seen to be supportive of managers' pursuit of organisational efficiency and organisational goals (Ansari and Euske, 1987). Furthermore, research adopting this paradigm utilises methodologies that are predominantly quantitative in nature, whereby investigation is made into events and actions. Contingency theory, considered above, tends to view accounting systems from both subjective and objective perspectives. MAS research has mainly focused on internal and external subjective-appraised organisational and environment characteristics. Established on such a perspective, MAS researchers aim to understand the subjective experience of individuals involved in the preparation, communication, verification, or use of accounting information. Consequently, the functionalist paradigm has been criticised for viewing management accounting as passively reflecting reality and failing to consider the effect that the subjective nature of the social world and accounting has on forming and shaping individuals' perceptions of reality (Hopper and Powell, 1985). Thus, the researcher's viewpoint was to study the social world not just from objective evidence, but also from a subjective perspective to construct social reality. Based on a subjective perspective, the following section will discuss the interpretive paradigm that views accounting from a subjective point of view.

3.1.4 The Interpretive Paradigm

The interpretive paradigm is characterised by the subjective and regular dimensions. In the interpretive paradigm, the social world retains an uncertain ontological status. From this perspective, social reality, although possessing order and regulation, does not possess an external concrete form (Hassard, 1991). Thus, it seeks to explain the

stability of behaviour from the individual's viewpoint. Researchers are most interested in understanding the subjectively created world "as it is" in terms of ongoing processes (Burrell and Morgan, 1979). Hopper *et al* (1987) offer further clarification:

> "Naturalism rests fundamentally on the ontological assumption that reality is subjective: the only "meanings" which actions and events can have are those that are filtered through individuals' shared perceptions".

This increased the researcher's perception that the interpretivist accountant is concerned with understanding from the position of a participant at the level of subjective experience. A recent study by Waweru *et al*. (2004) used contingency theory framework within the interpretive perspective to understand MAS change processes and to explore the rationale for such change processes in four retail companies in South Africa. In addition, Perera *et al*. (2003) argue the importance of focusing on the subjective values, norms and past experiences and the organisational and social systems within which the transfer pricing will operate. The interpretive view in accounting would focus on explaining the social order from a nominalist, antipositivist, voluntarist, and ideographic standpoint. Riahi-Belkaoui (1996) argues that the interpretive paradigm in accounting has focused on the ability of information to "construct reality", the role of accounting as a "linguistic" tool, and other roles and images that accounting may adopt. Thus, the underlying philosophical assumptions of interpretive approaches are: an ontological view of reality as subjective; the view that knowledge of phenomena can only be acquired through personal experience and participation; and the belief that individuals are considered to be able to shape their own environment. The methodologies adopted with this paradigm are qualitative in

nature and include observation, historical accounts and interviews (Dillard and Becker, 1997).

Following from the relationships between ontological assumptions and research methods developed by Burrell and Morgan, Tomkins and Groves (1983a; 1983b) present a theoretical argument for the applicability of interpretive investigations in accounting research. They propose and defend the position that the appropriate way to study accounting is within its everyday context and that an interpretivist perspective provides a means for successfully undertaking such research. In responding to Tomkins and Groves, Abdel-khalik and Ajinkya (1983) undertake a functionalist critique of interpretivist research. Further, Morgan (1988) claims to propose a new epistemology for accounting practice, arguing that it should move away from an objectivist perspective toward a dialogical one.

3.1.5 Theoretical Positioning within the Multiple Paradigms Framework

A number of researchers have used Burrell and Morgan's (1979) framework to structure their debates an distinct aspects of management accounting research (Cooper, 1983; Dillard, 1991; Dillard and Becker, 1997; Hassard, 1991; Hopper and Powell, 1985; James, 2001; Lewis and Grimes, 1999; McManus, 2006). The definitive classification of the paradigms put forward by Burrell and Morgan has been recognised as a shortcoming of the framework (Chua, 1986; Dillard and Becker, 1997; Hopper and Powell, 1985). In this current research, however, the differentiation among the four paradigms is not definite, nor fundamentally autonomous. The aim of this chapter is not to analyse the limitations of this

framework, nor endeavour to give a detailed deliberation. Rather, the framework introduced by Burrell and Morgan (1979) is used simply as a tool to shape the following discussion in regard to the theoretical viewpoints concerned with the study of sophisticated management accounting techniques such as ABC, and performance management systems such as the BSC. Table 3.1 represents an elaboration and extension of Figure 3.1.

Table 3.1: Summary of Underlying Philosophical Assumptions and the Management Accounting Theories

	Functionalist	Interpretive	Radical humanist	Radical structuralist
Objective/ Subjective Dimension	1. Reality viewed as concrete and objective. 2. Knowledge gained by observation and identification of causal relationships. 3. Individuals' actions determined by environment. 4. Investigation by systematic methods and techniques.	1. Reality understood by attaching shared meanings to ideas and concepts. 2. Acquisition of knowledge through participation and understanding of subject. 3. Individuals able to shape environment. 4. Investigation by accounts of events and actions.	1. Reality understood by attaching shared meanings to ideas and concepts. 2. Acquisition of knowledge through participation and understanding of subject. 3. Individuals able to share environment. 4. Investigation by accounts of events and actions.	1. Reality viewed as concrete and objective. 2. Knowledge gained by observation of causal relationships. 3. Individuals' actions determined by environment. 4. Investigation by systematic methods and techniques.
Radical change/ Regulation Dimension	Society viewed as stable, cohesive and well ordered.	Society viewed as stable, cohesive and well ordered.	Society viewed as inequitable, where conflict leads to change.	Society viewed as inequitable, where conflict leads to change.
Management accounting theories	Transaction cost; Contingency theory; Agency theory	Institutional theory; Resource dependency theory	Critical theory	Labour process theory

Adapted from McManus (2006)

From Table 3.1 it should be noted that the placement of management accounting theories is based on underlying assumptions of the subjective/objective continuum as presented in Figure 3.2. McManus's (2006) viewpoint of the underlying assumptions of the subjective/objective dimension of Burrell and Morgan model places contingency theory within the functionalist perspective. Conversely, Boland and Pondy (1983) suggest that accounting serves both objective and subjective functions;

they use two case studies to investigate how the rational and natural aspects of accounting interact with the life experiences of individuals. Further, management accounting literature points out that MAS research has been mainly focused on subjective-appraisal of organisations and environmental characteristics, as well as on objective-appraisal. The researcher believes that contingency theory in this study shares the interpretive and functionalist paradigms. Thus, contingency theory is discussed in detail in the following section.

3.2 Management Accounting Systems Informed by Contingency Theory

Theoretical underpinnings of contingency theory stem from classical organisation theory which holds that there is one optimal way of being organised, meaning that all organisations should possess the same organisational structure (Brech, 1957). Whilst, classical management theory may have been appropriate throughout the first part of the 20th century, it was extended in the 1960s by the contingency approach (Burns and Stalker, 1961; Lawrence and Lorsch, 1986; Thompson, 1967; Woodward, 1958; 1965). Contingency theory is developed in organisation theory, and the fundamental premise of the contingency approach is that there is no universally appropriate management system which, under all circumstances, can be applied for all organisations. In the early 1970s, contingency theory gained popularity as a means of understanding organisations, their accounting, and MAS (Birnberg and Shields, 1989).

Contingency theory suggests that the design of MAS is influenced by certain contingent factors in organisations such as technology and environment (Chenhall,

2003; Haldma and Lääts, 2002; Langfied-Smith, 1997). Should one or more of these factors change, is likely to cause the organisation to reform at least some aspects of its MAS. Contingency theory has been extensively utilised in MAS (Chenhall and Langfied-Smith, 1998a; Reid and Smith, 2000; Thompson, 1967; Woodward, 1965). It originated from the works of Burns and Stalker (1961), Lawrence and Lorsch (1967), Pugh *et al*. (1969), Pugh and Hickson (1976), and Woodward (1965). Otley (1980) argues that contingency theory of management accounting is based on the assumption that there is no universally appropriate accounting system applying equally to all organisations in all circumstances. This means that the appropriateness of any accounting information system depends upon situational factors in which an organisation finds itself. Consequently, the contingency approach advocates that there is no one "best" design for MAS, but that it depends upon situational factors.

Existing literature shows that management accounting researchers have studied contingency factors such as technology, size, organisational structure, strategy, industry, competition and notional culture, to explain the effectiveness of MAS. For instance, organisational size has been a contingent factor attracting significant research interest. Findings from Khalid's (2005) study show that there is a positive relationship between ABC adoption and firm size and diversity of products in large companies in Saudi Arabia. Hoque and James (2000) also report a significant relationship between size and BSC usage. The study found that large companies make more use of a BSC than do small firms, based on a survey of 66 Australian manufacturing firms. A further appropriate variable considered to impact upon the design of MAS is strategy. Abernethy and Guthrie (1994) find that broad scope management accounting information has a more positive effect on performance in

firms that follow a prospector strategy than in firms that follow a defender strategy[4]. Chong and Chong (1997) also adopted Miles and Snow's typology and provided further evidence that broad scope usage of management accounting information has a more positive impact on the performance of business units that follow a prospector strategy rather than a defender strategy. Similarly, Chenhall and Langfield-Smith (1998b) found that firms which pursued differentiation strategies benefited from the use of contemporary management accounting practices and reliance on non-financial information, and this ultimately resulted in better performance.

Technology has also been invoked to explain why accounting systems have been found to differ from one organisation to another. In this regard, Woodward's (1965) study found that production technology is a factor that has been recognised as influencing the design of internal accounting systems. Further, a recent study of a cross-sectional survey of Australian firms examined the influence of seven technological and organisational factors on firms' initial interest in ABC and their decision to adopt it or not (Brown *et al.*, 2004). The study reports that top management support, an internal champion, and organisational size were shown to be associated with initial interest in ABC. In addition, the support of an internal champion was associated with the decision to adopt or reject ABC. Perera *et al* (2003), in a study of a government-owned energy organisation in Australia, found that the choice of introducing transfer pricing was consistent with the internal organisational contextual factors of strategy and structure. Khandwalla's study (1972) found that there is a positive relationship between competition and the use of management accounting sophistication. The study suggests that price competition

[4] There is general consensus that prospector, build and differentiation- type strategies are conceptually similar, as are defender, harvest and cost leadership-type strategies (cited in (Abernethy and Guthrie, 1994).

appears to have little impact on the practice of management control; distributive competition appears to have a modest positive impact on its usage; while product competition appears to have a more substantial positive effect on its usage. Furthermore, Haldma and Lääts (2002) examined the MAS practices of Estonian manufacturing firms to explore the effects within a contingency theory framework. The study found some evidence that changes in cost and MAS practices are associated with shifts in the business and accounting environment as external contingencies, and with those in technology and organisational aspects as internal contingencies. Table 3.2 details recent studies that have adopted the contingency approach.

Table 3.2: Studies using a Contingency Approach

Author /industry	Contingent factors	Findings
Khalid, A (2005) Manufacturing firms in Saudi Arabia	Firm size, overhead level and number of products.	A positive relationship between ABC adoption and firm size and diversity of products. No evidence on the association between the level of overhead and ABC adoption.
Waweru *et al (*2004) Retail companies in South Africa	Economic constraints, deregulation/global competition, technological advancement and size and type of organisations.	A considerable change in MAS practices notably ABC allocation systems and the BSC approach to performance measures.
Baird *et a* (2004) Australian business units	Organisational and cultural factors.	Business unit size and all three business unit culture dimensions were found to be associated with extent of adoption of activity analysis and activity cost analysis, while decision usefulness and the cultural dimensions of outcome orientation and tight versus loose control were associated with ABC.
Haldma & Lääts (2002) Manufacturing companies in Estonia	External factors (business environment, accounting environment) & internal factors (organisational aspects, technology & strategy).	Changes in cost & management accounting practices are associated with shifts in the business and accounting environment as external contingencies, and with those in technology and organisational aspects as internal contingencies.
Reid & Smith (2000), new Scottish microfirms	Contingent events, contingencies cluster, technological uncertainty, production systems, business strategy, market environment, sub-unit interdependence, market dynamics and work methods.	Contingent events such as cash flow crisis, funding shortage and innovation were found well supported in the cases of cost management & computer application. Adaptive, stagnant and running blind firms were statistically significant with sales growth and market shares. Technological uncertainty, production systems, strategy and the market were supported in most aspects, except for these new microfirms, technological uncertainty was unimportant as determinant of this specific measure of organisational form. In terms of sub-unit interdependence founded affecting MAS complexity.

Associated with the above discussion, it can be concluded that there are several contingent variables which play an optimal role in the adoption of contemporary MAS such as ABC and BSC. This emphasises Otley's (1980) statement that

contingency theory of management accounting is based on the assumption that there is no universally appropriate accounting system applying equally to all organisations in all circumstances. Rather, contingency theory attempts to identify specific aspects of an accounting system that are associated with certain defined circumstances and to demonstrate an appropriate match. This study adopts this perspective by considering contingent factors such as business strategy, size and competitive environment in order to make a contribution to the development of an integrated framework that can be used to inform the combined use of ABC and BSC and how these contemporary techniques might improve organisational performance. In addition, the researcher chose contingency theory as the applicable theory for the study based on prior studies that use contingent factors in theoretical models similar to this study. However, contingency theory has been subject to criticism from a number of management accounting researchers. The following section reviews the limitation of contingency theory in general, and from a management accounting perspective in particular.

3.2.1 Limitations of Contingency Theory

From an organisational perspective, several problems arise when examining contingency theory. Donaldson (2001) isolated these problems into three clusters. Firstly, he points to the static nature of contingency theory and the failure to discuss change as a movement from misfit into equilibrium. Typically, organisations fluctuate between equilibrium repeated fluctuations, resulting in increased change in contingencies, and organisation structure from which a more dynamic theory may flow. Second is the question of how managers assess what organisational structure best fits their particular contingencies. In attempting to respond to these issues,

Donaldson (2001) suggests that a perfect fit to their particular organisation may be idealistic and, therefore, advocates adapting theory slightly to suit their individual situation. The third and final dilemma concerns the specified level of performance versus the fit line.

Similarly, Schoonhoven (1981) suggests that there are four problems with contingency theory. The first problem is a lack of clarity in a well-developed set of interrelated propositions, suggesting ways in which a phenomenon should be conceptualised. The second problem relates to contingent relations as interactions, and a lack of clarity by contingency theorists blurs the fact that an empirical interaction is being predicted. Explicit recognition should be given to the fact that contingency arguments produce interactive propositions. The third problem relates to the function forms of interaction and, because of a lack of clarity, theoretical statements fail to provide any clues about the specific form of the interaction intended. The fourth problem relates to the analytical model used with contingency theory and the fact that the operational and computational procedures that researchers tend to use impose assumptions on an already imprecise conceptual framework. Assumption of linearity masks another implicit assumption hidden within contingency theory, namely, that contingency relations are symmetrical.

From a management accounting perspective, Otley (1980), in his widely cited views on contingency theory, reports four criticisms. Firstly, the conceptualisation, definition and measurement of key variables require greater theoretical and empirical attention. Secondly, studies have tended to neglect theoretically and empirically the question of how controls belong to effectiveness. Thirdly, the prescriptions from

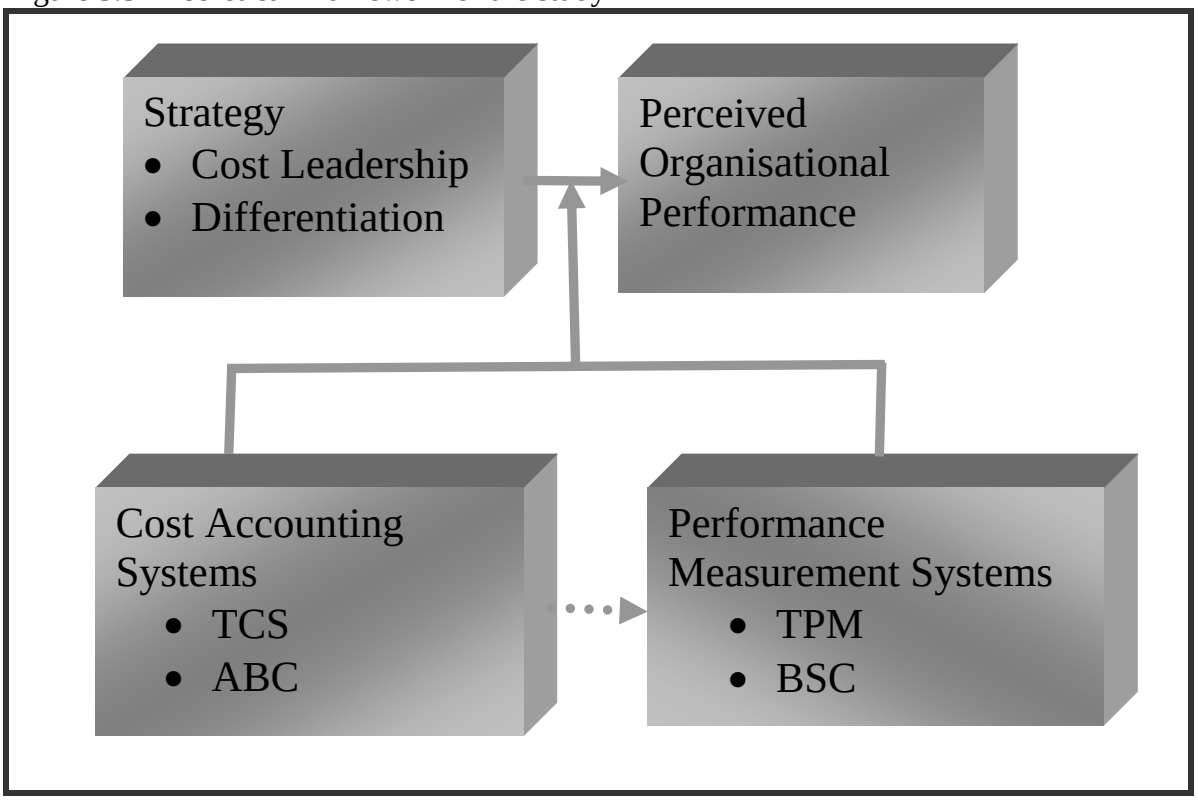
contingency theory are based on weak grounds and, finally, the highly connected nature of components in an organisational control package recommend that management accounting and information systems cannot be studied in isolation from their wider context. In general, researchers such as Child, (1972), Schreyogg (1980) and Cooper (1981) criticise contingency theory for paying insufficient attention to the discretion possessed by key decision-makers and how values, beliefs and ideologies may influence choices. Furthermore, in a recent study by Gerdin and Greve (2004) they argue that management accounting researchers criticise contingency theory as a result of methodological limitations. Lack of replication of contingencies factors within studies is also a limitation of contingency theory. In the other words, replication studies are a useful tool to confirm results of prior studies and make a comparison between the studies.

This study uses replicated contingency constructs that have been utilised in previous research such as organisational size, business strategy, business type and competitive environment. Given the use of already tried and tested variables and the operationalisation of such, together with the use of methodological triangulation, the limitations as described by these authors are, for the most part, overcome. Thus, the appropriateness of using contingency theory is justified.

3.3 Theoretical Framework of the Study

A contingency framework has been devised that presents a model illustrating the effect of the relationship between performance and the interaction of strategy, ABC and the BSC. As discussed in the literature, a firm's strategic focus will depend on its competitive environment. Also discussed is how ABC can improve firms' cost information, and how BSC provides a much clearer and focussed performance management system. Figure 3.3 depicts these relationships.

Figure 3.3 Theoretical Framework of the study



The model presented in Figure 3.3 reveals the relationship between the use of ABC and BSC on perceived organisational performance. It also indicates how an ABC system can provide critical insights into the BSC measures by providing valuable and accurate input to the four perspectives of the BSC to improve firm performance.

Porter (1980) suggests that a cost leader firms' focus is more on cost, but they should not ignore differentiation entirely. Rather, they should tend to focus on controlling costs, thus, ABC is particularly suitable for these firms. ABC information may be useful in controlling or reconfiguring existing business processes superior to those of competitors, thereby helping managers to choose new ways of achieving cost advantage (Cooper, 1995). Therefore, it is expected that there will be greater organisational performance for cost leader firms that use a combination of ABC and the BSC than those adopting the singular use of ABC or BSC. The following hypotheses have been developed in regard to this claim:

> H1: Cost leadership firms that use a combination of ABC and BSC will have greater performance than cost leadership firms that use ABC without BSC.
>
> H2: Cost leadership firms that use a combination of ABC and BSC will have greater performance than cost leadership firms that use BSC without ABC.

The BSC, along with improved costing information provided by ABC, will provide greater monitoring of achievement of strategic goals, thus increasing organisational performance. Therefore, as can be seen from Figure 3.3, an ABC system and the BSC can play a complementary role in contributing to a company's mission, objectives, and strategies. The increased accuracy provided by ABC enhances the ability to develop more effective strategies to meet organisation objectives (Cooper and Kaplan, 1992). This, in turn, increases the likelihood of organisation success in carrying out its defined objectives and mission. At the same time, an organisation can use a BSC to help monitor how well it is meeting strategic objectives and overall mission (Garg and Rafiq, 2002; Kaplan and Atkinson, 1998; Kaplan and Norton, 1992,1996,2001). Furthermore, with respect to the design and use of a performance system, contingency-based research suggests that financial measures may not be

appropriate under all circumstances, and that they may need to be supplemented with non-financial measures of performance. Thus, feedback from this particular loop necessitates actions which, in turn, increase organisational performance. Hence the derivation of the following hypothesis:

> H3: Cost leadership firms that use a combination of ABC and BSC will have greater performance than differentiator firms that use a combination of ABC and BSC.

As noted by Porter (1980, 1985) differentiator firms focus their strategic priorities on satisfying customer needs for high quality products, fast and reliable delivery and effective post-sales support. In achieving these strategic priorities, firms may focus and rely more on non-financial measures than financial measures to improve organisational performance. Chenhall and Langfield-Smith (1998b) found that firms which emphasised differentiation strategies benefited from the use of sophisticated management accounting practices and reliance on non-financial information, and this ultimately resulted in better performance. Shank (1989) and Lynch and Cross (1992) argue that firms emphasising differentiation strategies that use traditional accounting performance measures are unlikely to have sufficient evidence for assessing how production processes support a variety of customer-focused strategies. It is expected that since a differentiator firm will have less focus on cost it will benefit from using a BSC approach for improving organisational performance. It is expected the benefits for differentiators using both systems will outweigh the benefits of not using any system, resulting in greater performance for differentiation firms that use both, as opposed to none, but not as great as differentiator firms that only use a BSC. Hence, the following hypothesis:

H4: Differentiator firms that use the BSC without ABC will provide greater performance than differentiator firms that use a combination of ABC and BSC.

3.4 Conclusion

This chapter has provided a review of a contingency theoretical framework within a multiple paradigm model of social science as put forward by Burrell and Morgan (1979). As previously noted, contingency theory was chosen to inform the relationship of management accounting innovations such as ABC and BSC and their combined effect on organisational performance under alternative competitive strategies in the Australian business environment.

It was necessary to review the contingency theory approaches that have the most direct relevance to the study under review. In reviewing these approaches it was first appropriate to discover the four sociological paradigms. As discussed in this chapter, Burrell and Morgan define four paradigms for organisational analysis, structured into two independent dimensions—the objective/subjective dimension and radical change-regulation dimension. This is followed by a discussion of contingency theory within MAS research, as well as the limitation of the contingency theory. Ultimately, a theoretical framework was developed utilising the contingency approach. It is believed that contingency theory provides the best approach to understand and answer the fundamental questions of the study: Do cost leader firms perform better when they use a combination of ABC and BSC compared to the use of ABC and TPM? Do cost leader firms perform better when they use a combination of ABC and BSC compared to the use of TCS and BSC? Do cost leader firms using a combination of ABC and BSC perform better than differentiator firms using a combination of ABC and BSC? Do differentiator firms perform better when they use

both TCS and BSC compared to a combination use of ABC and BSC? The methodology adopted to investigate the research question and the research hypotheses are discussed in detail in Chapter Four.

CHAPTER 4

RESEARCH METHODOLOGY

4.0 Introduction

The contingency theoretical framework of this study is designed to understand and inform the research questions: Do cost leader firms perform better when they use a combination of ABC and BSC compared to the both use of ABC and TPM? Do cost leader firms perform better when they use a combination of ABC and BSC compared to the both use of TCS and BSC? Do cost leader firms using a combination of ABC and BSC perform better than differentiator firms using a combination of ABC and BSC? Do differentiator firms perform better when they use both TCS and BSC compared to a combination use of ABC and BSC? In order to answer these questions this study is conducted across a number of industry sectors in Australia. As mentioned in the previous chapter, contingency theory was chosen to inform the relationship of management accounting innovations such as ABC and BSC and their combined effect on perceived organisational performance under alternative competitive strategies in the Australian business environment.

To achieve this aim, a combination of a mail-out survey and exploratory case studies is used as the research design. Many authors in the management accounting field have used this method of analysis (Abernethy and Brownell, 1999; Birnberg, Shieds *et al.*, 1990; Brownell, 1995; Lillis and Mundy, 2005). Selection of an appropriate research methodology is an essential stage in defining the steps to be taken towards the

completion of research. It provides all the necessary steps to be followed in collecting and analysing the data for the research. Subsequently, research methods can be classified in various ways under the umbrella terminologies of qualitative and quantitative.

This study takes a combined approach toward quantitative and qualitative research by undertaking a mail-out survey of all industry sectors in Australia, combined with 15 case studies. It was felt that the variety of information required, together with the need to examine firms Australia wide—and taking into consideration time and money constraints—would be best served by conducting a questionnaire type survey. However, it was also believed that some in-depth discussion would be needed to further clarify and broaden the subject inquiry. To this end, a selection of survey respondents was also interviewed. Thereby, the approach used in this study is data triangulation through utilising a structured questionnaire, supplemented by structured and semi-structured interviews and firms' websites. This is additional to the publicly available archival documentation used for the interviewed firms. This usage of data triangulation has the advantage of overcoming some of the threats related to the four types of validity: construct validity, internal validity, external validity and reliability. Further, data triangulation may improve the accuracy of researcher judgements by collecting data referring to the same phenomenon (Higgs, 1997; Modell, 2005; Tashakkori and Teddlie, 1998; Yin, 1989)

This chapter aims to discuss the research methods adopted. More specifically, it examines, in the first instance, the survey method, its design applications and inherent disadvantages and advantages as a research design. This is followed by an outline of the

data collection instrument, together with a discussion on the sample obtained, and measurement of the variable. Case study interview details and the statistical design and case study analysis procedures are then presented.

4.1 Quantitative Research Method

Quantitative research in accounting can be conducted using several techniques, including survey research, experimental research and archival research (Smith, 2003). This study was conducted using the survey research approach. Survey research is a system for collecting information to describe, compare or explain knowledge, attitudes and behaviour (Babbie, 1990). Surveys refer to quantitative analysis where data from a large number of respondents are collected and analysed. Surveys are regarded as an appropriate method for gathering data and testing hypotheses (Sekaran, 2000; Ticehurst and Veal, 1999). Quantitative research is distinguished from qualitative research primarily by the large number of people who are questioned and the type of questions asked. A questionnaire is constructed to elicit information relevant to the subject of inquiry. One way to ensure a reliable and valid survey is to replicate a previously-used questionnaire that has already undergone scrutiny for reliability and validity through careful testing (Fink, 1995). The primary reason for conducting survey research in the first stage of this study is to answer the research questions and test research hypotheses. Further, the survey method is utilised to investigate the impact of cost accounting system and performance measurement system on perceived organisational performance for 229 firms across a number of industry sectors in Australia that utilise varying strategic postures.

Collecting data in order to analyse and test hypotheses can be conducted in a variety of ways and from various sources. Each data collection method has advantages and disadvantages. Smith (2003) describes how survey research can be conducted via mail, telephone, e-mail, internet or face-to-face interview. Furthermore, Sekaran (2000) explains that personal interviews or face-to-face interviews have the advantage of flexibility in adapting and clarifying the questions. However, they have cost, time and geographical limitations. On the other hand, a mail questionnaire survey is best suited for the collection of a substantial amount of information at a reasonable cost from large numbers of firms in a wide geographical area and, additionally, it also offers anonymity and avoids interviewer bias.

Many researchers in the ABC literature have used the mail questionnaire survey method for reasons similar to that stated above. For example, Maiga and Jacobs (2003), who studied the combined effects of BSC and ABC on organisational performance, used a mail-out survey in gathering data because it was a cost-effective method and suitable for analysing the large sample of firms in their study. Similarly, Booth and Giacobbe (1999), who report the findings of a survey of 213 Australian manufacturing firms' experiences with ABC, chose a mail survey to collect data because it enabled them to survey a large sample of the population at low cost. In addition, James (1997) used a mailed survey of manufacturing firms operating in Australia. She found that a mail-out survey was a more convenient approach to gathering data needed to examine firms Australia wide, taking into consideration the issues of time and money. Further, this method creates less pressure on the respondent for an immediate response and provides a safe, comfortable feeling of anonymity. It is evident that a mailed questionnaire survey is an appropriate method to gather data for this study.

On the other hand, a disadvantage of a mail-out survey is that participants do not always complete and return the questionnaire, therefore, the biggest problem encountered with mail questionnaires is a low response rate (Neuman, 2003). Sekaran (2000) suggests that sending follow-up letters, providing the respondent with self-addressed, stamped return envelopes and keeping the questionnaire brief are useful ways to improve the response rate of mail questionnaires. Consequently, the questionnaire in this study was sent with a cover letter and a reply and postage-paid envelope. The cover letter was addressed to the Chief Financial Officer (CFO) of each company. Previous research conducted by Hoque and James (2000) indicates that the CFO is the optimal person to direct questions relating to the variables of the study, as they are most likely to be able to provide accurate information about costing and performance measurement data within the firm. Consideration was also given to the time imposed on respondents in being asked to fill out the questionnaire. Therefore, it was felt that the ten minutes required to fill in the questionnaire was reasonable. The sample used in the study is discussed next.

4.1.1 The Survey Sample

To assess the hypothesised relationships outlined in Chapter 3, an initial sample was drawn from all industry sectors Australia wide. The sample consisted of 750 firms in the *Business Who's Who* of Australia Database (BWW). Following a poor response rate from the initial sample, a second was drawn from the same database consisting of 574 firms in all industry sectors. The resulting combined response rate, however, was still not adequate to conduct statistically robust analysis; as a result it was decided to draw a third, and final, sample. This sample was drawn from the *Business Review Weekly*

(BRW) database, consisting of the top 500 Australian public companies in the year 2005.

An initial search of the BWW database revealed nine main industries[1] with thirty sub-industries. However, the researcher divided the nine main industries into five industry groups (retail, services; manufacturing; finance, insurance and real estate; and other industries) to limit the length of the questionnaire. "Other industries" consisted of agriculture, forestry and fishing, wholesale, transportation, communications, electric, gas and sanitary services, mining and construction, and others which were not classified.

Further, this study includes small, medium and large size firms, defined by the number of employees. Forsaith *et al*. (1994, p 110) state that 'enterprises are most frequently classified by size according to the number of people they employ' and their study suggests that annual sales, total revenue, total assets and net worth of firms were factors occurring more frequently than changes in the number of employees each year. Some authors (Brown, 1981) argue that large firms have several advantages over smaller firms in the adoption of innovation; others (Acs and Auderetsch, 1988; Julien, 1993; Lefebvre and Lefebvre, 1993) argue that diffusion of innovation in small and medium size firms is more rapid than in large firms. Although criteria defining firms as small, medium and large vary, in this research firms with less than 200 employees were categorised as small, firms with 200 to 500 employees were categorised as medium, while those firms with more than 500 employees were categorised as large firms. Size and nature of business were the criteria used for sample selection, thus no deviation is expected

[1] Main industries are: services; agriculture, forestry and fishing; mining; construction; manufacturing; transportation, communications, electric, gas and sanitary services; wholesale trade; retail trade; finance, insurance and real estate.

among the main industries. Table 4.1 presents the three samples responses, including non-responses, for each sample.

Table 4.1: An explanation of three samples

Survey	No. of firms	Useable response	Negative response	Non-responses	Useable rate
1st	750	119	153	478	19.93 %
2nd	574	32	171	371	7.94 %
3rd	447	78	26	343	18.53 %
Total	1771	229	350	1192	16.12 %

The selection of the first sample was randomly selected from the BWW database, based on thirty sub-industries. Approximately twenty-five firms from each sub-industry were selected, using a random numbering technique. This study sought to include Australian business organisations from several sectors. However, as a result of BWW excluding Australian universities from its database, the second sample of 574 firms incorporated 34 randomly-selected Australian universities. All firms from a sub-industry which consisted of less than twenty-five firms were selected. From the first mailing questionnaire sent to 750 firms, a total of 154 surveys were returned, 94 participants completed the questionnaire, and 45 questionnaires were either returned to sender due to an incorrect address, or the person had left the company. Fifteen questionnaires were not completed, as the potential participant did not wish to participate in the survey. After a period of three weeks, a second reminder mailing was forwarded to the 690 firms, excluding the after mentioned 60 participants who were now inadmissible for the reasons stated. From this latter mailing, 25 questionnaires were completed and 44 participants did not wish to participate in the survey. The second mailing effectively increased the response rate from 94 to 119 responses.

The low response rate motivated the researcher to send a third reminder mailing after a period of four weeks from the date of the second mail-out. The third mailing was sent to 646 participants. From this, 40 potential participants returned the survey without filling in the questionnaire, and nine participants did not wish to participate. Therefore, first sample questionnaires were returned from a total of 272 firms from several industry sectors. Of the 272 responses, 119 questionnaires were completed, 40 surveys were uncompleted (without any explanation), and 113 surveys were uncompleted (with reasons given including that is against company policy to take part in surveys, and not being interested in completing such surveys). Additionally, others were not completed due to an incorrect address or the fact that the addressee had left the company, or time constraints prevented participation in the survey. Consequently, the final first sample consisted of 119 companies, giving a total useable response rate of 19.93 per cent (see Table 4.1).

Given that the first sample was costly and resulted in a low response rate, the researcher conducted a second sample by sending a card invitation to 574 firms in Australia in all industry sectors asking potential participants if they would like to participate in the research study. The procedure of the second sample selection was random selection, following the procedures of the first sample selection from the BWW database. A total of 203 cards were returned from 574 firms—155 of these were not interested in completing the survey, while 48 firms were interested in participating. The questionnaire was sent to these 48 firms. Of the 48 questionnaire, 32 positive responses were received and 16 surveys were not received. After a period of three weeks, a reminder mailing was sent; however, no further responses were received. Thus, the second sample sought responses from 203 firms—155 of these were not interested in

completing the survey, 16 firms were interested in the survey but did not complete the questionnaire, and 32 firms completed the survey. Associated with the above, the second sample increased responses from 119 to 151 companies from all different industrial sectors Australia wide, thereby, the first and second samples revealed a total useable response rate of 151 firms. Figure 4.1 describes the responses of the two samples.

Figure 4.1: Details of responses from first and second sample

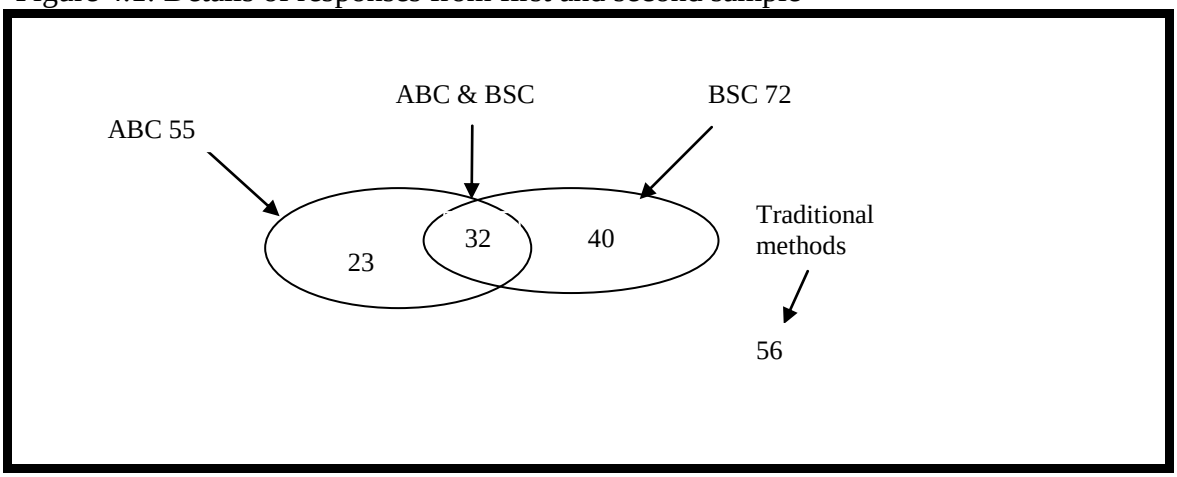


Figure 4.1 illustrates that 32 firms used a combination of ABC and BSC in their management accounting system and 23 firms used ABC singularly to allocate overhead costs with traditional performance indicators. Forty of the firms used BSC singularly with traditional costing systems, and 56 firms used a combination of traditional costing systems with traditional performance indicators to evaluate their perceived organisational performance.

Given that the data obtained from these first two samples indicated that there were only 32 firms from all industry sectors Australia wide using both approaches—ABC and BSC—there were not enough responses to evaluate perceived organisational performance for comparison with firms who used a singular approach—either ABC or

BSC—with traditional methods, or those who use only traditional methods for statistically robust analysis. Thus, the researcher selected a third sample from the top 500 Australian public companies to try and increase the number of responses. In addition, an invitation to participate in a one hour interview was requested from the third sample's participants who were willing to be interviewed. An initial search of the top 500 Australian public companies for the year 2005 at the BRW website revealed that there were ten companies replicated in the previous samples and 43 companies were overseas firms. Therefore, the researcher excluded these firms from the sample. The final third sample obtained consisted of 447 firms. From the first mailing questionnaire sent to the 447 participants, 43 questionnaires were completed and 11 questionnaires not completed. After a period of four weeks, a second reminder mailing was forwarded to the 447 firms, excluding the 11 firms who had responded as not wishing to participate in the survey, and the six firms who requested a summary of the research findings—some participants in the two first samples also requested a summary of the research findings.

Given that the survey research is anonymous, the researcher excluded from the second mail-out those who had requested the results of this study and those who did not wish to participate in the research. Thus, the final second reminder mail-out was sent to 430 firms, from which 35 positive responses were received, and 15 questionnaires were not completed (either because the participant was not interested in completing the survey, were no longer at this address, or were not applicable to the study). Therefore, the third sample questionnaires were returned from a total of 104 firms from different industry sectors. Of the 104 responses, 78 questionnaires were completed, 26 surveys were not completed (with reasons given including that the participant is no longer at this address or not applicable to the study, or not interested in completing such surveys).

