

**THE USE OF MANAGEMENT ACCOUNTING PRACTICES IN
MALAYSIAN SMES**

**Submitted by
Kamilah Ahmad**

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Declaration

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ABSTRACT

There have been the recent calls for additional research in order to enhance the understanding of the adoption of management accounting practices (MAPs) in small and medium sized enterprises (SMEs). This, allied to an increasing importance of SMEs around the world especially in developing countries, is the motivation for this research. This research explores the uptake of a broad range of MAPs in Malaysian SMEs; identifies the roles of MAPs in the management of SMEs; determines factors that affect the extent of use of MAPs in SMEs and lastly examines the relationship between the use of MAPs and organizational performance of SMEs. A postal questionnaire was conducted to 1,000 Malaysian SMEs in manufacturing sector which elicited 160 useable responses.

The results show that the majority of respondents have used the five management accounting areas identified. Use of the costing system, budgeting system and performance evaluation system are significantly higher than for the decision support system and strategic management accounting, which indicates that the uptake of traditional MAPs is greater than for sophisticated MAPs. The results indicate that medium sized firms make greater use of all MAPs as opposed to small sized enterprises. The most significant differences relate to the use of decision support system and strategic management accounting. The increased uptake of sophisticated MAPs by larger firms is in line with size being a contingent variable explaining the use of such practices.

The results also suggest that MAPs were perceived as playing very important roles in the management of Malaysian SMEs. Performance evaluation and controlling activities were the major roles of MAPs in the management of SMEs. Overall the study suggests

that MAPs are perceived by SMEs as relevant and useful in their management processes.

Further, the study found that four out of five contingent factors; size of the firm, intensity of market competition; participation of the owner/manager in the development of MAPs in firm and advanced manufacturing technology have a positive and statistically significant relationship with the use of certain MAPs. The research however found weak support for the positive relationship between the use of MAPs and organizational performance of SMEs.

This study enriches the existing body of knowledge of management accounting by providing information as to the use of MAPs in SMEs in Malaysia. The findings can be specifically informative for policy makers intent on developing management accounting skills among Malaysian SMEs. This research will provide valuable insights into the nature of MAPs in SMEs in a developing country and will promote interest among Malaysian researchers as well as researchers of other countries to make the SME sector a focus of interest in management accounting research.

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ABBREVIATIONS

ABC	Activity-based Costing
ABCMA	Activity-based Costing and Management
ABMA	Activity-based Management Accounting
AIS	Accounting Information System
AMT	Advanced Manufacturing Technology
ARR	Accounting Rate of Return
BBRT	Beyond Budgeting Round Table
BSC	Balanced Scorecard
CAM-I	Consortium for Advanced Manufacturing International
CBM	Central Bank of Malaysia
CIMA	The Chartered Institute of Management Accountants
CSFs	Critical Success Factors
CVP	Cost-Volume-Profit
DOS	The Department of Statistics
DSS	Decision Support System
FDI	Foreign Direct Investment
FMAC	Financial Management and Management Accounting Committee
GDP	Gross Domestic Product
IRR	Internal Rate of Return
IFAC	International Federation of Accountants
IMA	Institute of Management Accountants
IMP	Industrial Master Plan
IT	Information Technology
JIT	Just-In-Time
KM	Knowledge Management
KPIs	Key Performance Indicators
MA	Management Accounting
MAP	Management Accounting Practice
MAS	Management Accounting Systems
MAT	Management Accounting Technique
MCS	Management Control System
MOA	Ministry of Agriculture and Agro-based Industries
MP	Malaysia Plan
NPC	National Productivity Corporation (Malaysia)
NPV	Net Present Value
NSDC	Malaysian National SMEs Development Council
NZ	New Zealand
OC	Organizational Controls
PMS	Performance Measurement System
ROI	Return on Investment
ROE	Return on Equity

ROA	Return on Asset
ROS	Return on Sales
SMEs	Small and Medium sized Enterprises
SMIDEC	Small and Medium Industries Development Corporation
SMA	Strategic Management Accounting
TQC	Total Quality Control
TPM	Total Productive Maintenance
TQM	Total Quality Management
UNDP	The United Nations Development Program
UK	United Kingdom
US	United States
VBM	Value-based Management
VE	Value Engineering
ZBB	Zero-Based Budgeting

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Chapter 1

Introduction

1.1 Introduction

This chapter is organized into five sections. The first section describes briefly the background to small and medium sized enterprises (SMEs) and the role of management accounting practices (MAPs) in the management of all organizations. Section two discusses the problem statement followed by the identification of research objectives, research questions, and hypotheses. Next the rationale and importance of this study is explained. The section ends with the development of a methodology and the specification of the organisation of the thesis.

1.2 Background

Small and medium-sized enterprises (SMEs) make up the vast majority of the business population in most countries in the world therefore they constitute a vital force in modern information-based economies (Mitchell and Reid, 2000). In Malaysia the SMEs population comprises approximately 99 per cent of all Malaysian businesses (The Department of Statistics, 2005). Therefore this sector plays a crucial role in the economy as an engine to generate economic growth in Malaysia. SMEs also contribute to the economy in other ways. Cook (2001) highlighted some of those which includes;

- the encouragement of entrepreneurship;
- the greater likelihood that SMEs will utilize labor intensive technologies and thus have immediate impact on employment generation;
- the fact that they can usually be established rapidly and put into operation to produce quick returns;

- the ability of SME development to encourage the process of both inter-and intra-regional decentralization; and
- the notion that they may become a countervailing force against the economic power of larger enterprises. More generally, the development of SMEs is seen as accelerating the achievement of wider economic and socio-objectives, including poverty alleviation.

In addition to the advantages stated above, Mitchell and Reid (2000) argued that part of the reason for stressing the importance of small firms or SMEs is that their flexibility makes them well suited to the niche opportunities which are so characteristic of the 'new' economy. Thus SMEs play a key role in stimulating economic expansion. In light of both their significant contributions and potentials, there is a growing focus on this sector by policy makers in most countries. In Malaysia, the role of SMEs became more important after the 1990s especially after the Asian Crisis in 1997-1998. The country learnt not to be overly dependent on foreign direct investment (FDI) in stimulating its economy and used SMEs as a new mechanism for generating the growth of its economy (Aris, 2007). The government has been called upon to put up clear policies, strategies and implementation matrixes to develop this sector through an integrated approach (Aris, 2007). For example in the 9th Malaysia Plan (2006 – 2010), the principal SMEs policy strives for the development of a competitive, innovative and technologically strong SME sector, capable of meeting the increasing demands of globalization and intensifying competition (NSDC, 2007). In consequence various initiatives have been set in motion to build the capacity and capability of SMEs. For example, there have been efforts to improve the management and business methods in production, quality improvement, marketing and accounting skill (SME Annual Report, 2007). However there is concern about a lack of exposure to management accounting among Malaysian SMEs since there is no specific reference to the use of MAPs. Previous research has

suggested that MAPs are an important tool through which management can promote efficiency, and potentially have an important influence on performance (see Ghosh and Chan, 1997; Lybaert, 1998; and Mitchell and Reid, 2000). In particular, within small firms, MAPs act as the key information system that plays a vital role as an efficient information-processing (Reid and Smith, 2002). Apart from that, the availability of financial and non-financial information provided by MAPs permits firms to effectively face competition in the market, coping with change, surviving and thereby improves performance (Mia and Clarke 1999 and Reid and Smith, 2002). Although good MAPs may not by themselves guarantee success, an absence of them or poorly implemented practices may significantly reduce the firm's competitive advantages (Folk et al., 2002). Therefore, given these advantages from MAP use, it is important to promote knowledge and awareness of MAPs among small business in Malaysia so that the firms may benefit advantages that have been highlighted above.

1.3 Problem statement

Much has been written about small business and in particular about small business failure rates (Watson and Everett, 1996). Richard (2000) stated that there are many reasons for the failure rate of start-up businesses, including lack of adequate working capital, poor market selection, and rapidly changing external market conditions. However, the most significant reason for this high failure rate is the inability of SMEs to make adequate use of essential business and management practices. Many small firms fail to develop an initial plan, and those that do establish a plan fail to continually adjust and use it as a benchmarking tool. Similarly, Wichmann (1983) argued that one of the reasons for business failure is poor management ability which includes accounting problem-solving. Further, Hopper et al. (1999) using data based on the results from Japanese companies' concluded that a failure to adopt MAPs (i.e. cost

management systems) in a similar way to their larger counterparts and, at the margins, to experiment with new forms of control that are more profit oriented may be a factor in the currently high failure rate of SMEs. Based on these argument it can be suggested that MAPs are important for SMEs if they are to avoid failing.

Another driver of this thesis is the paucity of research into the use of MAPs among SMEs. Despite the increasing amount of research in management accounting in the past decade, little is known of its form and effectiveness within SMEs (McChlery et al., 2004). This lack of research based knowledge may have been based on a belief that the discipline in management accounting is best served by studying the most innovative and successful examples of practice that can be found in the leading western and Japanese firms (Mitchell et al., 1998). Consequently larger enterprises have been preferred for empirical management accounting research as expertise and a capacity to innovate and develop management accounting is more likely to exist in such enterprises (Mitchell and Reid, 2000). This situation creates a challenge into the study of MAPs in SMEs. However, Mitchell et al. (1998) contended that research into management accounting in SMEs provides possibilities of a different type which are nonetheless of great importance to the fundamental explanation and understanding of the discipline. Indeed, many of the research opportunities inherent in SMEs derive directly from the contrasts which they provide with large organisations. Mitchell et al. (1998) added that in the SME research setting all of the following advantages accrue.

1. The small size of the SME provides a less complex research setting than that provided by a large scale organisation. In the SME the nature, role and development of management accounting are more visible to the researcher and due to their smaller scale, more accessible. This enhanced visibility, combined with the

susceptibility of the SME to key contingencies such as phase of the business cycle and extreme financial and competitive pressures, provides an environment in which the effects of fundamental forces are marked and can therefore be studied more easily.