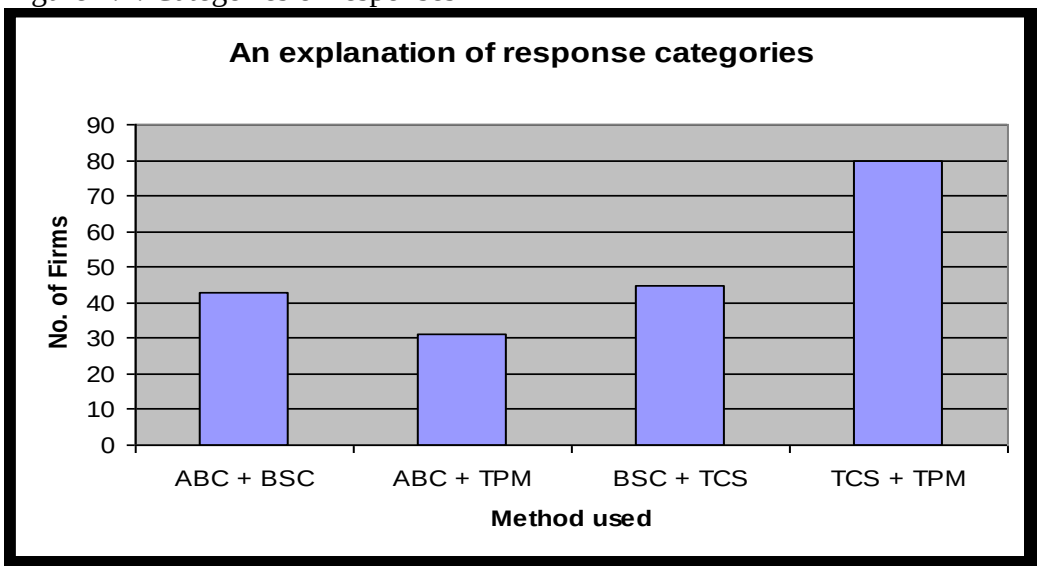
Consequently, the final third sample consisted of 78 firms, giving a total useable response rate of 18.53 per cent, thereby increasing the responses received from 151 (in previous samples) to 229 firms from all different industry sectors Australia wide.

Table 4.1 also indicates that from the 1771 questionnaires sent out, 229 surveys were returned as positive responses. These positive responses include 30 firms involved in both cost leadership and differentiation strategy who were excluded from statistical analysis[2]. Therefore, the remaining useable responses of 199 firms (229 -30) were used for statistical analysis. Further, 350 surveys were returned as negative responses (with reasons given including that is against company policy to take part in non-government surveys, no longer at this address, or not applicable to the study and not being interested in completing such surveys) and 1192 surveys were deemed non-responses. The total response rate of the three samples is 16.12 % (after excluding the 30 firms from the statistical analysis, the response rate of three samples is 14.31 %). From the positive responses obtained from the 199 firms, there were 43 firms (21.61 %) using ABC and BSC jointly, 31 firms (15.58 %) using ABC and TPM, 45 firms (22.61 %) using the BSC and TCS and 80 firms (40.20 %) using traditional methods which included TCS and TPM. To test for the existence of possible response bias, t-tests for three independent samples were undertaken by testing first and second mailing returns as suggested by Levine *et al.*, (2005), and no differences were found.

Figure 4.2 depicts response categories of the participants.

[2] These responses were weighted on the middle of the scale which cannot be separated into cost leadership or differentiation strategy.

Figure 4.2: Categories of responses



Given that in each category there were more than 30 responses, this sample size is considered more than adequate for statistical testing (Selvanathan et al., 2004).

4.1.2 The questionnaire

Based on prior contingency research in accounting (Chongruksut, 2002; Hoque and James, 2000; Shieds, 1995), a questionnaire was designed to collect the empirical data. A pilot study was undertaken to ensure that there were no problems associated in completing the survey instrument. This pilot study was conducted within an academic accounting department of a university business faculty. Moreover, to achieve validity and reliability in the survey instruments, the measures chosen for this study had previously been used and tested in several studies. The questionnaire consisted of six sections: demographic data, organisational characteristics, strategy, activity-based costing, balanced scorecard and performance. Respondents were asked to answer the questions with the best indicators that suited their organisation. This type of measurement involved the use of a rating scale which was constructed to indicate the

respondent's placement of the characteristic of interest along a continuum. The instrument used in this study is presented in Appendix A. Table 4.2 provides details of the responding firms according to their industry characteristics and number of employees. As can be seen from Table 4.2 below, there were ten retail firms (5.02 %), 41 manufacturing firms (20.60 %), 54 services firms (27.14 %), 18 finance, insurance and real state firms (9.05 %) and 76 firms (38.19 %) classified as other industry (which includes agriculture, forestry and fishing, wholesale trade, transportation, communications, utilities and sanitary, mining and construction and others).

4.1.3 Measurement of the Variables

This section describes the measurement of the variables used in this study. These measurements are divided into six sub-sections, each section addressing one variable of these measurements. The six sub-sections discuss demographic data, organisational characteristics, strategy, ABC, the BSC and performance.

Table 4.2: Sample by Industry and Size

Category	**N. of cases**	**Number of employees**		
Industry*		Less Than 200	200 to 500	501 or More
Retail:	**10**	**1**	**6**	**3**
Building materials, hardware, garden supply & mobile home	4	1	2	1
General merchandise stores	2	-	2	-
Apparel & accessory stores	2	-	1	1
Food stores	1	-	1	-
Other retails	1	-	-	1
Manufacturing:	**41**	**4**	**16**	**21**
Food, beverage & tobacco products	9	-	4	5
Textile, clothing, footwear & leather products	6	1	2	3
Lumber and wood products, furniture & fixture	1	-	1	-
Paper, printing, publishing & allied products	5	-	2	3
Chemicals, petroleum refining, oil & gas	6	2	1	3
Rubber, miscellaneous plastics products, clay, glass & concrete products	4	-	2	2
Primary metal, fabricated metal products & transportation equipment	5	1	2	2
Industrial and commercial machinery & computer equipment	4	-	2	2
Other manufacturing	1	-	-	1
Services:	**54**	**8**	**15**	**31**
Hotels, rooming houses, camps & other lodging places	7	1	5	1
Entertainment	4	-	2	2
Business services	5	1	1	3
Health & social services	12	5	1	6
Education services	16	1	2	13
Automotive repair, services & parking	4	-	2	2
Trade, professional & community membership organisations	4	-	2	2
Other services	2	-	-	2
Finance, insurance & real estate	**18**	**4**	**3**	**11**
Finance and banking	12	1	3	8
Insurance	4	2	-	2
Real estate	2	1	-	1
Other industries:	**76**	**21**	**18**	**37**
Agriculture, forestry and fishing	7	1	1	5
Wholesale trade	6	-	3	3
Transportation, communications, utilities and sanitary	27	8	4	15
Mining and construction	34	12	9	13
Others	2	-	1	1
Total	**199**	**38**	**58**	**103**

N = 199; * Industry classification was done using BWW classification after integrated from nine main industries into five main industries.

4.1.3.1 Demographic data

Using a similar measurement to Chongruksut (2002) this variable measures several of the data related to respondent information—such as age group, level of education, length of the participant's employment, experience in the area of accounting and

finance, and professional qualifications of the participant. This variable is designed to seek general information about respondents. Table 4.3 provides frequency statistics of personal information of respondents. From Table 4.3 it can be seen that 83.19 % and 32.66 % of individual respondents are in the 40-49 age group and 30-39 age group, respectively. It is notable that the length of employment with current firm (54.77%), current position (67.84%) and in industry (29.15%) for individual respondents is placed within less than 5 years. The majority of individual respondents have achieved postgraduate level of education (58.29%). Furthermore, 45.23 % and 40.70 % of individual respondents have accounting and finance experience for 11-20 years and more than 20 years, respectively. Most individual respondents are members of professional accounting organisations, such as CPA (46.23 %) and ICAA (32.66). whilst 13.57% of individual respondents are not members of accounting organisations.

Table 4.3: Characteristics of respondents

Characteristics	Categories	Frequency	Percentage
Age Group	20 to 20	10	5.03
	30 to 39	65	32.66
	40 to 49	76	38.19
	50 or over	48	24.12
Total		**199**	**100**
Length of employment			
With this firm	Less than 5 years	109	54.77
	5-10	50	25.13
	11-20	26	13.06
	More than 20	14	7.04
Total		199	100
In current position	Less than 5 years	135	67.84
	5-10	40	20.10
	11-20	18	9.05
	More than 20	6	3.01
Total		**199**	**100**
In industry	Less than 5 years	58	29.15
	5-10	43	21.61
	11-20	40	20.10
	More than 20	58	29.14
Total		**199**	**100**
Level of education	Secondary	6	3.02
	Graduate	77	38.69
	Postgraduate	116	58.29
Total		199	100
Experience in accounting & finance	Less than 5 years	4	2.01
	5-10	24	12.06
	11-20	90	45.23
	More than 20	81	40.70
Total		**199**	**100**
Professional qualifications	CPA	92	46.23
	ICAA	65	32.66
	CIMA	4	2.01
	ICAEW	4	2.01
	PNA	2	1.01
	AAT	2	1.01
	ICAS	1	0.50
	ICSA	1	0.50
	CFA	1	0.50
	Not applicable	27	13.57
Total		**199**	**100**

4.1.3.2 Organisational characteristics

This variable is designed to capture general information about the organisations surveyed. It includes several types of measurements as identified by Chongruksut (2002). Table 4.4 presents descriptive statistics pertaining to organisational characteristics. Table 4.4 shows that most participant firms are representative of public organisation (52.76%), followed by private organisations (40.70 %) and then 6.54% is representative of government owned organisations. The number of employees ranged from less than 200 to more than 501. Of the respondent firms, 51.76 % have 501 or more employees and this categorised these as large firms. Of the respondent firms, 29.14 % have between 200-500 employees which categorised them as medium firms, whereas 14.10 % of the respondent firms were categorised as small firms. In terms of number of products/services, 43.22 % of respondent firms have produced 51 or more of products/services. In addition, 36.18 % and 28.14 % of respondent firms have occasionally and fairly often introduced new products/services respectively.

Table 4.4: Classification of organisational characteristics

Characteristics	Categories	N	%	Characteristics	Categories	N	%
Organisation type	Private[3]	81	40.70	Number of employees	Less than 200	38	14.10
	Public	105	52.76		200-500	58	29.14
	Government owned	13	6.54		501 or more	103	51.76
Total		**199**	**100.0**			**199**	**100.0**
Products or services offers for sale	5 or less	54	27.14	Introduction of new products or services	Seldom	48	24.12
	6-10	24	12.06		Occasionally	72	36.18
	11-12	16	8.04		Fairly often	56	28.14
	21-50	19	9.54		Very often	23	11.56
	51 or more	86	43.22				
Total		**199**	**100.0**	**Total**		**199**	**100.0**

[3] This study examines organisational characteristics across sectors rather than within. It is believed the object of the study does not impact on sector type.

4.1.3.3 Strategy

Abernethy and Guthrie (1994) measured strategy based on Miles and Snow's (1978) strategic typology using an instrument which has been subjected to considerable psychometric assessment on a scale of one to seven. The current study measures strategy using the typologies identified by Porter (1980) of cost leadership and differentiator. Respondents were given a brief description of a 'cost leader' and 'differentiator' organisation. Firstly, cost leader was described as firms that compete by having lower cost for their products and services and are often referred to as having a low cost strategy. In contrast, the differentiator was described as firms that aim to be unique in their industry in customer service and/or product differentiation, and are often referred to as being differentiators. In addition to this, participants were given clarification that firms need not necessarily be at either extreme end of the scale, but may incorporate factors of both strategies. Participants were required to select their firm's strategic orientation that best represented their organisation (Abernethy and Guthrie, 1994) on a scale of one to seven (1 = cost leadership firm and 7 = differentiator). Table 4.5a presents the descriptive statistics relating to the strategies that were identified as the one currently being pursued.

Table 4.5(a): Classification of the responding Firms' Strategy

Strategy	**Number of Firms**	**Percent**
Cost leadership	79	35.0
Differentiator	120	52.0
Firms focus in both strategies*	30	13.0
Total	**229**	**100.0 %**

*Excluded from the statistical analysis

Table 4.5(a), revealed statistical information on the strategies adopted or pursued by respondents. There were 79 firms among the varying industries which were competing using a cost leadership strategic orientation for their products and services; and 120 firms among the various industries which were aiming to be unique in their industry in terms of customer service and/or product differentiation. A further 30 firms were involved in both lower cost and differentiation; however, these firms were not used in the statistical analysis. Table 4.5b presents the strategic orientation, by firms' cost accounting allocation bases and performance measurement systems adopted in their management accounting system.

Table 4.5(b): Strategy type[4]

Strategy type	Method used				**Total**
	TCS + TPM	ABC + TPM	TCS + BSC	ABC + BSC	
Cost leadership firm	29	13	16	21	**79**
Differentiation firm	51	18	29	22	**120**
Total	**80**	**31**	**45**	**43**	**199**

Table 4.5(b), illustrates firms' strategic orientation and management accounting methods adopted. Thus, there were 29 (14.57 %) firms who pursued cost leadership strategy with TCS and TPM methods, 13 (6.53 %) firms who utilised cost leadership firms with ABC and TPM methods, 16 (8.04 %) firms adopted cost leadership with TCS and BSC method, and 21 (10.55 %) firms who pursued a cost leadership strategy with ABC and BSC methods. Additionally, 51 (25.63 %) firms pursued differentiation strategy with TCS and TPM method, 18 (9.05 %) firms combined differentiation strategy with ABC and TPM methods, 29 (14.57 %) firms pursued differentiation

[4] Strategy type by method used crosstabulation

strategy with TCS and BSC and 22 (11.06 %) firms aimed for differentiation by using ABC and BSC methods.

4.1.3.4 Activity-Based Costing

Participants were asked whether they use an ABC system or TCS as cost allocation basis for assigning overheads. Those firms using ABC approach to allocate overhead costs were also surveyed on six ABC variables. These variables were related primarily to the basic framework of Shields (1995), but also to that of Maiga and Jacobs (2003), and Chongruksut (2002). Shields (1995) framework was adopted to measure ABC to enable this study to make comparisons between these authors' studies and the current study under investigation herein. Specifically, data were collected on six ABC variables which support ABC implementation, namely, (1) management support; (2) clear and concise objectives; (3) competitive strategy link; (4) adequate resources; (5) non-accounting ownership; and (6) performance evaluation/compensation (assumed to be closely related to ABC success). These variables were put to respondents using a seven-point Likert scale, ranging from one (strongly disagree) to seven (strongly agree). Further, the length of implementation time of ABC has been considered when measuring the effect of ABC on organisational performance by asking managers how long it has been in use in their organisation. Similarly, this method was also used in the current study.

Following Shields (1995), a principal component analysis with Varimax rotation was used, which produced one factor with total variance of 56.40 percent and eigenvalues greater than one. A reliability check for the ABC measures produced a Cronbach alpha

of 0.84, indicating that the measures were reliable (Pallant, 2005). The loadings of the measures are also consistent with Shields (1995). To compose the measurement for the model, a mean score of the responses to the six items in the questionnaire was computed as the measure of ABC success. Further, each of the variables was found to significantly correlate with one or more of the other variables. Table 4.6 presents these respondents' opinions on the six factors that influenced the success of ABC implementation.

Table 4.6: Factors influencing the success of ABC

Factors influencing the ABC success	N	Minimum	Maximum	Mean	S.D
1- top management support	74	1	7	5.20	1.365
2- clear and concise objectives	74	1	7	4.55	1.284
3- link to competitive strategy	74	1	7	4.55	1.444
4- link to performance evaluation	74	1	7	4.50	1.815
5- adequate resource	74	1	7	4.91	1.425
6- non-accounting ownership	74	1	7	4.34	1.483

Table 4.7 shows a comparison of the length of use for ABC adopters.

Table 4.7: Comparison of ABC adopters and non-adopters

Groups	**Respondents**		**Length of using ABC**				**Total**
	N	%	Less than 6 months	6 months to 1 year	Between 1 to 2 years	Greater than 2 years	
Adopters	74	37.2 %	3	6	11	45	74
*Non-adopters	125	62.8 %					

*Non-adopters are those firms who are still using traditional costing systems to allocate overhead costs by using volume drivers, such as direct labour hours and machine hours.

Table 4.7 further illustrates that there were 74 (37.2 %) companies using ABC in allocating overhead costs, three of which have less than six months experience using ABC, six firms had been using ABC for six months to one year, 11 firms had experience of one to two years and 45 firms had been using ABC for more than two

years. Although there were 125 companies still using traditional costing systems in allocating overhead costs to cost objects by using volume drivers, such as direct labour hours, machine hours and/or direct labour cost, most of these firms provided justification for why they had not implemented ABC. Table 4.8 provides details of their reasons for non-implementation. Based on the literature on difficulties in implementing ABC, the researcher classified the reasons given by 125 respondents for non-implementation of ABC (as shown in Table 4.8) into three issues: technical, behavioural and system issues (Booth and Giacobbe, 1997,1999; Clarke *et al.*, 1999; Innes and Mitchell, 1990b,1997; Shim and Stagliano, 1997).

Table 4.8: Reasons for not implementing ABC

Implementation difficulties	Reasons for not adopting ABC
Technical issues	Not relevant and warranted by type of business (16 firms) Limited value and not relevant to business model (13 firms) Activity does not drive overheads (4 firms) Not enough products offered (3 firms) Lack of resources (13 firms) Lack of cost/ benefits (10 firms) Overhead costs are not largest cost (4 firms) Overheads are only influenced by organisation structure (2 firms) Direct link between cost and product (4 firms) Overheads are allocated based on divisional assets employed (2 firms)
Behavioural issues	ABC benefits do not justify the efforts needed to implement ABC (10 firms) Lack of understanding (7 firms) Management fad that consumes expensive resources for no gain (2 firms) Constantly changing relationships (2 firms) Managers do not understand the concept (5 firms) Limited staff (2 firms) Not valued added (8 firms)
System issues	Full system costly (7 firms) Relatively immaterial level of fixed costs (2 firms) Current system is adequate (13 firms) Single product offered (2 firms) Cost and time consuming (5 firms) High priorities to new computer system implementation (7 firms) It is too complex to implement (4 firms)

4.1.3.5 Balanced Scorecard Performance Management System

This variable was measured firstly by asking the participant whether they use a BSC approach or TPM. Secondly, the BSC variable was measured using the four dimensions consistent with Kaplan and Norton's (1992; 1996) concept of a BSC. It included the twenty items tested by Hoque *et al*. (2001) in their study and, again, utilised by Maiga and Jacobs (2003) in their study. The respondents were asked to indicate on a seven-point Likert type scale, ranging from one (not at all) to seven (to a great extent), their use of particular indicators for each of the different items that represent the various dimensions of a BSC. This enabled a weighted measure to be developed that identifies a cost leader BSC, a differentiator BSC and an overall BSC for use in the hypotheses. To avoid any bias toward organisational performance, overall weighted BSC variables were created for each of the differing strategies, given that each strategy had a different generic BSC because of its strategic focus. In order to control commonality effects of experience and organisation learning, the length of time the BSC has been in use in the organisation was considered when measuring the effect of a BSC on organisational performance by asking managers how long it has been in use in the organisation. Table 4.9 presents counts and percentages of the BSC users and non-BSC users amongst respondents.

Table 4.9: Comparison of the BSC users and non-BSC users

Users	Respondents		Level of implemented the BSC	
	N	**%**	**Department level**	**Whole organisation[5]**
BSC users	88	44.2 %	71	17
*Non-BSC users	111	55.8%		

*****Non-BSC users are those firms who were still using traditional performance measures system

[5] The organisation as a whole level is the corporate level, where BSC measurements are for the entire organisation (strategic business unit).

Table 4.9 also indicates that there were 88 (44.2%) sample companies using BSC as a performance management system. Of those, 71 firms implemented it at a corporate level and 17 firms at the whole organisation level. Additionally, 111 (55.8%) firms were still using traditional performance measures indicators as a performance management system.

Following Maiga and Jacobs (2003), a principal components analysis of 32 measurements was conducted to decide whether to combine them into overall factors. This analysis extracted four factors with eigenvalues greater than one, consistent with Kaplan and Norton's (Kaplan and Norton, 1992,1993,1996) "balanced scorecard". To represent extent of BSC usage, a mean score was calculated for each of the four BSC perspectives. Table 4.10 presents the descriptive statistics, the factor loadings of the items that loaded most highly on each factor after orthogonal (Varimax) rotation, the percentage of variance explained by each factor, and a factor title. The four factors of the principal components analysis accounted for 65.08 per cent (see Appendix D, p 274) of the overall variance, which is considered adequate (Howell, 1997). The Cronbach coefficient alpha statistics for each factor involving aggregation were well above the lower limits of normal acceptability (Nunnally and Bernstein, 1994). The BSC is presented by the aggregate score of all indicators within the alternative perspective, with the highest the scores attributed to users of the BSC approach to a performance measurement system. The Cronbach coefficient alpha statistic for this single indicator was 0.89, indicating that the scale is reliable with the researcher‘s sample.

Table 4.10: Descriptive Statistics and Factor Loadings for Balanced Scorecard Indicators

	Description of variables	Mean	Median	Percentage of variance	Cumulative percentage	Cronbach alpha
1	**Internal Business Perspective**			33.69	33.69	0.90
	% of defective products shipped	2.73	2.00			
	Ratio of good output to total output	2.88	2.00			
	Rate material scrap loss	2.49	1.00			
	Materials efficiency variance	2.86	2.00			
	Manufacturing lead time	2.68	1.00			
	% of shipments returned due poor quality	3.00	2.00			
	On-time delivery	4.53	5.00			
	Labour efficiency	4.20	5.00			
2	**Innovation and Learning Perspective**			14.98	48.67	0.88
	Employee satisfaction	4.73	5.00			
	Investment in training	4.32	5.00			
	Employee turnover	4.43	5.00			
	Intellectual assets	3.75	4.00			
3	**Customer Perspective**			8.65	57.32	0.85
	Customer satisfaction	5.13	6.00			
	No. of customer complaints	4.54	5.00			
	Gains & losses of customers	4.20	5.00			
	Average time from customer contact to sales response	3.63	4.00			
4	**Financial Perspective**			7.76	65.08	0.73
	Shareholder equity/to total assets	4.00	4.00			
	Return on sales	4.77	5.00			
	Return on investment	5.12	6.00			
	Profit per service	4.10	4.00			
	Operating income	4.03	4.00			

4.1.3.6 Organisational Performance

This variable was measured using the four dimensions of perceived organisational performance consistent with Hoque *et al.* (2001), Evans and Lindsay (2002) and Hoque and James (2000). Maiga and Jacob's (2003) study also used three of these dimensions, namely, product quality, customer satisfaction and margin on sales. The study herein used all the dimensions identified by Hoque and James (2001), as this instrument focused not only on financial performance, but also non-financial performance

consistent with the BSC dimensions. Respondents were asked to indicate their organisation's performance compared to that of their direct competitors along the four dimensions of scale ranging from 1= below average, to 7= above average. Table 4.11 presents the descriptive statistics for the variables and the Pearson Correlation Coefficients are presented in the Table 4.12.

Table: 4.11 Descriptive Statistics for Organisational Performance Variables

Variables	Descriptive statistics		
	Mean	Median	Std. deviation
1. Overall Performance:	3.79	3.83	0.65
2. Financial Performance:			
Return on investment	4.38	5.00	1.52
Operating income	4.90	5.00	1.34
Cash flow	4.97	5.00	1.36
Economic valued added	4.10	4.00	1.49
Shareholder equity/to total assets	4.53	5.00	1.39
3. Customer Performance:			
Gains & losses of customer	3.92	4.00	1.29
Customer satisfaction	4.89	5.00	1.12
Avg time from cust. contact to sales res	4.07	4.00	1.22
Service expense per customer	2.60	2.00	1.72
4. Innovation Performance			
Employee satisfaction	4.42	3.80	1.12
No. of new product launches	4.03	4.00	0.99
Performance of innovation process	3.80	4.00	1.13
Intellectual assets	3.52	4.00	1.81
No. of new patents	2.30	2.00	0.99
5. Efficiency Performance			
Materials efficiency variance	2.46	1.00	1.75
Ratio of good output to total output	4.14	4.00	1.28
% of defective products shipped	2.34	1.00	1.81
Manufacturing lead time	2.37	1.00	1.84
Rate of material scrap loss	2.43	2.00	1.47
On-time delivery	4.81	5.00	1.19

N= 199

Table 4.12: Pearson Correlation Coefficients for the Organisational Performance Variables

	Financial performance	Customer performance	Innovation performance	Efficiency performance	Overall performance
Financial performance	1.00	.228†	.278†	.002	.591†
Customer performance		1.00	.319†	.398†	.719†
Innovation performance			1.00	.247†	.641†
Efficiency performance				1.00	.671†
Overall performance					1.00

N = 199; (Two-tailed); * p < 0.10; ** p < 0.05; †p = < 0.01

A principal components analysis was conducted on the organisational performance variables. This variable was measured by 32 indicators, including financial and non-financial factors. Each of the variables was found to significantly correlate with one or more of the other variables. This analysis extracted four factors with eigenvalues greater than one, namely, financial, customer, innovation and efficiency performance. Further, overall performance is the sum of the four variables and is included as a measure of organisational performance. The 32 measurements become 20 measurements after running principal components loading into four variables, namely financial, customer, innovation and efficiency performance.

4.1.3.7 Control Variables

There were three variables considered in this current study as control variables—organisational size, the length of use ABC and length of use of the BSC. Organisational size was measured by the number of employees including small, medium and large firms. Research on the size-innovation issue has yielded mixed results, for example, Gosselin (Gosselin, 1997) finds no statistically significant relationship between

organisational size and the decision to adopt ABM and ABC. However, Blau and McKinley (1979) and Tolbert and Zucker (1983) found a positive relationship between size and innovation. Further, in order to control the commonality effect of experience and organisation learning, the length of implementation time of ABC has been considered when measuring the effect of ABC on organisational performance by asking managers how long it has been in use in their organisation. Similarly, the length of time the BSC has been in use in the organisation was considered when measuring the effect of a BSC on organisational performance by asking managers how long it has been in use in the organisation.

4.1.4 Statistical Design

The quantitative data analysis, together with testing of propositions, involved the use of Statistical Package for the Social Sciences (SPSS) program for statistical analysis. Planned Contrasts Analysis (PCA) was conducted to test the research hypotheses. The research hypotheses aim to determine the differences between firms focus on cost leadership or differentiation strategies when they combine the use of costing systems and performance management systems. When researchers may be only interested in testing a few specific well-defined research hypotheses, PCA is then highly recommended in this situation (Hale, 1977; Keppel, 1989; Keppel and Wickens, 2004). In other words, it is argued that PCA is focused on thoughtful research questions of interest and reflect researchers' rational anticipation. PCA is concerned with the analysis of the contrast differences between the cell means. In many cases, particularly when contrasts for simple effects or interaction effects are required, the PCA is best specified in terms of cell means (Bercken and Voeten, 2004). Here, PCA tests the

statistical significance of differences between each hypothesis cell of cost leader firms and for differentiator firms. The purpose of applying multiple regression in this study is to test the interaction term of strategy, ABC and the BSC on performance and compare the findings of this regression with Maiga and Jacobs's findings (2003). The following regression models were initially employed to test this relationship.

$$\text{Performance} = \alpha_0 + \beta_1 \text{ size} + \beta_2 \text{ Str} + \beta_3 \text{ ABC} + \beta_4 \text{ Overall BSC} + \epsilon \quad \textbf{(1)}$$

$$\text{Performance} = \alpha_0 + \beta_1 \text{ size} + \beta_2 \text{ Str} + \beta_3 \text{ ABC} + \beta_4 \text{ Overall BSC} + \beta_5 \text{ StrxABC} + \beta_6 \text{ StrxOverall BSC} + \beta_7 \text{ ABCxOverall BSC} + \epsilon \quad \textbf{(2)}$$

$$\text{Performance} = \alpha_0 + \beta_1 \text{ size} + \beta_2 \text{ Str} + \beta_3 \text{ ABC} + \beta_4 \text{ Overall BSC} + \beta_5 \text{ StrxABC} + \beta_6 \text{ StrxOverall BSC} + \beta_7 \text{ ABCxOverall BSC} + \beta_8 \text{ StrxABCxOverall BSC} + \epsilon \quad \textbf{(3)}$$

Where: Performance = organisational performance (overall performance, financial, customer, innovation and efficiency performance)
Size = firms size as measured by the number of employees
Str = competitive strategy includes cost leadership and differentiation strategy.
ABC = extent of ABC implementation
Overall BSC = Overall Balanced Scorecard

The above regression models were applied first with organisational size as a control variable, then with the length of use ABC as a control variable and then with the length of use of BSC. A hierarchical regression analysis was used to test the relationship between performance and the interaction of Strategy, ABC and BSC. Performance was regressed on the control, independent variable and moderator variables in the first step. In the second step, the two-way interaction of Strategy and ABC, Strategy and overall BSC, and ABC and overall BSC were entered in the regression and, in the third step, a three way interaction of strategy, ABC and overall BSC was entered in the regression.

Most statistical tests rely upon certain assumptions about the variables used in the analysis. When these assumptions are not met the results may not be trustworthy,

resulting in a Type I or Type II error, or over-or under-estimation of significance or effect size(s). The researcher checked the four assumptions of multiple regression for the additional analysis as Tabachnick and Fidell (2001) describe. Specifically, the researcher assessed the assumptions of sample size, multicollinearity and singularity, outliers and normality, linearity, homoscedasticity, and independence of residuals. The following is a discussion of these assumptions.

Sample Size

Required sample size depends on a number of issues, including the desired power, alpha level, number of predictors, and expected effect sizes. Different authors tend to give different guidelines concerning the number of cases required for multiple regression. According to Tabachnick and Fidell (2001: 117), a rule of thumb for testing individual predictors is to have N >= 104 + m, where m = number of independent variables. Another popular rule of thumb is that there must be at least 20 times as many cases as independent variables. Following Tabachnick and Fidell's (2001) assumptions, the required sample size for this study should be 112 respondents ($N \geq 104 + 8$ predictors). However, given that the multiple regression analysis used in this study is to test the relationship between performance and the interaction of strategy, ABC and the BSC, there were only 74 cases (of 199) relevant to this interaction term. This is a potential limitation of this research.

Several studies that have been conducted in multiple regression analysis in the management accounting field have used a small sample size. Maiga and Jacobs (2003) investigate the interaction effect of BSC and ABC on organisational performance. The authors conducted multiple regression analysis to test this interaction term using a

sample size of 83 responses with 9 predictors. Prajogo's study (2007) also obtained a small sample size, and a multiple regression analysis with moderating effect was used for analysing the relationship between the competitive strategies and quality performance.

Multicollinearity

Multicollinearity can be introduced into a regression with an interaction when the variables are not centred (Marquardt, 1980). Very high levels of Multicollinearity can lead to technical problems in estimating regression coefficients. In this regard, Neter *et al.,* (1990) argue that centring variables will often help minimise these problems. Given this study includes two-way and three-way interaction terms in the regression equation, there is a high level of Multicollinearity. The tolerance value is less than 0.10 and VIF (variance inflation factor) value is above 10. To alleviate this problem, the researcher follows the suggestion of Neter *et al.* (1990) of using the centre mean of ABC variable and BSC variable. After using centre mean of the variables, this problem is treated and the tolerance value is greater than 0.10 and the VIF value less than 10 (the biggest value of VIF 2.80).

Outliers

Multiple regression is very sensitive to outliers. Tabachnick and Fidell (2001, p. 67) argue that the case is an outlier because it has a more severe impact on the value of the regression coefficient than other cases. They also point out that outliers are found in both univariate and multivariate situations, among both dichotomous and continuous variables, among both IVs and DVs, and in both data and results of analyses. In addition, outliers lead to both Type I and Type II errors, frequently with no clue as to which effect they have in a particular analysis. In this regard, the researcher has checked

the outliers as part of the initial data screening process and checked all IVs and DVs. Thus, the procedure followed is that before performing the factor analysis to reduce the number of context factor variables, the researcher checked the outliers of the measurements of ABC variables, the BSC and performance variable. Any measurement concerning outliers has been eliminated. There were no outliers for ABC variables, whilst there were some BSC indicators containingt outliers such as equipment availability, warranty repair cost, service expense per customer and number of new patents. The performance variables also contain some outliers such as sales growth, return on sales, warranty repair costs, investment in training and labour efficiency. Thus, these indicators had been eliminated and the results after performing the factor analysis for the BSC and the performance variables resulted in no outliers for the IVs and the DVs.

Normality, Linearity, Homoscedasticity, Independence of Residuals

These assumptions all refer to various aspects of the distribution of scores and the nature of the underlying relationship between the variables. The researcher checked these assumptions from the residuals scatterplots which are generated as part of the multiple regression procedure. It indicates that the distribution of scores on the DVs is almost normal. Tests of normality of data via Kolmogorov-Smirnov statistic, Shapiro-Wilk, histogram and normal plots revealed normality in the distributions for independent variables. However, descriptive statistics have also taken into account mean and standard deviation, and percentage.

4.2 Qualitative Research Method

The second stage of the research was conducted using case study methodology. The researcher believes that conducting case studies in the second stage of this research is essential to further clarify the subject inquiry and to supplement the quantitative data. This aided the interpretation and enriched the quantitative results and, additionally, to understand and recognise from the participants' point of view—the practice side—the broader meanings of the combined use of ABC and the BSC on perceived organisational performance under alternative competitive strategies. Kaplan (1983; 1984) argues that field-based research is essential for understanding what innovations have been developed, and the subsequent consequences of implementing them.

Furthermore, case studies are being increasingly used as a research method for studying management accounting practices (Chenhall and Langfied-Smith, 1998; Hoque, 2005; Lillis, 2002; Major and Hopper, 2005; Phillips and Louvieris, 2005; Scapens, 1990; Tuomela, 2005; Waweru *et al.*, 2004). These authors suggest that case studies provide a richer understanding of management accounting practices. They further suggest that research using the case study method has direct, in-depth contact with organisational participants, particularly in interviews and direct observations of activities. For example, Major and Hopper (2005) have applied an intensive case study method of implementing ABC in a Portuguese telecommunications firm. The authors of this study used multiple sources, including interview data and document collection, to increase the validity and reliability of the study. Similarly, Phillips and Louvieris (2005) conducted an exploratory case study using the BSC as the theoretical framework to explore and elicit critical success factors in performance measurement. In that study the authors express

their primary aim of using exploratory case studies was to gain insight into the performance measurement processes used by tourism, hospitality, and leisure best practice organisations in the UK. Case study research is qualitative and is considered as the appropriate method for 'how' and 'why' type questions for investigation (Yin, 1989, 2003). In addition, case study research gives the researcher rich information about the phenomena in specific settings (Yin, 2003). Case study interviews were conducted with 15 CFOs and the findings from the interviews were used to support or supplement the survey data (Kerssens-van Drongelen and Bilderbeek, 1999).

4.2.1 Research Design

Ryan *et al.*, (1992) distinguish five categories of accounting case study which are descriptive, illustrative, experimental, exploratory and explanatory case studies. Descriptive case studies are where current practice is described in terms of the procedures adopted. Illustrative case studies are where the researchers explore the implementation and outcomes associated with innovative practices. Experimental refers to where the research concerns the conduct of an experiment in the field, whereby new treatments are applied to sub-units of the site. Exploratory involves a preliminary investigation about how and why particular practices are adopted, whereas an explanatory case study is where research seeks to provide convincing explanations which justify practice choices and facilitate the development of theory.

This study follows an exploratory confirmatory type design using multiple firms. This design explores how innovation techniques such as ABC and the BSC jointly improve perceived organisational performance under alternative competitive strategies for

different industry sectors in Australia. In addition, it explores why some firms use BSC with a traditional costing system, whilst others use ABC with a traditional performance management system, to evaluate their perceived organisational performance.

4.2.2 Case Study Sample

This section describes the case study sample and how it was selected. The third survey sample outlined in section 4.1.1 included an invitation to a face-to-face interview. There were 30 respondents who were willing to be interviewed—fifteen cases were selected, based on the approach adopted by the firms[6]. Data from the survey previously conducted revealed four categories of respondents (see Figure 4.2, p. 93): first, where firms were using a combination of ABC and BSC approaches; second and third categories where firms were using either ABC or BSC within traditional methods; and the final category, where firms were using traditional methods only. Based on these findings, the researcher selected and included these four categories of respondents as case study representatives within two industry sectors, manufacturing and service. Thereby, this selection represents replication logic, not sampling logic, for multiple case studies (Yin, 2003). Table 4.13 illustrates the research matrix used to identify case study members.

Table 4.13: The research matrix of this study

Sector	ABC and BSC	ABC and TPM	TCS and BSC	TCS and TPM	Total
Services	5	1	2	2	10
Manufacturing	1	1	2	1	5
Total	6	2	4	3	15

Source: developed for this research.

[6] Approach adopted by the firm refers to what type of performance management systems and costing systems the firm used. The aim is being to ensure a variety of systems in the selection.

The researcher attempted to add one more manufacturing firms to the ABC and BSC category—unfortunately, all other manufacturing firm respondents who were willing to participate in the interview were not in that category.

4.2.3 Case Study Protocol

Case study protocols include the instruments and the procedures and general rules that should be followed in using the instrument, and can be used to control the contextual environment of studies (Yin, 1994). Controlling the contextual environment is an important consideration in design and application of qualitative research approaches (Emory and Cooper, 1991; Sekaran, 2000), and in case study research designs in particular (Yin, 1994). For this research, a case study protocol was developed to further increase the reliability of the study and to support the quantitative data obtained from the survey. It also became the guide for carrying out the investigation more efficiently (Yin 1994). It is considered that the essential components of a protocol are: an overview of the case study project, field procedures, case study questions and a guide for case study reports (Yin, 2003). How each of these components of the case study protocol was present in the research is discussed next, excluding the guide for the case study report which is, in essence, the case study findings. This whole thesis forms the guide for the case study report, which is the final case study protocol element.

4.2.3.1 An overview of the case study project

A letter of introduction was sent to the participants explaining briefly the background to the study and inviting willing participants to partake in an hour-long interview. Given

the low response rate of two samples initially investigated for the purpose of distributing the questionnaire, it was decided to draw a third sample, together with a call to interested persons for interviews. Further, to enhance the credibility of the research, contact details of the PhD candidate's supervisors were included in the letter for additional clarification and support.

4.2.3.2 Field procedures

The second case study protocol element was the development of field procedures. Thus, in field procedures it is essential to have adequate plans for access and communication with each respondent, required resources needed for each interview and preparation of a time schedule to accommodate interview cancellation (Yin 2003). In this regard, the researcher had scheduled a plan for each interview and emailed each interviewee to confirm the appointment and the interview date; the researcher also contacted each interviewee by phone to confirm receipt of the email and thank each interviewee for their interest in being interviewed. Moreover, for confidentiality purposes, names of organisations are not used in this thesis, therefore, organisations were identified as Case A to O. The respondents agreed to the publication of their names in the acknowledgments section of this thesis and the findings of this study have been sent to respondents who requested them. Table 4.14 indicates the profile of field study firms.

Table 4.14: Profile of field study firms

Case	Strategic orientation	Product or service sales level #	No. of employees ##	New products or services introduced	Industry
A	Cost leadership	1	3	Fairly often	Media
B	Differentiator	5	3	Fairly often	Office supplier
C	Cost leadership	1	1	Fairly often	Drug developer
D	Cost leadership	5	2	Occasionally	Food products
E	Cost leadership	5	3	Occasionally	Education
F	Cost leadership	1	3	Occasionally	Electricity transmission
G	Differentiator	5	3	Fairly often	Banking
H	Differentiator	5	3	Very often	Education
I	Cost leadership	4	3	Seldom	Water supplier
J	Differentiator	1	2	Occasionally	Finance
K	Differentiator	5	3	Fairly often	Education
L	Differentiation	3	2	Fairly often	Clothing products
M	Cost leadership	5	2	Occasionally	Automotive components
N	Differentiator	5	3	Very often	Mining
O	Cost leadership	2	2	Fairly often	Food products

#1= 5 or less, 2 = 6-10, 3 = 11-20, 4 = 21-50, 5 = 51 or more
1 = less than 200, 2 = 200-500, 3 = 501 or more

4.2.3.3 Case study questions

The case study questions were based on the suggestion that the heart of the protocol should focus on a set of substantive questions reflecting the actual inquiry (Yin, 2003). The interview questions were developed based on prior literature, survey questions, previous case studies in management accounting, and the research hypotheses.

Appendix B of this thesis presents the protocol of interview questions used in the 15 cases conducted for data collection purposes. The interview questions focused on the nature of the firm and its competitive environment, as well as questions relating to the research question and the hypotheses. The protocol then concludes by asking interviewees whether there were any further comments regarding their cost accounting system and performance measurement system that they would like to discuss. The interview questions were reviewed by academic staff and the researcher's colleagues prior to interviews to determine if there were any unclear questions or ambiguities.

4.2.4 Case Study Analysis Procedures

Many authors in management accounting have used different techniques to analyse qualitative data (Hoque, 2005; Lillis, 2002; Major and Hopper, 2005; Phillips and Louvieris, 2005; Scapens, 1990; Tuomela, 2005; Waweru *et al.*, 2004). Yin (2003) defined five specific techniques for analysing case studies: pattern matching, explanation building, time-series analysis, logic models and cross-case synthesis. Waweru *et al.*, (2004) adopted a multiple case study approach based on detailed fieldwork of management accounting change in the South African context. Their study analysis focused on cross case analysis and comparison of the results. Lillis (1999) used content analysis and pure grounded theory to evaluate the application of a systematic analytical protocol designed to encourage completeness and impartiality in collection and analysis of qualitative data. In analysing short interviews, a content or thematic analysis approach (a form of semiotic approach widely accepted and used in management accounting research) was appropriate to analyse case study data obtained from the interviews in this research study (Waweru *et al.*, 2004). Content analysis is

defined by Krippendorf (1980) as "a research technique for making replicable and valid inferences from data to their context" (p. 21). Lillis (1999) defined content analysis as "a research methodology that utilises a set of procedures to make valid inferences from test" (p.88).

The steps defined by Gillham (2000) in analysing interviews using the content analysis approach were adopted by the researcher. Gillham argues that a researcher cannot analyse interviews by just listening to them, as each interview must be in written form before it can be analysed. The researcher wrote up each interview fully, and then the steps followed for analysing data were:

1. The researcher went through each interview highlighting substantive themes, themes that make a point and ignoring replications.
2. If the themes were similar and the researcher felt they added something, then they were highlighted with a different colour.
3. The researcher went through and read all the transcripts again. This step ensured that all the important statements were highlighted.
4. After all transcripts were highlighted and reread to make sure nothing was omitted, the researcher devised a set of categories for the responses to each question and assigned a heading to each category.
5. All categories were then re-evaluated and checked for similarities and possible combinations of categories.
6. All transcripts, with the list of categories and substantive (highlighted) theme were checked against the category list to see if they fitted the correct category and whether they needed any changes.
7. All categories were entered in the analysis grid and each cell was checked to denote the presence of this category in the participant's answer.
8. The researcher ticked the relevant cell every time a participant made a statement related to a specific theme that fitted the category. Then a count analysis of the number of ticks in each cell was done to see how many interviewees made the same statements on a specific theme, thus revealing its importance.

9. Having all interviews' transcripts analysed in this fashion provided the material for the final analysis and writing up in conjunction with findings from other sources such as the internet, and the quantitative element.

10. The cross-case analysis was achieved by comparing the categories of the four method used and drawing inferences on similarities and differences.

In summary, the analysis of the transcripts from all interviews following the above-mentioned steps of content or thematic analysis is illustrated in the top-level categories shown in Table 4.15. These categories emerged directly from the answers to all questions and comments made by the interviewees.

Table 4.15: Categories and their Description as Revealed by Interviewees

Category	Description
1	Background of the case study organisations
2	Competitive strategy
3	Firm's competitive environment
4	Importance of product/service pricing to customer and competitors
5	Costing system
6	Performance measurement systems
7	Further comments

According to Yin (1994), there are five basic elements of research deign that are important for case studies: (1) the study's questions or objectives; (2) its propositions or theoretical reasoning, if any; (3) its unit(s) of analysis; (4) the rational linking of the data to the theoretical proposition; and (5) the criteria for interpreting the findings. Encompassing each of these elements requires that the researcher be aware of some of the limitation of case studies, particularly in relation to the issues of control, validity and reliability. These are discussed next and include discussion on how the researcher overcomes these limitations.

4.2.5 Limitations of Case Study

Gaining a richness of understanding from any research strategy, whether it is experimental, survey, archival or fieldwork research does not come without its limitations. For example, it has been argued that case studies are difficult to replicate, provide no comparative data for single case designs or data that may be difficult to compare in multiple case designs, and that their representativeness or generalisability may be unknown or weak (Laughlin, 1990). However, Scapens (1990) and Yin (2003) argue that these criticisms are based on the premise of statistical sampling logic which is inappropriate to case studies. Another common criticism of the case study method is the concept of reliability and construct validity and the trade-off of external for internal validity. These concerns are enhanced by the possibility of researcher bias. Validity in a broad context determines if the study has been conducted in a rigorous, systematic and non-biased manner. Social science research is generally evaluated on the basis of four validity criteria, namely, construct validity, internal validity, external validity and reliability. These are now discussed in turn.

Construct validity

Construct validity refers to whether researchers are measuring what they want to measure. Construct validity depends on (1) assessing the convergence across different measures of the same concept and (2) testing for difference across measures of theoretically dissimilar concepts. These points are endorsed by Cook and Brownell (1979) who argue that an adequately designed research will plan to gather several sources of evidence to be used to establish the 'calibration' of every construct. In this regard the researcher devoted a considerable amount of time and care in developing the

questions posed to interviewees. Structured and semi-structured questioning was employed to reduce the potential of research bias, and to allow the researcher to gather data applicable to ABC, the BSC and Strategy. Thus, to enhance construct validity, the researcher made efforts to refrain from subjective judgements during the periods of research design and data collection.

Furthermore, in the data collection phase, the researcher used data triangulation including structured questionnaires, interview tapes and company websites for protection against researcher bias, whilst in the data analysis phase, reviewing of draft case study transcripts in the report-writing phase was also used. Further, the interview questions posed were developed from, and grounded in, the extant literature on these concepts and were operationalised and clearly explained to each interviewee. In addition, the researcher explained the research model of this study to each participant before commencing the interview; therefore, this explanation resulted in useful information, as well obtaining rich and detailed information as a result of the participants' understanding of the importance of the study.

Internal validity

Internal validity can be determined by assessing whether changes in the dependent variable were caused by changes in the independent variable(s) (Birnberg, Shields *et al.*, 1990). An internally valid study is one in which conclusions can be drawn from a set of observations (Birnberg, Shields *et al.*, 1990). Due to measurement problems, as well as lack of control that can be exhibited over variables, internal validity is often poor in field research (Miles and Huberman, 1994). This can be magnified when there are a number of independent variables involved and the cause and effect relationship nearly

impossible to determine, and may cause rival hypotheses. In experimental studies the researcher is allowed the benefit of controlling these variables, however, in case studies, for the researcher, there is no such benefit (Scapens, 1990). One way in which this particular element of validity can be protected is through the use of data triangulation, where multiple sources of data are used to measure the same construct. This study utilised this method by conducting a structured questionnaire, unstructured, semi-structured interview, and company web sites.

External validity

External validity refers to the degree to which the results of one study hold across other settings and participants (Campbell and Stanley, 1963). Construct validity is a simultaneous condition to external validity because a justifiable conclusion cannot be reached in relation to other settings if the constructs are not adequately formulated. Frequently it is difficult to generalise findings of field research in one or more organisations because generalised results from organisations in the same category are open to enquiry (Birnberg, *et al*. 1990). Even so, Yin (1989, p. 43) argues that case studies are dependent on 'analytical generalisation' which involves assessing the degree to which a single case study relates to a particular theory—as opposed to a number of case studies. Atkinson & Shaffir (1998) lend their support to this statement with their comment:

> "…the tool of statistical generalisation, where sample results are generalised to the large population, is not available to the field researcher. Instead the approach is to use the field research results to develop a theory rather than to speculate directly about the larger population."

Reliability

Reliability in case studies where an independent researcher following exactly the same procedures could have performed the study again and arrived at the same findings or conclusion can be viewed, according to Brownell (1995), in terms of the extent to which it is directed toward the elimination of 'errors and biases'. Becker (1970) asserts that in contrast to more controlled methods of survey instruments, field research does not permit the likelihood of researchers being able to prejudice their results in accordance with their own anticipated outcomes—thereby promoting internal validity relative to other research methods that examine or measure behaviour. Becker (1970, p. 43) further contends that:

> "First, the people the field worker observes are ordinarily constrained to act as they would have in his absence, by the very social constraints whose effects interest him; he therefore has little change, compared to practitioners of other methods, to influence what they do, for more potent forces are operating. Second, the field worker inevitably, by his continuous presence gathers more data and makes many more tests of his hypotheses than researchers who use more formal methods."

To augment case study reliability, all procedures and data should be carefully documented to enable the study to be replicated (Bronwell, 1995). This replication then increases the reliability of the original study. Atkinson and Shaffir (1998, p. 62) note, "at every step the field researcher should be careful to show how the process and analysis has preserved the integrity of both the data and the logic underlying the conclusion". In formulating the research method discussion in this chapter, the researcher has been particularly mindful of the need to describe clearly and unambiguously both data collection and analysis techniques used in this research. In addition to the inherent need to interpret, describe or explain practices, Yin (2003) also purports that the primary aim in conducting field research is not to find correlations or

casual factors among variables but, rather, to interpret or explain practices. This viewpoint is consistent with that of Scapens' (1990) classifications of case studies wherein such classification is reliant on the rationale for the research. Given the particular circumstances of this research, it is, therefore, argued that, overall, the limitations claimed in field research are apt, given the particular circumstances (Birnberg, Shields *et al.*, 1990).

4.3 Ethical Consideration

Ethical consideration is an essential part of any research discipline. It concerns issues of honesty, trust and subjugation (Smith, 2003). Therefore, the main purpose of research ethics is to protect interviewees and organisations from harm or adverse consequences that may result from the research activities. Given the confidential nature of the information obtained, the researcher received approval from the Ethics Committee of the university before conducting the questionnaire survey and collecting the interview data. This approval preserves the rights, liberties and safety of the participants. Interviewees were informed of the main objective and purpose of this research through an introductory letter. The interviewees were also assured of confidentiality of all information provided, and that the names of their organisations would not be used in this thesis.

4.4 Conclusion

This chapter described the research methodology used for the current study. The research design utilised two stages in data collection: the first stage was covered by a questionnaire survey, whilst the second stage was performed by conducting an exploratory confirmatory-type case study design using multiple firms. A pilot study was conducted to confirm the clarity and validity of the questionnaire before distribution. Ethical issues in the research have been considered and discussed. The next chapter presents the results of the quantitative data.

CHAPTER 5

QUANTITATIVE STUDY FINDINGS–SURVEY

5.0 Introduction

This study investigates several related research questions about the relationship between costing systems, performance management systems and competitive strategies. This chapter presents the survey results of this research study and is structured as follows. The first section provides an overview of the statistical tests used to answer the research hypotheses. This is followed by reports on testing the hypotheses using planned contrast analysis. The next section details an additional statistical test using planned contrast analysis to explore the research hypotheses on individual performance items. This is in addition to hierarchical regression analysis which tests the relationship between performance and the interaction of strategy, ABC and the BSC. The chapter then concludes with a brief summary.

Planned Contrast Analysis (PCA) is considered to be the most suitable means of testing the research hypotheses when comparing the differences between the cell means. Planned contrast analysis emphasises mean differences between the cells (Keppel and Wickens, 2004). Here PCA tests the statistical significance of differences between each hypothesis cell[1] of cost leadership firms and differentiation firms (see Table 5.1a). This is in addition to multiple regression analysis applied to

[1] There were five cells tested with each dependent variable: cell one is cost leadership firm using ABC and BSC; cell two is cost leadership firm using ABC and TPM; cell three is cost leadership firm using TCS and BSC; cell four is differentiation firm using ABC and BSC; cell five is differentiation firm using TCS and BSC.

identify any significant interactions between strategy, ABC and the BSC on performance variables, first to extend prior knowledge in the literature and second to compare Maiga and Jacobs' (2003) findings to see whether their results hold in Australia. The aim of the hypotheses tests was to determine the differences on organisational performance between firms who focus on cost leadership or differentiation strategies using a combination of ABC and the BSC. Further, the hypotheses also aim to explore the differences in those firms that only use either ABC or BSC with traditional performance and costing methods. In addition, it explored whether there were any variations between cost leadership firms and differentiation firms in relation to costing systems and performance measurement systems on organisational performance. To further explain, cell one and two address hypothesis one; cell one and three address hypothesis two; cell one and four address hypothesis three; and cell four and five address hypothesis four. The researcher is, therefore, seeking the mean differences between the hypothesis cells and their effect on organisational performance. Table 5.1(a) shows the test of each hypothesis.

Table 5.1(a): Test of each hypothesis

Hypotheses	Test	Cell
H1	PCA	C1: Cost leader firms using ABC and BSC C2 : Cost leader firms using ABC and TPM
H2	PCA	C1: Cost leader firm using ABC and BSC C3: Cost leader firm using TCS and BSC
H3	PCA	C1: Cost leader firms using ABC and BSC C4: Differentiator firms using ABC and BSC
H4	PCA	C4: Differentiator firms using ABC and BSC C5: Differentiator firms using TCS and BSC

Source: developed by the author

5.1 Hypotheses Testing

5.1.1 PCA Using Overall Performance

This section presents the results of tests of the interaction between strategic orientation, costing systems and performance management systems and their effect on organisational performance. However, the dependent variable 'organisational performance' was measured by an overall weight of four items, namely, financial, customer, innovation, and efficiency performance. Table 5.1 presents the descriptive statistics obtained from the PCA for organisational performance with five cells.

Table 5.1: Descriptive statistics for organisational performance

Cell	Strategy type	Costing systems	Performance management systems	Mean	Std. deviation	N [2]
C1	Cost leadership[3]	ABC	BSC	3.67	0.63	21
C2		ABC	TPM	3.80	0.64	13
C3		TCS	BSC	3.82	0.82	16
C4	Differentiation[4]	ABC	BSC	3.99	0.69	22
C5		TCS	BSC	3.84	0.59	29

Table 5.2 provides test results of the research hypotheses. A test of hypotheses H_1, H_2, H_3 and H_4 were conducted to determine whether firms' focusing on cost leadership or differentiation strategies in Australia using ABC and the BSC approaches jointly perform better than firms using a singular use of ABC or BSC.

[2]Neter *et al.* (1990) argue that unequal size sample is not a problem when using simple contrast analysis when the researcher is using survey method.

[3] Cost leader firms that use both TCS and TPM are not presented in the table because it is not relevant to the research hypotheses. There are 29 firms cost leader firms using both TCS and TPM.

[4] Differentiation firms that use both ABC and TPM, and those using both TCS and TPM are not presented in the table because they are not relevant to the research hypotheses. There were 51 differentiation firms using both TCS and TPM, and 18 differentiation firms using both ABC and TPM.

Table 5.2: Planned contrast analysis results of the hypotheses

Hypothesis	Source	Sum of squares	df	Mean square	F
H1	Contrast	0.15	1	0.15	0.35
	Error	80.893	191	0.42	
H2	Contrast	0.22	1	0.22	0.51
	Error	80.893	191	0.42	
H3	Contrast	1.16	1	1.16	**2.74***
	Error	80.893	191	0.42	
H4	Contrast	0.32	1	0.32	0.75
	Error	80.893	191	0.42	

* p< 0.10; ** p< 0.05; † p< 0.01

H_1: Cost leadership firms that use a combination of ABC and BSC will have greater organisational performance than cost leadership firms that use ABC without BSC.

C1 and C2 in Table 5.1 pertain to H_1. The PCA test indicates that there was no difference between the mean of C1 and C2. Table 5.2 substantiates that cost leadership firms using a combination of ABC and BSC were not significantly different to cost leadership firms using ABC and TPM. Subsequently H_1 is not supported ($p = 0.55$).

H_2: Cost leadership firms that use a combination of ABC and BSC will have greater organisational performance than cost leadership firms that use BSC without ABC.

Associated with Table 5.1, C1 and C3 were related to H_2 and present the mean differences between cost leadership firms that use a combination of ABC and BSC, and those using TCS and BSC. In examining the means of C1 and C3, there is no difference between the mean of C1 and the mean of C3; this is confirmed in Table 5.2. Subsequently, it can be inferred that H_2 was also not supported ($p = 0.48$).

H_3: Cost leadership firms that use a combination of ABC and BSC will provide greater organisational performance than differentiator firms that use a combination of ABC and BSC.

C1 and C4 in Table 5.1 identify with H_3 and present the mean differences between cost leadership firms that use a combination of ABC and BSC, and differentiation firms that use a combination of ABC and BSC. Comparing the mean of C1 and C4, the findings are different. The output from Table 5.2 confirms that H_3 is weakly supported by the above-mentioned hypothesis ($p = 0.10$).

H_4: Differentiator firms that use BSC without ABC will provide greater organisational performance than differentiator firms that use a combination of ABC and BSC.

C4 and C5 represent H_4 which compares the mean of differentiator firms that use a combination of ABC and BSC with differentiator firms that use both TCS and BSC. Table 5.1 indicates that there is no difference between the mean of C4 and C5. Table 5.2 indicates that H_4 is not supported ($p = 0.39$).

Given the mostly insignificant results, to explore further, the researcher conducted additional PCA to test the individual performance items, namely, financial performance, customer performance, innovation performance, and efficiency performance.

5.1.2 PCA Using Individual Performance Items

As mentioned, organisational performance is measured using four individual performance items namely financial, customer, innovation, and efficiency performance. To delve further into the effect of ABC and BSC on performance,

additional analysis was conducted using PCA to examine differences between firms using a combination of ABC and BSC on each of the performance items, that is, financial, customer, innovation and efficiency performance, depending on their status as a cost leader or differentiator firm. Further, the PCA also explored differences in those firms that only use either ABC or BSC with traditional methods. The additional analysis conducted at this point categorised the organisational performance variable into the individual organisational performance items. Thus, the researcher placed H_1, H_2, H_3 and H_4 into four equations as showing in Table 5.3(a) to distinguish between testing organisational performance and individual performance items.

Table 5.3(a): Performance Items Equations

H1	E1	*Cost leadership firms that use a combination of ABC and BSC will have greater (a) financial performance (b) customer performance (c) innovation performance (d) efficiency performance than cost leadership firms that use ABC without BSC.*
H2	E2	*Cost leadership firms that use a combination of ABC and BSC will have greater (a) financial performance (b) customer performance (c) innovation performance (d) efficiency performance than cost leadership firms that use BSC without ABC.*
H3	E3	*Cost leadership firms that use a combination of ABC and BSC will have greater (a) financial performance (b) customer performance (c) innovation performance (d) efficiency performance than differentiator firms that use a combination of ABC and BSC.*
H4	E4	*Differentiator firms that use BSC without ABC will have greater (a) financial performance (b) customer performance (c) innovation performance (d) efficiency performance than differentiator firms that use a combination of ABC and BSC.*

Table 5.3 presents the descriptive statistics obtained from the PCA test for each individual organisational performance item. Table 5.4 provides the PCA test results for the individual organisational performance items.

Table 5.3: Descriptive statistics for the individual organisational performance items

Cell	Strategy type	Allocation cost system	Performance management system	Mean	Std. deviation	N
Financial performance:						
C1	Cost leadership	ABC	BSC	4.71	1.06	21
C2		ABC	TPM	4.75	0.68	13
C3		TCS	BSC	3.94	1.23	16
C4	Differentiation	ABC	BSC	4.79	1.03	22
C5		TCS	BSC	4.86	1.28	29
Customer Performance:						
C1	Cost leadership	ABC	BSC	3.64	0.92	21
C2		ABC	TPM	3.63	0.98	13
C3		TCS	BSC	3.95	0.85	16
C4	Differentiation	ABC	BSC	4.41	0.87	22
C5		TCS	BSC	3.90	0.63	29
Innovation performance:						
C1	Cost leadership	ABC	BSC	3.15	0.75	21
C2		ABC	TPM	3.62	0.71	13
C3		TCS	BSC	3.64	0.83	16
C4	Differentiation	ABC	BSC	3.75	0.76	22
C5		TCS	BSC	3.71	0.69	29
Efficiency performance:						
C1	Cost leadership	ABC	BSC	3.17	1.14	21
C2		ABC	TPM	3.21	1.30	13
C3		TCS	BSC	3.75	1.14	16
C4	Differentiation	ABC	BSC	3.02	1.12	22
C5		TCS	BSC	2.88	1.13	29

Table 5.4: Planned contrast analysis results of the individual performances

Hypothesis	Source	Sum of squares	df	Mean square	F
Dependent variable: **Financial Performance**					
E1	Contrast	0.02	1	0.02	0.02
	Error	232.108	191	1.22	
E2	Contrast	5.35	1	5.35	**4.39****
	Error	232.108	191	1.22	
E3	Contrast	0.08	1	0.08	0.07
	Error	232.108	191	1.22	
E4	Contrast	0.05	1	0.05	0.04
	Error	232.108	191	1.22	
Dependent variable: **Customer Performance**					
E1	Contrast	0.00	1	0.00	0.00
	Error	146.072	191	0.77	
E2	Contrast	0.94	1	094	1.23
	Error	146.072	191	0.77	
E3	Contrast	6.51	1	6.51	**8.51**†
	Error	146.072	191	0.77	
E4	Contrast	3.29	1	3.29	**4.30****
	Error	146.072	191	0.77	
Dependent variable: **Innovation Performance**					
E1	Contrast	1.72	1	1.72	**2.97***
	Error	110.574	191	0.58	
E2	Contrast	2.14	1	2.14	**3.69***
	Error	110.574	191	0.58	
E3	Contrast	3.90	1	3.90	**6.73**†
	Error	110.574	191	0.58	
E4	Contrast	0.02	1	0.02	0.04
	Error	110.574	191	0.58	
Dependent variable: **Efficiency Performance**					
E1	Contrast	0.01	1	0.01	0.01
	Error	270.806	191	1.42	
E2	Contrast	3.01	1	3.01	2.12
	Error	270.806	191	1.42	
E3	Contrast	0.25	1	0.25	0.18
	Error	270.806	191	1.42	
E4	Contrast	0.26	1	0.26	0.18
	Error	270.806	191	1.42	

* p< 0.10; ** p< 0.05; † p< 0.01

Table 5.4, $E_{(1)}$ indicates that cost leadership firms using a combination of ABC and BSC are significantly different to cost leadership firms that use both ABC and TPM. This means that cost leader firms using a combination of ABC and BSC have greater innovation performance than cost leader firms that use both ABC and TPM (p =

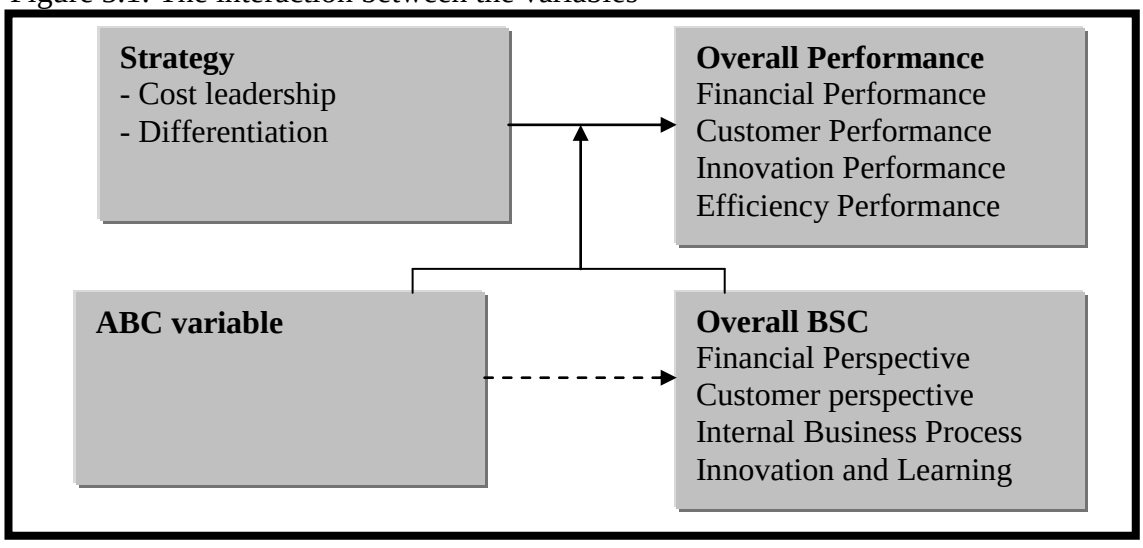
0.086). However, no difference was found for financial, customer and efficiency performance. Associated with Table 5.3, C1 and C3 is related to E_2. Looking at the mean of C1 and C3, there is a difference between the mean of C1 and C3 for financial and innovation performance. In contrast, there is no difference between the mean of C1 and C3 for customer and efficiency performance. Results in Table 5.4, $E_{(2)}$ inform that cost leader firms that use a combination of ABC and BSC have greater financial and innovation performance than cost leader firms that use both TCS and BSC ($p < 0.05$ and $p < 0.10$ respectively). However, no differences were found for customer and efficiency performance. C1 and C4 in Table 5.3 present E_3 and, as can be seen, the mean of C1 and C4 are significantly different for customer and innovation performance, but not for financial and efficiency performance.

Therefore, results from Table 5.4, $E_{(3)}$ infer that cost leader firms that use a combination of ABC and BSC have greater customer and innovation performance than differentiator firms that use a combination of ABC and BSC ($p< 0.01$), but no significant differences were found for both financial and efficiency performance. C4 and C5 presented E_4 which compares the mean of differentiator firms that use a combination of ABC and BSC with those using both TCS and BSC. Table 5.3 indicates that there is a difference between the mean of C4 and C5 for customer performance, whilst there are no differences between the mean of C4 and C5 for financial, innovation and efficiency performance. Results outlined in Table 5.4, $E_{(4)}$ indicate that differentiator firms that use both TCS and the BSC have greater customer performance than differentiator firms that use a combination of ABC and BSC ($p < 0.05$), whilst no differences were found for financial, innovation and efficiency performance.

5.2. Multiple Regression Analysis

To test the interaction effects of strategy, ABC and BSC, one construct was used to measure ABC (Shields 1995), four constructs were used to measure BSC (Hoque *et al.*, 2001), and strategy was of a dichotomous nature—as identified by Porter (1980). As mentioned in the previous chapter, strategy was measured using the typologies identified by Porter (1980) of cost leader and differentiator. ABC variables are related to the basic framework of Shields (1995), whilst the BSC integrates the four perspectives of financial, customer, internal business process, and innovation and learning that are vital to growth and long-term competitiveness. Figure 5.1 illustrates the interaction terms between strategy, ABC and the BSC and dependent variables.

Figure 5.1: The interaction between the variables



A hierarchical regression analysis was used to test for the presence of an interaction of the strategy/ABC/overall BSC on performance. Performance was regressed on the control, independent variable and moderator variables in the first step. In the second step, the two-way interaction of strategy/ABC, strategy/overall BSC, and

ABC/overall BSC were entered in the regression. In the third step, the three way interaction of strategy/ABC/overall BSC was entered in the regression. Further, the regression was first run by controlling organisational size; in the second run, controlling for the length of use of ABC; and, in the third run, controlling for the length of use of the BSC. The data for the regression analysis consists of 74 firms that pursued cost leadership or differentiation strategies that utilise an ABC method as the basis for cost allocation and the BSC as a performance measurement system.

5.2.1 Regressions Controlling for Organisational Size

Table 5.5 presents regression analysis results by controlling for organisational size.

Table 5.5: Regression analysis controlling for organisational size

Panel A: Financial Performance						
	Equation1		**Equation2**		**Equation3**	
	B	t	B	t	B	t
(Constant)	4.574	10.840	4.557	10.548	4.546	10.405
Organisational size	0.025	0.154	0.053	0.323	0.053	0.322
Strategy	0.053	0.241	0.027	0.116	0.041	0.174
ABC	0.132	1.029	0.236	1.314	0.230	1.261
Overall BSC	0.220	**2.035****	0.244	1.467	0.240	1.430
StrxABC			-0.183	-0.698	-0.171	-0.638
StrxBSC			-.016	-0.073	-0.004	-0.020
ABCxBSC			-.136	-1.146	-0.106	-0.660
StrxABCxBSC					-0.067	-0.280
R^2		0.093		0.119		0.120
R^2-change		0.093		0.025		0.001
F-Value		1.779		1.271		1.107

* P< 0.10; ** P< 0.05; † P< 0.01, N = 74

Table 5.5: Regression analysis controlling for organisational size (cont)

Panel B: Customer Performance

	Equation1		**Equation2**		**Equation3**	
	B	t	B	t	B	t
(Constant)	3.784	10.585	3.780	10.455	3.757	10.307
Size	0.099	0.733	0.123	0.901	0.123	0.901
Strategy	-0.442	**-2.370****	-0.506	**-2.630**†	-0.476	**-2.402****
ABC	0.005	0.050	-0.043	-0.286	-0.056	-0.369
Overall BSC	0.446	**4.865**†	0.408	**2.939**†	0.401	**2.865**†
StrxABC			0.208	0.948	0.234	1.047
StrxBSC			0.133	0.716	0.157	0.831
ABCxBSC			-0.128	-1.287	-0.065	-0.484
StrxABCxBSC					-0.140	-0.705
R^2		0.337		0.371		0.376
R^2-change		0.336		0.034		0.005
F-Value		8.778†		5.566†		4.895†

Panel C: Innovation Performance

	Equation1		**Equation2**		**Equation3**	
	B	t	B	t	B	t
(Constant)	3.497	10.574	3.629	11.140	3.621	10.990
Size	0.067	0.536	0.060	0.485	0.060	0.483
Strategy	-0.355	**-2.061****	-0.475	**-2.740**†	-0.465	**-2.595****
ABC	-0.005	-0.049	0.131	0.971	0.127	0.923
Overall BSC	0.217	**2.557****	-0.022	-0.177	-0.025	-0.196
StrxABC			-0.177	-0.896	-0.168	-0.833
StrxBSC			0.445	**2.662**†	0.454	**2.649**†
ABCxBSC			-0.058	-0.647	-0.036	-0.295
StrxABCxBSC					-0.049	-0.274
R^2		0.158		0.243		0.244
R^2-change		0.157		0.085		0.001
F-Value		3.246**		3.027†		2.621**

Panel D: Efficiency performance

	Equation1		**Equation2**		**Equation3**	
	B	t	B	t	B	t
Constant	3.096	6.639	3.195	6.804	3.157	6.683
Size	-0.091	-0.517	-0.141	-0.795	-0.140	-0.790
Strategy	0.285	1.174	0.266	1.065	0.314	1.225
ABC	-0.035	-0.244	-0.109	-0.559	-0.130	-0.659
Overall BSC	0.383	**3.207**†	0.219	1.214	0.207	1.141
StrxABC			0.152	0.532	0.193	0.665
StrxBSC			0.256	1.064	0.295	1.202
ABCxBSC			0.190	1.468	0.289	1.663
StrxABCxBSC					-0.221	-0.858
R^2		0.147		0.199		0.208
R^2-change		0.142		0.051		0.736
F-Value		2.983**		2.337**		2.129**

* P< 0.10; ** P< 0.05; † P< 0.01, N = 74

Table 5.5: Regression analysis controlling for organisational size (cont)

Panel E: Overall Performance						
	Equation1		**Equation2**		**Equation3**	
	B	t	B	t	B	t
(Constant)	3.738	15.957	3.790	15.963	3.770	15.793
Size	0.025	0.281	0.024	0.264	0.024	0.267
Strategy	-0.115	-0.939	-0.172	-1.361	-0.146	-1.127
ABC	0.025	0.344	0.054	0.545	0.043	0.429
Overall BSC	0.316	**5.271†**	0.212	**2.326****	0.206	**2.245****
StrxABC			0.000	-0.001	0.022	0.149
StrxBSC			0.204	**1.678***	0.225	**1.817***
ABCxBSC			-0.033	-0.508	0.021	0.234
StrxABCxBSC					-0.119	-0.917
R^2		0.331		0.363		0.371
R^2-change		0.331		0.032		0.008
F-Value		8.544†		5.369†		4.781†

* P< 0.10; ** P< 0.05; † P< 0.01, N = 74

Table 5.5 shows regression analysis results of the relationship between each performance variable and the interaction of strategy, ABC and the BSC. The two-way interaction terms were obtained by multiplying strategy by the ABC measure, strategy by the overall BSC, and the ABC measure by the overall BSC. The three-way interaction terms were obtained by multiplying strategy by the ABC measure and by the overall BSC.

From the regression output it can be seen that there is no significant organisation size effect for each model in the regression ($p > 0.10$). Table 5.5, equations (1), (2) and (3) indicate that strategy predicts a significant and positive outcome affecting customer and innovation performances ($p < 0.05$ or $p < 0.01$). However, financial, efficiency and overall performance are not significant functions of strategy. Equation (1) shows that overall BSC predicts a significant and positive result affecting financial, customer, innovation, efficiency and overall performance at ($p < 0.05$ or $p < 0.01$). Similarly, equations (2) and (3) show that BSC overall is a significant function of customer and overall performance at ($p < 0.05$ or $p < 0.01$). On the other hand, there is no significant interaction between strategy, ABC and the

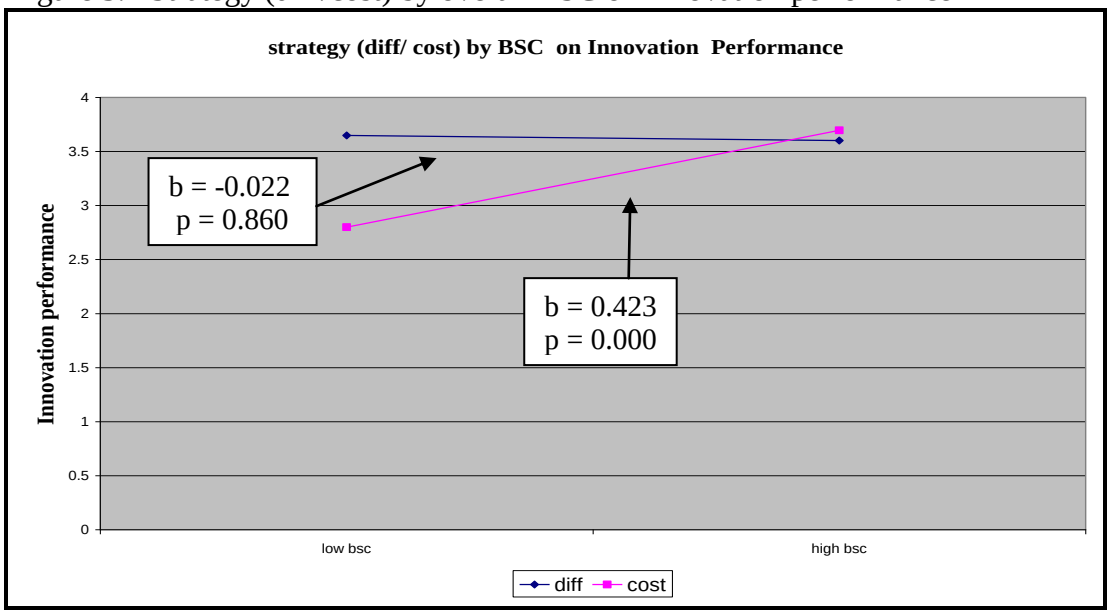
BSC overall affecting financial and customer performance. Furthermore, equations (2) and (3) in Table 5.5 indicate that innovation performance is a significant function of the interaction between strategy and BSC overall ($p < 0.01$).

To understand what this interaction term means requires plotting the regression equation (for example, equation 2) at selected values. In this case it might plot the effect of BSC on innovation performance for cost leadership firm and for differentiation firm separately. Doing this requires selecting values at which to plot using the regression equation (2) in Table 5.5 and then calculate the predicted dependent variable (DV) score for a case with any specific values on the independent variable (IV) that the researcher chooses. This is done simply by substituting those values into the regression equation the researcher has calculated. The following regression equation (2) is presented by the above output as shown in Table 5.5:

Performance = 3.629 + 0.060 * size – 0.475 * strategy + 0.131 * ABC - 0.022 * BSC -0.177 * strategy * ABC + 0.445 strategy * BSC - 0.058 * ABC * BSC.

Plotting the regression with the appropriate value is straightforward for the strategy variable; there are only two values—zero and one, as coded in the original data file. For the continuous variable, BSC, frequently the scaling of variables is arbitrary, such as in this case. It is possible to use values that represent high and low values of BSC, such as one standard deviation above the mean of the sample and one standard deviation below the mean of the sample. Thus, the researcher followed this procedure each time when plotting the interaction term. Figure 5.1 graphs the effect of the interaction of strategy and BSC overall on innovation performance for cost leadership and differentiation firms.

Figure 5.2 Strategy (diff/cost) by overall BSC on innovation performance

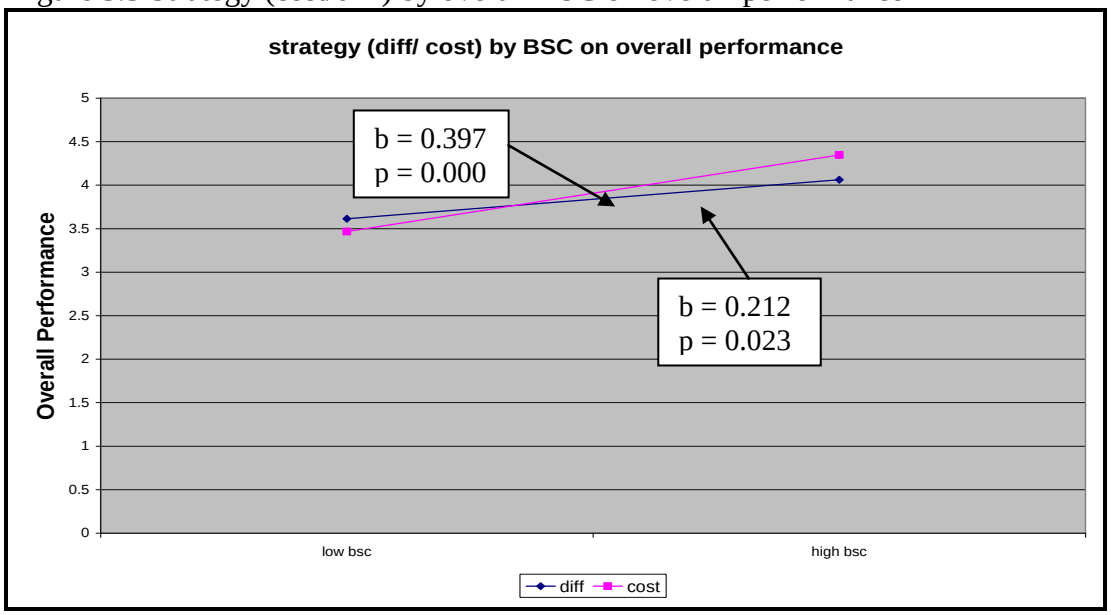


From Figure 5.2, it can be interpreted that for cost leadership firms only, a one unit increase in overall BSC is expected to result in a 0.423 unit increase in innovation performance ($p < 0.001$). Conversely, for differentiation firms only, a one unit increase in the BSC is expected to result in a 0.022 unit decrease in innovation performance ($p = 0.860$). In other words, for cost leadership firms, increasing overall BSC use leads to higher innovation performance, whilst for differentiation firms there is no change[5].