2. Prior research, e.g. Holmes and Nicholls (1989) in an Australian context, indicates that management accounting information (and its absence) is associated with success (and failure) in SMEs and is therefore potentially an important influence on performance within this economic sector. This, in combination with the relative importance of SMEs as generators of economic well-being reinforces the significance of this area of research.
3. In new and young SMEs the birth and early years of management accounting systems are observable. The existing research focusing on these formative stages concentrates mostly on the development of management control systems (MCS) in which only a few control systems are associated with management accounting (see for example Sweeting, 1991; Davila, 2005; Davila and Foster, 2007; Wisbaden and Sandino, 2007; and Hutzschenreuter, 2009). Hence there is a dearth of research material that specifically focuses on management accounting at these stages have been undertaken.
4. The absence, in many instances, of professional accounting support in the SMEs results in information provision which is derived purely from managerial demand. The 'producer' driven influence of the accountant is absent from the subject of study and consequently the SME setting provides a unique and pure insight into managerial information needs.

For these reasons SMEs offer a potentially rewarding location for investigating MAPs and exploring the factors underlying their development. At present in Malaysia there is a dearth of information on the extent of use of MAPs among SMEs. Given their small

size especially in the context of developing country, there is a possibility that SMEs do not use MAPs and fail to take full advantage of the opportunities that better accounting information might create. Also despite the claims of an association by many researchers, there is little information on whether or not there is any association between the use or extent of use of MAPs and the performance of firms, especially for Malaysian SMEs. The absence of data on MAPs in SMEs has perhaps prevented the Malaysian regulators/policy makers from taking actions that might improve the functioning of Malaysian SMEs. Consequently, there are significant gaps in the knowledge base relating to MAP usage in SMEs in Malaysia, which should be filled on the grounds that the information provided may underpin government policy towards the sector.

Therefore given the significant economic importance of SMEs and the gap in the literature, this research aims to obtain a broad overview of the use of MAPs within Malaysian SMEs, their roles in the management of SMEs, and to examine both the factors that lead to their use as well as their impact on performance. Following are the research objectives, research questions and research hypotheses developed for this study.

1.4 Research objectives

Based on the issues and problems discussed above, this study identifies four main objectives

1. To investigate the extent to which MAPs are employed by Malaysian SMEs.
2. To identify the roles played by MAPs in Malaysian SMEs' management.
3. To determine the factors that affect the extent of use of MAPs among Malaysian SMEs.

4. To seek to demonstrate a positive relationship between MAP use and the performance of SMEs.

1.5 Research questions

These objectives can be expressed in the following research questions:

1. What is the extent of the use of MAPs by Malaysian SMEs?
2. What are the roles of management accounting in Malaysian SMEs' management?
3. What factors affect the extent of the use of MAPs by Malaysian SMEs?
4. Is there a positive relationship between the use of MAPs and the performance of Malaysian SMEs?

1.6 Hypotheses

Research questions 3 and 4 can be expressed in terms of the following two general hypotheses for empirical testing:

H1: There are significant and positive relationships between selected contingent factors and the use of MAPs.

H2: There is a significant and positive relationship between the use of MAPs and organizational performance.

1.7 Importance of the study

This study will have useful implications for theory and practice. Regarding the potential implications for theory, the study will expand the existing management accounting literature in two main ways. First the study will provide new empirical evidence on the use of MAPs. Second, the study will contribute an additional study in the new context of Malaysian SMEs regarding what contingent factors affect the extent of MAP use.

Finally, the research will test for a relationship between the use of MAPs and the performance in the context of Malaysian SMEs. The focus on Malaysia is especially important because research on MAPs and SMEs is very limited in this country and developing countries more generally. Benefits for practice will include the following:

- the creation of an awareness among SME managers of the importance of management accounting as a means of improving performance and maintaining competitiveness in the marketplace.
- the provision of results that may assist policymakers, such as the level of use of MAPs among SMEs and factors that affect the use of MAPs, that may ensure that future policy decisions made by the Malaysian government, financial institutions, and other groups with an interest in SMEs are evidence based.

1.8 Research methodology

The quantitative data for descriptive purposes and empirical testing will be collected by a postal questionnaire. The questionnaire will examine and explore the state of MAPs within Malaysian SMEs in the manufacturing sector. The research concentrates only on one sector in order to avoid inappropriate distractions arising out of variations between sectors. Besides that the manufacturing sector in Malaysia plays a significant role in the Malaysian economy and therefore it is worthwhile to focus on this sector as a target population for this study. In addition the questionnaire will also explore the roles of MAPs as well as the factors that influence their use among SMEs. Lastly questions on the level of performance of SMEs and details of the profile of the firms will also be included. A postal questionnaire approach has been widely used in management accounting research (see for example, Drury et al., 1993; Firth, 1996; Chenhall and Langfield-Smith, 1998; Haldma and Laats, 2002; and Al-Omiri, 2003).

The information on the membership of the population will be derived from the directory of the Federation of Malaysian Manufacturers (FMM). This source, although not comprehensive, provides detailed information about SMEs in the manufacturing sector. This directory consists of comprehensive profiles of over 2,200 manufacturers from SMEs to large enterprises. For the sampling purposes, this research will focus on the small and medium category as the sampling unit. Thus in order to ensure every sub-sample gets an appropriate representation, a stratified random sampling procedure is used. This research will expect to receive between 120 to 150 responses from the 1,000 sample. This is based on past response rates in Malaysian studies. A detailed specification of the methodology is provided in Chapter 5.

1.8.1 Research process

Figure 1.1 shows the steps that will be employed in addressing the research problems.

Figure 1.1 Overview of research process

STEP 1	Literature review
STEP 2	Identification of possible variables Development of survey questionnaire
STEP 3	Pilot testing - Postal questionnaire Approximately 2 months
STEP 4	Actual survey- postal questionnaire Approximately 4 months
STEP 5	Data analysis

The first step in the research process will be a literature search to ascertain the current state of knowledge in the field and ultimately to identify the relevant research design

and methodology to help address the research questions as well as to identify relevant factors to be considered in this study. In the second step, a list of possible variables for identifying MAPs, possible contingent factors and indicators of performance will be drawn up based on the literature review. Next, a pilot test will be conducted to acquire feedback from the respondents on the questionnaire as well as to test the response rate assumption and the timing of responses. On the basis of this information, the questionnaire form will be reviewed and enhanced and a specific approach for follow-up procedures will be determined. In the fourth step, the postal survey will be conducted in order to collect descriptive data needed to answer the four research questions posed. Finally the data collected from the survey will be analysed using the descriptive statistics, bivariate association analysis and logit regression analysis.

1.9 Organisation of the thesis

This thesis is organized into nine chapters.

Chapter 1: Introduction

This chapter establishes the importance of SMEs in today's modern economy and the importance of management accounting in the management of all organizations. The problem statement for this research discusses the failure of the SMEs and the importance of adopting proper MAPs to reduce the failure rate. The existence of a research gap in the MAP literature especially in the SME context is also outlined. The chapter also states the research objectives, research questions and hypotheses for this study followed by a statement of the contribution generated by the study both in theory and in practice. This chapter specifies the intended research methodology which briefly explains how the data will be collected and the sampling method. The chapter ends with a description of the structure of the thesis.

Chapter 2: Management accounting development

This chapter discusses the development of management accounting in terms of its role and techniques. Challenges that have been faced by management accounting in today's environment are also considered.

Chapter 3: SMEs in Malaysia

This chapter explains the development of SMEs in Malaysia and outlines the role of this sector in the Malaysian economy. The chapter also establishes a definition of SMEs based on a Malaysian context, three main sizes of SMEs and their sectors. Finally this chapter emphasizes the significance of the SME manufacturing sector which is selected as the target population for this research.

Chapter 4: Literature review and key research areas

The chapter reviews and examines the current state of knowledge in the field under examination. First research into MAPs that cover MAPs in both developed and developing countries and in SMEs will be explored. Second the roles of management accounting in management will be reviewed. Next the literature on contingency theory in management accounting will be considered both in terms of the organizational framework for contingency-based management control (MCS) and contingency-based MAPs. Lastly the research information on the relationship between MAPs and organizational performance is considered.

Chapter 5: Research design and methodology

This chapter explains the research design chosen to answer the research questions set. This chapter also discusses the target population, sample selection method and the reasons behind the use of a stratified random sampling procedure. The method of data

collection; postal survey and measurement of variables is also explained in detail. This chapter concludes with a discussion on the method of analysis.

Chapter 6: Descriptive analysis

The chapter analyses and discusses findings from the data collected. The non-response bias test is also presented. The main aim of this chapter is to provide a descriptive analysis that helps to answer the first two research questions: the extent of the use of MAPs in SMEs; and the roles of MAPs in the management of SMEs. Additionally the chapter also provides descriptive data of contingent variables and the performance of firms that will be used for bivariate association analysis and multiple regression analyses.

Chapter 7: Bivariate analysis

This chapter answers the last two research questions through the testing of the two hypotheses developed in this study. The statistically significant contingent factors which affected the extent of the use of MAPs and whether or not there is a positive relationship between the use of MAPs and the performance of the firm will be examined through the use of bivariate association analysis.

Chapter 8: Multivariate analysis

This chapter continues the analysis by focusing on the interactive effect of particular independent variables on the dependent variable. Specifically, the logistic (logit) regression analysis will be used to investigate the influence of selected contingent variables on the use of MAPs if the interactive effect between explanatory variables is taken into account, and the influence of the use of MAPs on firm performance if the interactive effect between explanatory variables is taken into account.

Chapter 9: Conclusions, limitations and suggestions for further research

This chapter provides reflections on the main findings of the study and a discussion of the findings contribution to the extant literature. The implications of these findings for management accounting research will be considered taking into account any limitations that may be of relevance to future research. In light of these implications, suggestions for future research and recommendations are formulated.

1.10 Summary

This chapter commences with a brief background on the importance of SMEs and the roles of MAPs in business organizations before the research problem was specified. This is followed by the development of research objectives, research questions, hypotheses and an explanation of the rationale of the study. This chapter is continued by describing the methodology and research process before briefly detailing the content of the chapters in the thesis.