Table 5.5, equation (2), also presents a significant relationship between overall performance[6] and the interaction of strategy and BSC overall ($p < 0.10$). Plotting this interaction in Figure 5.3 demonstrates which strategy is most likely to lead to an increased use of the overall BSC.

[5] The slope line for the strategic differentiator firm is negligible suggesting that there is very little to no change with respect to innovation performance".
[6] Overall performance is referred to as organisational performance. For the purpose of this study, the two are used interchangeably.

Figure 5.3 Strategy (cost/diff) by overall BSC on overall performance



From Figure 2.5, it can be interpreted that for cost leader firms only, a one unit increase in the overall BSC usage is expected to result in a 0.397 unit in overall performance ($p < 0.001$), whilst for differentiator firms only, a one unit increase in the overall BSC usage is expected to result in a 0.212 unit in overall performance ($p = 0.023$). This means that the relationship between the overall BSC and overall performance is stronger for cost leader firms than for differentiator firms. Based on the forgoing results, the researcher conducted further analysis with each individual BSC perspective to test which of the BSC perspectives interact with strategy and ABC. This further analysis employed the following regression models.

$$\text{Performance} = \alpha_0 + \beta_1 \text{ size} + \beta_2 \text{ Str} + \beta_3 \text{ ABC} + \beta_4 \text{ Cust} + \epsilon \quad \textbf{(4)}$$

$$\text{Performance} = \alpha_0 + \beta_1 \text{ size} + \beta_2 \text{ Str} + \beta_3 \text{ ABC} + \beta_4 \text{ Cust} + \beta_5 \text{ StrxABC} + \beta_6 \text{ StrxCust} + \epsilon \quad \textbf{(5)}$$

$$\text{Performance} = \alpha_0 + \beta_1 \text{ size} + \beta_2 \text{ Str} + \beta_3 \text{ ABC} + \beta_4 \text{ customer} + \beta_5 \text{ StrxABC} + \beta_6 \text{ StrxCust} + \beta_7 \text{ StrxABCxCust} + \epsilon \quad \textbf{(6)}$$

Where Performance = financial, customer, innovation, efficiency and overall performance.
Size = firms size as measured by the number of employees
Str = competitive strategy includes cost leadership and differentiation strategy.
ABC = extent of ABC implementation

Cust = Customer perspective (each time BSC perspective inserted into the equation individually)
StrxABC = strategy multiple by ABC
StrxCust = Strategy multiple by customer (each time in the equation, strategy multiple by each of BSC perspectives)
StrxABCxCust = strategy multiple ABC, then multiple by each of BSC perspectives individually.

Table 5.6 below presents a summary of regression analysis for each dependent variable that has a significant interaction with strategy, ABC and BSC perspectives, as well as the direct effect of strategy, ABC or BSC perspectives on each dependent variable.

Table 5.6: A summary of regression analysis controlling for organisational size

Panel A: Financial performance						
	Equation 4		**Equation 5**		**Equation 6**	
	B	t	B	t	B	t
Customer perspective: BSC customer	0.153	**2.240****				
Internal Business Process: ABC			0.310	**1.849***	0.332	**1.971***
Innovation & learning: ABCxInnv			-0.192	**-2.294****		
Panel B: Customer performance						
	Equation 4		**Equation 5**		**Equation 6**	
	B	t	B	t	B	t
Financial perspective:						
Strategy	-0.634	**-3.109**†	-0.718	**-3.328**†	-0.691	**-3.127**†
BSC financial	0.217	**2.739**†				
Customer perspective:						
Strategy	-0.385	**-2.003****	-0.416	**-2.048****	-0.398	**-1.916****
BSC customer	0.269	**4.522**†	0.262	**2.600****	0.265	**2.610****
Internal Business Process:						
Strategy	-0.541	**-2.696**†	-0.543	**2.655**†	-0.552	**-2.594****
BSC business	0.191	**3.062**†	0.150	**1.766***	0.151	**1.762***
Innovation & learning:						
Strategy	-0.484	**-2.285****	-0.508	**-2.280****	-0.431	**-1.862***
BSC innovation	0.163	**2.083****				

* P< 0.10; ** P< 0.05; † P< 0.01; N = 74

Table 5.6: A summary of regression analysis controlling for organisational size (cont)

Panel C: Innovation performance						
	Equation 4		**Equation 5**		**Equation 6**	
	B	t	B	t	B	t
Financial perspective:						
Strategy	-0.440	**-2.474****	-0.608	**-3.428**†	-0.605	**-3.318**†
StrxFinan			0.427	**3.221**†	0.490	**3.158**†
Customer perspective:						
Strategy	-0.343	**-1.929***	-0.443	**-2.375****	-0.452	**-2.369****
BSC customer	0.110	**1.994****				
StrxCust			0.232	**1.949***	0.231	**1.925***
Internal business process:						
Strategy	-0.417	**-2.335****	-0.433	**-2.448****	-0.428	**-2.323****
StrxBusin			0.231	**2.011****	0.236	**1.884***
Innovation & learning						
Strategy	-0.284	**-1.724***	-0.294	**-1.689***		
BSC innovation	0.240	**3.940**†	0.249	**2.537****	0.251	**2.509****
Panel D: Efficiency performance						
	Equation 4		**Equation 5**		**Equation 6**	
	B	t	B	t	B	t
Financial perspective:						
ABCxFinan			0.237	**2.254****	0.354	**2.636**†
Customer perspective:						
BSC customer	0.140	**1.746***				
Internal business process:						
BSC business	0.399	**6.224**†	0.289	**3.390**†	0.287	**3.335**†
StrxBusin			0.226	**1.697***		
Panel E: Overall performance						
	Equation 4		**Equation 5**		**Equation 6**	
	B	t	B	t	B	t
Financial perspective:						
Strategy	.0245	**-1.773***	-0.333	**-2.358****	-0.292	**-2.041****
BSC financial	0.130	**2.415****				
StrxFinan			-0.256	**2.420****	0.236	**2.229****
Customer perspective:						
BSC customer	0.168	**4.138**†				
Internal Business Process:						
BSC business	0.167	**4.208**†	0.099	**1.872***	0.101	**1.886***
StrxBusin			0.157	**1.894***		
Innovation & learning:						
BSC innovation	0.125	**2.406****	0.140	**1.684***	0.154	**1.842***

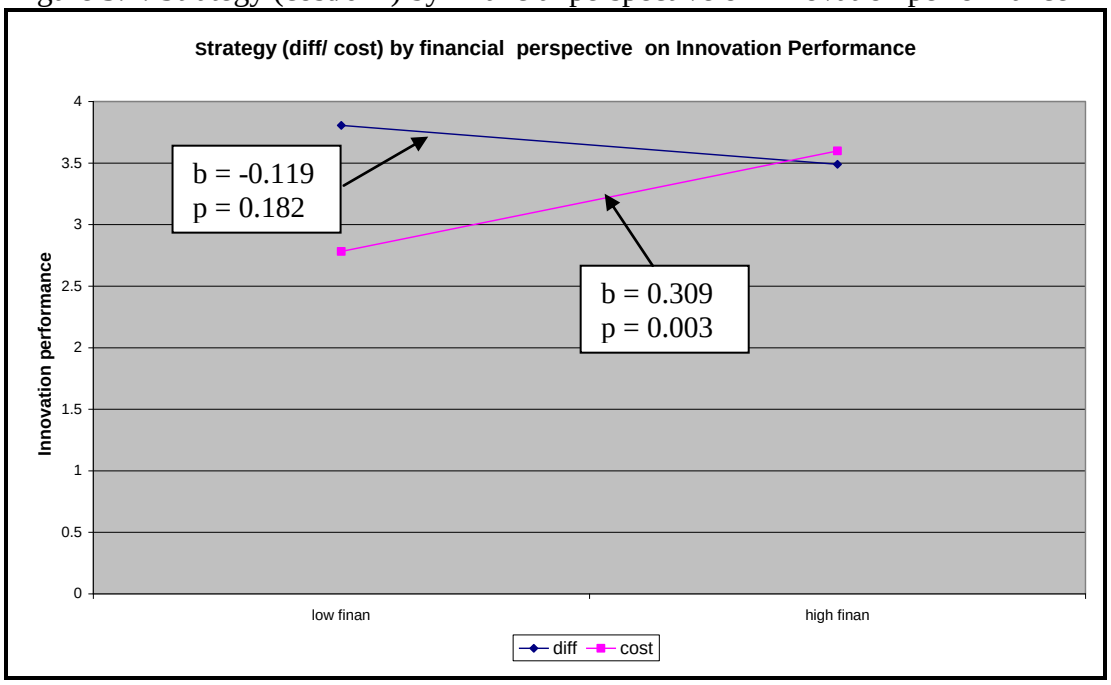
* P< 0.10; ** P< 0.05; † P< 0.01; N = 74

Results from Table 5.6, equations (4), (5) and (6), show that strategy predicts a strongly significant impact on customer and innovation performance within each BSC perspective entered in the equations at ($p < 0.05$ or $p < 0.01$). In addition, strategy has a significant impact on overall performance when the financial perspective is entered in the equations (4), (5) and (6). On the other hand, there is no significant impact of strategy on financial or efficiency performance. Furthermore,

equations (4) and (5) indicate that ABC has only a slightly significant ($p < 0.10$) and positive impact on financial performance when the internal business process perspective is entered into the equations. Table 5.6, equation (4), show that the BSC‘s financial perspective has a significant and positive impact on customer performance when the BSC’s financial perspective is entered into the equation.

Results in Table 5.6 also reveal that the BSC customer perspective has a significant and positive impact on financial, customer, innovation, efficiency and overall performance. The BSC internal business process predicts a significant and positive impact on customer, efficiency and overall performance. The BSC innovation and learning perspective also predicts a significant and positive impact on innovation, customer and overall performance. Further, from Table 5.6, equation (5), it can be inferred that financial performance is a significant function of the interaction between ABC and the BSC innovation and learning perspective ($p < 0.05$). In contrast, equation (5) indicates that efficiency performance is a significant relationship of the interaction between ABC and the BSC financial perspective ($p < 0.05$). Results in Table 5.6, equations (5) and (6), also demonstrate the strong relationship of the interaction between strategy and the BSC’s financial perspective on innovation performance ($p < 0.01$). To understand this interaction term, Figure 5.4 plots strategy by the BSC financial perspective on innovation performance.

Figure 5.4: Strategy (cost/diff) by financial perspective on innovation performance



As can be seen from Figure 5.4, for cost leadership firms, increased use of the BSC's financial perspective leads to higher innovation performance (p = 0.003). In contrast, for differentiation firms, increased use of the financial perspective leads to a decrease in innovation performance (p = 0.182). Results from Table 5.6 equation (5), also indicate that overall performance is a significant and positive function of the interaction between strategy and the BSC's financial perspective. Figure 5.5 illustrates this interaction term.

Figure 5.5: Strategy (cost/diff) by financial perspective on overall performance

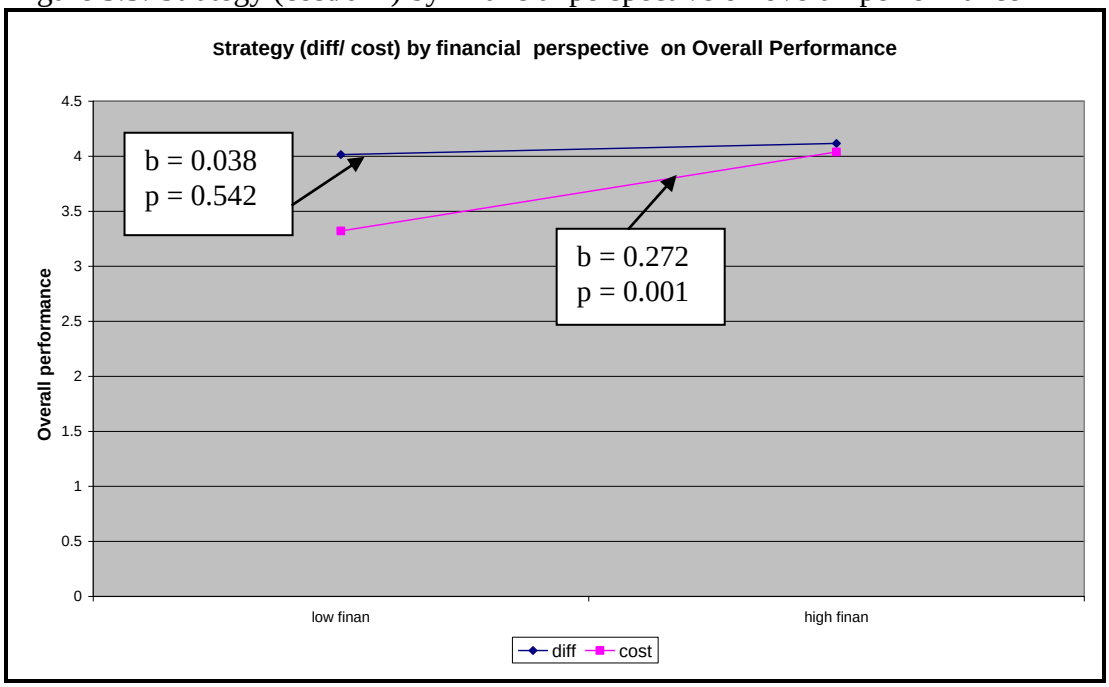


Figure 5.5 shows that for cost leader firms, increased use of the BSC's financial perspective leads to increase overall performance ($p < 0.01$). For differentiator firm, increased use of the BSC's financial perspective leads to a negligible increase in overall performance ($p = 0.54$).

Results in Table 5.6, equation (5), reveal that innovation performance is a significant function of the interaction between strategy and the BSC's customer perspective ($p < 0.10$). Figure 5.6 presents the interaction term to see which strategy type leads to increased use of BSC customer perspective.

Figure 5.6: Strategy (cost/diff) by customer perspective on innovation performance

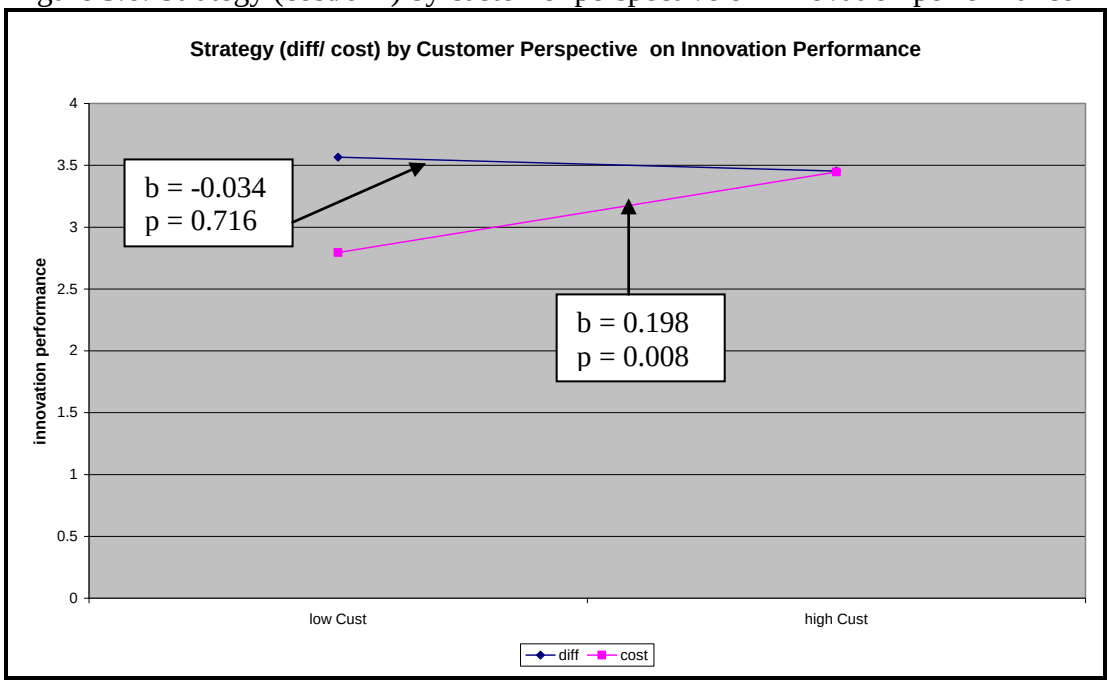


Figure 5.6 indicates that for cost leader firms, a one unit increase in the customer perspective is expected to result in a 0.198 unit increase in innovation performance (p = 0.008). For differentiation firm only, increased use of the customer perspective leads to a decrease in innovation performance by - 0.034 units (p = 0.716).

Results in Table 5.6, equation (5), show that innovation performance is a significant function of the interaction between strategy and the BSC's internal business process ($p < 0.05$). Figure 5.7 graphs this interaction between strategy and internal business process on innovation performance.

Figure 5.7: Strategy (cost/diff) by internal business process on innovation performance

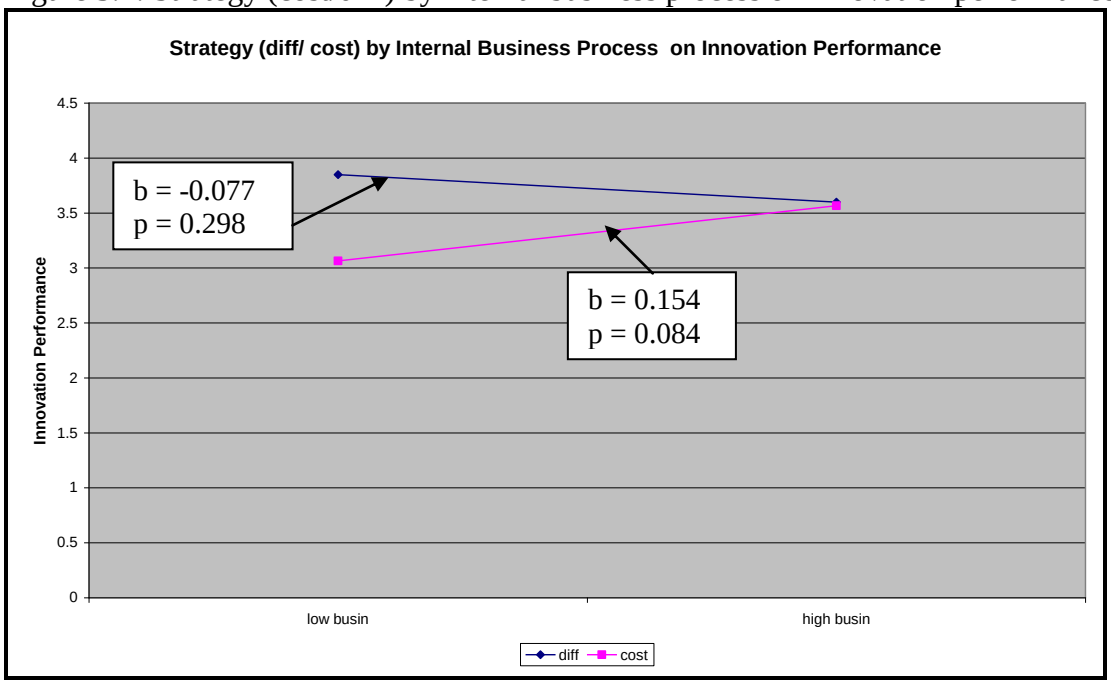
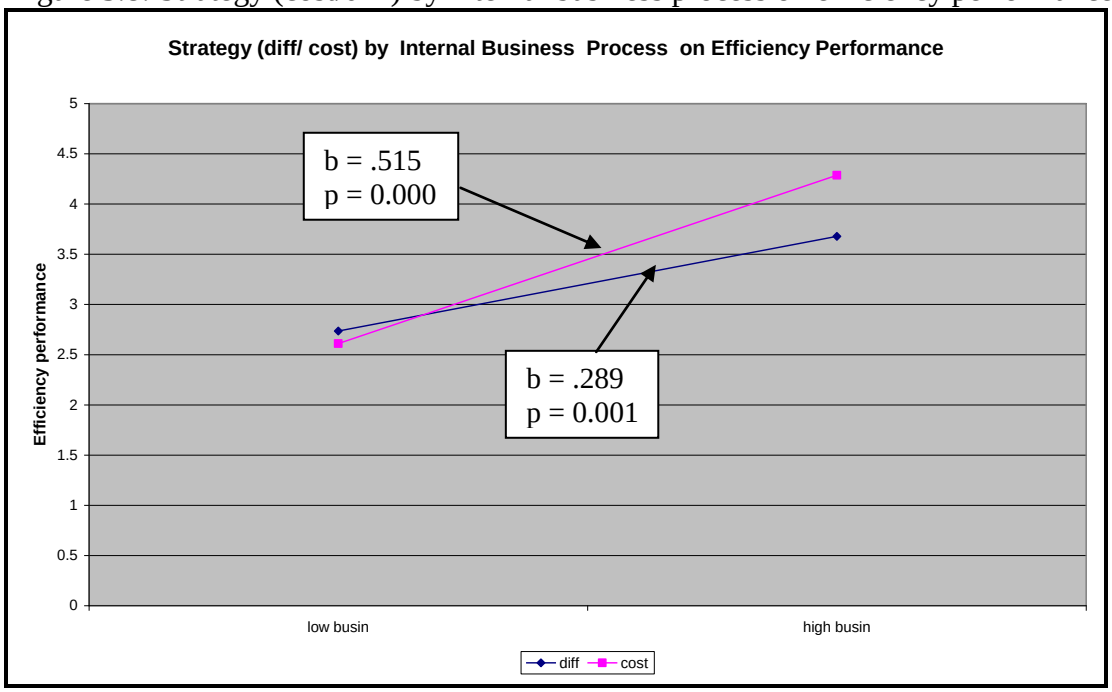


Figure 5.7 shows that for cost leader firms only, increased use of the BSC's internal business process leads to an increase in innovation performance of 0.154 units. For differentiator firms only, increased use of the BSC's internal business process leads to a decrease in innovation performance of -0.077 units.

Table 5.6 equation (5) reveals that efficiency performance is a significant function of the interaction between strategy and the BSC internal business process ($p < 0.10$). Plotting this interaction indicates which strategy type leads to increased use of the BSC's internal business process. Figure 5.8 illustrates this interaction between strategy and the BSC internal business process on efficiency performance.

Figure 5.8: Strategy (cost/diff) by internal business process on efficiency performance



From Figure 5.8 it can be interpreted that for cost leader firms only, a one unit increase in the BSC's internal business process is expected to result in a 0.515 unit increase in efficiency performance (p = 0.000). Further, for a differentiator firm only, a one unit increase in the BSC's internal process is expected to result in a 0.289 unit increase in efficiency performance (p = 0.001).

Results in Table 5.6 equation (5) indicate that overall performance is a significant positive function of the interaction between strategy and the BSC's internal business process ($p < 0.05$). Figure 5.9 graphs this interaction to see which type of strategy leads to increased use of the BSC internal business process in overall performance.

Figure 5.9: Strategy (cost/diff) by internal business process on overall performance

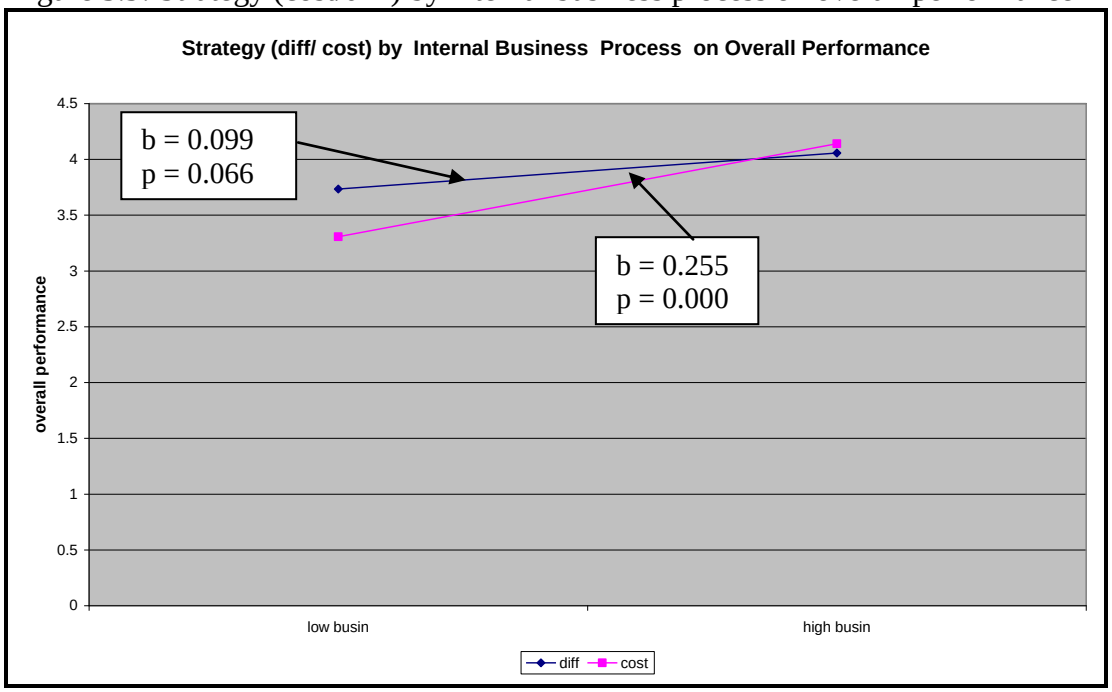


Figure 5.9 shows that for cost leadership firms only, a one unit increase in the internal business process perspective is expected to result in a 0.255 unit increase in overall performance ($p < 0.001$). For differentiation firms only, a one unit increase in the internal business process perspective is expected to result in a 0.099 unit increase in overall performance ($p = 0.066$).

5.2.2 Regressions Controlling for the Length of ABC Use

Controlling for weight of ABC use, and as mentioned earlier, the second run of the regression analysis was performed by controlling for the length of ABC use—implementing a similar procedure of regression analysis to that used when controlling for organisational size. Table 5.7 presents the regression analysis results by controlling the length of use of ABC.

Table 5.7: Regression analysis controlling for the length of ABC use

Panel A: Financial performance						
	Equation 4		**Equation 5**		**Equation 6**	
	B	t	B	t	B	t
(Constant)	4.311	8.501	4.539	8.278	4.506	8.278
Length of use ABC	0.094	0.668	0.043	0.283	0.048	0.317
Strategy	0.033	0.149	0.019	0.080	0.034	0.141
ABC	0.109	0.835	0.218	1.177	0.209	1.109
BSC	0.214	**1.981***	0.230	1.361	0.225	1.313
StrxABC			-0.177	-0.669	-0.162	-0.598
StrxBSC			-0.001	-0.005	0.014	0.060
ABCxBSC			-0.123	-1.016	-0.087	-0.530
StrxABCxBSC					-0.075	-0.315
R^2		0.099		0.118		0.120
R^2-change		0.078		0.019		0.001
F-Value		1.896		1.267		1.106
Panel B: Customer performance						
	Equation 4		**Equation 5**		**Equation 6**	
	B	t	B	t	B	t
(Constant)	4.299	9.970	4.351	9.453	4.297	9.138
Length of use ABC	-0.079	-0.659	-.078	-0.615	-0.068	-0.532
Strategy	-0.420	**-2.228****	-0.481	**-2.456****	-0.455	**-2.270****
ABC	0.012	0.112	-0.031	-0.197	-0.045	-0.288
BSC	0.449	**4.884**†	0.417	**2.936**†	0.408	**2.845**†
StrxABC			0.186	0.838	0.212	0.933
StrxBSC			0.121	0.640	0.146	0.752
ABCxBSC			-0.128	-1.268	-0.070	-0.504
StrxABCxBSC					-0.126	-0.630
R^2		0.336		0.367		0.371
R^2-change		0.335		0.031		0.004
F-Value		8.739†		5.468†		4.790†
Panel C: Innovation performance						
	Equation 4		**Equation 5**		**Equation 6**	
	B	t	B	t	B	t
(Constant)	3.550	8.891	3.505	8.496	3.478	8.233
Length of use ABC	0.033	0.296	0.078	0.686	0.083	0.719
Strategy	-0.360	**-2.064****	-0.492	**-2.804**†	-0.479	**-2.659**†
ABC	-0.019	-0.185	0.102	0.730	0.094	0.664
BSC	0.214	**2.513****	-0.044	-0.346	-0.049	-0.377
StrxABC			-0.164	-0.823	-0.151	-0.741
StrxBSC			0.470	**2.776**†	0.483	**2.772**†
ABCxBSC			-0.037	-0.410	-0.007	-0.058
StrxABCxBSC					-0.064	-0.357
R^2		0.156		0.246		0.247
R^2-change		0.155		0.090		0.001
F-Value		3.186**		3.071†		2.667**

* P< 0.10; ** P< 0.05; † P< 0.01; N = 74

Table 5.7: Regression analysis controlling for the length of ABC use (cont)

Panel D: Efficiency performance						
	Equation 4		**Equation 5**		**Equation 6**	
	B	t	B	t	B	t
(Constant)	3.763	6.819	3.467	5.844	3.386	5.592
Length of use ABC	-0.259	-0.694	-0.178	-1.091	-0.163	-0.991
Strategy	0.340	1.410	0.304	1.205	0.342	1.324
ABC	0.031	0.221	-0.040	-0.202	-0.063	-0.309
BSC	0.400	**3.398†**	0.269	1.473	0.256	1.386
StrxABC			0.121	0.422	0.159	0.546
StrxBSC			0.199	0.816	0.236	0.947
ABCxBSC			0.142	1.085	0.230	1.296
StrxABCxBSC					-0.191	-0.738
R^2		0.178		0.205		0.212
R^2-change		0.166		0.027		0.007
F-Value		3.774†		2.436**		2.185**
Panel E: Overall performance						
	Equation 4		**Equation 5**		**Equation 6**	
	B	t	B	t	B	t
(Constant)	3.981	14.137	3.965	13.173	3.917	12.770
Length of use ABC	-0.053	-0.676	-0.34	-0.409	-0.025	-0.300
Strategy	-0.102	-0.827	-0.162	-1.269	-0.140	-1.068
ABC	0.033	0.461	0.062	0.612	0.049	0.473
BSC	0.319	**5.317†**	0.218	**2.349****	0.210	**2.245****
StrxABC			-0.008	-0.058	0.015	0.098
StrxBSC			0.197	1.596	0.220	**1.737***
ABCxBSC			-0.037	-0.554	0.017	0.183
StrxABCxBSC					-0.114	-0.873
R^2		0.335		0.364		0.371
R^2-change		.0335		0.029		0.007
F-Value		8.685†		5.390†		4.795†

* P< 0.10; ** P< 0.05; † P< 0.01; N = 74

From Table 5.7 it can be seen that regression output revealed no statistically significant relationship exists between the length of implementation time of ABC and overall performance and each of the individual performance items ($p > 0.10$). Strategy predicts a significant impact on customer and innovation performance ($p < 0.05$ or at $p < 0.01$). Equations (4), (5) and (6) in Table 5.7, show that, overall, BSC has a significant and positive effect on customer and overall performance ($p < 0.01$ or at $p < 0.05$). This is similar to the equation (1) for financial, innovation and efficiency performance ($p < 0.10$, $p < 0.05$ and $p < 0.01$ respectively). Further, equations (5) and (6) reveal a significant relationship between innovation performance and the interaction of strategy and overall BSC ($p < 0.01$, $p < 0.01$ respectively). Understanding this interaction term necessitated plotting, for example;

equation (5) to see which strategy leads to increase of the overall BSC on innovation performance. All the interaction figures for controlling for the length of use ABC and the length of the BSC implementation are presented in Appendix C of this thesis.

The slope line (see Figure 5.10 in Appendix C) of the interaction between strategy and overall BSC on innovation performance indicates that for cost leadership firms only, increasing overall BSC use leads to increased innovation performance by 0.426 units ($p < 0.001$). For differentiation firms only, increasing overall BSC use leads to a decrease in innovation performance by -0.044 units ($p = 0.731$). In addition, equation (6) in Table 5.7 also shows that overall performance impacts significantly on the interaction of strategy and overall BSC ($p < 0.10$). The plotting of this interaction (see Figure 5.11 in Appendix C) results in, for cost leader firm only, a one unit increase in overall BSC and is expected to result in a 0.429 unit increase in overall performance ($p < 0.001$). For differentiation firms only, a one unit increase in overall BSC is expected to result in a 0.210 unit increase in overall performance ($p = 0.028$).

Given that overall BSC has a significant effect on financial, customer, innovation, efficiency and overall performance, the researcher conducted further analysis to test which of the BSC perspectives interact with strategy and ABC. Similarly, equation models 4, 5 and 6 were employed here for this further analysis. Table 5.8 presents a summary of regression analysis for overall performance and each individual performance item that has a significant interaction with strategy, ABC and the BSC perspectives.

Table 5.8: A summary of regression analysis controlling for the length of use ABC

Panel A: Financial performance						
	Equation 4		**Equation 5**		**Equation 6**	
	B	t	B	t	B	t
Customer perspective:						
BSC Customer	0.149	**2.195****				
Innovation & learning:						
ABCxInnv			-0.183	**-2.165****		
Panel B: Customer performance						
	Equation 4		**Equation 5**		**Equation 6**	
	B	t	B	t	B	t
Financial perspective:						
Strategy	-0.614	**-2.976**†	-0.710	**-3.225**†	-0.686	**-3.036**†
BSC financial	0.211	**2.665**†				
Customer perspective:						
Strategy	-0.369	**-1.907***	-0.398	**-1.958***	-0.384	**-1.858***
BSC customer	0.271	**4.601**†	0.275	**2.784**†	0.276	**2.773**†
Internal business process:						
Strategy	-0.528	**-2.600****	-0.528	**-2.541****	-0.528	**-2.428****
BSC internal business	0.188	3.010†	0.144	**1.708***	0.144	**1.694***
Innovation & learning:						
Strategy	-0.468	**-2.183****	-0.494	**-2.203****	-0.424	**-1.825***
BSC innovation & learning	0.164	2.091**				
Panel C: Innovation performance						
	Equation 4		**Equation 5**		**Equation 6**	
	B	t	B	B	t	B
Financial perspective:						
Strategy	-0.444	**-2.477****	-0.634	**-3.539**†	-0.634	**-3.438**†
StrxFinan			0.448	**3.372**†	0.448	**3.320**†
Customer perspective:						
Strategy	-0.350	**-1.951***	-0.444	**-2.379****	-0.447	**-2.353****
BSC customer	0.110	**2.014****				
StrxCust			0.229	**1.944***	0.228	**1.913***
Internal business process:						
Strategy	-0.425	**-2.362****	-0.456	**-2.552****	-0.453	**-2.437****
StrxBusin			0.236	**2.110****	0.238	**1.988***
Innovation & learning						
Strategy	-0.287	**-1.720***				
BSC innovation & learning	0.238	**3.892**†	0.247	**2.505****	.0248	**2.476****
Panel D: Efficiency performance						
	Equation 4		**Equation 5**		**Equation 6**	
	B	t	B	t	B	t
Financial perspective:						
ABCxFinan			0.243	**2.330****	0.372	**2.807**†
Customer perspective:						
BSC customer	0.139	1.766*				
Internal business process:						
BSC internal business	0.401	**6.412**†	0.310	**3.725**†	0.310	**3.693**†
Panel E: Overall performance						
	Equation 4		**Equation 5**		**Equation 6**	
	B	t	B	t	B	t
Financial perspective:						
Strategy	-0.235	**-1.689***	-0.330	**-2.301****	-0.287	**-1.975***
BSC financial	0.128	**2.403****				
StrxFinan			0.257	**2.412****	0.238	**2.234****

* P< 0.10; ** P< 0.05; † P< 0.01; N = 74

Table 5.8: A summary of regression analysis controlling for the length of ABC (cont)

Panel E: Overall performance						
	Equation 4		**Equation 5**		**Equation 6**	
	B	t	B	t	B	t
Customer perspective:						
BSC customer	0.167	**4.152**†				
Internal business perspective:						
BSC internal business	0.166	**4.188**†	0.099	**1.901***	.0100	**1.896***
StrxBusin			0.157	**1.933***	0.146	**1.683***
Innovation & learning:						
BSC innovation	0.126	**2.427****			0.151	**1.813***

* P< 0.10; ** P< 0.05; † P< 0.01; N = 74

Results in Table 5.8, equations (4), (5) and (6), show that strategy has a significant relationship with customer, innovation and overall performance at ($p < 0.10$, $p < 0.05$ or $p < .01$) each time the BSC perspectives (financial, customer, internal business process and innovation and learning perspectives) is entered into the regression equation. Equation (4) in Table 5.8 reveals that BSC financial perspective has a significant positive relationship with customer and overall performance ($p < 0.05$). BSC customer perspective also has a significant positive relationship with financial, customer, innovation, efficiency and overall performance. In addition, BSC internal business process has a significant relationship with customer, efficiency and overall performance at ($p < 0.10$, 0.05 or p at 0.01), whilst BSC innovation and learning perspective has a significant and positive relationship with customer, innovation and overall performance at ($p < 0.05$ or p at < 0.01).

Furthermore, results in Table 5.8, equation (5), indicate that ABC has a significant interaction with the BSC's innovation and learning perspective on financial performance ($p < 0.05$). In contrast, equations (5) and (6) reveal that ABC has a significant and positive interaction with the BSC's financial perspective on efficiency performance ($p < 0.05$, $p < 0.01$ respectively). Equations (5) and (6), show

the positive interaction relationship between strategy and the BSC's financial perspective on innovation performance ($p < 0.01$). To understand this interaction term, the researcher plotted equation (5) to see which strategy type leads to increase use of the BSC's financial perspective (see Figure 5.12 in Appendix C for this interaction graph). The slope line of this interaction shows, for cost leader firms only, a one unit increase in financial perspective is expected to result in a 0.314 unit increase in innovation performance ($p = 0.002$). For differentiation firms only, a one unit increase in financial perspective is expected to result in a -0.134 decrease in innovation performance ($p = 0.131$).

Equations (5) and (6) in Table 5.8 also show that overall performance is a significant function of the interaction between strategy and BSC financial perspective ($p < 0.05$). Understanding this interaction term required plotting the regression, equation (5) for example, at selecting values (see Figure 5.13 in Appendix C for this interaction graph). It can be interpreted from the slope line that for cost leadership firms only, a one unit increase in financial perspective is expected to result in a 0.279 unit increase in overall performance ($p = 0.001$). For differentiation firms only, a one unit increase in financial perspective is expected to result in a 0.022 unit negligible increase in overall performance ($p = 0.754$).