Chapter 2

Management accounting overview

2.1 Introduction

The thesis seeks to investigate the extent to which MAPs are employed by SMEs in Malaysia. Therefore the thesis starts with an overview of management accounting, in order to provide an outline of its development and to highlight its importance for management and small businesses. The chapter first reviews the history of management accounting before examining the role that MAPs play in the modern business environment and developments in definitions of management accounting. The chapter ends with a discussion focusing on the factors that are catalysts for change in MAPs.

2.2 History and development of management accounting

Management accounting was first known as cost accounting. This origin was reflected in the earlier title for practitioners of cost or works accountants (Wilson and Chua, 1988). Accounting historians have long endorsed the view that cost accounting is a product of the industrial revolution (Johnson, 1981). For example (Wilson and Chua, 1993) claimed that cost accounting was practiced by the mechanized, multi process, cotton textile factories that appeared in England and United States around 1800. This point of view was consistent with Garner (1947) who pointed out that cost accounting had emerged only after eighteenth century as a result of the rise of the factory system in the industrial revolution. The traditional view contends that cost accounting arose due to the increased use of fixed capital prompted accountants during the industrial revolution to graft cost accounting onto the double-entry system (Johnson, 1981). This widely held belief however was rejected by Johnson (1981) who argued that changes in the way textile mills and giant manufacturing firms organized economic activity, not just

changes in the temporal structure of their costs, prompted the industrial organizations to develop internal cost accounting procedures. Cost accounting is defined as the equivalent of 'direct costing' designed to provide financial information for management decision-making and control (Johnson, 1981). Garner (1947) argued that the practices and theories of cost accounting origins can be traced to the fourteenth century. During this period there was a rapid growth of Italian, English, Flemish, and German commerce, and various industrial enterprises were engaged in the manufacture of woollen cloth, books, coins, and other products (Garner, 1947). Cost accounting at this time was concerned with those specialized aspects of general accounting which have to do with recording and analysis of factory expenditure (Garner, 1947).

The first evidence of cost accounting found was "job order" costing of the carding of wool in Italy (Abs et al., 1954). Parker (1969) also cites the accounts of Francesco di Marco Datini, merchant of Prato, who in 1390 kept double entry; records which show evidence of job cost accounting, accrual accounting and depreciation. In 1531, another example of cost accounting appeared in the accounts of Raffello di Francesco de' Medici, cloth manufacturers of Florence (Parker, 1969).

According to Garner (1947) the first definite instance of cost accounting development in the UK occurred during the reign of Henry VII of England (1485-1509). At this time a large number of small woollen manufacturers, who resented guild restrictions in cities, moved to the country villages, and established industrial communities, hoping to be able to sell their finished products through channels other than the organized guilds (Garner, 1947). Costing became a prerequisite for success when the small factory owners found themselves competing not only against the guilds, but also among themselves. Later in the sixteenth century, the Plantin accounts (Flemish printer and publisher) contain many

elements of a modern job-order cost system. A separate account was established by Plantin for each book which he undertook to publish (Garner, 1947). The first book on cost accounting was published in 1887 by the electrical engineer Emile Garcke and accountant John Manger Fell and titled *Factory Accounts* in 1887 (Parker, 1969). H.L. Arnold, the American Engineer, in 1903 published a book in which he set forth a number of examples of the latest American practice and his own views of the true object of cost accounting (Parker, 1969).

Cost accounting continued to develop further in the nineteenth century and through the middle of twentieth century as a result of greater industrialisation and the increasing size of corporations (Garner, 1947). Caplan (2006) observed that in the early decades of the twentieth century, the fields of industrial engineering and management accounting developed in tandem. During this period, industrial engineers developed methods to control production that included a “scientific” determination of standards for inputs of materials, labor and machine time, against which actual results could be compared. In consequent this development led to the use of standard costing systems, which are still widely used for planning and control by manufacturing companies (Caplan, 2006).

Later in the twentieth century, the term of cost accounting started to change into management accounting. Johnson and Kaplan (1987) argued that by 1925 virtually all MAPs used today had been developed. On the other hand, Wilson and Chua (1988) claimed that the term ‘management’ or ‘managerial’ accounting only came into widespread use at the beginning of the 1960s. A useful distinction between the era of cost accounting and the era of management accounting was made by Horngren (1975). In an exaggerated sense, the cost accountant’s main mission might have been depicted as the pursuit of *absolute truth*, where truth was defined in terms of getting as accurate

or precise costs as possible..... (While in management accounting) the theme of ‘different costs for different purposes’ was stressed- a preoccupation with finding *conditional truth.*” (Horngren, 1975, pp. 9-10).

The factor that led from a costing to a managerial emphasis was the development of new corporate structures such as multidivisional organization, the conglomerate and the multinational enterprise (Wilson and Chua, 1988). These new structural forms placed fresh demands on an organization’s accounting function. For instance, a means of evaluating divisional performance had to be devised. Similarly, prices had to be established for goods that were sold by one division to another within the same organization. These extra informational requirements led to a development of the subject beyond a narrow costing emphasis (Wilson and Chua, 1988).

Additionally in the middle and later parts of the twentieth century, the growth of service industries like financial institutions and an expansion in the number of government, and quasi government organisations further supported the development of management accounting (Wilson and Chua, 1988). The traditional cost concepts and costing techniques that were appropriate for a manufacturing process had to be modified to cater for a variety of organizations. With these changes in focus, the term ‘cost’ accounting no longer adequately described the accounting function within an organization. Hence, the terms of ‘management’ or ‘managerial’ accounting was gradually adopted.

The first known textbook in management accounting emerged in 1950, written by Vatter, and titled *Managerial Accounting* (Kelly and Pratt, 1994). Vatter argued that

management accounting has the purpose of supporting managers, not of reporting to owners (Kelly and Pratt, 1994).

The changes from cost accounting to management accounting was also manifested when The Institute of Cost and Works Accountants changed the name of its journal from Cost Accounting to Management Accounting in 1965 and its own name to the Institute of Cost and Management Accounting in 1972. In 1986 it received its royal charter and became The Chartered Institute of Management Accountants (CIMA) (Allot, 2000). In the United States the National Association of Cost Accountants changed its name to the National Association of Accountants in 1958 (Scapens, 1991, p. 9). This organization became the Institute of Management Accountants (IMA) in 1991.

Overall it can be seen that after nineteenth century the focus changed from cost accounting to an emphasis on the provision of information that was appropriate to the needs of managers.

2.2.1 The changing focus and innovation of management accounting

According to IFAC (1998, p.84), the evolution of management accounting has consisted of four main stages. The trends of management accounting from prior 1950 to by 1995 are grouped as follows:

1. Stage 1: Prior to 1950

The focus was on cost determination and financial control, through the use of budgeting and cost accounting technologies;

2. **Stage 2: By 1965**

The focus had shifted to the provision of information for management planning and control, through the use of such technologies as decision analysis and responsibility accounting;

3. **Stage 3: By 1985**

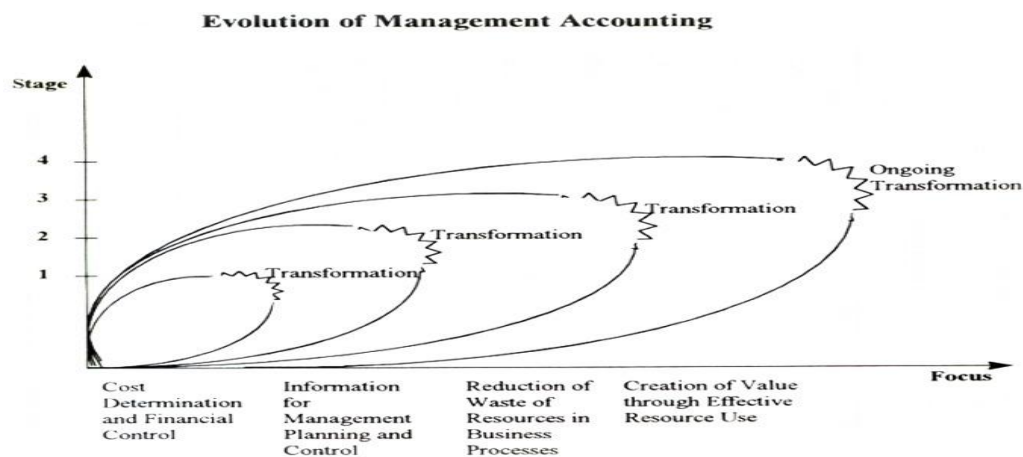
Attention was focused on the reduction of waste in resources used in business processes, through the use of process analysis and cost management technologies;

4. **Stage 4 : By 1995**

Attention had shifted to the generation or creation of value through the effective use of resources, through the use of technologies which examine the drivers of customer value, shareholder value, and organizational innovation.

The change in every stage represents adaptation to a new environment faced by organizations in which the organization has had to reshape and reformulate its strategies in order to remain competitive in the market. Figure 2.1 below shows the transformation stages diagrammatically.

Figure 2.1: Evolution of Management Accounting.



Source (IFAC 1998) p. 85

Overall management accounting has been changing from a narrow to a broader function. An additional catalyst for this evolution has been criticism of the role of management accounting and MAPs by academics (Hutaibat, 2005). According to Kaplan (1994) the seeds of the revolution of management accounting theory and practice can be seen in many publications which have identified the obsolescence or fall in usefulness of a number of MAPs including costing and performance measurement. The primary contention of these critiques was that management accounting fails to respond to developments in the technological and competitive environment, with the result that internal accounting information is frequently inaccurate and misleading (Drury et al., 1993). For example, Johnson and Kaplan (1987) in their book 'Relevance Lost: The Rise and Fall of Management Accounting' claimed that as management accounting had not changed since the early part of the twentieth century, it had lost relevance by failing to provide relevant information for managerial needs. Later, Drury (1996, p.2) provided the following comprehensive summary of the main criticisms of current conventional MAPs:

1. Conventional management accounting does not meet the needs of today's manufacturing and competitive environment;
2. Traditional product costing systems provide misleading information for decision-making purposes;
3. MAPs follow, and have become subservient to, financial accounting requirements;
4. Management accounting focuses almost entirely on internal activities and relatively little attention is given to the external environment in which the business operates.