Moreover, results in Table 5.8, equations (5) and (6), show that innovation performance is a significant function of the interaction between strategy and customer perspective ($p < 0.10$). The interaction slope of equation (5) (see Figure 5.14 in Appendix C) revealed that for cost leadership firms only, a one unit increase in customer perspective is expected to result in a 0.200 unit increase in innovation

performance (p = 0.007). For differentiation firms only, a one unit increase in customer perspective is expected to result in a -0.029 decrease in innovation performance (p = 0.753). This means that for cost leadership firms, increasing customer perspective use leads to higher innovation performance, whilst for differentiation firms, there is almost no change.

In contrast, equations (5) and (6) in Table 5.8, show that innovation performance is a significant and positive function of the interaction between strategy and internal business process ($p < 0.05$, and $p < 0.10$ respectively). To understand this interaction term, it required plotting the regression equation (5) to see which strategy leads to increases or decreases in innovation performance (see Figure 5.15 in Appendix C). The interaction slope line indicates that for cost leadership firms only, a one unit increase in internal business process is expected to result in a 0.153 unit in innovation performance ($p < 0.10$). For differentiation firms only, a one unit increase in internal business process is expected to result in a -0.083 unit decrease in innovation performance (p = 0.52). In addition, results in Table 5.8, equations (5) and (6), indicate that overall performance is a significant and positive function of the interaction between strategy and internal business process ($p < 0.10$). By plotting the regression equation (5), it clarifies which strategy type has increased with overall performance (see Figure 5.16 in Appendix C). The slope line of this interaction indicates that for cost leadership firms only, a one unit increase in internal business process is expected to result in a 0.256 unit increase in overall performance ($p < 0.001$). For differentiation firms only, a one unit increase in internal business process is expected to result in a 0.099 unit increase in overall performance (p = 0.062).

5.2.3 Regressions Controlling for the Length of Use of the BSC

In order to control the commonality effect of experience and organisation learning, the third run of the regression analysis was performed controlling the length of implementation time of the BSC. Table 5.9 presents the results of the regression analysis by controlling the length of use of the BSC.

Table 5.9: Regression analysis controlling for the length of use BSC

Panel A: Financial performance						
	Equation 4		**Equation 5**		**Equation 6**	
	B	t	B	t	B	t
(Constant)	4.567	8.829	4.666	8.770	4.672	8.712
Length of use BSC	0.008	0.060	0.006	0.041	0.001	0.007
Strategy	0.054	0.247	0.030	0.129	0.044	0.185
ABC	0.128	0.995	0.230	1.279	0.225	1.232
BSC	0.220	**2.033****	0.240	1.446	0.236	1.409
StrxABC			-0.186	-0.708	-0.174	-0.647
StrxBSC			-0.013	-0.057	-0.001	-0.003
ABCxBSC			-0.130	-1.106	-0.100	-0.627
StrxABCxBSC					-0.066	-0.276
R^2		0.093		0.117		0.118
R^2-change		0.092		0.024		0.001
F-Value		1.774		1.254		1.092
Panel B: Customer performance						
	Equation 4		**Equation 5**		**Equation 6**	
	B	t	B	t	B	t
(Constant)	4.172	9.417	4.263	9.538	4.278	9.530
Length of use BSC	-0.041	-0.340	-0.051	-0.429	-0.062	-0.515
Strategy	-0.439	**-2.347****	-0.502	**-2.596****	-0.470	**-2.362****
ABC	0.001	0.010	-0.048	-0.317	-0.061	-0.398
BSC	0.444	**4.828**†	0.398	**2.861**†	0.390	**2.782**†
StrxABC			0.205	0.928	0.234	1.039
StrxBSC			0.142	0.765	0.169	.0891
ABCxBSC			-0.116	-1.173	-0.048	-0.357
StrxABCxBSC					-0.151	-0.755
R^2		0.333		0.365		0.371
R^2-change		0.333		0.032		0.006
F-Value		8.620†		5.425†		4.787†

* P< 0.10; ** P< 0.05; † P< 0.01; N = 74

Table 5.9: Regression analysis controlling for the length of use BSC (cont)

Panel C: Innovation performance						
	Equation 4		**Equation 5**		**Equation 6**	
	B	t	B	t	B	t
(Constant)	3.485	8.522	3.611	9.007	3.615	8.944
Length of use BSC	0.050	0.454	0.046	0.428	0.043	0.396
Strategy	-0.351	**-2.036****	-0.470	**-2.712**†	-0.462	**-2.579****
ABC	-0.019	-0.189	0.120	0.882	0.116	-0.846
BSC	0.217	**2.554****	-0.026	-0.207	-0.028	-0.222
StrxABC			-0.182	-0.921	-0.175	-0.864
StrxBSC			-0.449	**2.686**†	0.456	**2.661**†
ABCxBSC			-0.050	-0.562	-0.032	-0.263
StrxABCxBSC					-0.040	-0.223
R^2		0.157		0.242		0.243
R^2-change		0.154		0.085		0.001
F-Value		3.222**		3.017†		2.608**
Panel D: Efficiency performance						
	Equation 4		**Equation 5**		**Equation 6**	
	B	t	B	t	B	t
(Constant)	3.168	5.498	3.139	5.420	3.162	5.449
Length of use BSC	-0.084	-0.538	-0.081	-0.526	-0.099	-0.632
Strategy	0.279	1.148	0.256	1.021	0.308	1.198
ABC	-0.013	-0.092	-0.085	-0.434	-0.105	-0.534
BSC	0.383	**3.206**†	0.228	1.265	0.215	1.185
StrxABC			0.163	0.568	0.208	0.715
StrxBSC			0.247	1.026	0.290	1.181
ABCxBSC			0.171	1.337	0.280	1.613
StrxABCxBSC					-0.241	-0.929
R^2		0.148		0.194		0.205
R^2-change		0.145		0.047		0.011
F-Value		2.2990**		2.274**		2.094**
Panel E: Overall performance						
	Equation 4		**Equation 5**		**Equation 6**	
	B	t	B	t	B	t
(Constant)	3.857	13.323	3.920	13.418	3.932	13.437
Length of use BSC	-0.016	-0.211	-0.020	-0.259	-0.029	-0.371
Strategy	-0.114	-0.934	-0.172	-1.359	-0.145	-1.118
ABC	0.024	0.340	0.054	0.549	0.044	0.439
BSC	0.316	**5.260**†	0.210	**2.309****	0.203	**2.223****
StrxABC			0.000	-0.002	0.023	0.158
StrxBSC			0.206	**1.697***	0.229	**1.845***
ABCxBSC			-0.031	-0.483	0.025	0.285
StrxABCxBSC					-0.125	-0.954
R^2		0.331		0.363		0.372
R^2-change		0.331		0.032		0.009
F-Value		8.531†		5.368†		4.804†

* P< 0.10; ** P< 0.05; † P< 0.01; N = 74

The output from Table 5.9 infers that there is no statistically significant relationship between the length of implementation time of the BSC and each of the dependent variables (DVs). Strategy predicts a positive relationship with customer and innovation performance (see equations 4, 5 and 6 in Table 5.9). Results displayed in

Table 5.9 show that overall BSC has a significant and positive relationship on each DVs at either ($p < 0.05$ or $p < 0.01$). Further, equations (4) and (5) reveal that innovation performance is a significant and positive relationship of the interaction between strategy and overall BSC ($p < 0.01$). To determine which strategy leads to an increased or decreased use of the overall BSC on innovation performance, it necessitated plotting the regression equation (5) (see Figure 5.17 in Appendix C). The slope of this interaction revealed that for cost leader firms only, a one unit increase in overall BSC is expected to result in a 0.423 unit increase in innovation performance ($p < 0.001$). For differentiation firms only, a one unit increase in overall BSC is expected to result in a -0.026 decrease in innovation performance ($p = 0.837$). This means that for cost leader firms, increased use of the overall BSC leads to an increase in innovation performance, whilst in differentiation firms there is no change.

In addition, equations (5) and (6), in Table 5.9 reveal that there is significant interaction between strategy and overall BSC on overall performance ($p < 0.10$). Plotting this interaction term aims to provide an understanding and analysis of which strategy type leads to increased use of the overall BSC on overall performance (see Figure 5.18 in Appendix C). The slope line of this interaction shows that for cost leader firms only, a one unit increase in overall BSC is expected to result in a 0.417 unit increase in overall performance ($p < 0.001$). For differentiation firms only, a one unit increase in overall BSC is expected to result in a 0.210 unit increase in overall performance ($p = 0.024$).

Given that overall BSC has a significant effect on financial, customer, innovation, efficiency and overall performance, the researcher conducted further analysis to test

which of the BSC perspectives interact with strategy and ABC. Table 5.10 presents a summary of the regression analysis results for each dependent variable that has a significant interaction with strategy, ABC and each of BSC perspectives.

Table 5.10: A summary of regression analysis controlling for the length of use BSC

Panel A: Financial performance						
	Equation 4		**Equation 5**		**Equation 6**	
	B	t	B	t	B	t
Customer perspective:						
BSC customer	0.153	**2.240****				
Internal business process:						
ABC			0.308	**1.832***	0.323	**1.913***
Innovation & Learning:						
ABCxInnv			-0.186	**-2.245****		
Panel B: Customer performance						
	Equation 4		**Equation 5**		**Equation 6**	
	B	t	B	t	B	t
Financial perspective:						
Strategy	-0.627	**-3.068**†	-0.716	**-3.311**†	-0.693	**-3.124**†
BSC financial	0.210	**2.658**†				
Customer perspective:						
Strategy	-0.385	**-2.013****	-0.411	**-2.061****	-0.387	**-1.905***
BSC customer	0.272	**4.628**†	0.271	**2.824**†	0.275	**2.846**†
Internal business process:						
Strategy	-0.537	**-2.667**†	-0.542	**-2.646**†	-0.540	**-2.540****
BSC business	0.187	**2.988**†				
Innovation & learning:						
Strategy	-0.482	**-2.267****	-0.502	**-2.250****	-0.426	**-1.838***
BSC innovation	0.161	**2.032****				
Panel C: Innovation performance						
	Equation 4		**Equation 5**		**Equation 6**	
	B	t	B	B	t	B
Financial perspective:						
Strategy	-0.434	**-2.439****	-0.606	**-3.422**†	-0.606	**-3.327**†
StrxFinan			0.435	**3.290**†	0.434	**3.239**†
Customer perspective:						
Strategy	-0.341	**-1.919***	-0.418	**-2.262****	-0.427	**-2.263****
BSC customer	0.110	**2.016****				
StrxCust			0.205	**1.789***	0.204	**1.761***
Internal business process:						
Strategy	-0.413	**-2.312****	-0.432	**-2.444****	-0.427	**-2.330****
StrxBusin			0.230	**2.027****	0.235	**1.914***
Innovation & learning:						
Strategy	-0.275	**-1.673***				
BSC innovation	0.246	**4.025**†	0.244	**2.497****	0.245	**2.464****

* P< 0.10; ** P< 0.05; † P< 0.01; N = 74

Table 5.10: A summary of regression analysis controlling for the length of BSC (cont)

Panel D: Efficiency performance						
	Equation 4		**Equation 5**		**Equation 6**	
	B	t	B	t	B	t
Financial perspective: ABCxFinan			0.234	**2.221****	0.359	**2.681**†
Customer perspective: BSC customer	0.135	**1.704***				
Internal Business process: BSC business	0.399	**6.228**†	0.292	**3.447**†	0.291	**3.406**†
StrxBusin`			0.221	**1.674***		
Panel E: Overall performance						
	Equation 4		**Equation 5**		**Equation 6**	
	B	t	B	t	B	t
Financial perspective: Strategy	-0.243	**-1.761***	-0.333	**-2.357****	-0.292	**-2.044****
BSC financial	0.128	**2.392****				
StrxFinan			0.257	**2.439****	0.239	**2.267****
Customer perspective: BSC customer	0.168	**4.164**†				
Internal business process: BSC business	0.165	**4.172**†	0.096	**1.834***	0.097	**1.837***
StrxBusin			0.161	**1.973***	0.151	**1.708***
Innovation & Learning: BSC innovation	0.125	**2.384****			0.152	**1.821***

* P< 0.10; ** P< 0.05; † P< 0.01; N = 74

Results displayed in Table 5.10, equations (4), (5) and (6), show that strategy predicts a significant relationship with customer, innovation and overall performance at (p < 0.10, 0.05 or at 0.01). Equation (4) reveals that BSC financial perspective has a significant and positive impact on customer performance (p < 0.01); this is similar to overall performance. BSC customer perspective also has a significant and positive relationship with each DV at (p < 0.10, 0.05 or at 0.01). In addition, BSC internal business process shows a significant and positive relationship with customer, efficiency and overall performance at (p < 0.10 or at 0.01). This is similar to BSC innovation and learning (p < 0.05 or 0.01). Further, equations (4) and (5) reveal that financial performance is the only DV that has significant and positive relationship with ABC (p < 0.10). Equation (5) also shows that financial performance has a significant relationship with the interaction between ABC and the BSC's innovation and learning perspective (p < 0.05). In contrast, equations (5) and (6) indicate that

efficiency performance has a significant relationship on the interaction between ABC and the BSC's financial perspective ($p < 0.05$, $p < 0.01$ respectively).

Moreover, equations (5) and (6) show a positive relationship between innovation performance and the interaction of strategy and the BSC's financial perspective ($p < 0.01$). To understand this interaction term, it necessitated plotting the regression equation (5) (see Figure 5.19 in Appendix C). The slope line of this interaction demonstrates that for cost leadership firms only, a one unit increase in financial perspective is expected to result in a 0.309 unit increase in innovation performance ($p < 0.01$). For differentiation firms only, a one unit increase in financial perspective is expected to result in a -0.126 unit decrease in innovation performance ($p = 0.154$).

Equations (5) and (6) also reveal that overall performance has a significant and positive function of the interaction between strategy and financial perspective ($p < 0.05$). Interpreting this interaction required plotting, for example, the regression equation (5) in Table 5.8 (see Figure 5.20 in Appendix C). The slope of this interaction shows that for cost leader firms only, a one unit increase in the use of financial perspective is expected to result in a 0.279 unit increase in overall performance ($p = 0.001$). For differentiation firms only, a one unit increase in financial perspective is expected to result in a slight 0.022 unit increase in overall performance ($p = 0.753$).

Further, equations (5) and (6) in Table 5.10, show a significant interaction between strategy and customer perspective on innovation performance. Understanding this interaction term required plotting, for example, the regression equation (5) (see

Figure 5.21 in Appendix C). The interaction slope shows that for cost leader firms only, a one unit increase in customer perspective is expected to result in a 0.192 unit increase in innovation performance (p = 0.01). For differentiation firms only, a one unit increase in customer perspective is expected to result in a -0.013 unit decrease in innovation performance (p = 0.880). In other words, for cost leader firms, increased use of the BSC's customer perspective leads to an increase in innovation performance, whilst for differentiation firms there is almost no change.

In contrast, equations (5) and (6) indicate that innovation performance is a significant function of the interaction between strategy and internal business process ($p < 0.05$, $p < 0.10$ respectively) (see Figure 5.22 in Appendix C). This interaction slope reveals that for cost leadership firms only, a one unit increase in internal business process is expected to result in a 0.154 unit increase in innovation performance (p = .083). For differentiation firms only, a one unit increase in internal business process is expected to result in a -0.076 unit decrease in innovation performance (p = 0.297). Equation (5) in Table 5.10 indicates that efficiency performance is a significant function of the interaction between strategy and internal business process. Graphing this interaction shows which strategy type leads to increased use of internal business on innovation performance (see Figure 5.23 in Appendix C). The slope line of this interaction reveals that for cost leader firms, increased use of the internal business process leads to a higher increase in efficiency performance ($p< 0.001$) compared to differentiator firms (p = 0.001).

In addition, equations (5) and (6) indicate that overall performance is a significant function of the interaction between strategy and internal business process.

Understanding this interaction term required plotting, for example, the regression equation (5) (see Figure 5.24 in Appendix C). The interaction slope shows that for cost leader firms only, a one unit increase in the internal business process is expected to result in a 0.257 unit increase in overall performance ($p < 0.001$). For differentiation firms only, an increase in the internal business process is expected to result in a 0.096 unit increase in overall performance ($p = 0.071$).

5.2.4 Summary of Regression Results

Overall regression results show almost the same results each time controlling for size, length of use ABC and length of use the BSC[7]. Regression results demonstrate that organisational performance, customer performance and innovation performance are contingent upon the type of strategy pursued by the surveyed firms—whether it is cost leadership or differentiation. Regression outputs also indicate that organisational performance and innovation performance are a significant and positive function of the interaction between strategy and overall BSC, the interaction between strategy and BSC's financial perspective, the interaction between strategy and BSC's customer perspective and the interaction between strategy and BSC's internal business process perspective. Further, efficiency performance predicts a significant positive function of the interaction between strategy and BSC's internal business process.

Overall BSC and BSC's customer perspective predict a significant and positive relationship with organisational performance and each of individual performance items. BSC's financial perspective, BSC's internal business process and BSC's

[7] Regression analysis also has been run to determine any difference as a result of industry. No significant industry groups' effects on performance were found for each model in the regression.

innovation and learning also show a significant and positive relationship with organisational performance and customer performance. Furthermore, BSC's internal business process perspective also has a significant relationship with efficiency performance. In addition, BSC's innovation and learning perspective has a significant and positive relationship with innovation performance. Financial performance is the only variable which has a significant and positive relationship with ABC. In terms of the interaction between ABC and BSC perspective, the regression results show that financial performance is a significant function of the interaction between BSC's innovation and learning perspective and ABC. The regression also shows that efficiency performance is a significant and positive function of the interaction between BSC's financial perspective and ABC.

5.3 Conclusion

This chapter presents quantitative results for the research hypotheses. Using PCA, the findings confirm that H_1 is supported by improved innovation performance; but not by financial, customer, efficiency and overall performance. It also finds that H_2 is supported by enhanced financial and innovation performance, but not with customer, efficiency and overall performance. Further, H_3 is supported by customer and innovation performance, but not with financial, efficiency and overall performance. In addition, H_4 is supported by customer performance, but not with financial, innovation, efficiency and overall performance. Efficiency and overall performance were not supported by any of the hypotheses tests. Furthermore, multiple regression analysis was conducted to test the relationship between each dependent variable and the interaction of strategy, ABC and the BSC. It is noted that from the regression

outputs some of Maiga and Jacobs' (2003) findings hold in the Australian context. For example, this study demonstrates that financial performance is a significant positive function of the interaction between ABC and the BSC's innovation and learning perspective. The regression also demonstrates that efficiency performance is a significant positive function of the interaction between ABC and BSC's financial perspective. The next chapter discusses the quantitative study results.

CHAPTER 6

DISCUSSION OF QUANTITATIVE STUDY FINDINGS

6.0 Introduction

This chapter provides a discussion of quantitative results gathered via a mail-out survey questionnaire to test several related research questions that concern the relationship between costing systems and performance management systems and strategy. The chapter is divided into two sections as follows: Section 6.1 discusses the research hypotheses tested by using PCA. Section 6.2 discusses the results of multiple regression analysis which was conducted as additional analysis to test the relationship between each of the dependent variables and the interaction of strategy, ABC and the BSC. The chapter concludes with an overall summary of the quantitative results.

6.1 Hypotheses

In this section, the hypotheses for this research are discussed in light of the survey findings presented in Chapter Five. Analysis of the hypotheses were performed in four steps using PCA to determine: firstly, whether cost leader firms that use a combination of ABC and BSC provide greater organisational performance than those that use both ABC and TPM; secondly, whether cost leader firms which use a combination of ABC and BSC have greater organisational performance than those that use both TCS and BSC; thirdly, whether cost leader firms that use a combination of ABC and BSC have greater organisational performance than differentiator firms

that use a combination of ABC and BSC; and, finally, whether differentiator firms that use both TCS and the BSC have greater organisational performance than those using a combination of ABC and the BSC.

6.1.1 Hypothesis One

Hypothesis one looked at determining whether there was significant difference between cost leader firms that use a combination of ABC and the BSC and those using both ABC and TPM in organisational performance, stated as:

> *H_1: Cost leadership firms that use a combination of ABC and BSC will provide greater organisational performance than cost leadership firms that use both ABC and TPM*

Results of the planned contrast analysis showed that there was no significant difference in organisational performance between cost leader firms that use a combination of ABC and BSC and cost leader firms that use both ABC and TPM ($F = 0.35$ and $p = 0.55$). H_1 is not supported.

This result is the opposite to what the literature inferred as cost leader firms seek to achieve above-average returns over competitors through low prices by driving all components of activities towards reducing costs. In addition, Porter (1990) suggests that cost leader firms should not ignore differentiation entirely. To attain this advantage, it was expected that using a combination of ABC and the BSC, rather than the singular use of ABC or the BSC, would provide greater performance for firms pursuing this type of strategy. In this way, the study proposed that the combination of a cost accounting system (such as TCS or ABC) and a performance measurement system (such as TPM or BSC) is contingent on the strategy the firm

adopted in deciding whether to implement cost leadership or differentiation strategies. This is particularly pertinent where the market environment is under competitive pressure and management expects to improve the productivity and efficiency of the organisation, as well as enhancing organisational performance to survive.

In the existing literature on MAS there is no empirical study[1] that examined the combined contingent relationship between cost accounting systems and performance measurement systems on performance with competitive strategy. Rather, the literature shows numerous studies that examined each implementation variable separately. For instance, Bergin-Seers and Jago (2007), Prajogo (2007), Debusk and Crabtree (2006), Anand *et al* (2005), Ittner *et al* (2002), Kenney and Affleck-Graves (2001) and Olson and Slater (2002). In particular, Debusk and Crabtree (2006) found that firms that implemented the BSC had improved performance. Prajogo (2007) examined the individual impact of differentiation and cost leadership and their interaction effect on quality performance for manufacturing and non-manufacturing sectors in Australia. The findings of their study indicated that product quality was predicted by differentiation strategy, but not cost leadership strategy. They also found that the relationship between differentiation strategy and quality is moderated by the effect of cost leadership, whereby the higher the cost leadership, the stronger the effect. Kenney and Affleck-Graves (2001) studied the impact of ABC techniques on firm performance in the UK. The study shows that ABC firms outperform matched non-ABC firms in both accounting and market-based measures of performance by approximately 27 percent over the three years beginning on

[1] Maiga and Jacobs‘s study (2003) is the only study that examined the interaction effect of BSC and ABC on manufacturing unit performance. Organisational performance is measured by three dimensions of performance namely, product quality, customer stratification and margin of sales.

January 1 of the year in which the ABC techniques are first implemented. Further analysis also suggests that ABC adds to firm value through better cost controls and asset utilisation, coupled with greater use of financial leverage. A study by Olson and Slater (2002) sought to determine whether benefits can be derived from matching an emphasis in the scorecard to strategy type. They found that high-performing, low-cost defenders place greater emphasis on the financial perspective than do low-performing ones. High-performing, low-cost defenders also place significantly lower emphasis on both the customer and the innovation and growth perspectives than low performers do.

Given the surprisingly insignificant results of H_1 and what has been mentioned in the literature about the benefits of using ABC and the BSC to improve performance, further analysis was conducted to test H_1 on each of the individual performance items. These individual performance items consisted of financial performance, customer performance, innovation performance and efficiency performance. Thus, these were labeled as E_1 (equation) to match H_1 and to distinguish between the test of organisational performance and individual performance items.

> *E1: Cost leadership firms that use a combination of ABC and BSC will provide greater (a) financial performance (b) customer performance (c) innovation performance (d) efficiency performance than cost leadership firms that use both ABC and TPM*

The PCA confirmed that E1 (a), E1 (b) and E1 (d) are not supported by the mentioned equation. This means that there is no significant difference between cost leadership firms that use a combination of ABC and the BSC and those cost leadership firms that use both ABC and TPM for financial performance, customer

performance and efficiency performance. However, the PCA found that E1 (c) was supported. Cost leader firms that use a combination of ABC and BSC have greater innovation performance than cost leader firms that use both ABC and TPM (F = 2.97 and p = 0.086). This means that cost leadership strategy is contingent on a combined use of ABC and the BSC in improving innovation performance. This serves to reinforce the importance of the strong relationship between firms and their employees in understanding their employees' attitude, opinions, motivation and satisfaction. This aspect will lead to improved performance, since it shows employees that their opinions and views are considered important. On the other hand, ensuring employees' satisfaction can greatly increase a firm's chances of successfully launching new products, as well as improving intellectual assets measurement—eventually resulting in improved performance. Drake *et al*. (1999) found that innovative activity can produce a higher or lower level of firm profit when workers have ABC information.

6.1.2 Hypothesis Two

> *H_2: Cost leadership firms that use a combination of ABC and BSC will provide greater organisational performance than cost leadership firms that use both TCS and BSC.*

The PCA revealed that there was no statistical significant difference between cost leader firms that use ABC and the BSC and cost leader firms that use both TCS and BSC on organisational performance. Thus, the finding of H_2 on organisational performance is not supported. This negative result is again in conflict with MAS literature. MAS literature indicates a general consensus regarding the failure of cost

accounting systems based on TCS[2] in meeting the requirements of businesses which operate in today's competitive markets (Cooper, 1988,1989a,1989b,1990; Cooper and Kaplan, 1988,1991; Drury, 2000; Gunasekaran *et al.*, 1999). Ultimately, the information based on TCS leads to a distortion of product and service costs which can, in turn, mislead strategic decisions related to pricing, marketing, customer and profitability. In this regard, cost leadership strategy is characterised by cost control which aims to improve cost reduction, including research and development, and advertising costs. Consequently, for firms that adopt this strategy, ABC is particularly suitable as a means to improve cost reduction and cost information for decision making. However, this debate is not supported according to the results of H_2. The findings of H_2 are inconsistent with several contingency studies that have focused on the relationship between strategy and performance evaluation and reward systems (Govindarajan, 1988; Govindarajan and Fisher, 1990; Gupta and Govindarajan, 1986; Porter, 1980). Again, additional tests of H_2 were conducted for each individual performance item to establish if there is any statistical significance. H_2 was denoted as E_2 to distinguish between testing organisational performance and individual performance items.

> *E_2: Cost leadership firms that use a combination of ABC and BSC will provide greater (a) financial performance (b) customer performance (c) innovation performance (d) efficiency performance than cost leadership firms that use both TCS and BSC.*

[2] This treatment is inadequate for overhead cost allocation and can result in cost distortions; especially in an organisation where a large proportion of overhead costs is higher than labour cost (Cooper, 1988; Raffish, 1991). Gunaskaran *et al.* (1999) point out that TCS distorts cost information by allocating overhead costs based on an inappropriate basis for today's manufacturing/service organisations.

The PCA result reported that E2 (a) is significantly positive supported by the above equation. Thus, cost leader firms that use a combination of ABC and the BSC have greater financial performance than cost leader firms that use both TCS and BSC (F = 4.399, p = 0.037). Thus, it can be inferred that improved financial performance can occur when a cost leader firm combines the use of ABC and the BSC. This finding is consistent with Olson and Slater's finding (2002) that high-performing, low-cost defenders place greater emphasis on the financial perspective than do low-performing ones. E_2 (c) showed a slightly significant positive result for innovation performance (F = 3.692, p = 0.056). Thereby, cost leader firms that use a combination of ABC and the BSC will have greater innovation performance than cost leader firms that use both TCS and BSC. This means that improved innovation performance can occur when a cost leader firm combines the use of ABC and the BSC. This is interpreted to mean that the benefits of using a combination of ABC and the BSC will result in increased innovation performance in the form of increased employee satisfaction, number of new product launches, performance of innovation process, intellectual assets and number of new patents when firms focus on low cost strategy rather than differentiation.

Innes and Mitchell (1990) initiated three case studies in the UK. Two of the cases were manufacturers with one year's experience in organising and implementation of ABC. The third case was a retail distribution company with two years experience with ABC. The three cases studies demonstrated the deficiencies of the cost information produced by TCS. This was well recognised by accountants and managers in the three companies and ABC was viewed as a means of overcoming many of the disadvantages associated with the TCS. Maiga and Jacobs (2003) argue

that the accuracy of cost information obtained by ABC can be viewed as a supportive measurement system for successful implementation of the BSC. E_2 (b) and E_2 (d) were not supported and, in this way, there is no difference for cost leader firms that use a combination of ABC and the BSC and those that use both TCS and BSC in improving customer and efficiency performance.

6.1.3 Hypothesis Three

> *H3: Cost leadership firms that use a combination of ABC and BSC will provide greater organisational performance than differentiation firms that use a combination of ABC and BSC.*

The PCA confirmed that there was a slight difference between cost leader firms that use a combination of ABC and the BSC, and differentiator firms that use a combination of ABC and the BSC on organisational performance ($F = 2.74$ and $p = 0.10$). This indicates that in today's Australian business environment, organisations try to maintain a balance between cost control and quality of their products and services. This makes it compatible with cost leadership strategy, indicating that customers' behaviour is more sensitive to the quality of products and services prices offered by today's firms. To achieve this aim, organisations need to use a combination of ABC system and the BSC. On the other hand, firms are aiming to build a competitive advantage by offering unique products/services which are characterised by features such as quality, innovation, and customer service. This, in turn, is associated with differentiation strategy and in this way organisations need to adhere to the BSC approach. Kaplan and Norton (2001) suggest that financial measures should be supplemented with additional measures that reflect customer satisfaction, internal business processes and the ability to learn and grow. This is in

the form of the BSC which translates the firm's strategy into four perspectives: financial, customer, internal business process, and innovation and learning perspective. Hoque and James (2000) found that overall usage of the BSC was significantly correlated with organisational performance. In a study of financial institutions, Davis and Albright (2004) found that a group of branches that used a BSC outperformed a non-user group on common composite financial performance. An additional test of H_3 was conducted for each individual performance item to find out if there is any statistical significant divergence between them. H_3 is denoted as E_3 to distinguish between the test of organisational performance and individual performance items.

> *E_3: Cost leadership firms that use a combination of ABC and BSC will provide greater (a) financial performance (b) customer performance (c) innovation performance (d) efficiency performance than differentiation firms that use a combination of ABC and BSC*

The PCA results show that E_3 (b) is significant, and positively supports the above equation. Consequently, cost leader firms that use a combination of ABC and the BSC will have greater customer performance than differentiator firms that use a combination of ABC and the BSC (F = 8.507, p = 0.004). This indicates that improved customer performance is contingent on a combined use of ABC and the BSC for cost leader firms. Thus, a combined use of an ABC system and the BSC is associated with firms pursuing a cost leadership strategy to improve customer performance in the form of customer satisfaction, gains and losses of customers, average time from customer contact to sales response, and service expense per customer. Included in the findings of Maiga and Jacobs' study (2003) was the inference that customer satisfaction is a significant function of the interaction

between the BSC customer perspective and an ABC system. The ABC literature argues that ABC helps by allowing organisations to better understand the value of their customers to their bottom-line. Porter (1980; 1985; 1990) also asserts that firms competing on low cost must ensure that their products are competitive on product features such as delivering on time, providing service and warranties, as well as developing technologies to continuously lower costs. Furthermore, Banker *et al*., (2000) found that non-financial measures of customer satisfaction are significantly associated with future financial performance and contain additional information not reflected in past financial measures.

The PCA results also revealed that E3 (c) was positively and significantly supported. This means that cost leadership firms that use a combination of ABC and the BSC have greater innovation performance than differentiation firms that use a combination of ABC and the BSC ($F = 6.729$, $p = 0.01$). Thus, improved innovation performance is contingent on a combined use of ABC and the BSC for cost leader firms. Involving and considering employees in the ABC implementation process can lead to greater success in ABC adoption and result in improvements in performance measurement systems, as well as conclusively enhancing innovation performance. Liberatore and Miller (1998) argue that ABC information can provide a more accurate analysis of the true costs than TCS and, therefore, results in increased profit within alternative distribution channels. ABC also facilitates more accurate future projections of the profitability of alternative distribution channels. In this regard, it can enhance a firm‘s ability to create an effective distribution channel strategy. At the same time, the increased accuracy of assessment of costs obtained by an ABC system can also improve the accuracy of the performance measures of a BSC.

Among the findings of Maiga and Jacobs (2003) is the argument that quality product, customer satisfaction and margin on sale were significantly positive with interaction of BSC learning and growth perspective and ABC. E3 (a), E3 (d) were not supported. This can be interpreted to mean that there is no difference between cost leader firms that use a combination of ABC and the BSC and differentiator firms that use a combination of ABC and the BSC.

6.1.4 Hypothesis Four

> *H4: Differentiation firms that use both TCSC and the BSC will provide greater organisational performance than differentiation firms that use a combination of ABC and BSC.*

The PCA results show that there was no significant difference between differentiator firms that use both TCS and the BSC and differentiator firms that use a combination of ABC and BSC. This finding confirms that H_4 is not supported. Thus, it can be interpreted that there is no significant difference between differentiator firms that use both TCS and the BSC and differentiator firms that use a combination of ABC and the BSC in improving organisational performance. Since a differentiator firm will have less focus on cost, it will benefit from using a BSC approach for improving organisational performance. On the other hand, the benefits of not using any system results in greater performance for differentiation firms that use both, but not as great as differentiator firms that use only a BSC. This debate was not supported by the H_4 result. Given this negative result of H_4, the researcher conducted further analysis to explore if there was any difference between each individual performance item. Thus, H_4 is donated as E_4 to distinguish between testing organisational performance and individual performance items.

> *E_4: Differentiation firms that use both TCS and the BSC will provide greater (a) financial performance (b) customer performance (c) innovation performance (d) efficiency performance than differentiation firms that use a combination of ABC and BSC*

The PCA result shows that E_4 (b) was supported. Thus, differentiator firms that use both TCS and the BSC have greater customer performance than differentiation firms that use a combination of ABC and the BSC ($F = 4.297$, $p = 0.04$). This means that customer performance is contingent upon the use of both TCS and the BSC for differentiator firms. Chenhall and Langfield-Smith (1998) found that firms which emphasised differentiation strategies benefited from the use of sophisticated management accounting practices and reliance on non-financial information, and this ultimately resulted in better performance. Shank (1989) and Lynch and Cross (1992) argue that firms emphasising differentiation strategies that use traditional accounting performance measures are unlikely to have sufficient evidence for assessing how production processes support a variety of customer-focused strategies. Further Maiga and Jacobs (2003) found that product quality, customer satisfaction and margin sales are significant positive functions of the interaction between BSC customer perspective and ABC.

Discussion of the relationship between performance and the interactions of strategy, ABC and the BSC is presented in the following section.

6.2 Discussion of Multiple Regression Findings

This section discusses the findings of multiple regression analysis that was conducted as additional analysis to test the relationship between each of the dependent variables

and the interaction term of strategy, ABC and the BSC. Multiple regression analysis was applied first with organisational size as a control variable, then with the length of use of ABC as a control variable, and then with the length of use of a BSC.

6.2.1 Strategy by BSC Overall or by BSC Perspectives on Performance

Multiple regression analysis results show that strategy predicts a significant and positive outcome affecting customer and innovation performance with BSC overall, or each time the BSC perspectives were entered in the equation model ($p < 0.05$ or $p< 0.01$). The regression results also indicate that the type of strategy an organisation pursues has a significant impact on organisational performance when the BSC's financial perspective is entered in the equation model ($p <0.10$ or $p < 0.05$). From this it can be interpreted that organisational performance, customer performance and innovation performance were contingent upon the type of strategy pursued.

Organisational performance shows a slightly significant and positive function of the interaction between strategy and the overall BSC ($p < 0.1$). As mentioned in Chapter Five, plotting this interaction demonstrates which strategy is most likely to lead to an increased use of the overall BSC. The plotting of this interaction results in—for cost leader firms—an increased use of the overall BSC and leads to a greater increase in organisational performance compared with differentiator firms ($p = 0.000$, $p = 0.028$ respectively). This indicates that cost leader firms need to recognise and emphasise the use of the BSC approach to improve and enhance their business performance. Innovation performance is also a significant and positive function of the interaction between strategy and overall BSC ($p < 0.01$). The slope line of this interaction, for

cost leader firms shows an increased use of the overall BSC leads to an increase in innovation performance, whilst for differentiation firms there is no change[3] ($p < 0.001$, $p = 0.73$ respectively). Thus, cost leadership strategy is contingent on usage of the BSC to improve innovation performance.

Furthermore, innovation performance predicts a significant and positive function of the interaction between strategy and the BSC financial perspective ($p < 0.01$). The slope line of this interaction revealed that, for cost leader firms, an increased use of the BSC's financial perspective leads to an increase in innovation performance, whilst for differentiator firms it decreased ($p = 0.003$, $p = 0.182$ respectively). This is consistent with Olson and Slater's (2002) results which showed that high-performing, low-cost defenders place greater emphasis on the financial perspective than do low-performing ones. In addition, as Porter (1980) suggests, cost leadership firms focus more on achieving a cost advantage compared with their competitors—and to attain such a relative cost advantage, firms need to put considerably more effort into controlling their product or services costs. This leads cost leader firms to place greater emphasis on the BSC's financial perspective, particularly when firms utilise ABC cost information.

Organisational performance predicts a significant and positive function of the interaction between strategy and the BSC's financial perspective ($p < 0.05$). The slope line of this interaction shows that for cost leader firms, an increased use of the BSC financial perspective leads to an increase in organisational performance, whilst for differentiator firms there is negligible change ($p = 0.001$, $p = 0.754$ respectively).

[3] The slope line was nearly flat for differentiator firms.

Thus, usage of the BSC's financial perspective leads to a greater increase in organisational performance for cost leader firms compared to differentiator firms[4] . Innovation performance is a significant and positive function of the interaction between strategy and BSC customer perspective ($p < 0.10$). The interaction slope revealed that for cost leader firms, an increased use of the BSC customer perspective leads to an increase in innovation performance, whilst for differentiator firms there is almost no change. Organisational performance predicts a significant and positive function of the interaction between strategy and the BSC's internal business perspective ($p < 0.05$). The slope line of this interaction term shows that for cost leader firms, an increased use of the BSC's internal business process perspective leads to a greater increase in organisational performance compared to differentiator firms ($p = 0.000$, $p = 0.066$).

Kaplan (2001) points out that assigning resources to activity and process costs provides the first link between ABC and the BSC. This link arises in the operational excellence component of the scorecard's internal perspective. Thereby, the cost measurement in the BSC's internal perspective should come from a properly constructed ABC model. For Porter (1990), a firm with a successful low cost strategy has the ability to design, produce, service and market a comparable product or service more efficiently than its competitors. In this way, it demonstrates that low cost strategy firms attempt to maintain a stable base of customers and products by competing primarily on competitive price, supported by their focus on efficient operations. Improving efficient operations can be achieved by emphasising the BSC internal business process perspective, which comprises indicators such as ratio of

[4] Cost leader firms increase by 0.272 unit, whereas differentiator firms increased by 0.038 unit.

good output to total output, on-time delivery and percentage of defective products shipped. Efficiency is also stimulated by the financial perspective.

Innovation performance also predicts a significant and positive function of the interaction between strategy and the BSC's internal business process perspective (p <0.05). The interaction slope line indicates that for cost leader firms, an increased use of the BSC internal business process leads to an increase in innovation performance of 0.154 units. For differentiator firms, increased use of the BSC's internal business process leads to a decrease in innovation performance of – 0.077 unit (p = 0.084, p = 0.298 respectively). A firm with differentiation strategy has the ability to provide unique and superior value to the buyer in terms of product/service quality, special features, or after-sale service (Porter, 1990). This can be achieved by placing more emphasis on the BSC's customer perspective. In addition, efficiency performance[5] predicts a significant and positive function of the interaction between strategy and the BSC's internal business process perspective (p < 0.10). The slope line of this interaction revealed that for cost leader firms, a one unit increase in the BSC's internal business process is expected to result in a 0.515 unit increase in efficiency performance (p = 0.000). For differentiator firms, a one unit increase in the BSC internal business process is expected to result in a 0.289 unit increase in efficiency performance (p = 0.001). Olson and Slater (2002) found that high-performing, low-cost defenders also place significantly lower emphasis on both the customer and the innovation and growth perspectives than low performers do. This suggests that attempting to get close to their customers and pursing innovation and market growth detract from low-cost defenders' quest for efficiency. Further, they

[5] Efficiency performance was significant when controlling for organisational size and the length of use the BSC, but it was not significant when controlling length of use ABC.

found that high-performing differentiated defenders place more emphasis on the customer perspective than low performing ones. Their study also found that high-performing differentiated defenders emphasise the innovation and financial perspectives more than low performers.

In reviewing the results of the additional analysis which broke down the BSC and organisational performance into the individual components which make up these constructs, it has been revealed that a "Balanced" scorecard may not be the best option to choose after all. The results reveal that carefully selecting performance indicators from varying perspectives is important, but there may be greater weighting applied to alternative perspectives which depends or is contingent upon the type of strategy pursued.

6.2.2 Overall BSC and BSC Perspectives on Performance

Overall BSC predicts a significant and positive function affecting organisational performance and each of the individual performance items ($p < 0.05$ or $p < 0.01$). This indicates that for improving organisational performance and each of the individual performance items, firms' emphasis is on utilising the BSC approach. Bergin-Seers and Jago (2007) found that managers of successful, small motels in Australia employ a balanced approach to performance measurement by utilising a small number of key measures to monitor results and review management activities. The BSC's financial perspective shows a significant and positive relationship with customer and organisational performance ($p < 0.05$). In a study of banks, Davis and Albright (2004) found that a group of branches that used BSC outperformed a group that did not use BSC on common composite financial performance. The BSC's

customer perspective also has a significant and positive relationship with organisational performance and each of individual performance items ($p < 0.01$, $p < 0.05$ and $p < 0.10$). Performance and service of the organisation concentrate on how the organisation's products and services are valued in the eyes of its customer—which is achieved by emphasis on the BSC's customer perspective (Kaplan and Norton, 2001). For instance, even firms such as Toyota or McDonald's, which compete by offering customers a low cost buying experience, still emphasise quality and purchase times to attract and retain their customers. Many other firms find customers willing to pay significantly higher prices, even for standard products and services, if the purchase is easy and fast.

The BSC's internal business process perspective predicts a significant and positive relationship with organisational performance, customer performance and efficiency performance ($p < 0.01$, $p < 0.05$ or $p < 0.10$). Kaplan and Norton (1992) explain that the internal measures of the BSC should stem from the business processes that have the greatest impact on customer satisfaction—factors that affect, for example, cycle time, quality, employee skills, and productivity. The BSC's innovation and learning perspective has a significant and positive relationship with organisational performance, customer performance and innovation performance ($p < 0.01$ and $p < 0.05$). In order to meet changing requirements and customer expectations, employees may be asked to take on dramatically new responsibilities, and may require skills, capabilities, technologies, and organisational designs that were not existing before. This can be achieved when firms place greater emphasis on the BSC's innovation and learning perspective.

6.2.3 Relationship between ABC and Performance

Regression analysis revealed that there is a slightly significant and positive relationship with financial performance and ABC when the BSC's internal business process was entered into the equation model ($p < 0.10$). This significant result of ABC on financial performance occurred when controlling for organisational size and controlling the length of use BSC implementation. This can be interpreted to imply that greater accuracy in assigning costs to cost objects such as products, services, and customers by using ABC ultimately results in enhancement of financial performance. Chong and Cable (2002) studied the implementation of an ABC system in an Australian oil and gas company. Their findings suggest that the three most important objectives of implementing an ABC system were: more effective cost management, better cost control and enhanced cost management. Cagwin and Bouwman (2002) found that there was indeed a positive association between ABC and improvement in ROI when ABC is used concurrently with other strategic initiatives, when implemented in complex and diverse firms, when used in environments where costs are relatively important, and when there are limited numbers of intra-company transactions.

6.2.4 Interaction between ABC and BSC Perspectives

Multiple regression analysis results show that financial performance is a significant and positive function of the interaction between the BSC's innovation and learning perspective and ABC ($p < 0.01$or $p < 0.05$). This result is consistent with Maiga and Jacobs' (2003) finding where margin on sales was a significant positive function of

the interaction between the BSC's learning and growth perspective and ABC. The regression also found that efficiency performance is a significant and positive function of the interaction between the BSC's financial perspective and ABC ($p < 0.01$ or $p < 0.05$). This result is more significant when compared with Maiga and Jacobs' study (2003). In this regard, Maiga and Jacobs found that product quality is a significant positive function of the interaction between the BSC's financial perspective and ABC ($p < 0.10$).

6.3 Conclusion

This chapter has discussed the quantitative results of the study in relation to the literature. The results demonstrate that the combined use of ABC and the BSC improve organisational performance, customer performance and innovation performance for cost leader firms compared with differentiator firms. Cost leader firms that use a combination of ABC and the BSC have improved their innovation and financial performance more than those who singularly use ABC or BSC. Analysis also revealed that differentiator firms using TCS and BSC have improved customer performance compared with those who use a combination of ABC and the BSC.

From discussion in this chapter, it is concluded that customer, innovation, efficiency and organisational performance are contingent upon the type of strategy pursued when combined with the use of the BSC's financial, customer, internal process and innovation perspectives. Furthermore, this study also supports Maiga and Jacobs' finding in relation to the interaction of the BSC's innovation and learning perspective

and ABC on financial performance, as well as the interaction of the BSC's financial perspective and ABC on efficiency performance. The next chapter presents the results and a discussion of the qualitative component of this study.

CHAPTER 7

QUALITATIVE STUDY FINDINGS AND DISCUSSION

7.0 Introduction

As discussed, this research uses methodological triangulation; the second phase of this research involves case studies. These case studies are essential to further examine the subject inquiry and to enrich the findings already obtained from the survey.

This chapter presents the results and discussion of the case studies and is organised into numerous components. These components reflect the type of organisations in the qualitative study, that is, the first section looks to firms using traditional costing system and traditional performance measurement. This is followed by firms using an ABC system and traditional performance measurement. The third section looks to firms using a traditional costing system and a BSC approach, followed finally with firms using an ABC system and the BSC approach. These sections conclude with an overall discussion.

The focal point of drawing compelling conclusions from in-depth interviews is both the most difficult and the least codified part of the process (Eisenhardt, 1989; Yin, 2003). Having collected the data, researchers are then faced with the decision of how to analyse it. There are several methods of analysing interviewees' reporting of their experience of certain issues, thematic analysis is one approach used to analyse qualitative data.

Thematic analysis or content analysis, as defined in Chapter Four, concentrates on individual themes or subjects and patterns. The interviews produced insightful descriptions of themes that provided broader meanings of the relationship between performance and the interaction of strategy, ABC and the BSC. These interviews served both as a method of obtaining qualitative data about the study's variables and to confirm issues resulting from the questionnaire. Throughout the interviews, the interviewees identified several themes or issues that they considered influence the combined use of ABC and the BSC on performance under alternative competitive strategies. These themes emerged directly from the answers to all questions (see Appendix B for interview protocol) and comments made by the interviewees, and are presented in Table 7.1

Table 7.1: Categories and their Description as Revealed by Interviewees

Category	Description
1	Background of the case study organisations
2	Competitive strategy
3	Firm's competitive environment
4	Importance of product/service pricing to customer and competitors
5	Costing system
6	Performance measurement system
7	Further comments

In order to clearly discuss each of these thematic issues the organisations (cases) of the study are categorised according to their usage of types of costing and performance measurement systems. Table 7.2 presents these categorisations.

Table 7.2: Organisations Categorisation

Case	Performance measurement system		Costing system		Strategy	
	TPM	BSC	TCS	ABC	CL	DiFF
A		√	√		√	
B		√		√		√
C	√		√		√	
D	√		√		√	
E	√		√		√	
F	√			√	√	
G		√	√			√
H		√		√		√
I		√		√	√	
J		√		√		√
K		√		√		√
L	√			√		√
M		√	√		√	
N		√	√			√
O		√		√	√	

7.1 Firms using traditional costing system and traditional performance measurement system

Case studies D, C and E used a traditional allocation costing system and a traditional performance measurement system in their management accounting system. The following sections discuss the themes mentioned previously as being thematic issues that were identified as inherent indications of types of management accounting system.

7.1.1 Background of the case study organisations

Case study D commenced operations in 1972 and is run as a family business, owned by two families. The product range encompasses a wide range of chicken products and the market scope is large retail, commercial and small business. At the time of

this study, it had an annual turnover of over $60 million and employs over 200 people. It offers more than 50 products and occasionally introduces new products/services.

Case study C was established in 1995 and listed on the Australian Stock Exchange (ASX) under pharmaceuticals, biotechnology and life sciences. It deals with research and development of potential biopharmaceutical therapeutics for the treatment of human diseases; development, manufacture, and importation and distribution of a range of molecular biology products, consumables and fine chemicals for scientific research. At time of this study, it employs less than 200 people, offers five or less products and frequently introduces new products/services.

Case study E was established in 1993 as a university and is a tertiary education provider. During the 1970s it was a Teachers' College and was transformed into a College of Advanced Education in the early 1980s. Its vision is to be a dynamic learning community recognised for distinctive achievements in teaching and research, as well as playing a key role in supporting regional development. At the time of this study, it employs more than 500 people, offers more than 50 courses and occasionally introduces new products/services.

7.1.2 Competitive strategy

Competitive strategy signifies a method for achieving a firm's goals and objectives. An organisation that competes by having lower cost strategy for its products and services is often referred to as having a low cost strategy; whilst an organisation that

aims to be unique in its industry in customer service and/or product differentiation is often referred to as being a differentiator (Collis and Montgomery, 2005). Case studies C and E both compete in terms of the quality of their product/service, which is in contrast to Case study D, which competes via a lower cost strategy as discussed by the financial controller.

> "We are trying to find a competitive advantage within our local market. We regard ourselves as a boutique abattoir servicing a local area and trying to build up brand loyalty by differentiating our product on quality, but that's only a small part of our strategy. Our main strategy at the moment is lowering of costs because that's where we believe we have more opportunity".
>
> (Case D)

The aforementioned comment by the financial controller is applicable for cost leadership strategy. Porter (1980) identifies that a firm implementing cost leadership aims to have a lower cost strategy for its products and services without ignoring the quality of its products or services. Thus, a cost leader, cannot ignore the bases of differentiation—if the product is not perceived as comparable or acceptable by buyers, a cost leader will be forced to discount prices well below that of competitors to gain sales (Porter, 1990).

In a differentiation strategy, a firm has the ability to provide unique and superior value to the buyer in terms of product/service quality, special features, or after-sale service and, in the meantime, focus less on costs. The comments below were put forward by the chief financial officer of Case C.

> "It is a differentiation, not a low cost strategy, because when it's life and death people don't worry about whether they're going to spend another five thousand dollars".
>
> (Case C)

And this statement by the financial controller from case E:

> "We try to be unique I think in a way that we want to offer the best service. So we try to offer courses that have high quality but we also screen the price strategy".
>
> (Case E)

7.1.3 Competitive environment

Case study D trades across local markets in Australia within the chicken industry and only supplies between two to five percent. Given Case study D's fiercely competitive cost environment following a cost leadership strategy (as mentioned in section 7.1.2), it appears to be the best approach to maintain survival:

> "We are a very small player within our industry; we regard ourselves as a price taker, not a price maker. So whatever the larger players in the industry are doing, we basically have to follow…in terms of pricing in the marketplace. We do not have that competitor advantage".
>
> (Case D)

Case study C operates in the highly competitive pharmaceutical industry in the local and international market. It experiences significant demand for its product around the world as put forward by the financial controller:

> "It is very much a global industry because any product which is marketed for the treatment of cancer will not be just marketed in Australia—it will be marketed throughout the world—therefore, we are competing with companies particularly in the US and Europe. So it is a very interesting industry and very competitive".
>
> (Case C)

This is in contrast to Case study E, which competes regionally with all universities in the sector.

> "Because we are a small regional university, we tend to attract people who like the smaller environment. We are also competing for international students—like the whole sector. So I guess we are in a fairly competitive environment. We need to improve our structure so that we can remain competitive".
>
> (Case E)

Areas of concern identified by the respondents from a product/service pricing point of view are highlighted. For example, the financial controller for Firm D identified that pricing was very important to their customers:

> "Pricing is very important to our customers; we have a lot of smaller customers who are loyal to us because they've been with us for many years. But our larger customers don't display much loyalty—they are very price driven".
>
> (Case D)

Firm C discussed that pricing of their products is based on negotiation between the seller and the buyer.

> "We don't make chairs or tyres or anything, but what we make is a very unique product so there are no comparisons. It very much comes down to negotiation between a willing seller and willing buyer: its how much that willing buyer is prepared to pay for it".
>
> (Case C)

The business manager of Firm E expressed similar comments to Firm D, as pricing is very important to their customers:

> "Pricing is quite important for our university. We have a fairly low pricing structure which helps us to get a lot of students".
>
> (Case E)

7.1.4 Costing system

Cost and management accounting textbooks state that there are two types of allocation costing bases that can be used to assign overhead costs to cost objects, namely, TCS and ABC. TCS allocation uses simple volume drivers such as direct labour cost, direct labour hours, machine hours and/or direct materials cost, while ABC uses a cause-and effect allocation relationship based on the activities consumed by cost objects (Drury, 2000; Horngren *et al.*, 2003; Kaplan and Atkinson, 1998). Overhead costs are allocated to products or services using simple allocation bases such as floor space, rent, light and heating as in Case study C.

> "Basically we allocate some overhead costs on floor space, so rent, power, light, heating, that sort of stuff is allocated amongst the departments and projects, depending on floor space those department occupy".
>
> (Case C)

This is similar with the findings of Case study E:

> "We use more simple allocation bases such as unit cost, floor space, and power".
>
> (Case E)

Whereas Case study D allocated product costing based on the price per kilo:

> "The main measure for our business is the price per kilo of what we've sold, whatever that is. So we don't actually allocate the overheads, but the overhead costs included in the product line. Therefore, at the end of each month we basically come up with a cost for getting the bird to back door, the cost for processing the bird and the administration cost".
>
> (Case D

The researcher asked the interviewees whether the cost accounting technique currently employed by their firms is satisfying their targets or achieving their strategy. The interviewees' responses were as follows:

> "We have actually started looking at the management reporting, and how it related to costing. So we have just installed a new system which scans/tracks that product right through our system. We are just starting to get to the process where we are drilling down into the costs. So the systems we are putting in place, we believe, are addressing the profitability, but also efficiency and effectiveness as well".
>
> (Case D)

> "Because we have not got a set manufacturing process, it is no benefit. [but] when we have got a set manufacturing process, and we are making a set product…we need to really define our costs [and] then costing allocation techniques then ABC or allocating overheads become important. But when you are developing a new drug, overheads and costs can shift significantly as you try new things. So nothing is set in concrete at moment, so it's therefore very hard to see if you have got standard costs to compare that against actual cost, because you cannot develop a standard cost when you do not know what your production process is—so a difficult challenge".
>
> (Case C)

> "We are trying to improve our strategy for the allocation of overheads. We have changed our method of allocation slightly, but we are hoping that ABC will give us a bit more insight into allocating those overheads better again".
>
> (Case E)

7.1.5 Performance Measurement System

The balanced scorecard performance measurement system focuses on both financial and non-financial performance measures. It provides a comprehensive framework for translating an organisation's strategic objectives into a coherent set of performance measures (Kaplan and Norton, 1996). However, Case studies D, C and E did not use the BSC approach in their management reporting system. Thus, all the above cases

still focus on traditional accounting based performance measures to measure their business performance. The respective financial controllers had this to say on the firm's performance measurement systems:

> **"**It is very hard for a company who does not have a very good reporting regime in place to actually implement that. So really, the BSC to us is something that would be great to have one day, but we have got lots and lots of steps that we have to do before we can get to that route. Executive managers in the business have KPIs for about a year. We are just filtering back down now to our administrative and eventually to all our staff. The KPIs are still not in use in our system yet, but because this is the first time we have had a CEO who is committed to KPIs, it is turning into a long process".
>
> (Case D)

> "It is clear to me that a lot of this technique does not work. Our biggest KPI or BSC is how quickly we can develop a drug—which is how quick you can develop it; how quick you find whether it works or not. Our real measure of success will be whether we can licence the drug or not through the pharmaceutical company".
>
> (Case C)

> "We have not done any work on the BSC and there is no plan to do any work on the BSC at this stage. We are just trying to get ABC at the moment and then maybe the higher people, the chief executive, will look it that".
>
> (Case E)

7.1.6 Further comments

In relation to allocation costing systems, Case study D revealed it would be useful to use the ABC system in the near future, at least for the value-add component of their business.

> **"**We will take the ABC approach to the stage where we will because the way the chicken industry is going in Australia is that the major supermarkets are looking for value-added product. So we will need to find products that the supermarkets will be happy to have hold of

> because we are going to be adding more processes to producing that product; we are going to have to move to the ABC at least for the value-add part of our business".
>
> (Case D)

Additionally, Case study E considered implementing ABC after recognising weaknesses in their traditional costing system.

> "I can see the benefits and I can understand that our traditional costing system is not giving us the information we need and I also see that for our executive to make informed opinions they need a lot more information than what they have got. In addition, I think if we can understand our costs better, we will have a better way of coming up with performance indicators that make sense. At the moment we haven't got the best way of measuring whether people are performing or whether areas or whatever is performing. So once we see what we can get from the system we are able to develop performance indicators. There will be non-financial indicators as well, but we hoping that activity-based costing can help too".
>
> (Case E)

Case study C revealed that the ABC system is not working for their particular type of business. On the other hand, all three cases still use traditional costing system in assign overhead cost to the products or services.

> "It is very challenging to have a cost accounting system or a management accounting system to measure the performance of the company when you are wholly and solely a research and development company. That is the real challenge of a bio-technology company—you can't measure the performance because by its very definition we are developing something which is new and, therefore, you can't set a benchmark or performance indicator because you have got no way of setting a benchmark or performance indicator which you know is rational or legitimate. We know what we are trying to do and achieve, but we cannot actually measure that with the mechanics".
>
> (Case C)

Further, all the above cases still concentrate on accounting based financial performance measures in assessing their business performance.

7.1.7 Discussion

From the findings of foregoing firms, it can be concluded that for case firm D, an ABC approach will be considered in the near future—at least for the value-added part of their business—as buyers are looking for value-added products. Firm E is considering implementing ABC after realising the weaknesses of their current costing system. However, for firm C, ABC is not applicable for their business line. Therefore, it can be inferred that the increasing competitive environment within which firms work, type of business and the strategy pursued by firms were the three main contingent factors affecting the adoption of ABC or the BSC approach. On the other hand, traditional accounting based performance measures are still the preferred method of measuring business performance in all three case studies.

7.2 Firms using ABC system and traditional performance measurement system

There were two case studies using ABC and TPM in their management accounting systems, namely, Case study L and Case study F. The following cost allocation methods and performance measurement systems were in use in these organisations.

7.2.1 Background of the case study organisations

Case L was established in 1912 and is a member of the Australian industry group. It is a major Australian designer and manufacturer of uniforms, protective equipment and armour systems. It manages contracts as a prime vendor and supplies its world-patented products to a wide range of domestic and overseas customers in both the public and private sectors. At the time of this study, it had an annual turnover of over $35 million, employs over 200 people, and frequently introduces new products/services.

Case F commenced business in 1995 and is a transmission network service provider in the National Electricity Market (NEM). It owns, develops, operates and maintains Queensland's high-voltage electricity transmission network. It has also been appointed by the Queensland Government as the Jurisdictional Planning Body (JPB) responsible for transmission network planning within the state. At the time of this study, it had $3 billion in assets, employs more than 500 people, and infrequently introduces new products/services.

7.2.2 Competitive strategy

Findings from Case study L revealed that it is more focused on customer services differentiation, but does not ignore the cost. Thus, the company is providing quality service for its products to the customers, at competitive prices to keep its customers happy.

> "The customer service is our key business. So the main element is to keep our customers happy with quality services for the products we sell. The success of this company in the last few years has been because of the services of this company given to the customers".
>
> (Case L)

Findings from Case study F found that it is more focused on a lower cost strategy, but at the same time it does not ignore elements of quality services. Also, because of its uniqueness in providing electricity services to the State, it follows and uses characteristics exclusive to providing electricity to the community.

> "Our benchmarking is already indicating that we are the lowest cost transmission organisation in the country, so yes, the international benchmarking shows we are at the forefront there, but that's always not enough on its own. We also have characteristics that are unique to providing electricity in the State and we use those as well".
>
> (Case F)

7.2.3 Competitive environment

Case study L is a supplier of clothing and related products to large corporations in Australia and around the globe and is operating in an extremely competitive environment.

> "We are working in a very competitive domestic market as a lot of people are involved with clothing products. Our core competencies are in finding solutions to product and service offerings for specific organisational needs. We are also faced with high competition with our products globally".
>
> (Case L)

Case F operates as a very active and intense business. In addition, it is a regulated monopoly business with revenues set by the Australia Energy Regulator (AER); however, it does not have a direct competitor. Therefore, the strategic focus of cost

leadership is not to be "market leader" as such, but more so to follow governmental directives to reduce costs.

> "We have 90 percent of our revenue as regulated return, a regulated return. So in that regard we do not actually have any competition, because we are a regulated, monopoly business, with revenues set by the AER. It doesn't make sense to have two transmission networks up and down the state. Furthermore, we are recognised by benchmark authorities as a world leader in cost efficiency and reliability". (Case F)

The following additional statements by interviewees on product/service pricing and other important aspects on customers and competitors were offered:

> "Pricing of our products is very important to our customers; we do not want soldiers running around without clothing".
>
> (Case L)

> "Because we are sort of the intermediary in between power stations and two distribution companies, if we have trouble with our reliability these [impact]…with the public, so if we do that lot of people get blacked out".
>
> (Case F)

Guilding *et al* (2005) argue that competitive pricing can be expected to put cost information at a premium. In this regard, in highly competitive environments, accurate product/service costing information becomes extremely important.

7.2.4. Costing system

Cases studies L and F both used different cost drivers to allocate their overhead costs based on cost activities. Further, it was found that 100 percent of the overhead costs in Case study F were caused by non-product/service volume related factors; whilst in Case study L, just 45 percent of the overhead costs were caused by non-product/service volume related factors. Drury *et al* (1993) argue that companies

operating in highly competitive environments are more likely to consider the adoption of ABC, a view supported by the following comments from interviewees:

> "We now use the costs of activities performed as allocations of fixed cost to products and we also use other allocation bases such as direct labour cost as supplement of ABC".
>
> (Case L)

> "We looked to different drivers for each type of activity that gets undertaken and then we find out—so we look at the drivers and we look at the users and we do this on an annual basis".
>
> (Case F)

In regard to whether the cost accounting techniques used by firms satisfied their strategy, the interviewee of Firm F reported company satisfaction with the current costing technique used, whereas the respondent of Firm L advised that the company is currently only about 70 per cent satisfied with their current product costing system which compared the actual cost with standard costs every month.

7.2.5 Performance measurement system

Case study L revealed that it does not use the BSC approach, but it is incorporating financial—and some non-financial—performance measures into their management reporting system. The non-financial performance measures were more often considered from a customer perspective.

> "The most common financial measures we use are operating income, sales growth, cash flow and return on sales. We also use some non-financial measures such as customer satisfaction, delivering the right item on time and not having many back order—these are measured as supplementary to our financial performance measures".
>
> **(**Case L)

This is similar to the findings of Case study F, which also incorporated financial and non-financial measures into its management reporting system. The non-financial measures were more concerned with employee satisfaction rather than the customers' perspective, as evidenced by the statements below:

> "I had a discussion with my boss about the BSC; he did not believe it quite works for our type of business being an infrastructure business, and our number of customers is very limited. But we do use some non-financial measures relating to employee satisfaction and we do other customer surveys to get feedback on what they think of our performance. Our financial measures are interest cover, return on equity and return on assets".
>
> **(**Case F)

7.2.6 Further comments

Case study L found that it is satisfied with both the ABC system given the current levels of product and price competition; and with the non-financial performance measures used to supplement financial performance measures. This is similar to the findings of Case F. In relation to further comments about cost accounting systems and performance measurement systems in these two cases, the interviewees made the following additional statements:

> "We need to continually monitor our performance and sales on a weekly basis. We are very much involved, we've got a flat structure, and everyone knows what is happening. We need to monitor our overhead cost and also need to keep comparing our actual costs with standard costs".
>
> (Case L)

> "Previously we used to have lots of internal arguments about which number was the right number. With our current ABC system we do not have those arguments anymore because we have one integrated system that gets one number out of it. Actually one of the biggest things with our ABC system, it enables us to more focus upon what we are doing when we spend our money than what did we spend it

> on. I think our current system has helped us to the sort of position that we are in, and we are, according to the benchmarking, the lowest cost organisation".
>
> (Case F)

7.2.7 Discussion

From the participating firms' results, it can be concluded that an ABC system is beneficial for the two cases in relation to cost/benefit considerations. Both firms incorporated non-financial measurements as a supplement to financial measures. These non-financial measures were perceived differently, according to the firms' strategic focus. Thus, one firm's focus is more allied to the customer perspective, whereas the other firm places a great emphasis on employee satisfaction. Strategy, business type, and the intensity of competition were the main contingent factors affecting the use of costing system methods and performance measurement systems.

7.3 Firms using traditional allocation costing system and the BSC performance management system

Case studies A, G, M and N use TCS and the BSC in their management accounting systems. The following allocation costing methods and performance measurement systems are in use in these organisations.

7.3.1 Background of the case study organisations

Case study A was founded in 1995 and is listed on the ASX under the media category. It trades mainly in the television business and focuses on lower cost and customer value. At the time of this study, it had an annual operating income of over

$3.8 million and employs over 500 people. Its coverage area is approximately 2.4 million homes in regional and rural Australia, including Darwin and Hobart. It frequently introduces new products/services.

Case study G, a bank was established in 1874, and in 1971 became a publicly traded company listed on the ASX under that category. It is one of Australia‘s fastest growing retail banks and is the second largest Queensland-based financial institution, and the State’s fifth-largest listed company. At the time of this study, it had an operating income before tax of over $63 million and employs over 500 people. It offers more than 50 services and regularly introduces new products/services.

Case study M is a manufacturing and wholesale automotive component firm. It is a leading supplier of drivetrain, chassis, structural, and engine technologies and designs and manufactures products for every major vehicle and engine producer in the world. With operations throughout the world, case study M focuses on being an essential partner to automotive, commercial, and off-highway vehicle customers and collectively produces more than 60 million vehicles annually. Their continuing operations reported sales of $8.6 billion in 2005. At the time of this study, it offers more than 50 products, employs more than 200 people and occasionally introduces new products.

Case study N, established in 1933, is a leading integrated engineering and services provider with diverse operations throughout Australia, South East Asia and the near Pacific. It aims to deliver successful outcomes to its clients through the diversity of its operations in building, civil engineering, mining, process, environmental, utilities

services, and facilities operations and maintenance. At the time of this study, it had an annual turnover over $4 billion and $8 billion of work in hand. It offers more than 50 products or services, employs over 2000 people, and regularly introduces new products/services.

7.3.2 Competitive strategy

Results of Case study A showed they were more focused on lower cost strategy and elements of customer service strategy in trying to improve the value equation to their customer. This is similar to the findings of Case study M. In contrast, Case studies G and N were very much focusing on differentiating their service to the customers. However, the respondents had this to say about competitive strategy as a means of achieving their firms' goals and objectives:

> "We are following lower cost strategy and at the same time we're not ignoring the elements of customer services".
>
> (Cases A)

> "We are very much focusing on quality service for our customer and this is the strategy we aim for".
>
> (Cases G)

> "Our key focus is on delivering quality performance from core business areas as one of the largest construction, mining, and service providers in Australia, South East Asia and the near pacific".
>
> (Case N)

7.3.3 Competitive environment

All case studies were found to be operating in relative competitive environments. Case study A competes within the entertainment market in Australia.

> "The market or the industry we are in is a relatively competitive environment for us. We are competing for the entertainment dollars of the family household and free to airs in certain other markets with other TV providers".
>
> (Case A)

Case study G was competing in the banking market locally and internationally.

> "We are in a very competitive market, which is due not only to the number of institutions we have in Australia, but also credit unions, building societies and we are starting to see international competition".
>
> (Case G)

Case study M competed in Australian automotive components, whilst Case study N competes in the construction and mining industry throughout Australia, the near Pacific and South East Asia.

> "We are working in a competitive environment as a leading service provider in local and international markets. Further, by any measure, our company name is unique and pre-eminent in Australia's construction history".
>
> (Case G)

In terms of the importance of product/service pricing to customers and competitors, the interviewees from the above case studies regarded pricing of their product or services as very important. Thus, their businesses were continuously growing in their respective industry, they were endeavouring to keep their customers happy with their competitive price strategy; and, finally, they are continually striving to gain a competitive advantage over their competitors.

7.3.4 Costing system

Findings from Case study A were similar to those of Case study G regarding the allocation of overhead costs. Cases A and G accumulated their overhead costs to the corporate office using simple allocation bases such as unit base and number of customers. Direct costs were allocated based on functional alignment. In addition, the proportion of service overhead costs was 60 percent in Case study A; whilst in Case G it was 65 percent.

> "We allocate our direct costs to functional alignment of the business such as finance department, legal, market, sale departments and so on. In relation to indirect cost like rent, utilities, such as water, electricity and outgoings, are allocated to corporate office as corporate overheads".
>
> (Case A)

> "We allocate our direct costs based on individual departments such as IT and finance departments and so on. Indirect costs like rent, we keep them central. We tried to implement ABC three years ago as a pilot project but the results we got were not very useable so we abandoned it".
>
> (Case G)

Case study M and N allocated their overhead costs using simple allocation bases such as direct material, direct labour cost and number of services. The research revealed that in both of these case studies, 80 percent of their overhead costs was attributed to product/services volume-related factors.

> "We do not use ABC system as an allocation base for our overhead costs. The proportion of our production/service overhead costs was just 25 percent which was allocated based on cost volume drivers".
>
> (Case M)

> "We do not use ABC system to allocate the overhead costs. Most of our costs are related to direct raw material costs which are about 75

> percent of our total costs. Therefore, we use simple allocation bases in allocating indirect costs such as direct labour costs".
>
> (Case N)

The respondents from Case study M and N pointed out that the proportion of their indirect costs was still relatively low. Hence, full adoption of ABC might not meet the cost/benefit consideration. Research to date has not observed a positive relationship between the level of overhead and the tendency to adopt ABC by organisations. Clarke *et al.*(1997) and Al-Mulhem (2002) did not support such a relationship, whilst Bjørnenak (1997) found a positive relationship between the level of overhead costs and ABC adoption. A recent study by Khalid (2005) found that nine out of thirteen ABC-adopting firms in Saudi Arabia have an overhead costs level of less than 20 percent to the sum of operating costs. This result provides further support to the previous empirical findings outlined above. Further, asked to comment on the degree of satisfaction with the current costing system, the interviewees of Cases M and N put it at 50 percent, which is similar to Cases A and G.

7.3.5 Performance measurement system

Case studies A, G, M and N reported using the BSC performance measurement system in their management reporting system. Cases G and M regarded the implementation as BSC. Contrastingly, Case A regarded the implementation as management accounting, whilst in Case N no name is attributed to the implementation. Further, at the time of this study, all cases had implemented the BSC at an organisational level for a period of more than two years. Moreover, the study revealed that the BSC approach incorporated financial and non-financial

performance measures to guage their organisational performance. Thus, each case study indicated that the BSC improved different perspectives of performance, such as customer, human resources and internal business processes. The interviewees revealed the following in relation to the BSC:

> "Our BSC includes financial measures which measured the financial targets like sales, gross margins. It includes non-financial measures which place more focus on human resource management, staff turnover or staff retention and sick days, those types of things, to measure the business performance. So our BSC gives us the opportunity to take a holistic view of the business and we understand that the business is just not financial results".
>
> (Case A)

> "We use the BSC in our management reporting system and the financial part of it is around account equity and an extra share. The non-financial measures focus on our staff and innovation. It was assumed prior to the BSC that the bank was a good place to work, but no one had any evidence or data to know that was the case".
>
> (Case G)

> "Our BSC incorporated financial performance measures and non-financial measures. Financial measures are those we use to measure our business performance such as return on sale return on investment and operating income; whilst non-financial performance measures are like percent of defective product shipped, on-time delivery, improvement in productivity, customer satisfaction, and employee satisfaction and employee turnover".
>
> (Case M)

> "BSC is very useful for our business in our human resources, environmental performance and health and safety performance, as well as financial performance. So it is whole systems that enable us to succeed in our business and what might happen in the future".
>
> (Case N)

The interviewees stated that BSC has enabled them to understand what has happened and from this understanding they are better able to assess what might happen in the future and respond accordingly.

7.3.6. Further comments

Results from Case studies A, G, M and N revealed satisfaction by respondents with their BSC performance measurement system. Further, they realised that the success of their businesses is not reliant on financial results alone, but also requires more attention and consideration to non-financial performance aspects. One respondent pointed out that the BSC approach contains outcome measures and the performance drivers of outcomes aim to be a feed-forward control system. However, in terms of product/service costing allocation, respondents from Cases G, M and N were satisfied with the allocation bases they used, but this was in contrast to Case study A which was trying to improve its costing allocation by implementing an ABC system in the near future. The following comments from the respective case study respondents support these assertions:

> "We need to make sure that our system enables us to grow in the industry, so that basically means we are increasing our market share. Thus, our BSC approach enables use to monitor and assess our bank's progress towards strategic goals and objectives".
>
> (Case G)

> "Our current management system is building our success performance toward financial, health and safety performance, environment and community performance. For example, it enables our employees to access information and shared knowledge".
>
> (Case N)

7.3.7 Discussion

The results from the foregoing case firms substantiate that an ABC system did not meet the cost/benefit considerations as the proportion of overhead costs were still relatively low. One of the case firms was contemplating implementing an ABC

system in the near future to improve its costing allocation. In terms of performance measurement systems, all the participating case firms were using a BSC performance measurement system in their management reporting system. In addition, each case firm was endeavouring to improve their performance in different facets such as customer, innovation and learning, internal business processes and financial perspectives. From the findings, it can be inferred that strategy, business type and an increasing competitive environment were the main contingent factors affecting the adoption of the ABC system and the BSC approach.

7.4 Firms using ABC system and the BSC performance management system

There were six firms using an ABC system and the BSC in their management accounting systems; Cases B, H, I, J, K and O. This study revealed the following allocation costing system and performance measurement systems in use in these organisations.

7.4.1 Background of the case study organisations

Case study B was established in 1995 and is listed on the ASX under commercial services and suppliers. It deals with distribution and sale of computers and office products in Australia and New Zealand. The business model is fairly straightforward in that it is a buy/sell business in the major cities in Australia. At the time of this study, it is a $10–11 billion dollar business, it employs over 2000 people and it offers more than 51 products.

Case study H was established by an Act of Parliament in 1958, making it the first university to be established in the State of Victoria for 106 years. It is Australia's most internationalised university. It has eight campuses, including one in Malaysia and one in South Africa, along with centres in London, UK and Prato, Italy. An energetic and dynamic university, it is committed to quality education and research. It developed a wide range of courses in arts, commerce, engineering, education, law, medicine and science. At the time of this study, it employs more than 2000 people, offers more than 50 courses and it frequently introduces new products/services.

Case study I was established in 1971 and listed on the ASX. It is the largest water services provider in Australia. It provides drinking water, recycled water, wastewater services and some stormwater services to more than four million people in the Sydney region. At the time of this study, it has assets worth over $12 billion, an annual capital works program of more than $500 million and it employs over 3,300 staff.

Case study J has been administering superannuation schemes since 1919. It provides superannuation administration and related services in both the public and private sectors. It manages over a million member accounts and has the knowledge, experience and systems needed to efficiently administer most retail products. The business operates within the financial services industry. This market segment is diverse, dynamic and subject to constant change and challenge. At the time of this study, it has annual revenue around $16 billion, employs 460 people and infrequently introduces new services.

Case study K traces its origins to 1951, and in 1975 the university was deemed an independent institution of higher learning by the New South Wales Parliament. In 1982 the university amalgamated with the Institute of Higher Education, which had begun its life in 1962. Thus, in over 50 years, the university has grown from a provincial feeder college with 300 students to an international university with over 18,000 students spread across three campuses and five access centres. Originally established as a provider of technical education for engineers and metallurgists required for the region's steel industry, the university now offers a wide range of courses across nine faculties. At the time of this study, it employs over 1000 people and frequently introduces new services.

Case study O was established in 1888 as a basic company of salt production, and is now Australia's largest producer and refiner of salt. It operates twelve solar salt fields throughout Australia with a total production of over 1.4 million tonnes annually. Six refineries produce a variety of salt grades. Together, the fields and the refineries supply salt for every need, from consumer size packs of cooking and table salt to entire shiploads of industrial salt. At the time of this study, it has an operating income before tax of over $20 million, employs over 200 people and it offers six to ten products.

7.4.2 Competitive strategy

Cases H and K revealed that these firms were more focused on product/service differentiation. This is similar to the findings of Case studies B and J.

> "We are constantly looking at ways we can do things better and more efficiently in terms of administrative, teaching and research

> efficiency. We are trying hard to differentiate ourselves in this context".
>
> (Case H)

> "We are always looking to differentiate our delivery services to the customers. If we are going to lose a customer it is because we failed on delivery. Further, because of our strong relationships with key manufacturers, our prices are competitive".
>
> (Case B)

> "We provide quality services at a fair price and we certainly have the competitive edge in terms of our technology and our staff skills".
>
> (Case J)

In contrast, Case studies I and O were focusing on lower cost strategy, with some elements of product/service quality.