Since the emergence of those criticisms, innovations in management accounting have been made and there has been considerable change in MAPs (Abdel-Kader and Luther,

2006 and Ittner and Larcker, 2001). According to Preda and Watts (2004) recent innovations in management accounting have extended the descriptive objects, the causal variability factors, and the time periods of analysis, while, at the same time, influencing organizational applications. The innovations provide more relevant, accurate and appropriate information within a proper time period to reconcile the inherent deficiencies contained in traditional management accounting techniques (Preda and Watts, 2004). The examples of contemporary accounting innovations include:

- Value-based Management (VBM)
- Non-financial performance measurement systems
- Total Quality Management (TQM)
- Balanced Scorecard (BSC)
- Activity-based Costing (ABC)
- Activity-based Management (ABM)
- Strategic Management Accounting (SMA)

These innovations have led to management accounting gradually developing away from the conventional concepts of formal, internal and financial information to the use of broader scope of information such as informal, external and non-financial information (Chenhall, 2003) that are now applied to a greater or lesser degree in many different organizations. Not only that, the new innovations in MAPs have also changed the narrow view of accountants from ‘bean-counters’ to more active participants in formulating and implementing business strategy, and have been accompanied by a shift in the collection, reporting and analysis of routine financial information from accountants to non-financial line managers (Preda and Watts, 2004).

2.2.2 The changing roles of the management accountant

Research has highlighted these significant changes in roles of management accountants. For example Siegel and Sorensen (1999) suggested the rate of change in the management accountant role had been more rapid between 1995 and 1999 than over the preceding five year period, and the respondents believed that the rate of change would continue to increase over the next three years. Similarly Burns et al. (1999) concluded that in some businesses, accountants are changing their job titles, becoming ‘business analysts’ instead of ‘corporate controllers’. The changing roles of management accountants are also confirmed by some studies for example Russel et al. (1999); and Zarowin (1997). Lobo et al. (2004) summarise the roles or functions of a management accountant as follows.

- Business analyst
- Strategy formulator
- Internal consultant or advisor (or business partner)
- Change agent or supporter of change
- Information provider (or knowledge worker the hub for data)
- Leader of and/or participator in cross-functional teams
- Designer and manager of information systems
- Designer and controller of performance measurement systems
- Teacher, guide or educator
- Interpreter and manager of complexity.

The following section discusses the evolution in definitions of management accounting based on selected professional bodies.

2.2.3 Definition of management accounting

Scapens (1991) stated that there is no generally agreed definition of management accounting. Various definitions are available; but some are too general to provide a suitable structure, while others simply emphasize a particular research approach (Scapens, 1991). The evolution of management accounting will now be explored in terms of the changing definitions from three major accounting bodies: The Institute of Management Accountants (IMA); the Chartered Institute of Management Accounting (CIMA); and the International Federation of Accountants (IFAC).

2.2.3.1 Institute of Management Accountant (IMA)

The Institute of Management Accountants (IMA) has provided definitions of management accounting that reflect changing demands by businesses for accounting information. The initial definition of management accounting by IMA (IMA, 1981, p. 1), defined management accounting as “...*the process of identification, measurement, accumulation, analysis, preparation, interpretation, and communication of financial information used by management to plan, evaluate, and control an organization and to assure appropriate use of and accountability for its resources. Management accounting also comprises the preparation of financial reports for non-management groups such as shareholders, creditors, regulatory agencies, and tax authorities.*” But more recently, the definition (IMA, 2008, p. 1) was “*a profession that involves partnering in management decision making, devising planning and performance management systems, and providing expertise in financial reporting and control to assist management in the formulation and implementation of an organization’s strategy*”. The change in definitions show the role of management accountants evolving from a transaction and compliance orientation (as reflected in the 1981 definition) to one of a strategic business partner that helps the organisations in corporate performance

management, planning and budgeting; corporate governance processes, risk management, internal control, and financial reporting at a time of great change; and experts in cost management methods (IMA, 2008).

2.2.3.2 Chartered Institute of Management Accounting (CIMA)

The Chartered Institute of Management Accounting (CIMA) is an international professional body based in the UK. The definition of management accounting by CIMA (CIMA, 1987, p. 10), defined management accounting as the provision of information required by management for such purposes as: the formulation of policies; planning and controlling activities of the enterprise; decision taking on alternative courses of action; disclosure to those external to the entity (shareholders and others); disclosure to employees; and safeguarding assets. This information provision ensures that there is effective:

- (a) Formulation of plans to meet objectives (long term planning)
- (b) Formulation of short term operation plans (budgeting/profit planning)
- (c) Recording of actual transactions (financial accounting and cost accounting)
- (d) Corrective action to bring future actual transactions into line (financial control)
- (e) Obtaining and controlling finance (treasurership)
- (f) Reviewing and reporting on systems and operations (internal audit, management audit).

CIMA's revised version of management accounting terminology (CIMA, 2005 p. 18) showed that management accounting had moved forward to a broader role. Management accounting is defined as the application of the principles of accounting and financial management to create, protect, preserve and increase value for the stakeholders of for-profit and non-profit enterprises in the public and private sectors.

CIMA (2005) further elaborated the definition of management accounting to emphasise that management accounting is an integral part of management, which requires the identification, generation, presentation, interpretation and use of relevant information to:

1. Inform strategic decisions and formulate business strategy
2. Plan long, medium and short term operations
3. Determine capital structure and fund that structure
4. Design reward strategies for executives and shareholders
5. Inform operational decisions
6. Control operations and ensure the efficient use of resources
7. Measure and report financial and non-financial performance to management and other stakeholders
8. Safeguard tangible and intangible assets
9. Implement corporate governance procedures, risk management and internal controls.

CIMA's changed definitions show that management accounting has moved closer to senior management concerns with a focus on efficiency, strategic planning and value creation.

2.2.3.3 International Federation of Accountants (IFACs)

IFAC (1989,) in IFAC (1998, p.99) defined management accounting as *“the process of identification, measurement, accumulation, analysis, preparation, interpretation, and communication of information (both financial and operating) used by management to plan, evaluate, and control within an organization and to assure use of and accountability for its resources”* IFAC (1989) - A definition which is grounded in traditional ideas of the subject. However, only nine years later the scope had widened

considerably and Revised International Management Accounting Practise 1 (IFAC, 1998, p. 86) issued by the Financial Management and Management Accounting Committee (FMAC) of the International Federation of Accountants (IFAC) viewed management accounting as an activity that is interwoven in the management processes of all organizations. Management accounting refers to that part of the management process which is focused on adding value to organizations by attaining the effective use of resources by people, in dynamic and competitive contexts. This practice is also viewed as the outcome of the four stages of evolution as discussed in section 2.2.1.

2.2.3.4 Summary

Overall all the definitions discussed have over time moved away from a narrow traditional managerial perspective to an emphasis on assisting the senior management activities including value creation. The following section discusses the factors that drive change in MAPs.

2.3 Drivers of change in management accounting

The previous sections identified considerable changes in MAPs over the past few decades. The changes reflect in part emerge from criticisms of management accounting but the fundamental drivers of change can probably be ascribed to environmental factors. Burns and Scapens (2000) argued that probably the most frequently cited of driver change of management accounting was the competitive economic situation of the 1990s, and especially global competition. When organizations face considerable environmental change, the traditional management accounting role, comprising formal controls and reporting procedures is simply not adequate to meet these new demands hence managerial accounting systems need to be updated and modified accordingly to accommodate the new, different informational needs (Allot, 2000).

In a summary of empirical studies conducted in Australia, the UK and the US, Lobo et al. (2004) identified the role played by both environmental and organizational factors in initiating change in management accounting. Below is a summary of those factors.

Environmental factors

- Globalisation of markets
- Advances in information and production technologies
- Increased competition

Organisational factors

- Core competencies
- Customer and Supplier Relationships
- Downsizing
- Outsourcing
- Flatter Organisational Structures
- Team work

Overall these various drivers or forces for management accounting change have important implications for the nature of management accounting particularly the manner in which traditional accounting techniques are now being used. New types of “measurements” for meeting the challenges at the corporate, national and international levels are required (Ratnatunga, 2004).

2.4 Summary

In general the discipline of management accounting has seen changes in focus, techniques, functions and roles, in response to criticisms that the profession had failed to adapt to changes in business and economic environment. This discipline has also evolved due to the change in the requirements in competitive markets and economic conditions. A constant theme in management accounting is that its role is to provide what managers need and want (Allot et al., 2000). This business centred approach has meant that management accounting has been willing to adopt techniques and approaches developed by other disciplines and move into any area that offers a means of satisfying management priorities (Allot et al., 2000). As such it has moved beyond its traditional concern with a narrow range of numbers to incorporate wider issues in management. Management accounting in the future will be expected to adapt and employ more innovative techniques in order to keep pace with the hyper competitive environment. Management accountants must face up to the demands and challenges of more directly contributing to the decision process as a value adding business partner, hence the reinvented management accountant needs a more broadly developed knowledge base including areas such as operations, product and process technology, systems, marketing and strategic management (Parker, 2002).

This chapter contributes to the thesis by providing an understanding of the history and development of management accounting and its changing roles and practices. The significant changes in management accounting discussed reflect the drive for change from criticisms of traditional management accounting, the current environment within which the firm competes and various organisational factors.

Chapter 3

Small and medium-sized enterprises (SMEs) in Malaysia

3.1 Introduction

The thesis is focused on MAPs in Malaysian SMEs. Therefore this chapter aims to demonstrate the importance of SMEs to Malaysia as a means of justifying the importance of researching them. The chapter seeks to establish a definition of Malaysian SMEs which will be detailed in subsection 3.4 of this chapter, discusses the importance of SMEs to the Malaysian economy and in particular emphasizes the significance of the SME manufacturing sector. The chapter also discusses the increasing interest shown by Malaysian researchers in Malaysian SMEs and considers whether there is a research gap with respect to knowledge of the use of MAPs by Malaysian SMEs.

3.2 The importance of SMEs

SMEs constitute a large number of establishments in most developed and developing economies around the world. On average, this sector comprises more than 90 per cent of the total number of businesses either in developed countries or in developing countries. For example, in developed countries such as the U.K. and the U.S., SMEs represent more than 95 per cent of all businesses in each country (see Wichmann, 1983; Mitchell et. al, 1998). Similarly, in developing countries such as Malaysia and Indonesia, SMEs account for more than 90 per cent of all businesses (see DOS,¹ 2005; Tambunan, 2008). Given the large numbers of SMEs in various countries, it might be anticipated that SMEs will contribute various advantages for these countries. Fan (2003) highlighted the advantages of SMEs that are generally accepted worldwide as including;

¹ The Department of Statistics

- Engine of growth: SMEs contribute to the growth by being the largest provider of employment and as a source of technological innovation and new products.
- Essential for a competitive and efficient market: A large number of SMEs creates competitive market pressure. This sector also plays a major role in removing regional and sector imbalances in the economy and as subcontractors in the downsizing, privatization and restructuring of large companies.
- Critical for poverty reduction: SMEs play a particularly important role in developing countries where poverty is most severe. SMEs are sometimes the only source of employment in poor regions and rural areas and this sector is the only source of income for many poor.

Therefore given the above various advantages, the SME sector has attracted interest from policy makers/in the governments of countries who seek to develop and strengthen this sector in order to help national growth. The following sub section details the contribution of SMEs in Malaysia.

3.2.1 The contribution of Malaysian SMEs

In Malaysia, SMEs account for 99 per cent of all businesses (DOS, 2005). These firms have historically been the main players in domestic economic activities and their impact has been progressively developing from year to year (NSDC,² 2006). As such this sector has significantly contributed to the growth of the economy in many ways.

First, this sector is a key agent for industrial development through its role in promoting domestic-led growth in new and existing industries (Aris, 2006). This can be seen for example, from its role as a key supplier and service provider to large corporations,

² Malaysian National SMEs Development Council

including multinational and transnational corporations (UNDP,³ 2007). Besides, it plays a central role between industries through inter-firm backward and forward linkages (CBM, 2005⁴).

Secondly, Malaysian SMEs account for more than half of the total employment in Malaysia (DOS, 2005). Hence it has generated sources of primary and secondary income for many Malaysian households. SMEs have also alleviated poverty and decreased income inequality within Malaysian households. This is indicated by the decrease in the poverty rate in Malaysia from 49 per cent in the 1970s to less than 5 per cent in 2007 (UNDP, 2007).

Thirdly Malaysian SMEs have substantially contributed to the Malaysian gross domestic product (GDP) and total exports. According to the DOS (2005), SMEs contributed 32 per cent of the total GDP and 19 per cent of the total exports. The involvement of SMEs in export activities indicates that SMEs are not only participating in the domestic market but can also compete effectively in the international marketplace. In consequence, a strong SME sector is also a factor in attracting foreign direct investment (FDI) (CBM, 2005).

Fourthly, the SMEs sector has made the economy more resilient. Aris (2006) observed that the potential of Malaysian SMEs to strengthen the resilience of the economy in a competitive and challenging environment is inarguable. The nature of SMEs is that they are heavy users of domestic resources, both natural and human, and also act as providers of broad-based growth that are able to be resilient in the face of economic downturns and consequently play a major role in a well-balanced economy. For example, during

³ The United Nations Development Program, 2007

⁴ Central Bank of Malaysia

the unstable times from 1996 to 2005 when the Malaysian economy faced several events such as the Asian financial crisis, the bombing of the World Trade Center in the U.S. and the SARS outbreak, the SME manufacturing sector proved its resilience in the recovery that followed these events (DOS, 2005).

Lastly, SMEs contribute to the encouragement of entrepreneurship in the country. The majority of SMEs are scattered widely throughout rural areas and play an important role in increasing the number of entrepreneurs, especially women. The NSDC (2006) claimed that SMEs can stimulate private ownership and entrepreneurial skills and can also act as incubators for developing domestic enterprises into larger corporations. Realizing this potential, the government of Malaysia provides various programmes to nurture entrepreneurship in the country, such as the setting up of technology incubators and ongoing entrepreneurship programmes (NSDC, 2006).

Overall, it has been demonstrated that the SME sector has significantly contributed to economic development for Malaysia. In the future, domestic SMEs are expected to be an important driver of growth as Malaysia goes forward to achieve developed nation status. The next section describes the general development of SMEs in Malaysia.

3.3 The development of SMEs

3.3.1 The Malaysian economy

The Malaysian economy started developing before the fourteenth century when it was known as the Malay Peninsula or Malaya and was a centre for the trading of several commodities, especially porcelain and spices. In the seventeenth century, the economy of Malaya was strengthened by producing three of the world's widely demanded commodities: tin, rubber and palm oil. The Malaysian economy continued to be

commodity-based after independence in 1957 until the 1970s. During that time, the activities of SMEs were concentrated in agriculture and small services such as wholesaling, retailing and restaurants (Economic Planning Unit, 2009). After the 1970s, Malaysia experienced strong economic growth as the country committed itself to a transition from a reliance on mining and agriculture towards developing manufacturing with the ultimate objective of transforming itself from a commodity-based economy to a manufacturing-based economy (Aris, 2007). The manufacturing sector was responsible for an increase in Malaysian exports particularly of electrical and electronic products and it has been the key factor in sustained rapid economic growth.⁵ This transformation has also led to a growth in the number of SMEs in the manufacturing sector. However during this time, the development strategy for SMEs still strongly emphasized the development of domestic market-oriented, small-scale industries and in particular, the creation of the bumiputra commercial and industrial community (NSDC, 2005).

After the mid 1990s, the role of SMEs in Malaysian economy became more significant. After the Asian financial crisis in 1997–1998, and the impact of globalization, SMEs were targeted as a mechanism for generating domestic-led investment, stimulating economic expansion and increasing the job market in the country (Aris, 2007). This strategy arose because, during the crisis, many foreign investors withdrew their investments and relocated to new destinations that were more profitable, often because they offered lower labour costs, and Malaysia consequently learned not to be overly dependent on foreign direct investment (FDI) to stimulate economic development (Aris, 2007). Since this time, SMEs have been transformed and strengthened as a means to encourage domestic investment and also to provide a critical linkage in the development of a broad-based globally competitive industrial sector.

⁵ The United Nations Development Program 2007

With the support of the Malaysian government, the number of SMEs has grown increasingly across various activities. Malaysian SMEs are now not only focused on manufacturing and agriculture activities but are also widely involved in service activities. The Malaysian economy faced a continuous global economic downturn in 2008 to 2010 but fared better than expected due to swift and aggressive policy to ensure the stabilisation of the economy and a quick economy recovery (NSDC, 2010). The SMEs sector also proved to be resilient in the changing business environment aided by massive support from the Malaysian government. The following section discusses the role of Malaysian government in ensuring the success of the SME sector.

3.3.2 The role of the Malaysian government

The role of the Malaysian Government is believed to be one of the main reasons for the growth of SMEs in Malaysia. The Government believes that the development of SMEs forms an integral component of initiatives for Malaysia to achieve sustainable economic growth and developed country status by 2020. The remarkable involvement of the Malaysian government in SMEs can be witnessed since mid 1990s. The first agency that was initiated by the government to support SMEs was the Small and Medium Industries Development Corporation (SMIDEC) which was established in 1996 to serve as a national focal point for the overall development programmes for SMEs in Malaysia (SMIDEC, 2009). Its responsibilities included handling, supervising and streamlining loans, incubator premises, vendor development programmes, entrepreneurship training and assistance with the use of technology. The SMIDEC programmes helped to reduce bureaucratic delays for entrepreneurs and to increase their participation in the programmes (NPC⁶, 2008). The commitment of the Malaysian Government to the SME sector is also reflected in the national development agenda. The Government has

⁶ National Productivity Corporation (Malaysia)

formulated policies and launched programmes under the Malaysia Plan (MP) and Industrial Master Plan (IMP), which are developed every 5 years and 10 years, respectively. Prior to the Seventh Malaysia Plan (1996–2000) (7MP) period, the development strategy for SMEs emphasized the development of domestic market-oriented, small-scale industries. During the 7MP, the approach switched to promoting those SMEs that exhibit strong growth potential and enhancing the capacity of SMEs to be competitive and export-oriented (SMIDEC, 2005). During 8MP (2000-2006) and 9MP (2006-2010) SMEs have been trained to adopt Information and Communication Technology (ICT), have greater market access and linkages with large firms, and to be more innovative and technologically strong. One major development during 8MP, was the establishments of the Malaysian National SMEs Development Council (NSDC) in June 2004 in order to develop and deliver a strategy for the future of SMEs. This NSDC was chaired by the Prime Minister of Malaysia making a clear statement of the government's systematic approach to building up a strong SME sector.⁷ The Council was to coordinate inter-Ministry and Agency efforts on SME development, as well as provide a policy strategic framework for the industry going forward. Among the initiatives planned for SMEs under NSDC were: the formulation of targeted strategies for the development of SMEs across all sectors; the adoption of a specific and standard definition of an SME according to economic activity; the establishment and maintenance of a comprehensive national SME database; and the expansion of development support programmes and facilities to enhance access by SMEs to financing and markets for export (CBM, 2006). Financial support programmes provided by the government led SMEs to enjoy a high level of financing from the financial system. For example, in 2006, banking institutions approved loans of RM39.6 billion to more than 84,000 SME accounts, an increase of 10.7% from the previous year. Meanwhile,

⁷ smibusinessdirectory.com.my, 1 September 2009

outstanding loans to SMEs expanded by 4.2% on an annual basis to RM104.6 billion at the end of 2006, accounting for 45% of total outstanding business loans (Abdul Ghani, 2007). The strategic plan for SMEs is still continues, with the Ninth Malaysia Plan 2006–2010 (9MP) and the Third Industrial Master Plan 2006–2015 (IMP3). Both the 9MP and IMP3 outline key strategies and initiatives to help SMEs move up the value chain, with a special focus on information and communications technology (ICT), capacity building and enhanced productivity (NSDC, 2007).