> "We started pushing toward lower cost strategy, deliver the same level of quality because the quality is very high, but deliver the same level at a lower cost".
>
> (Case I)

> "We compete with a lower cost strategy, but at the same time we are not ignoring the quality of our products and services".
>
> (Case O)

7.4.3. Competitive environment

Case study B found that it competed with office product markets in Australia and it distinguished itself from its competitors by delivering the goods to the operator's desk the next day—in most cases. Case studies H and K were competing in the education industry in Australia. Case study I operates in the water services industry in Australia, especially in recycled water, and is competing with the private sector. Case study J is a single product company competing in superannuation fund administration in Australia. In contrast, Case study O operates in salt products for the food and industrial market in Australia. It is developing its business in Asia, the

fastest growing region in the world. The following are some comments revealed by some interviewees in the case studies regarding the current competitive environment:

> "Remember that most students are funded from their parents, so they look at cost, price, value and market. So the sector has changed a lot over the last ten years, it is becoming very competitive and it was not competitive within universities in the last ten years."
>
> (Case H)

> "The market is very competitive and we are always keeping up with innovation of technology to introduce additional products to our clients because our type of business is very heavily relying on computer technology".
>
> (Case J)

> "We operate in a very dynamic progressive marketplace. As leading provider of the business essentials, our strong relationships with key manufacturers and the volumes we purchase give us the ability to keep our prices fair by using the competitive advantage of volume and efficiency".
>
> (Case B)

Other areas of concern from the product/service pricing point of view were raised by the interviewees, who indicated that pricing of their product and service to customers is very important within the competitive business they are dealing with. Further, they revealed that building competitive advantage with competitors compels the business to succeed and grow. To support this view, two of the interviewees stated, for example:

> "Our prices are a little bit higher than the Australian average, but increasingly we start to be cost competitive in the new competition era, especially in the areas of new products in our market industry".
>
> (Case J)

> "Price is important because most of the products we sell are commodity products and available in lots of places and the prices are reasonably well known". (Case B)

7.4.4 Costing system

Analysis of Case studies B, H, I, and J found that they have fully implemented ABC systems. In contrast, Case study K revealed that their ABC system was seamlessly integrated with other organisational systems. Further, it found that 40 percent of the overhead costs in Cases B and O were caused by non-product/service volume related factors. However, with respect to overheads just 30 and 50 percent were caused by non-volume cost drivers in Cases H and K respectively. In contrast, a large proportion of overhead costs were caused by non-product/service volume related factors in Case studies I and J, that is, 80 and 70 per cent respectively. In addition, all the above cases had implemented an ABC system at the organisation level.

In terms of the benefits to the case study firms in using the ABC system, Case study A indicates that ABC improves cost control and better determination of performance profitability, as well as understanding the costs.

> **"**Our ABC enables us to understand our cost and what is a driver that is driving the business or driving that costs in each cost centre. Actual ABC provides us accurate cost information which results in being able to control our costs and increase our profit performance".
>
> (Case B)

Cases H and K revealed that ABC is a better determinant of those departments that add value from those that do not add value. Further, ABC enables them to understand the full cost.

> "ABC system helps us understand the full cost. ABC is allowing us to distinguish the departments that add value from those that do not add

> value to the university when we looked at the full cost. Every single thing in this university is charged out based on ABC".
>
> (Case H)

Case study I argued that they are a large infrastructure, and their model is aimed at costing their infrastructure and demonstrating this to the price regulator. In this respect ABC helps them in different areas such as improving cost control and management:

> "First, ABC helps us to break up our costs on asset clients, how much our pumping stations cost to pump water through the system, how much our treatment plants cost and things like that. How much our different areas cost…so we demonstrate that, and point to where the costs pressures are coming from".
>
> (Case I)

Also Case study I indicated that ABC is a better allocation of overhead costs and what the drivers of those costs are.

> "Second, our internal restructuring, the ABC is fairly important in allocating the high costs, especially in overhead costs, and how that flows through to the direct areas. So we've had a big restructure of the corporate area, and basically its highlighted how big the costs are there, what drives those costs and what we are trying to do is we're trying to define what limiters there are, what the outputs from the period are using ABC to come up with an indicative or standard cost for those as a benchmark".
>
> (Case I)

In addition, Case study I pointed out that ABC is improving their pricing decision.

> "The next benefit will be the access price regime where we are going to have to justify our costs and maybe build that pricing through our cost structure".
>
> (Case I)

This is similar to Case study J who believes that ABC provides a better allocation of overhead costs and better for cost management.

> "We actually have a much better understanding as to the cost functions for direct costs, support costs and the other things that we also have to bear in mind. We just want to test whether the corporate overheads would vary over a range of outputs and also over a period of time—and over a period of time nothing is fixed**".**
>
> (Case J)

Case study O is similar to Case study B in terms of the benefits in using ABC. Thus, Firm O indicates that ABC is more accurate at product costing, positive cost reduction and improved business performance.

> "The ABC system in our company gives us more accurate cost information which is monitoring our cost reduction and improving our business performance".
>
> (Case O)

7.4.5 Performance measurement system

Case studies B, H, I, J, K and O were found to be using the BSC approach in their management reporting system. At the time of this study, cases B, H, I, J and O have been using the BSC for more than two years, whereas case study K has been utilising it for less than one year. In addition, Case studies B, I, J and O implemented the BSC at an organisational level, whilst Cases H and K implemented it at a financial division level only. Further, all the above cases indicated that the BSC integrated financial and non-financial performance measures to determine the overall performance of the organisation, as well as the business units of each division. The interviewees elaborated further on the BSC in their organisations as follows:

> **"**BSC allows us to drill down to the business and look at each of the areas and each of operations. It allows us to check to see whether we are actually doing that in practice. So it makes us focus on the

> important pieces of our business and not just focus on the financials for the success and survival our business".
>
> (Case B)

> "We use the BSC at our internal level, our finance department level. We have not employed the BSC at the university level because we've got hundred of units and each unit might actually employ a different way in managing the total outcome. Thus, BSC tells us what we need to concentrate on and what we actual setup and how we achieve those things and what we need to do better".
>
> (Case H)

> "Our key BSC perspectives are around financial, stakeholder, process and knowledge and learning. The most useful area is probably in our asset management area where they are making decisions about investing in future assets, and long term decisions based on current system performance, customers willing to pay for increased quality, and safety issues".
>
> (Case I)

> "Maximising profit is not our only objective; we also have to make sure that we grow and create employments opportunities. By using the BSC in our management reporting system it allows us to achieve our business objective and gaols".
>
> (Case J)

7.4.6 Further comments

Case studies B, H, I, J and O were satisfied with their management performance system and product/service costing. Further, in relation to the BSC approach, all the interviewees in the above case studies revealed that BSC approach is very important to their business success. In addition, they confirmed that an ABC system is a more reliable costing system than using traditional costing allocation in providing accurate cost information. The following further comment is offered by one case study respondent:

> The BSC performance measurement is very important to us running this business. The ABC side of it we are learning and developing, and

> as more and more people are becoming business people who run through the profit and loss statement, get to the bottom and then start looking at the economic profit or economic value, so we're comparing them to the balance sheet, and that's a process we are going through.
>
> (Case B)

7.4.7 Discussion

From the case firms' findings, it can be concluded that ABC and the BSC approach were used in their management accounting reporting. The implementation of an ABC system improved the visited firms in a variety of ways, for example, enhanced cost control and management, the provision of a useful management tool to understand the cost of activities and how these costs accrue, improved cost control and better determination of performance profitability, and optimal allocation for resources allowing differentiation between activities that add value from those that do not. On the other hand—and despite differing perspectives—the BSC approach results in benefits such as enhanced customer, financial, internal business processes and innovation, and learning perspectives. The findings from these visited firms also demonstrate that the BSC approach is pivotal to their business success. Further, it can be inferred that the strategy that firms pursue, coupled with an increasingly competitive environment, were the main contingent factors in adopting ABC and the BSC.

7.5 Discussion of comparative analysis

The theoretical framework of the study is based on the model that costing systems and performance management systems play a moderating role and are contingent on the competitive strategy adopted by an organisation to improve performance. This means that strategy as a contingent factor affects the utilisation of costing systems, whether ABC or TCS. Strategy also affects the choice of performance management systems, whether BSC or TPM. The case studies interview findings also demonstrate that strategy and an increasing competitive environment are the main contingent factors affecting the use of ABC and the BSC; whilst survey findings indicate that organisational size has no impact on the use of costing and performance management systems.

The visited firms that use a combination of ABC and the BSC confirmed that a combination of ABC and the BSC is pivotal to their business success. The results support the quantitative results that cost leader firms which use a combination of ABC and the BSC improve their organisational performance greater than differentiator firms using a combination of ABC and the BSC. This indicates that Australian firms try to maintain a balance between cost control and quality of their products and services in the current business environment. In addition to improving customer and innovation performance, ABC and the BSC also improve their performance in other areas. For instance, an ABC system meets cost/benefit considerations, is a more effective cost control and management system, and provides better determination of profitability and optimal allocation of resources to

distinguish between activities that add value from those that do not. On other hand, the BSC approach—despite differing perspectives—results in an improvement in areas such as customer, financial, internal processes, and innovation and learning. For example, from the quantitative results, it can be inferred that cost leader firms improve their customer performance in the form of customers, gains and losses of customers, average time from customer contact to sales response, and service expense per customer. Furthermore, the quantitative results show that cost leader firms have improved their innovation performance more than differentiator firms. This can be inferred that a strong relationship between firms and their employees in understanding their employees' attitude, opinions, motivation and satisfaction can greatly increase a firm's chances of successfully launching new products, as well as improving intellectual assets measurement.

These findings also suggest that choice of costing systems and performance management systems are contingent on strategy for improving business performance. Additionally, the design of the BSC may also be contingent on the strategy a firm pursues. For instance, from management responses of the visited firms one understands that some firms are applying different weight to the BSC perspectives, depending on the strategy the firm pursues. This finding aligns with the theoretical model of the study that costing systems and performance management systems play a moderating role with strategy to improve organisational, customer and innovation performance. In addition, an ABC system can provide critical insights into the BSC measures by providing valuable and accurate information to the four perspectives of the BSC to improve organisational performance.

The visited firms that use both ABC and TPM determined that an ABC system has enabled them to understand their costs, improve their products/services costing, and has ultimately resulted in enhanced cost information. Further, some visited firms tend to focus on only certain aspects of the BSC, such as customer perspective or employee satisfaction. For example, Case Firm L pursued a differentiation strategy by focussing on the customer perspective more; whereas Case Firm F which focused on the cost leadership strategy places greater emphasis on employee satisfaction. This means that the design of the BSC perspective is contingent on the strategy type a firm pursued. This result confirms the quantitative findings in relation to no difference being found between cost leader firms that use a combination of ABC and the BSC, and cost leader firms that use both ABC and TPM to improve organisational performance. In addition, this result also supports the quantitative finding in terms of positive improvement in innovation performance for cost leader firms that use a combination of ABC and the BSC, compared with cost leader firms that use both ABC and TPM. As mentioned previously, firms that use a combination of ABC and the BSC approach have experienced improvements and benefits to their business performance after adoption of these systems.

The finding from the visited firms using both TCS and the BSC confirmed that the ABC system does not always meet cost/benefit considerations—for some firms it is irrelevant to their business activity, whilst others realise that their current costing system does not assist decision makers in understanding their cost information. This result is confirmed by the quantitative finding in relation to cost leader firms that use a combination of ABC and the BSC and who have subsequently experienced improved financial and innovation performances, compared to those cost leader firms

that use both TCS and the BSC. At the same time, it also supports the view that differentiator firms use both TCS and the BSC to improve their customer performance, as ABC is not relevant nor does it meet cost/benefit considerations. This is in comparison to differentiator firms that use a combination of ABC and the BSC. This finding is consistent with the argument that differentiator firms rely more on non-financial measures than financial measures to improve their performance. However, from the visited firms' findings it is understood that competitive strategy, business type, along with an increasingly competitive environment, are the main contingent factors affecting the use of costing systems such as ABC or TCS, and performance measurement systems such as the BSC approach or TPM. These findings also confirm the theoretical framework of this study in that costing systems and performance management systems play a moderating role and are contingent on a set of contingency factors such as strategy, activity business type and competitive environment. In this way, it can be concluded that a set of contingent factors such as strategy, activity business type and an increasingly competitive environment affect the use of the type of costing systems and performance management systems for improved firm performance.

7.6 Conclusion

This chapter explored the findings and discussion of the qualitative component of the study. The qualitative data were analysed using a content analysis approach based on a set of categories the researcher devised for the responses. The fifteen case studies included four types of firms: firms using traditional methods; firms using the ABC

and traditional performance measurement system; firms using traditional costing system and the BSC; and, finally, firms using ABC system and the BSC approach.

Thus, of particular interest is what the adopters of ABC system stated about the ABC system, namely, it has enabled them to understand their costs, improve their products/services costing, and is an important source of information for decision making. For those firms still using a traditional costing system, the interviewees pointed that because of the proportion of their production/service overheads, costs were low to total cost. In this regard, the interviewees revealed that an ABC system does not meet their cost/benefit considerations. Further, some firms were not using ABC because they considered it irrelevant to their business, whereas other firms realised that their current costing allocation system was not useful for cost information and they planned to implement an ABC system in the near future.

Finally, and contrastingly, there were firms not using the BSC approach. The respondents from some case study firms stated that a BSC approach was not effective for their type of business. Others pointed out that their current systems are not ready to implement the BSC, whereas some firms focus on only certain aspects of the BSC such as customer perspective or employee satisfaction. Further, other types of firms interviewed who were using the BSC revealed that it is useful and important in assessing their business performance. The next chapter presents the conclusions of this research.

CHAPTER 8

CONCLUSION AND FUTURE RESEARCH

8.0 Introduction

The objective of this research was to investigate whether cost leader firms using a combination of ABC and the BSC perform better than differentiator firms using a combination of ABC and BSC. It also explored whether cost leader firms perform better when they use a combination of ABC and BSC approaches compared to the single use of ABC or BSC. In addition, it sought to determine whether differentiator firms perform better when they use both TCS and the BSC, compared to a combined use of ABC and the BSC approaches. These objectives were examined across a number of industry sectors in Australia.

8.1 Summary of the Thesis

Chapter 1 outlined the research problem domain, describing the importance of management accounting innovation in today business environment. The motivation for this research was discussed in terms of the criticism of both traditional costing systems and traditional performance measures in prior research literature. This chapter also articulates the contributions of this thesis.

In turn, Chapter 2 began with a comprehensive review of the relevant literature on the variables considered for this study: cost accounting systems; performance management systems and strategy. First, cost accounting systems that assign overhead costs to cost objectives were discussed in detail. A discussion of TCS concepts and its failure, ABC system, implementation and difficulties, and its impact on performance followed. Performance management systems were discussed with an emphasis on the BSC. Explanations of strategic typologies were reviewed. Then, the relationship between ABC, the BSC and strategy and their effect on performance was addressed. This review revealed that no study had empirically examined the combined use of cost accounting systems (TCS or ABC) and performance management systems (TPM or BSC) and their effect on performance under alternative competitive strategies, thus, this led to four research questions being put forward:

- *Do cost leader firms perform better when they use a combination of ABC and BSC compared to the both use of ABC and TPM?*
- *Do cost leader firms perform better when they use a combination of ABC and BSC compared to the both use of TCS and BSC?*
- *Do cost leader firms using a combination of ABC and BSC perform better than differentiator firms using a combination of ABC and BSC?*
- *Do cost differentiator firms perform better when they use both TCS and BSC compared to a combined use of ABC and BSC?*

Chapter 3 provided a contingency theoretical framework within a multiple paradigm of social science, as put forward by Burrell and Morgan (1979). The theoretical model of this study complements Maiga and Jacobs's study (2003) carried out in the US. Maiga and Jacobs investigated the interaction term between BSC perspectives

and ABC on organisational performance. The research hypotheses were developed subsequent to considering prior literature.

Chapter 4 described the research methodology followed in this research study. A multiple research method—combining a survey and in-depth interview—was adopted and applied. Descriptive statistics of the variables were presented and ethical issues in the research were considered and discussed.

Chapter 5 analysed the data collected from the survey sent to the CFO across a number of industry sectors in Australia. Chapter 5 also reported the testing of the four hypotheses using Planned Contrast Analysis (PCA), as well as an additional statistical test using PCA to explore the research hypotheses on individual performance items. The chapter then analysed the interaction between strategy, ABC and the BSC on perceived organisational performance and on each of the individual performance items.

Chapter 6 discussed the findings obtained from the quantitative study showing the relationship between cost accounting systems and performance measurement systems, and their combined effect on organisational performance and the individual performance items under alternative competitive strategies.

Chapter 7 explored the results and discussion of the qualitative component of the study to supplement the quantitative findings presented in Chapter 6. The qualitative data were analysed using a content analysis approach based on a set of categories the

researcher devised for the responses. The chapter concluded with a discussion on the comparative analysis of the visited firms, and linked with the quantitative findings.

In this final chapter, a summary of the main findings are presented and the contributions to theory and practice of this research are identified. The chapter concludes with a discussion of the limitations of the study and the identification of areas for further research.

8.2 Conclusions from the Findings

This study analysed the relationship between cost accounting systems (TCS or ABC) and performance measurement systems (TPM or BSC) and their combined effect on perceived organisational performance under alternative competitive strategies. The independent variable of strategy was measured based on Porter's (1980) strategic typologies of cost leadership and differentiation. Cost accounting systems and performance measurement systems played a moderating role in the relationship between the independent variable and the dependent variable. The following sections summarise the main findings of the research study and the additional findings of the relationship between performance and the interaction terms of strategy, ABC and the BSC.

8.2.1 Firms using a combination of ABC and the BSC

As was identified in the literature review many organisations have experienced significant benefits in applying management accounting innovations such as ABC or BSC into their management system by considering factors related to the success of

using ABC or BSC. This study contributes to the literature by offering detailed evidence on whether such a combination of management accounting innovations improves performance at the organisational level and at individual performance items compared to the singular use of management accounting innovations in improving performance in the context of the Australian business environment.

From the quantitative findings it was found that the combined use of ABC and the BSC improves organisational, customer, and innovation performance for cost leader firms compared to differentiator firms. This finding was supported by the qualitative study which revealed that visited firms experienced improvement in using ABC system. These improvements include several areas such as discovering hidden costs and more accurate calculation of product, service and customer costs, improved cost control and better determination of performance profitability, and providing a greater capability to distinguish between activities that add-value from those that do not. Further, the BSC has improved visited firms in different ways such as customer, internal process, financial and innovation and learning perspectives. Thus, of particular interest is what the BSC adopter denotes about the BSC approach—it forces firms to focus on the important aspects of their business, and not just focus on the financials for success and survival. In addition, BSC informs them what they need to concentrate on, what they actually need to set up, and what they need to do better to successfully achieve their objectives and goals. Furthermore, the findings infer that strategy, business type and an increasingly competitive environment were the main contingent factors affecting the use of alternative costing systems and performance measurement systems, whilst showing there is no relationship with organisational size. Associated with above discussion it can be inferred that ABC and

the BSC play a moderating role with strategy to improve performance. This finding is in alignment with the theoretical framework of this study that costing systems (ABC or TCS) and performance management systems (BSC or TPM) play a moderating role and are contingent on the competitive strategy adopted by an organisation. Furthermore, it also demonstrates that the type of business activity and increased competitive environment are contingent on a combination of costing systems and performance management systems. This means that these contingent factors are affecting the choice of costing systems such as ABC or TCS and performance management systems such as BSC or TPM.

8.2.2 Firms using ABC system and TPM

The quantitative findings confirmed that there is no difference between cost leader firms that use a combination of ABC and the BSC and those that use both ABC and TPM to improve organisational performance. On the other hand—and in contrast to cost leader firms that use both ABC and TPM—this result supports the quantitative finding in relation to a positive improvement in innovation performance for cost leader firms that use a combination of ABC and the BSC. This confirms the benefits experienced by visited firms as a result of adopting an ABC system and the BSC in their management reporting. In addition, visited firms that use both ABC and TPM determined that ABC resulted in cost information improvement, but they tend to focus only on certain aspects of the BSC, such as customer and employee satisfaction, which ultimately resulted in diminished performance compared to firms using a combination of ABC and the BSC. This is consistent with the literature, that is, if correct measures are not included in the BSC, firms will find it difficult to deploy and it will lose its usefulness. The relationship between costing systems and

performance management systems was established in the theoretical model of the study as moderating variables with strategy as an independent variable for improving performance.

8.2.3 Firms using TCS and the BSC

The quantitative findings revealed that there is no difference between cost leader firms that use a combination of ABC and the BSC, and cost leader firms that use both TCS and the BSC in improving organisational performance. It also confirmed that cost leader firms that use a combination of ABC and the BSC experienced a greater improvement in financial performance than cost leader firms that use both TCS and the BSC. This finding was consistent with the qualitative results. The interviewed firms that use both TCS and the BSC expound that the ABC system does not meet cost/benefit considerations or, for some firms, is irrelevant to their business activity, whilst others were hopeful of improving their costing allocation by implementing an ABC system in the near future. On the other hand, they indicated that BSC improved different perspectives of performance such as customer, human resources and internal business processes. Therefore, of particular interest is what the BSC adopter stated about the BSC approach, namely, it is a whole system that enables them to succeed in their business and predict what might happen in the future. This is also consistent with the argument in the literature that firms who pursued differentiation strategy are relying more on non-financial measures than financial measures in improving their performance. This view was supported in the quantitative findings of this study: that differentiator firms have better customer performance when they use both TCS and the BSC compared to a combined use of

ABC and the BSC. The increasingly competitive environment, activity business type and the particular competitive strategy firms pursued were three main contingent factors affecting the use of ABC and the BSC.

8.2.4 Relationship between performance and the interaction of BSC pillars and ABC

The additional findings obtained from the quantitative study supported Maiga and Jacobs' (2003) findings of the relationship between margin on sales and the interaction of BSC learning and growth perspective and ABC. This study confirmed that financial performance is a significant function of the interaction between BSC innovation and learning perspective and ABC. Further, the findings also demonstrated that efficiency performance is a significant function of the interaction between BSC financial perspective and ABC. In this regard, Maiga and Jacobs found that product quality is a significant and positive function of the interaction between BSC financial perspective and ABC.

8.2.5 Relationship between performance and the interaction of strategy and BSC pillars

The additional findings from the quantitative study indicated that strategy interacted with BSC overall, BSC financial perspective, BSC customer perspective and BSC internal business process perspective to improve organisational performance, innovation performance and efficiency performance. In all these interaction terms it shows that cost leader firms experienced enhanced performance compared with differentiator firms.

8.2.6 Relationship between ABC and performance

The additional quantitative findings revealed that there is a significant positive relationship between financial performance and ABC system when BSC internal business process was entered into the equation model. This finding is consistent with Maiga and Jacobs' (2007) finding that cost improvements have a significant positive impact on financial performance. This means that the accuracy of assigning overhead costs to cost objects such as product, service and customer by using an ABC system eventually result in improvement in financial performance. This finding supports Cagwin and Bowman's (2002) findings that there indeed is a positive association between ABC and improvement in ROI.

8.2.7 Relationship between BSC perspectives and performance

The additional quantitative findings demonstrated that BSC overall predicts a significant positive relationship with organisational performance and each of customer, financial, innovation and efficiency performances. BSC financial perspective is a significant positive function with customer and organisational performance. BSC customer perspective also has a significant positive relationship with organisational performance and each of customer, financial, innovation and efficiency performance indices. Further, the BSC internal business process perspective has a significant and positive relationship with organisational performance and each of the customer and efficiency performance indices. The BSC innovation and learning perspective had a significant and positive relationship with organisational performance and each of customer and innovation performance indices. These findings were consistent with the qualitative findings conducted in

this study whereby visited firms that utilise the BSC approach have confirmed that BSC improved their business performance in different perspectives. A recent study conducted by Maiga and Jacobs (2007) found that both quality improvement and cost improvement have a significant positive impact on financial performance.

8.3 Contribution to Theory and Practice

The findings of this research aimed to make a contribution to management accounting innovation. This study is the first to examine the relationship between cost accounting systems (such as ABC or TCS) and performance measurement systems (such as BSC or TPM) and their effect on organisational performance under alternative competitive strategies in an Australian context. In addition, it is the first empirical study that explores the relationship between performance and the interaction of strategy, ABC and the BSC across a number of industry sectors in Australia.

The major contribution of the research to the existing stock of knowledge on contemporary management accounting issues derives from the emphasis on innovative techniques implemented by management in response to the new global competitive environment. This research provides evidence from Australia to complement Maiga and Jacobs's study (2003) carried out in the US. In this way, this research confirmed Maiga and Jacobs's findings in terms of a significant positive interaction between the BSC innovation and learning perspective and ABC to affect financial performance, in addition to a significant positive interaction between BSC financial perspective and ABC on efficiency performance. This research also extends

Maiga and Jacobs's study—by not just looking for the interaction between ABC and BSC perspective on performance, but also by examining the combined relationship between costing systems and performance measurement systems under alternative competitive strategies.

Academically, the study provides a contingency framework that links the relationship between competitive strategy, costing systems, and performance measurement systems on organisational performance. Thus, a contingency theoretical framework is positioned within a multiple paradigm model of social science as put forward by Burrell and Morgan (1979) in order to understand and explain contemporary management accounting practices. Further, this study demonstrated that competitive strategy, business type, and an increasingly competitive environment, are the main contingent factors affecting the use of costing systems such as ABC or TCS, and performance management systems such as the BSC approach or TPM.

The framework provides useful information to managers in industry about the benefits of using an accurate costing system and a BSC approach to improve decision making and strategic performance of their organisation. It also explains the role of contingent factors such as strategy that are likely to impact upon the use and benefits in the direction or use of ABC and the BSC. For instance, firms that follow a cost leadership strategy will benefit from using an ABC system, as ABC adds to firm value through better cost controls and asset utilisation, and the accuracy ABC cost information yields improvement in the BSC perspectives.

8.4 Limitations

The general limitation of this study lies in the small size sample—a not abnormal limitation for the survey method wherein the biggest problem typically encountered is a low response rate (Neuman, 2003). Interpretation of the quantitative findings should be undertaken with caution due to the small sample size. Given that the nature of the research objective was to investigate three types of organisations, first, firms that use a combination of ABC system and the BSC, second, firms that use both traditional costing system (TCS) and the BSC approach and, third, firms that use ABC system and traditional performance measures (TPM), the researcher used several strategies to increase the response rate. Unfortunately, the majority of the participating firms use traditional methods rather than ABC or BSC and this is likely to have contributed towards the low response rate. The positive responses obtained from the 199 sample firms revealed that among the firms there were 21.61 % using ABC and BSC jointly, 15.58 % using both ABC and TPM, 22.61 % using both the BSC and TCS and 40.20 % using traditional methods, which included TCS and TPM. The researcher conducted 15 case study interviews to supplement the quantitative results, thereby reducing the limitation caused by a small sample size.

Another limitation to the study was the small number of firms across some industry sectors. Additionally, because the questionnaires were specifically addressed to the Chief Financial Officer (CFO) of the firm, even though previous research indicates that the CFO is the optimal person to whom to direct questions relating to the variables of study (Hoque and James, 2000), this could be another reason for the low response rate, that is, the limited availability and/or ease of access to the CFO of the firm.

8.5 Directions for Future Research

The findings of this research study are important and significant for ABC adopters, BSC adopter firms, practitioners and academics who have an interest in management accounting research in the Australian business environment or other developed countries. Acknowledging the lack of prior research into the combined relationship between costing systems and performance management systems across a number of industry sectors in Australia means the potential for further research is considerable.

An obvious direction for future research efforts within this field in Australia is further investigation into the findings of this thesis. This will facilitate a better understanding of the relationship between management accounting innovations such ABC and the BSC in the Australian business environment. One of the interesting avenues of further research that has not been addressed in the scope of this research thesis is to explore the impact of firm structural characteristics (e.g. decision structure, organisational structure and process/product integration) on the combined use of cost accounting systems and performance measurement systems in improving business performance.

The research questions of this study examined firms using a combination of ABC systems and the BSC, in addition to firms using singular use of ABC or BSC, but did not compare firms using both traditional costing system and traditional performance measurement in their system because this type of firm is not relevant to the research hypotheses. Further research that includes these firms may advance academic and

practitioner understanding about whether firms using a combination of ABC and the BSC will perform better than those who use traditional methods only.

The contingency theoretical model used in this study examined a set of contingency factors such as strategy, organisational size, competitive environment and activity business type in relation to costing systems and performance measurement systems. Further research in regard to other factors such as notional culture, industry and technology may increase understanding about how these factors are likely to impact upon the use of combined costing systems and performance measurement systems towards performance improvement. Furthermore, another avenue for future research could be the replication of this research study with a larger simple size, and a subsequent comparison between different industry sectors.

8.6 Conclusion

This study sought to examine the relationship between costing and performance management systems and their combined effect on performance under alternative competitive strategies across a number of industry sectors in Australia. The study also sought to examine the relationship between performance and the interaction of strategy, ABC and the BSC. This thesis effectively demonstrated that contingency factors such as strategy, business type and increase of competitive environment do affect the choice of using costing systems (ABC or TCS) and performance management systems (BSC or TPM). It also demonstrated that the design of the BSC perspectives may also be contingent on the strategy a firm pursues.

Through this research, the candidate has extended his own personal knowledge, as well as that of the Australian business environment, regarding management accounting innovations and their impact. The possibility of comparing the findings to other developing countries, and reading vast amounts of literature on cost accounting systems and performance management systems, has provided infinite insights into how, in the future, the candidate may be able to contribute further knowledge to this research context.

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Appendix A: Survey Questionnaire

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An Activity-Based costing, Balanced Scorecard, Competitive Strategy and Performance Survey

STATEMENT OF PURPOSE: To understand and explore how varying cost allocation and performance management accounting technologies affect the key determinants of performance under differing competitive strategies.

The survey has been designed for anonymity - your name, department or group are not required. I would appreciate your answering all the questions in the survey, since all questions are interrelated and important for making a comprehensive evaluation.

SECTION A: Organisational and Environmental Characteristics

Organisation type:

- ☐ Private
- ☐ Public
- ☐ Government

Operating Income Before Tax:

- 2000 ($m).....
- 2001 ($m).....
- 2002 ($m).....
- 2003 ($m).....

How frequently are new products/services or major redesigns introduced?

- ☐ Seldom
- ☐ Occasionally
- ☐ Fairly Often
- ☐ Very Often

Products or Services Organisation Offers for Sale:

- ☐ 5 or less
- ☐ 6 – 10
- ☐ 11 – 20
- ☐ 21 – 50
- ☐ 51 or more

Number of Employees in Organisation:

- ☐ Less than 200
- ☐ 200 – 500
- ☐ 501 – 1,000
- ☐ 1,001 – 2,000
- ☐ 2,001 or more

Industry (Please choose the most dominant industry your firm operates in ☑):

Retail

- ☐ Building materials, Hardware, garden supply and mobile home dealers
- ☐ General merchandise stores
- ☐ Automotive dealers and gasoline service stations
- ☐ Apparel and accessory stores
- ☐ Food stores
- ☐ Home furniture, furnishings and equipment stores

Manufacturing:

- ☐ Food, beverage and tobacco products
- ☐ Textile, clothing, footwear and leather products
- ☐ Lumber and wood products, furniture and fixture
- ☐ Paper, printing, publishing and allied products
- ☐ Chemicals, petroleum refining and related products
- ☐ Rubber and miscellaneous plastics products, clay, class and concrete products
- ☐ Primary metal, fabricated metal products and transportation equipment
- ☐ Industrial and commercial machinery, computer equipment and electrical equipment and components
- ☐ Other manufacturing (please specify): .....

Service:

- ☐ Hotels, rooming houses, camps and other lodging places
- ☐ Personal services
- ☐ Entertainment
- ☐ Business services
- ☐ Health and social services
- ☐ Educational services
- ☐ Automotive repair, services and parking
- ☐ Trade, professional and community membership organisations

Other:

- ☐ Agriculture, forestry and fishing
- ☐ Wholesale trade
- ☐ Transportation, communications, electric, gas and sanitary service
- ☐ Mining & Construction
- ☐ Finance, insurance and real estate
- ☐ Other (please specify):

SECTION D: Activity-Based Costing

Activity-Based Costing (ABC) is a method for allocating costs based on the number of activities consumed by cost objects (such as product, service or customer). It integrates causal relationships between cost objects and activities as well as between activities and resources. Does your firm use Activity-Based Costing to allocate overhead costs?

Yes ☐ No ☐

If Yes, how long has your firm used ABC? ☐ Less than 6 mths ☐ 6 mths to 1 year ☐ Between 1 and 2 years ☐ Greater than 2 years

If No, can you offer any reasons why your firm has not implemented ABC?: .....

.....

In your opinion, your firm has succeeded in the implementation of ABC on the grounds that ..... Please tick the appropriate option using the response options indicated on the scale as a guide:

	1 Strongly disagree	2	3	4 Neither agree or disagree	5	6	7 Strongly agree
▪ ABC initiative has the strong active support of top management.	☐	☐	☐	☐	☐	☐	☐
▪ Upper management has provided adequate resources, such as time and commitment, to the ABC implementation effort.	☐	☐	☐	☐	☐	☐	☐
▪ ABC has been closely tied to the competitive strategies of your firm.	☐	☐	☐	☐	☐	☐	☐
▪ When the ABC initiative began, the objectives of ABC implementation were clearly understood both by designers and users.	☐	☐	☐	☐	☐	☐	☐
▪ ABC data have been used for performance evaluation.	☐	☐	☐	☐	☐	☐	☐
▪ Compensation systems in the firm are designed to motivate employees to implement ABC.	☐	☐	☐	☐	☐	☐	☐
▪ Operating departments or departments outside the accounting department (such as production/service and so on) have shown commitment to ABC success.	☐	☐	☐	☐	☐	☐	☐
▪ Top management or senior managers have a clear commitment to use ABC information as the basis for decision making.	☐	☐	☐	☐	☐	☐	☐
▪ The accountants have shared their ownership of information with non-accountants.	☐	☐	☐	☐	☐	☐	☐
▪ The non-accounting/ finance groups (such as production/service groups, marketing groups, engineer groups and so on) are committed to use ABC information.	☐	☐	☐	☐	☐	☐	☐
▪ Education (such as benefits of ABC, the need for implementation of ABC and so on) is being provided.	☐	☐	☐	☐	☐	☐	☐
▪ Sufficient training about the design and objectives of ABC is being provided.	☐	☐	☐	☐	☐	☐	☐
▪ Sufficient training about implementing ABC is being provided.	☐	☐	☐	☐	☐	☐	☐

SECTION E: Organisational Performance

Please rate your firm's overall performance in the following areas by circling the appropriate number using the scale provided. If you believe particular areas are not relevant to your firm please tick the 'not applicable' circle: Please note this section has four parts **A,B,C and D**

A.	n/a	1 Well Below Average	2	3	4 Average	5	6	7 Well Above Average
Operating income	○	1	2	3	4	5	6	7
Sales growth	○	1	2	3	4	5	6	7
Cash flow	○	1	2	3	4	5	6	7
Return on sales	○	1	2	3	4	5	6	7
Profit per service	○	1	2	3	4	5	6	7
Shareholder equity/ to total assets	○	1	2	3	4	5	6	7
Return on investment	○	1	2	3	4	5	6	7
Economic valued added	○	1	2	3	4	5	6	7

B.	n/a	1 Well Below Average	2	3	4 Average	5	6	7 Well Above Average
Equipment availability	○	1	2	3	4	5	6	7
No. of customer complaints	○	1	2	3	4	5	6	7
Gains and losses of customer	○	1	2	3	4	5	6	7
Average time from customer contact to sales response	○	1	2	3	4	5	6	7
Customer satisfaction	○	1	2	3	4	5	6	7
% of shipments returned due to poor quality	○	1	2	3	4	5	6	7
Warranty repair costs	○	1	2	3	4	5	6	7
Service expense per customer	○	1	2	3	4	5	6	7

	1 Well Below Average	2	3	4 Average	5	6	7 Well Above Average
C							
Materials efficiency variance	❍	1	2	3	4	5	6	7
Ratio of good output to total output	❍	1	2	3	4	5	6	7
% of defective products shipped	❍	1	2	3	4	5	6	7
Manufacturing lead time	❍	1	2	3	4	5	6	7
Rate of material scrap loss	❍	1	2	3	4	5	6	7
Labour efficiency	❍	1	2	3	4	5	6	7
On-time delivery	❍	1	2	3	4	5	6	7
Improvement in productivity	❍	1	2	3	4	5	6	7

	1 Well Below Average	2	3	4 Average	5	6	7 Well Above Average
D							
No. of new product launches	❍	1	2	3	4	5	6	7
Performance of individual innovations	❍	1	2	3	4	5	6	7
Performance of the innovation process	❍	1	2	3	4	5	6	7
Employee satisfaction	❍	1	2	3	4	5	6	7
Employee turnover	❍	1	2	3	4	5	6	7
Intellectual assets	❍	1	2	3	4	5	6	7
Investment in training	❍	1	2	3	4	5	6	7
No. of new patents	❍	1	2	3	4	5	6	7

SECTION F: Demographic Data

Your Age Group:

- ❒ 20 to 29
- ❒ 30 to 39
- ❒ 40 to 49
- ❒ 50 or over

Your Level of Education:

- ❒ Secondary
- ❒ Graduate
- ❒ Postgraduate

Your Professional Qualifications (eg. CPA):

- ▪ ……..……
- ▪ ……..……
- ▪ ……..……
- ▪ ……..……

Length of Your Employment (years):

- ..... With this firm
- ..... In current position
- ..... In industry

Your Experience in Accounting and Finance Area (years):

- ❒ Less than 5
- ❒ 5 – 10
- ❒ 11 – 20
- ❒ More than 20

Would you like a summary of the findings of this research? ❒ **No** ❒ **Yes**, there are two options:

Options:

1. Please include your business card with the survey upon return, your details will remain confidential and not be disclosed.

or

2. Place a business card in a separate envelope and post to the same address as shown on the return envelope provided for the return of the survey.

In order to follow up issues raised in this investigation and to improve the quality of my data. I hope to interview some of the respondents to this questionnaire, probably in October 2005. if you are willing to be interviewed, would you please fill in the form below.

- Company name: ……
- Your name: ……
- Telephone number: ……

Please return this questionnaire in the attached pre-paid self-addressed envelope by the end of March 2006

Thank you in advance for your time and effort, it is very much appreciated.

Appendix B: Case Study Interview Protocol

1- General Information

1- Interview date: ……2. Time: …….

3. Who: ……4. Organisation: ……..

Q1- Would you please give me a brief introduction about your firm and its competitive environment?

Q2- How important is your firm products/services pricing to customers and competitors?

Q3- Would you please tell me about cost accounting technique your firm use in allocating overhead costs:

Q4- How this costing system useful to your firm performance and cost information?

Q5- Would you tell me about performance management systems in your firm?

Q6- How the BSC approach is improving your firm performance?

Q7- What are most areas you find that the BSC improved in your firm?

Q8- Does your firm have a list of performance indicators that are used for performance evaluation?

Q9- What type of strategy your firm pursued in achieving firm's goals and objectives?

Q10- Finally, I would like to ask if you have anything to add or any last comments regarding costing system and performance management systems?

This interview would keep interviewee abreast of research
Thank you for your time

Appendix C: Interaction between the Variables

1- Interaction between the variables when controlling for the length of ABC use.