In 2008, the Government announced the official handover of the NSDC to the Small and Medium Industries Development Corporation (SMIDEC). SMIDEC, which had been rebranded as the SME Central Coordinating Agency or SME Corp., aims to develop a competitive and resilient SME sector to overcome the economic crisis (NSDC, 2010).

3.3.3 Opportunities and challenges for SMEs

To compete successfully in the domestic and global markets, SMEs are encouraged to capitalize on outward investment opportunities, adopt best business practices and be more resilient in the face of greater competition. SMEs have ventured into newly identified sources of economic wealth. Among some of the new areas are halal products and services, franchising and ICT (NSDC, 2007).

Since human capital development is expected to spur the development of business start-ups further and increase the supply of skilled and knowledge workers, SMEs need to improve on capacity and capability by investing in appropriate technologies and intensifying the ongoing training of human resources (NSDC, 2007).

In 2007, 135 programmes were planned to build the capacity and capability of SMEs, with a total financial commitment of RM945 million. Highlights of key expected outcomes include: the provision of entrepreneur development in terms of training about 2,000 entrepreneurs including 200 technopreneurs; the organization of 10 international conferences; 15 mentoring programmes; 20 workshops; and training 200 entrepreneurs in financial management skills through the Accounting Training Programme run by the Ministry of Agriculture and Agro-based Industries (MOA).

The Asian Productivity Organization (APO) Best Practices Network developed a set of key performance indicators (KPIs) for SMEs to generate, share and transfer knowledge on best practices that will assist organizations in enhancing productivity and competitiveness. The survey compared and integrated the performance of SMEs based on selected KPIs, which included:

- Organizational productivity;
- Manufacturing productivity;
- Human capital performance;
- Business performance; and
- Financial performance.

Another area of importance is financial management knowledge. SMEs need to be better equipped to understand their finances and be aware of the array of financing options available (NSDC, 2007) In response, selected financial institutions offer basic finance training programmes for SMEs, which aim to enhance their financial management capabilities so they can manage their finances better. Likewise, new tailor-made training programmes like MOA's RM2 million *Program Latihan Perakaunan*

(Accounting Training Programme) will be run in collaboration with banks to offer 200 agro entrepreneurs advice on basic accounting methods.⁸

In recognizing and promoting the use of best practices in management accounting amongst organizations in Malaysia, the National Awards for Management Accounting (NAfMA) are organized by the Malaysia Institute of Accountants and the Chartered Institute of Management Accountants Malaysia. The award is open to large companies as well as to Malaysian SMEs. This event highlights the importance of MAPs to business enterprises.

SMEs face many economic challenges that can affect their survival. Among the challenge for SMEs in Malaysia is the global financial crisis. In 2009, the global economy experienced financial crisis that led to a significant drop in private sector demand. The Asian economies, particularly those with a higher degree of trade openness were badly affected. The manufacturing sector was among the worst affected (NSDC, 2010). The global financial crisis had also a severe impact on SMEs where the tightening of credit resulting the SMEs to struggle with insufficient working capital. In response, the Malaysian government introduced financial stimuli to help protect SMEs from the full brunt of the global financial crisis and place them on the track to recovery. Other issues faced by Malaysian SMEs are increase in raw material costs, overhead cost and cash flow problems particularly in the manufacturing sector (NSDC, 2010). Despite these challenges, SMEs are still keen to invest and expand their operations in the country. The gradual removal of market distortions and proper functioning of markets would incentivise SMEs to move up the value chain and be better prepared to face globalisation and liberalisation and become more competitive.

⁸ www.smeinfo.com, 2007

In conclusion, the development of Malaysian SMEs has been, and continues to be, strongly supported by the Malaysian Government. The next section will briefly discuss the definition of SMEs before examining the structure of the SME sector in Malaysia.

3.4 Definition of SMEs

At present, there is no consensus internationally on a definition of what constitutes an SME. Variations exist between countries and industries. SMEs are defined by a number of criteria such as location, size, age, structure, organization, number of employees, sales volume, net worth, ownership structure, innovation and technology (Deros et al. 2006). In Malaysia, the NSDC in June 2005 approved a common definition of SMEs and sub-divisions thereof across all economic sectors. The definition was to be adopted by all Malaysian Government ministries and agencies involved in SME development, as well as financial institutions. Under this definition, an enterprise is considered to be an SME in each of the respective sectors if either the annual sales turnover or the number of full-time employees falls within the limits set out in Table 3.1 below.

Table 3.1: Summary of the SME definition

Sector	Category	Definition	
Manufacturing, manufacturing-related services and agro-based industries	1. Micro enterprises	Sales turnover less than RM 250,000	OR fewer than 5 employees
	2. Small enterprises	Sales turnover between RM 250,000 and RM 10 million	OR between 5 and 50 employees
	3. Medium enterprises	Sales turnover between RM 10 million and RM 25 million	OR between 51 and 150 employees
Services (including ICT) and primary agriculture	1. Micro enterprises	Sales turnover less than RM 200,000	OR fewer than 5 employees
	2. Small enterprises	Sales turnover between RM 200,000 and RM 1 million	OR between 5 and 19 employees
	3. Medium	Sales turnover between RM	OR between 20

	enterprises	1 million and RM 5 million	and 50 employees
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Source: SMIDEC <http://www.smidec.gov.my> . For details of the SME definition, please refer to glossary.

Table 3.1 not only provides separate definitions for SMEs but also recognizes that some small enterprises are very small and therefore separately identifies the category of micro enterprises. Micro enterprises through this recognition have access to the same business facilities provided by the government for slightly larger businesses. According to the NSDC (2005), these definitions will facilitate the identification of SMEs in the various sectors and sub-sectors, which will enable more effective targeting of SMEs with respect to the design of future development policies and support programmes and the provision of technical and financial assistance. The next section discusses the characteristics of SMEs in Malaysia.

3.5 An overview of SMEs and their key sectors

This section compares the three main sectors in which Malaysian SMEs operate. The data used in this section arises mainly from the census conducted by Department of Statistics in Malaysia in 2003, which was reported in 2005. This survey was a pioneering nationwide census of establishments and enterprises in Malaysia, which aimed to obtain information on the status and performance of SMEs. The following section describes some of the important data on SMEs.

3.5.1 Number of establishments

The results of the census as set out in Table 3.2 show that the overwhelming majority of business establishments in Malaysia are SMEs with large companies constituting less than 1 per cent of business establishments. This preponderance indicates that SMEs occupy an important place in Malaysian business activities.

Table 3.2: Number of SMEs establishments, 2003

Category	No.	%
Large companies	4,537	0.8
SMEs	548,267	99.2
Total establishments	552,804	100

Source: Census of Establishments and Enterprises 2005

3.5.2 SMEs by sector

Table 3.3 shows that SMEs are sub-divided into three main sectors: services; manufacturing; and agriculture. Clearly, the service sector predominates in terms of number of establishments with almost 90 per cent of SMEs being in this category but manufacturing and agriculture are significant with a combined total of almost 75,000 establishments.

Table 3.3: SMEs by sector, 2003

Sector	No.	(%)
Services	474,706	86.6
Manufacturing	39,373	7.2
Agriculture	34,188	6.2
Total establishments	548,267	100

Source: Census of Establishments and Enterprises 2005

3.5.3 Size of SMEs

Table 3.4 shows the distribution of SMEs in terms of the definition of size discussed in section 3.4. As might be expected, almost 80 per cent of establishments fall into the category of micro enterprises. However, there are significant numbers of small and medium-sized enterprises, which comprise around 20 per cent of the total SMEs.

Table 3.4: SMEs by size, 2003

Size	No.	(%)
Medium	12,610	2.3
Small	100,333	18.3
Micro	435,324	79.4
Total establishments	548,267	100

Source: Census of Establishments and Enterprises 2005

3.5.4 Size and sectors of SMEs

Table 3.5 further analyses the proportion of enterprises in each size category by sector. Both the service sector and the agricultural sector have a predominance of micro enterprises (more than 80%). Although just over half of enterprises in the manufacturing sector are micro enterprises, the balance representing a substantial proportion are concentrated in small and medium sized enterprises. The lower number of micro firms in the manufacturing sector is expected because manufacturing is more capital and technology intensive in contrast to the service and agriculture sectors that often require only basic skills and less capital.

Table 3.5: Proportion of sizes within the sectors of SMEs

Sector/Size	Service	%	Manufacturing	%	Agriculture	%
Micro	381,585	80.4%	21,516	54.6%	31,838	93.1%
Small	83,127	17.5%	15,796	40.1%	1,775	5.2%
Medium	9,994	2.1%	2,061	5.2%	575	1.7%
Total	474,706	100.0%	39,373	100.0%	34,188	100.0%

3.5.5 SMEs activities

This section briefly highlights the activities of SMEs in three main sectors. The section starts with the data in the service sector.

3.5.5.1 Activities of the service sector

Table 3.6 indicates that SMEs in the service sector are involved in a wide range of activities, from wholesale and retail trades, hotels, restaurants, transport and communication to finance. Retailers dominate this sector, accounting for nearly half of the total establishments.

Table 3.6: SMEs by service sub-sector, 2003

Sub-sector	No.	%
Hotels	2,563	0.5
Education	7,855	1.7
Health ⁹	7,964	1.7
Professional	13,857	2.9
Transport and communications	30,766	6.5
Computer services	1,096	0.2
Telecommunication services	71	0.01
Real estate activities	9,318	2
Business/management consultancy	8,967	1.9
Finance	19,590	4.1
Wholesale	43,012	9.1
Retail	220,147	46.4
Restaurants	67,558	14.2
Other services ¹⁰	41,942	8.8
Total	474,706	100

⁹ Including hospital, medical, dental and veterinary services, homeopathy and foot reflexology.