Figure 5.10: Strategy (cost/diff) by BSC overall on innovation performance

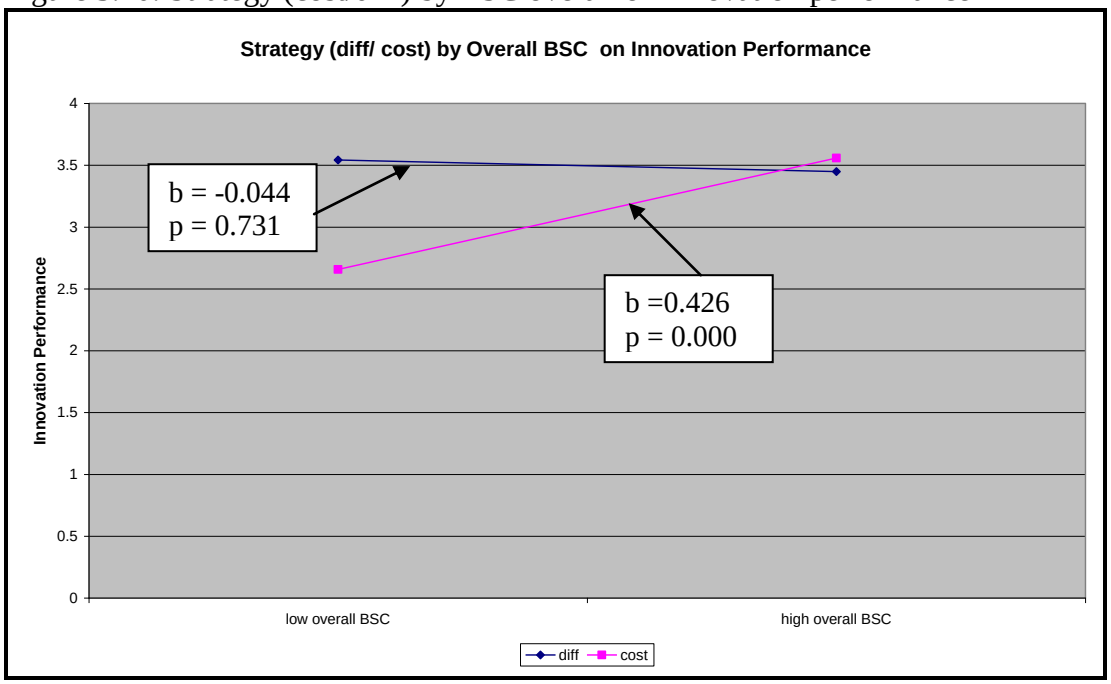


Figure 5.11: Strategy (cost/diff) by overall BSC on overall performance

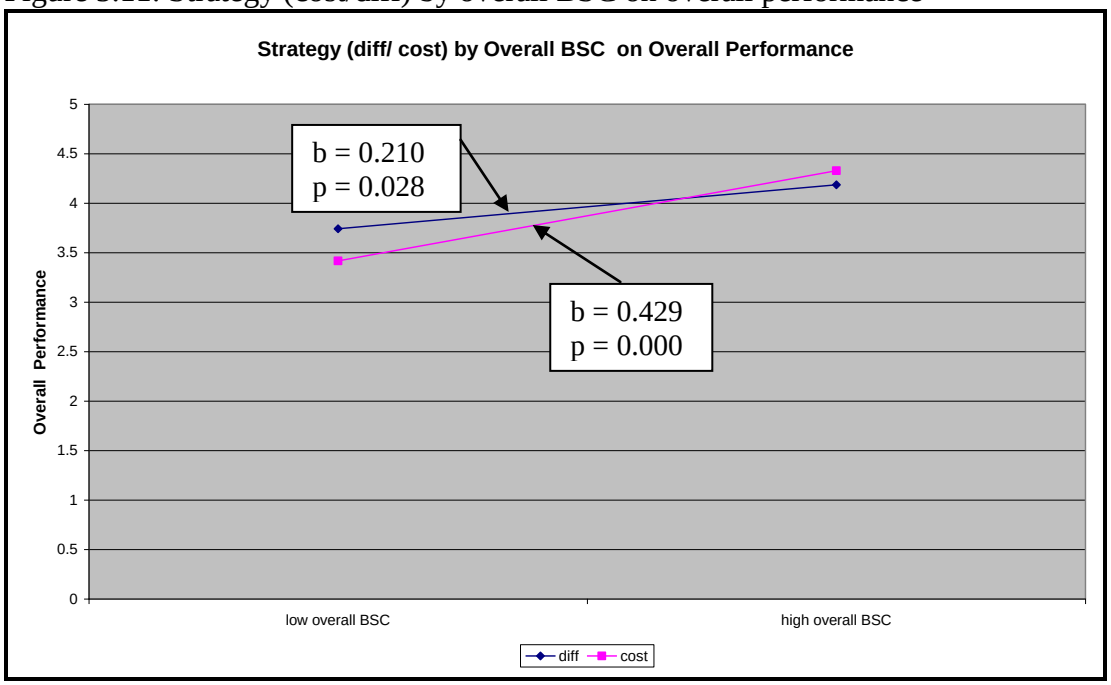


Figure 5.12: Strategy (cost/diff) by financial perspective on innovation performance

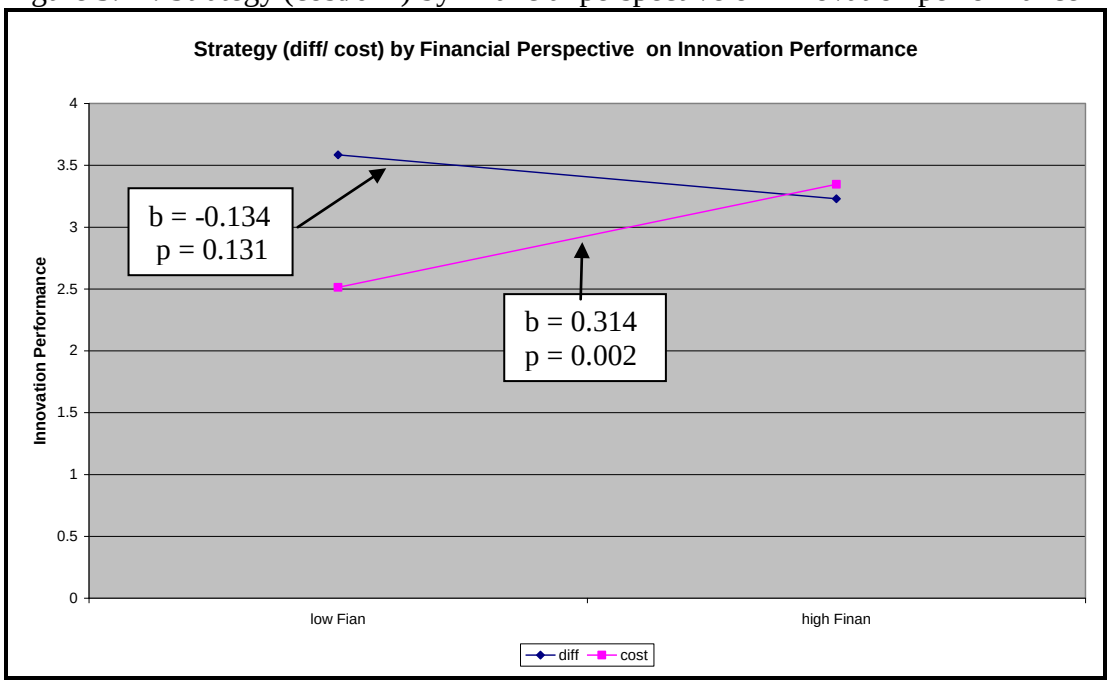


Figure 5.13: Strategy (cost/diff) by financial perspective on overall performance

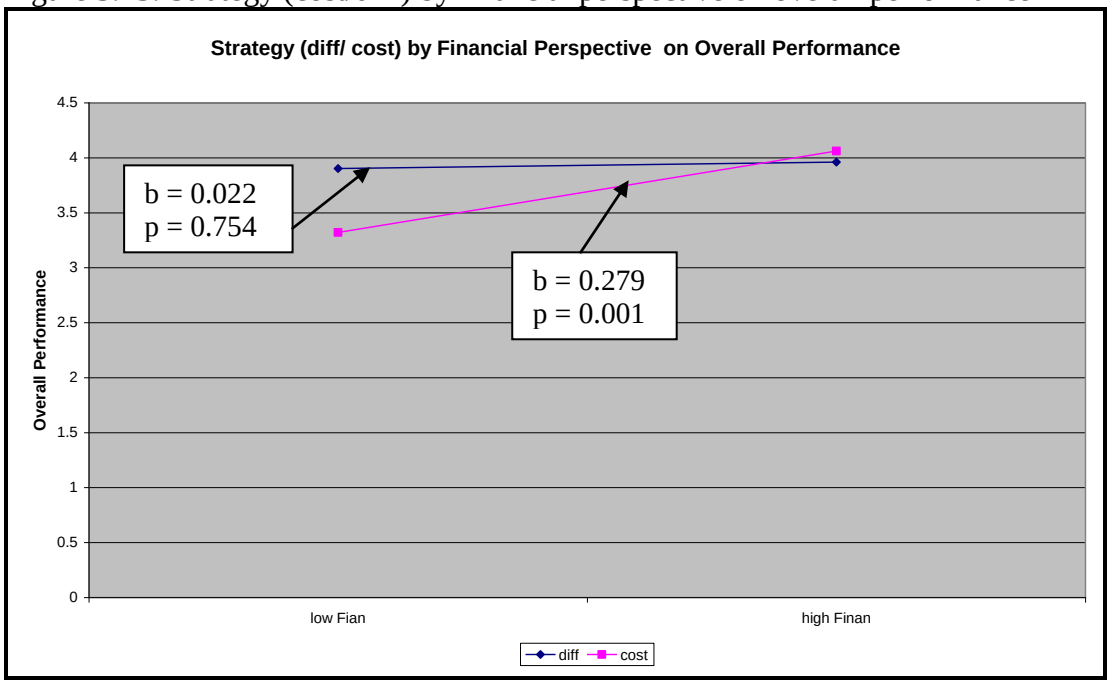


Figure 5.14: Strategy (cost/diff) by customer perspective on innovation performance

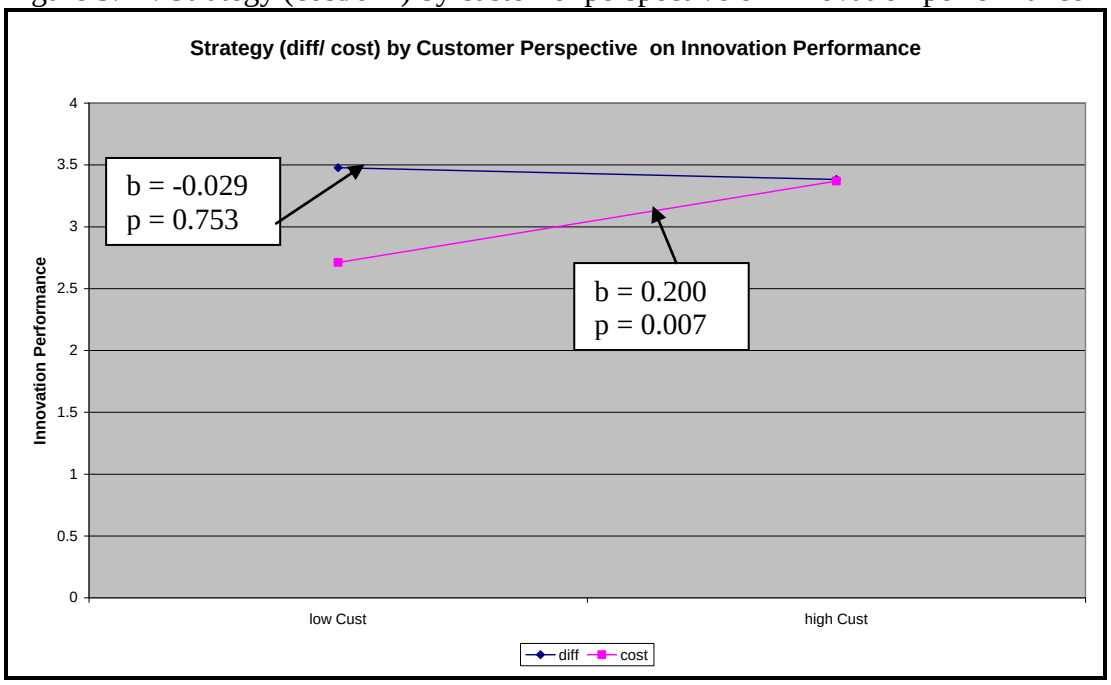


Figure 5.15: Strategy (cost/diff) by internal business process on innovation performance.

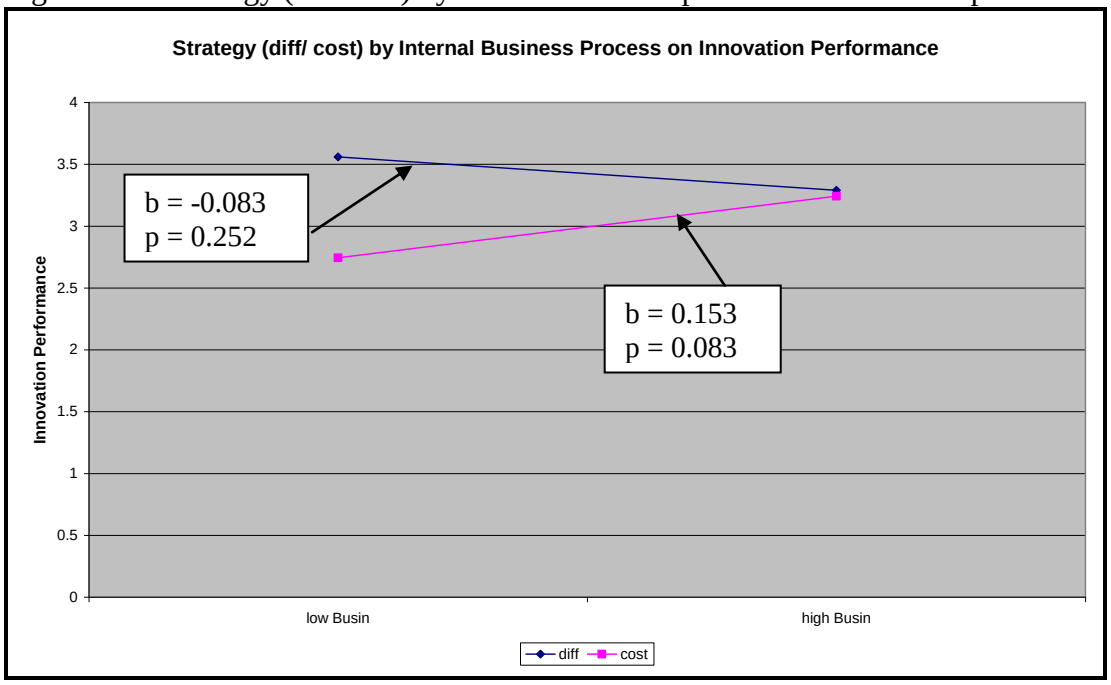
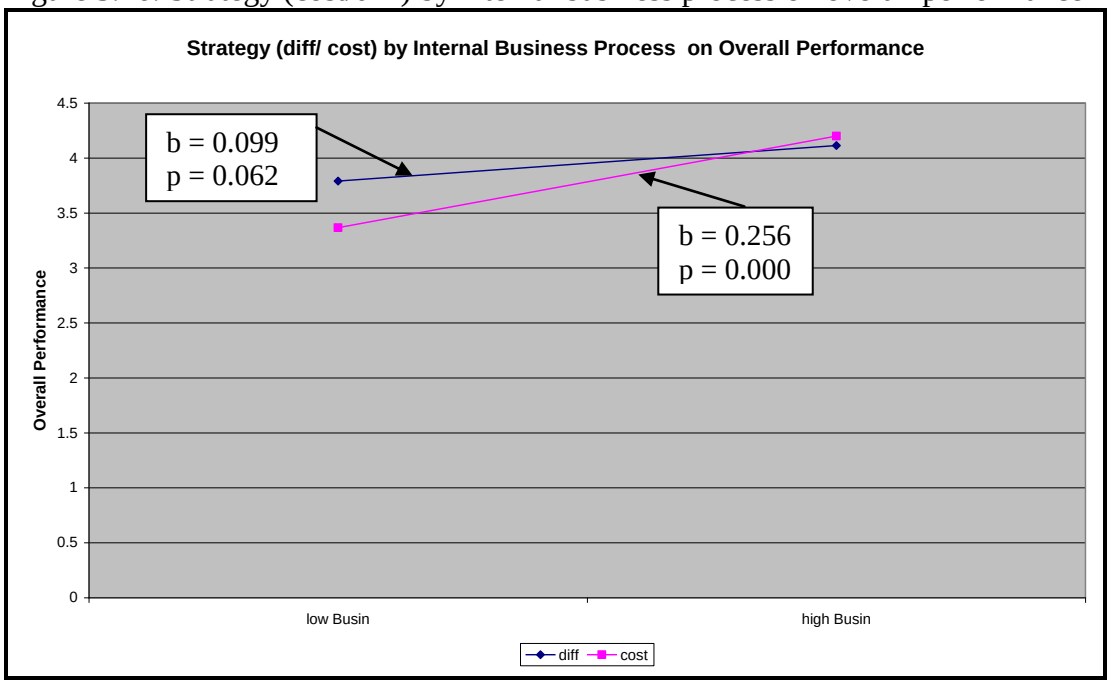


Figure 5.16: Strategy (cost/diff) by internal business process on overall performance



2- Interaction between the variables when controlling for the length of BSC use

Figure 5.17: Strategy (cost/diff) by overall BSC on innovation performance

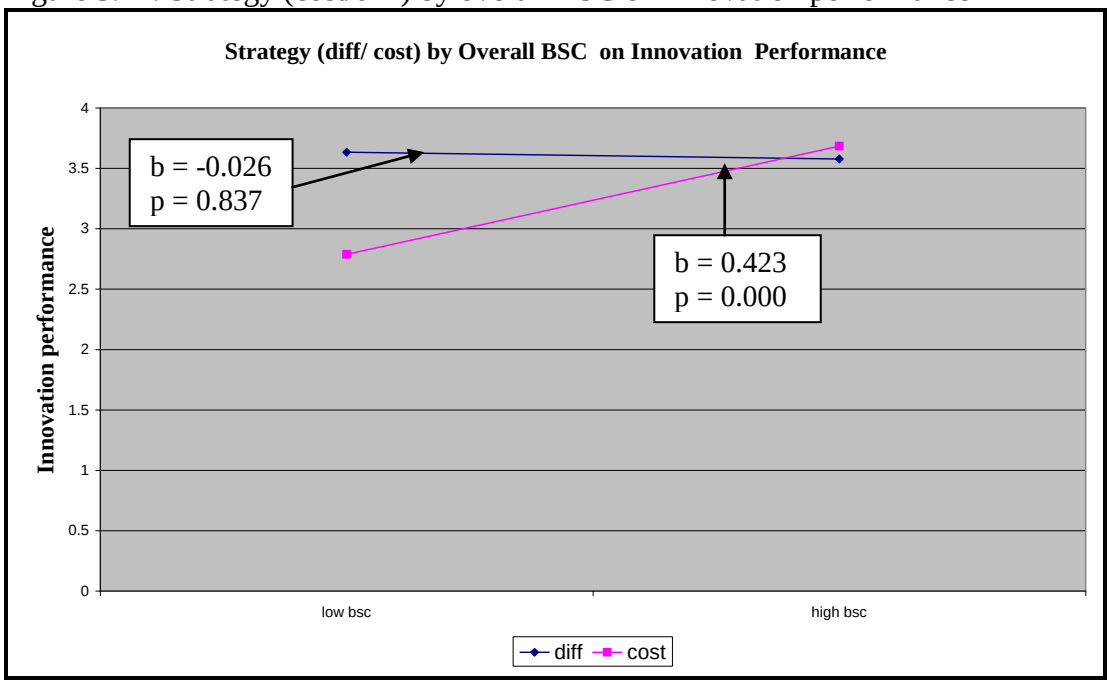


Figure 5.18: Strategy (cost/diff) by overall BSC on overall performance

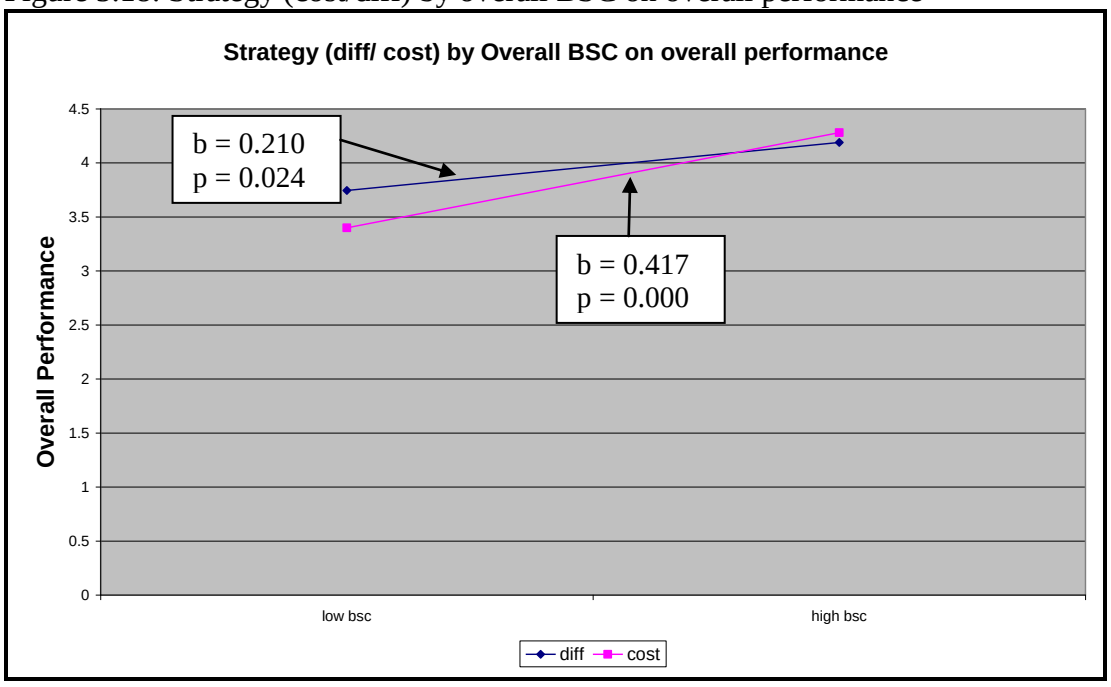


Figure 5.19: Strategy (cost/diff) by financial perspective on innovation performance

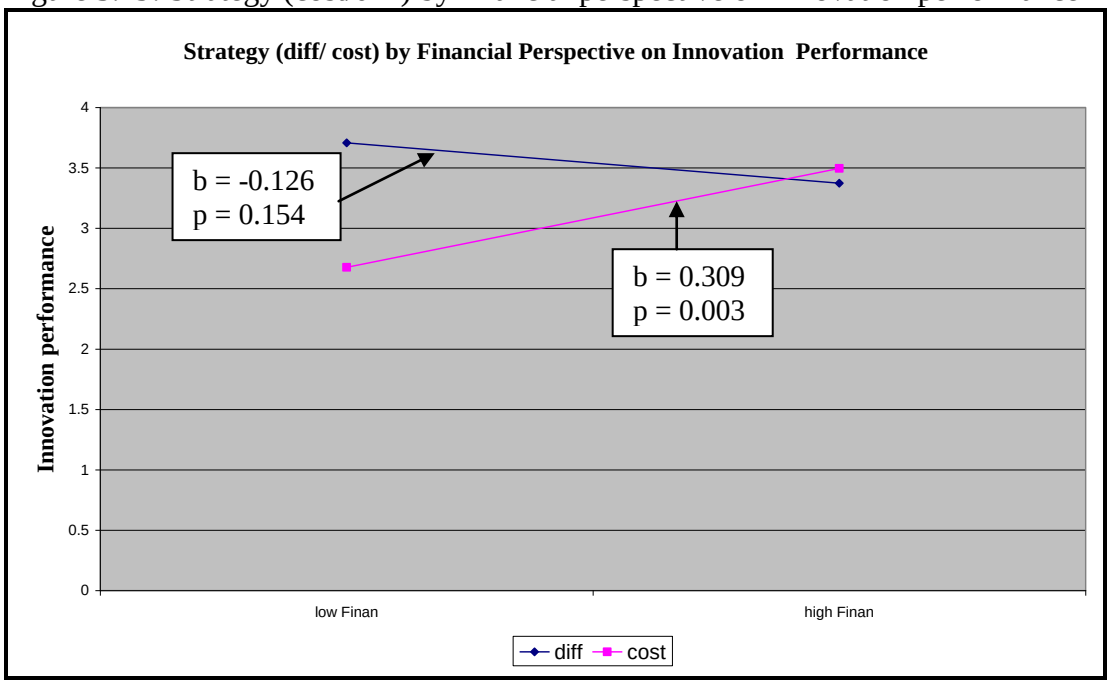


Figure 5.20: Strategy (cost/diff) by financial perspective on overall performance

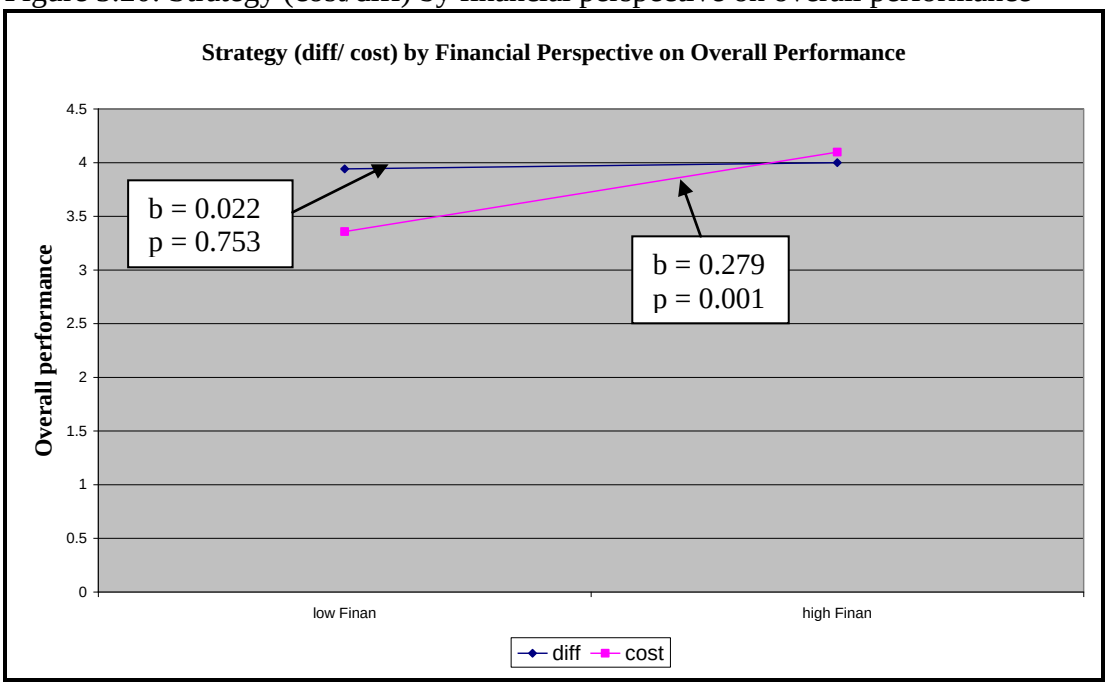


Figure 5.21: Strategy (cost/diff) by customer perspective on innovation performance

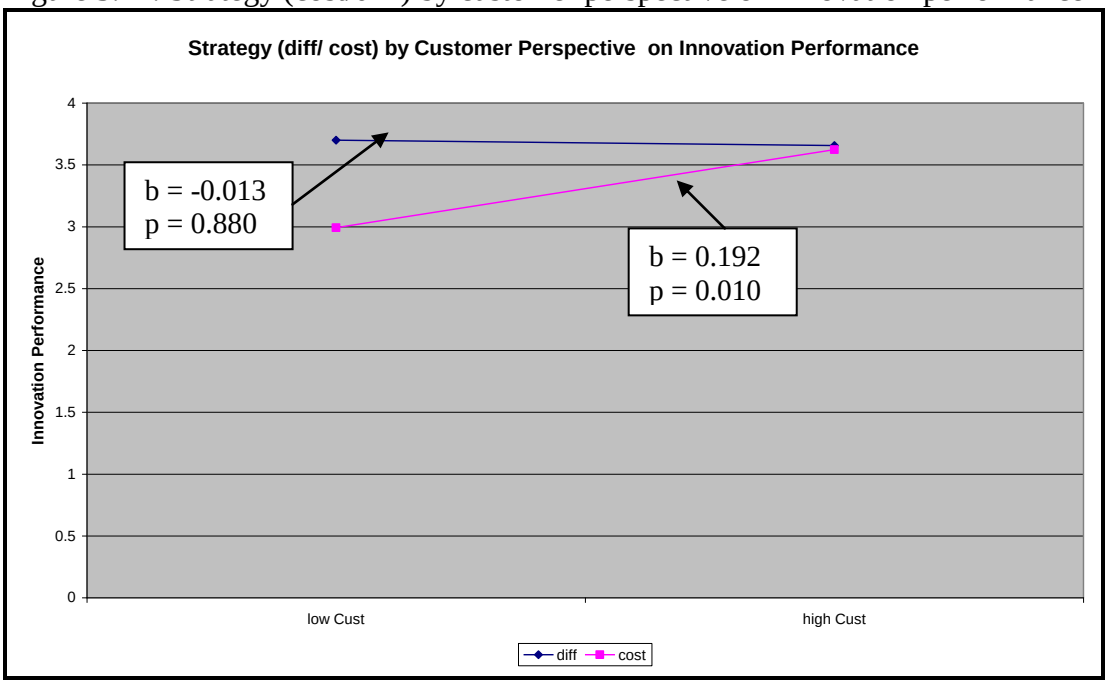


Figure 5.22: Strategy (cost/diff) by internal business process on innovation performance

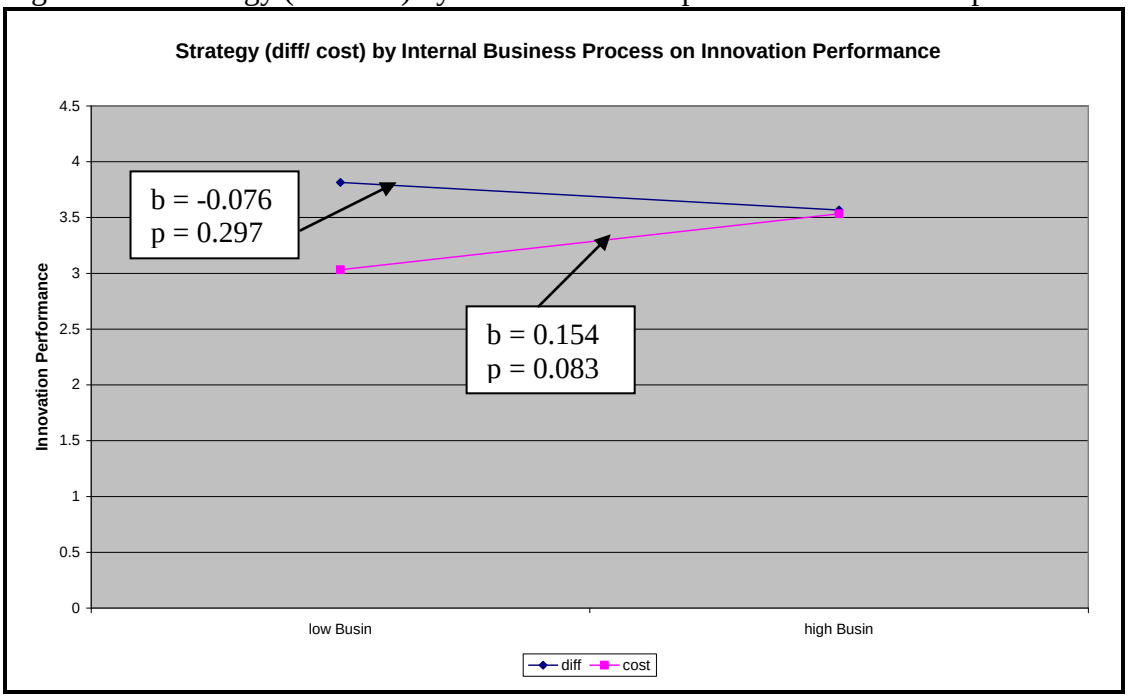


Figure 5.23: Strategy (cost/diff) by internal business process on efficiency performance

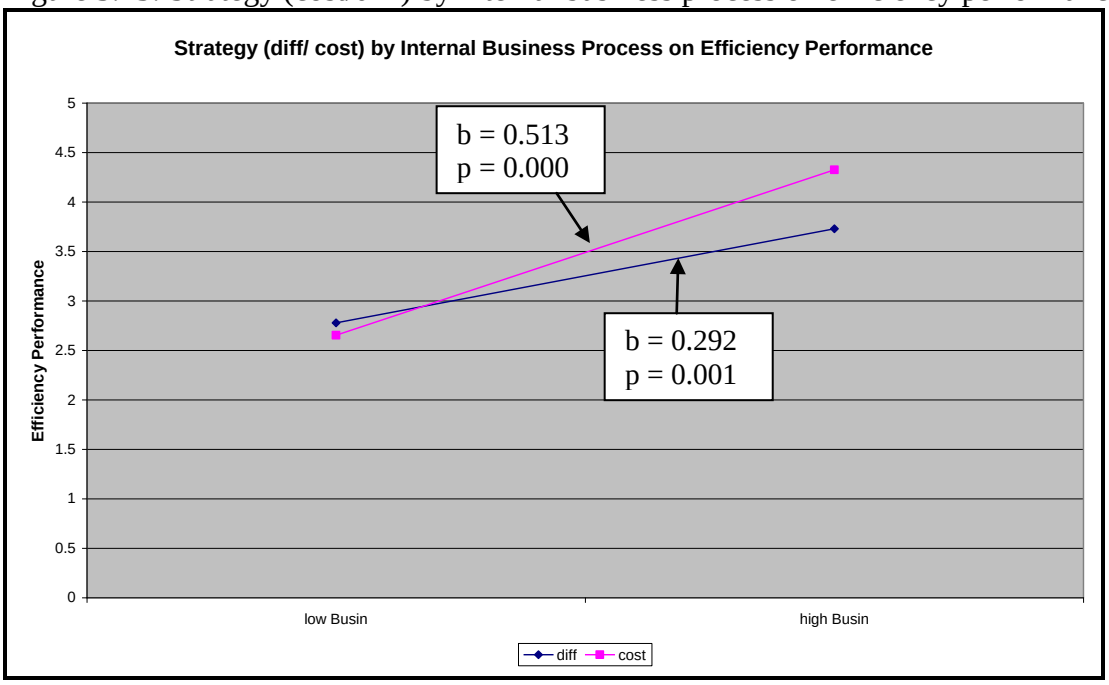
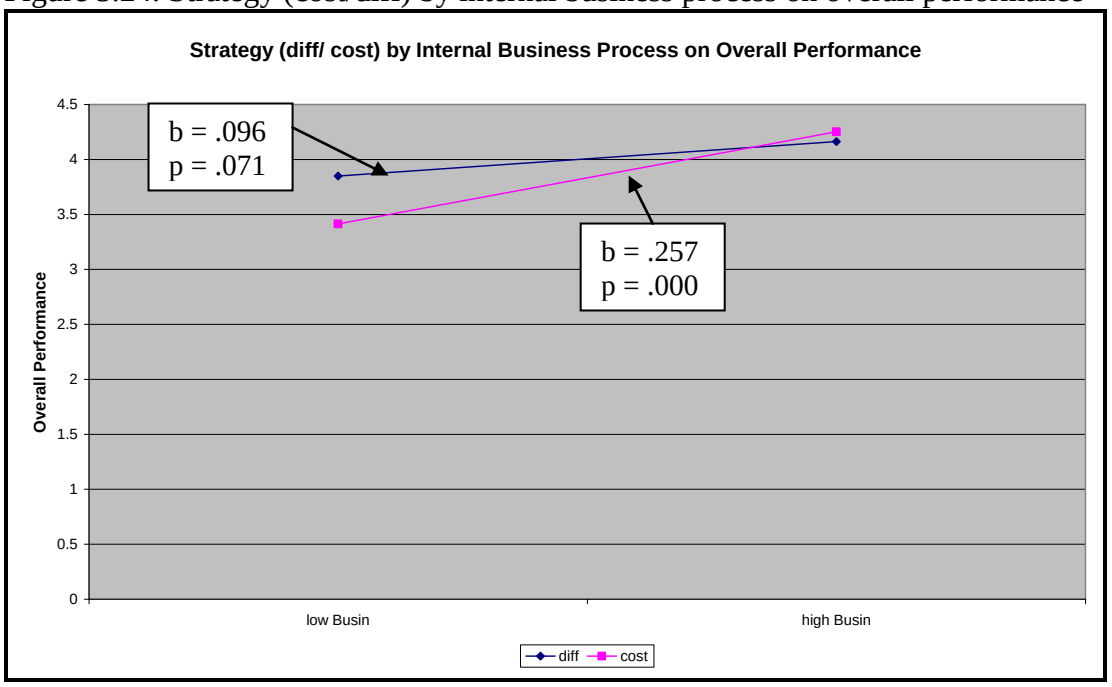


Figure 5.24: Strategy (cost/diff) by internal business process on overall performance



Appendix D: Factor Loading for the BSC Indicators

1- Total Variance Explained

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.737	33.687	33.687	6.737	33.687	33.687	4.667	23.333	23.333
2	2.997	14.983	48.670	2.997	14.983	48.670	3.018	15.091	38.425
3	1.731	8.654	57.324	1.731	8.654	57.324	2.972	14.859	53.283
4	1.551	7.757	65.081	1.551	7.757	65.081	2.360	11.798	65.081
5	.877	4.386	69.467						
6	.827	4.133	73.600						
7	.701	3.507	77.106						
8	.625	3.124	80.230						
9	.540	2.700	82.930						
10	.509	2.545	85.476						
11	.445	2.223	87.699						
12	.418	2.090	89.788						
13	.353	1.763	91.551						
14	.320	1.601	93.152						
15	.310	1.550	94.703						
16	.252	1.258	95.961						
17	.236	1.178	97.139						
18	.212	1.059	98.198						
19	.192	.959	99.157						
20	.169	.843	100.000						

Extraction Method: Principal Component Analysis.

2- Rotated component Matrix

Rotated Component Matrix(a)

	Component			
	1	2	3	4
CC.% of defective products shipped	.822			
CC.Ratio of good output to total output	.804			
CC.Materials efficiency variance	.802			
CC.Rate of material scrap loss	.795			
CC.Manufacturing lead time	.755			
CB.% of shipments returned due to poor quality use	.672		.350	
CC.Labour efficiency	.629			
CC.On-time delivery	.610		.359	
CD.Investment in training		**.850**		
CD.Employee satisfaction		.835		
CD.Employee turnover		.820		
CD.Intellectual assets		.808		
CB.Customer satisfaction use			**.804**	
CB.Gains & losses of customers use			.784	
CB.No. of customer complaints use			.780	
CB.Average time from customer contact to sales response			.696	
CA.Shareholder equity/to total assets use				**.813**
CA.Return on investment use				.792
CA.Return on sales use				.650
CA. Profit per service				.553
CA Operating income				.552

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a Rotation converged in 6 iterations.