¹⁰ Including rental services, advertising, research and development, business activities (such as labour recruitment, cleaning of buildings, packaging services and duplication services), recreation, cultural and sporting activities (such as motion picture projection and creation clubs) and other service activities (such as hairdressing, beauty and funeral services).

The predominance of retail and restaurant businesses is consistent with the high proportion of micro enterprises.

3.5.5.2 Activities of the agriculture sector

Agriculture is the smallest sector of SMEs, accounting for less than 7 per cent of all SMEs. Table 3.7 indicates that the majority of the SMEs in the agriculture sector are largely involved in the growing of crops, market gardening and horticulture sub-sectors with the fishing sub-sector coming second. Such enterprises will typically be family or individual businesses, which again accounts for the preponderance of micro enterprises.

Table 3.7: SMEs by agriculture sub-sectors, 2003

Sub-sector	No.	%
Growing of crops, market gardening and horticulture	22,440	65.6
Fishing and service activities incidental to fishing	7,130	20.9
Livestock farming	2,388	7.0
Others	2,230	6.5
Total establishments	34,188	100.0

Source: Census of Establishments and Enterprises 2005

3.5.5.3 Activities of the manufacturing sector

Table 3.8 shows the main sub-sectors in the manufacturing sector. The largest sub-sector in the SME manufacturing sector is textiles with 23 per cent of the total establishments. Metal and non-metallic mineral products and food products and beverages both account for over 15 per cent of the total establishments. In total these sub-sectors account for 56% of establishments. The diversity of the sector is revealed by the 'Others' category, which accounts for 29 per cent of the manufacturing SMEs.

Table 3.8: Selected manufacturing sub-sectors of SMEs, 2003

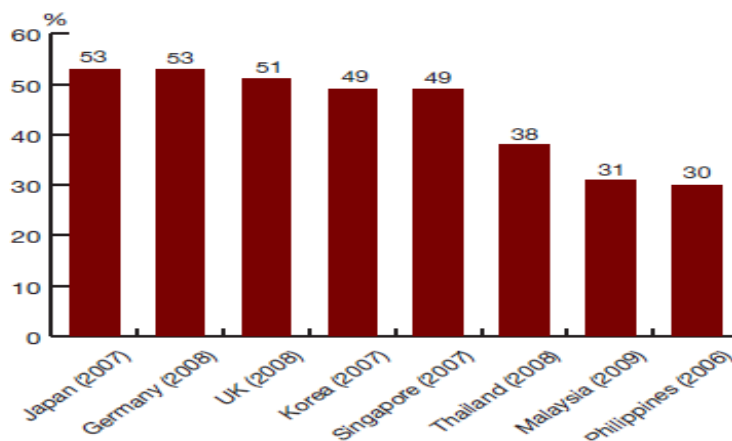
Sub-sector	No.	(%)
Textiles and clothing	9,213	23.4
Metal and non-metallic mineral product	6,890	17.5
Food products and beverages	5,945	15.1
Paper and recorded media	3544	9.0
Furniture	2,362	6.0
Others	11,418	29.0
Total establishments	39,373	100

Source: Census of Establishments and Enterprises 2005

3.5.6 Contribution of SMEs to the Malaysian economy

This section discusses the contribution of SMEs by highlighting selected economic data. The section starts by presenting a general comparison of SME contribution to Gross Domestic Product (GDP) in selected countries as in figure 3.1 below.

Figure: 3.1: SME contribution to GDP in selected countries (% share)



Source: National SME Development Council (NSDC) (2010).

Figure 3.1 indicates that the performance of Malaysian SMEs lags behind other industrial countries. While in several developed countries, SMEs contribute more than half of GDP, Malaysian SMEs contribute around a third. The chart also indicates that

Malaysian SMEs lag behind two other South Asian countries (Singapore and Thailand) and therefore have potential to increase their contribution. Nevertheless the international comparisons of SME contribution should be viewed with caution given differences in the criteria used to define such enterprises as well as the specific context of the each economy.

3.5.6.1 Performance of SMEs sector in term of total output, value added and employment

Table 3.9 to 3.11 show the performance of Malaysian SMEs in term of total output, value added and employment based on the three main sectors. Additional information as to the performance of the manufacturing sector is also included.

Table 3.9: Total output, value added and employment per establishment, 2003

	Output		Value added		Employment	
Overall contribution	38.4%		41.3%		64%	
By sector	Total (RM million)	Per establishment	Total (RM million)	Per establishment	Total ('000)	Per establishment
Services	216,109	0.46	108,676	0.23	2320	5
Manufacturing	154,743	3.93	45,760	1.16	760	19
Agriculture	10,401	0.30	4,945	0.14	142	4
Total	381,253	0.70	159,381	0.29	3223	6

Table 3.9 shows that the SMEs sector contributes less than half of total output and value added but almost two thirds to overall employment. This emphasises the important role played by SMEs in maintaining and creating employment. The Table also reveals that the productivity of SMEs per establishment by output and by value added is RM 0.7 million and RM 0.29 million respectively. The manufacturing sector has a more significant contribution in output, value added and employment in comparison to the other two sectors, for example, output per establishment being between around five to

ten times higher than other sectors. The significant contribution of the manufacturing sector implies that this sector is the most important sector for Malaysian SMEs.

Table 3.10: Total output, value added and employment of SMEs by size, 2003

	Service		Manufacturing		Agriculture	
TOTAL OUTPUT						
Sector/Size	RM (million)	%	RM (million)	%	RM (million)	%
Micro	71,983	33.3	4,642	3	2,333	22.4
Small	87,051	40.3	65,611	42.4	4,729	45.5
Medium	57,075	26.4	84,490	54.6	3,339	32.1
Total	216,109	100	154,743	100	10,401	100
VALUE ADDED						
Sector/Size	RM (million)	%	RM (million)	%	RM (million)	%
Micro	38,947	35.8	1,830	4	1,063	21.5
Small	41,538	38.2	21,050	46	2,369	47.9
Medium	28,191	26	22,880	50	1,512	30.6
Total	108,676	100	45,760	100	4,945	100
TOTAL EMPLOYMENT						
Sector/Size	Total (‘000)	%	Total (‘000)	%	Total (‘000)	%
Micro	1,068	46	78	10.2	76	53.5
Small	867	37.4	423	55.6	32	22.8
Medium	385	16.6	259	34.1	34	23.7
Total	2,320	100	760	100	142	100

Table 3.10 shows that small enterprises made the highest contribution in terms of total output and value added in the service sector and agriculture. The second largest contribution in terms of output and value added are provided by micro enterprise in service sector and medium sized enterprises in the agriculture sector. However in term of total employment micro enterprises have the highest percentage in the service and

agriculture sector. In the agriculture sector, although micro enterprises create the largest share of employment, productivity is largely generated by small and medium sized enterprises.

Meanwhile in the manufacturing sector, medium sized enterprise activities have the largest share of total output and value added. Micro enterprises made a much lower contributions at no more than five per cent to total output and value added. In terms of employment, small enterprises provide the biggest share for total employment in the manufacturing sector followed by the medium category. Therefore it can be concluded that small and medium sized enterprises make the major economic contribution in the manufacturing sector.

Table 3.11 adds more information on the manufacturing sector in terms of the value of assets employed.

Table 3.11: Value of assets in the manufacturing sector by size, 2003

SMEs	Value of assets		Per establishment
	RM million	%	RM million
Micro	1,856	3.7	0.1
Small	20,320	40.0	1.3
Medium	28,623	56.3	13.9
Total	50,799	100	1.3

Source: Census of Establishments and Enterprises 2005

Table 3.11 shows the value of assets per establishment in the manufacturing sectors. According to the census in 2003, the total value of assets owned by SMEs in the manufacturing sector is more than RM50,000 million. Although the medium-sized enterprises contribute the lowest number of total establishments, the value of assets is

the highest with almost RM30,000 million or RM 14 million per establishment which is more than ten times that of other categories.

Overall the above data indicate that SMEs in three main sectors play a significant role in the Malaysian economy. The manufacturing sector is the most significant sector in Malaysian SMEs since it generates the highest average productivity, value added and employment per establishment. The sector also has 45% of enterprises in the small and medium sized enterprise categories as against below 20% in the two other sectors. The above information indicates that the manufacturing sector particularly in small and medium sized category is suitable as a population in which to study the use of MAPs in SMEs by virtue of the concentration of small and medium sized enterprises, who might reasonably be expected to rely on such systems, and its economic significance. The next section reviews research related to Malaysian SMEs.

3.6 Research relating to Malaysian SMEs

This section discusses the research that has been undertaken into Malaysian SMEs and examines whether or not research on MAPs in Malaysian SMEs has been done before.

The Malaysian Government's interest in SMEs has generated research in the sector since 2000. The areas of SME that have captured the interest of researchers include business practices among SMEs, the barriers faced by SMEs, critical success factors for SMEs, information technology (IT), financing issues, and the development of Malaysian SMEs. The following section discusses extant literature on Malaysian SMEs.

An initial area of study was on business practices. Sulaiman et al. (2000) reported that owners/managers of SMEs in the Malaysian manufacturing sector do practice some

form of strategic management in running their businesses. Osman and Hashim (2003), who evaluated the business practices in Malaysian SMEs, reported the majority of the respondents had moderate adoption rates for business practices that focused on technology, marketing, human resource management, finance and strategy. However this result is contrast with that of Hamid et al. (2004), who concluded in a study of Malaysian SMEs in the manufacturing sector, that SMEs appear to have a very limited knowledge of managerial practices such as financial management, human resource management and marketing.

SME research has also investigated barriers to growth and challenges to survival faced by SMEs. Hashim (2000) analysed the nature of the business problems faced by SMEs in the manufacturing sector. This study revealed six problems that are commonly faced by Malaysian SMEs. The problems are human resource management, marketing, production, financial management, strategic management and general management. A study conducted by the Central Bank of Malaysia (2003) assessed the current situation of Malaysian SMEs and factors that impede their development. The result indicated that SMEs do not have problems obtaining financing with about half of the SMEs obtaining bank loans and the rest being self-financed. Factors that are perceived to impede the growth of their business are low technological capability and a lack of business and financial advisory services. SMEs require advice especially on accounting, finance, auditing and marketing. Another study by Saleh et al. (2008) identified the government policy and infrastructure availability as the major business barriers for Malaysian SMEs.

Another issue for SMEs highlighted by research in Malaysia is the nature of the critical success factors (CSFs) in this sector. Hashim et al. (2003) who studied the

organizational factors that stimulate innovation, found that SMEs emphasized three factors that inspired innovation. Those factors are: organizational structure, human resource practices and organizational culture. On the other hand, Wong and Aspinwall (2005), who investigated the critical success factors for adopting knowledge management in SMEs reported that management leadership and support and culture are the two most critical factors for adopting knowledge management.

The use of information technology by SMEs has also been researched in Malaysia. For example Zakaria and Hashim (2004) studied the perceptions of Malaysian SMEs on the opportunities provided by e-business. The findings indicated a positive attitude from SME owners and managers towards e-business. Similarly Alam and Ahsan (2007) investigated the extent to which SMEs in the southern region of Malaysia are prepared for ICT adoption. The outcomes of this study revealed that investment in ICT in Malaysian SMEs is relatively low. Ismail and King (2007), who examined a sample of SMEs for different levels of alignment or fit between information technology (IT) and business strategy and factors that influence alignment, found that accounting information system (AIS) alignment was related to the firm's level of IT maturity; level of owner/manager's accounting and IT knowledge; use of expertise from government agencies and accounting firms; and existence of internal IT staff.

Financing issues have also received attention in Malaysian SME literature. For example, Boocock and Shariff (2005) studied the effectiveness of financing schemes provided by credit guarantee schemes (CGC), and found that the financing scheme provided by CGC in Malaysia has failed to meet all the objectives sought by the corporations. In the following year, Rozali et al. (2006) examined the financing practices of small firms in Malaysia. The result showed that SMEs prefer self-financing during the start-up stage,

medium-term bank financing during the next stage and long-term bank financing during the mature stage. A more recent study conducted by Wahab and Buyong (2008) examined current financing practices and problems among technology-based SMEs in Malaysia. The results indicated that in addition to entrepreneurs' personal saving and profit retained in the firms, most Malaysian SMEs approached external sources to finance their business.

The development of Malaysian SMEs and their contributions to the country have been examined. Aris (2006) reported on the importance of SMEs using profiles based on the census conducted by the Department of Statistic of Malaysia in 2003. Further, Saleh and Ndubisi (2006) and Isa (2008) who evaluated the development of SME in Malaysia, noted the contribution from SMEs as well as highlighted the challenges and barriers faced by Malaysian SMEs. Samudhram and Sivalingam (2009) examined the effectiveness of government policy on SMEs. This study investigated the differences in labour productivity amongst micro, small and medium-scale industries in the manufacturing sectors, and found that larger firms are not always more productive than their smaller counterparts, and suggests that policies that simply drive growth may not be suitable for all sectors.

The literature review shows that existing literature on Malaysian SMEs has focused on management practices and general issues related to SMEs and not into MAPs in Malaysian SMEs. Therefore the lack of knowledge and supporting literature suggests that there is a knowledge gap as regards MAPs in Malaysian SMEs.

3.7 Summary

The chapter has reviewed the SME sector in Malaysia and found that over recent years SMEs have assumed an increasingly important role in the economy of the country. This development reflects active support from the Malaysian Government through a number of programmes. In particular, these programmes and related incentives have encouraged SMEs in the development of innovative products to help them keep pace with the global demand for high quality products and services. This chapter has also outlined the significant contribution of manufacturing SMEs to the Malaysian economy. This sector has a high production level and generates substantial revenue for the Malaysian economy especially from the small and medium-sized enterprises. Given these attributes the SME manufacturing sector is an appropriate population for research into the use of MAPs in small and medium sized enterprises.

This chapter also highlights the dearth of research into MAPs among SMEs in Malaysia and concludes that despite a number of studies since 2000 into management practices and other general issues, there is no research on MAPs in Malaysian SMEs. This absence supports the need for this research to close the knowledge gap, especially because, as was discussed before, management accounting is essential for SMEs to strengthen their business strategies in a competitive environment and help SMEs avoid failure in the market.

In conclusion, the importance of Malaysian SMEs in the manufacturing sector and the absence of research into MAPs among these enterprises justify them as a population for this study.

Chapter 4

Literature review and key research areas and development of hypotheses

4.1 Introduction

This chapter presents a review of the literature surrounding the objectives of the research and the research questions posed. In particular, the literature review looks at current state of knowledge related to the following four research questions.

1. *To what extent are MAPs used by Malaysian SMEs?*

The literature review relating to the first research question examines the uptake of MAPs in general in both developed and developing countries, before narrowing the scope down to the uptake of specific MAPs in costing, budgeting, performance evaluation systems, decision support systems and strategic management accounting. The literature review ends by considering research into MAPs in SMEs.

2. *What are the roles played by management accounting in Malaysian SMEs' management?*

The literature review relating to the roles of management accounting has partly been addressed in Chapter 2 section 2.2. This section will present further literature related to the roles of management accounting and explain the decision to use IFAC (1989) as the reference point for the questions in the questionnaire.

3. *What factors affect the use of MAPs in Malaysian SMEs?*

This study uses contingency theory as an approach to identify factors which explain variations in the use and development of MAPs. Therefore the literature review will identify the range of contingent variables that have been employed by researchers in

management accounting. The review will examine contingency theory generally before narrowing the scope to contingency-based MCS and MAPs research in both large companies and SMEs. The results will be used to select contingent variables for testing hypothesis one.

4. *Is there a positive relationship between the use of MAPs and the performance of Malaysian SMEs?*

This section reviews past literature that has tested for possible relationships between MAPs and firm performance. The review distinguishes between positive and negative findings about the relationship in both large companies and SMEs. The results will be used to select variables for testing hypothesis two.

4.2 Research into management accounting practices

A substantial body of research emerged, especially after 1990s, investigating current MAPs in organizations. These studies were driven mainly by assertions about the irrelevance of management accounting to current managerial needs, especially in modern manufacturing, and claims that there is a gap between management accounting theory as portrayed in textbooks, and management accounting in practice (Drury et al., 1993). An additional driver was uncertainty over the level of use of newly developed MAPs. The research is reviewed by distinguishing between findings in developed and developing countries.

4.2.1 Management accounting practices in developed countries

Research in developed countries has been carried out in Europe, the US and the Asia Pacific region. Examples of literature in each country are reviewed in the following subsections:

4.2.1.1 European research

In the UK, Drury et al. (1993) reported on MAPs in 303 UK manufacturing organizations and found out that a variety of different practices were used. Although many appeared to correspond closely with theory, there was also evidence of considerable gulf between some aspects of theory and practice for some respondents. Abdel-Kader and Luther, (2006) conducted a survey on MAPs in the UK food and drinks industry. They concluded that traditional management accounting is “alive and well” but there are indications of an increased use of: information concerning the cost of quality; non-financial measures relating to employees; and analyses of competitors’ strengths and weaknesses. Again, there was also evidence of a gap between current textbook practices and actual practices.

In other European companies, studies in management accounting were conducted by various researchers. For example, Anderson and Rohde (1994); Laitinen, (1995); Israelsen et al. (1996), Bruggeman et al. (1996); Pierce and O’Dea, (1998); Szychta, (2004); and Hyvonen, (2005). These studies covered a variety of different MAPs such as costing, planning and control, performance measurement and evaluation and decision support system. For example, Bruggeman et al. (1996) examined the use of MAPs within Belgian companies. They found that traditional approaches were still in use although companies had started to adopt new techniques such as ABC. Pierce and O’Dea (1998) investigated MAPs among Irish management accountants and reported that traditional techniques continued to dominate management accounting systems (financial measures of control and performance evaluation); and that the uptake of more modern techniques (ABC and target costing) was generally low. This suggests that the main contribution of newer techniques may be in supplementing, as opposed to replacing, traditional techniques. In another recent study, Hyvonen (2005) provided

empirical evidence on MAPs in Finnish manufacturing companies. The study recorded the extent of adoption of the MAPs, the perceived benefits from their use and ascertained intentions for future developments in these practices. The results indicated that financial measures like product profitability analysis and budgeting for controlling costs will continue to be important in the future, but noted that greater emphasis will be placed on newer non-financial practices like customer satisfaction surveys and employee attitude surveys in the future.

4.2.1.2 U.S research

In the U.S, Chow et al. (1988) reviewed previous studies on MAPs. The survey covered the following topics: cost accounting system design, decision making, planning, control, and the use of quantitative methods. The researchers concluded that while many common approaches were identified, there are areas where practices diverge. Shields et al. (1991), who summarized the MAPs literature in U.S and Japan, discovered that there are many similarities as well as differences in the use of management accounting between Japanese and U.S companies. For example, they found that: there is about the same use of direct (variable) costing and full (absorption) costing in both countries though the Japanese firms report more frequent use of process costing to accumulate product costs and a higher percentage of U.S. firms do not use any form of CVP modeling. One of the biggest reported differences between Japanese and U.S. firms is in the use of capital budgeting decision models. Discounted cash flow models such as net present value and internal rate of return were commonly used by U.S. firms. In contrast, Japanese firms more frequently used pay back as the primary model.

4.2.1.3 Asia-Pacific research

In Japan, Scarbrough et al. (1991) identified several important Japanese MAPs used in advanced Factory Automation (FA) manufacturing environments. The survey revealed that Japanese management accounting systems for product costing and inventory valuation did not employ newer or more innovative methods than Western manufacturers used. Instead, the firms appear to have put their innovating effort into cost analysis for decision-making and cost control through unique management 'accounting' techniques such as target costing and engineering performance enhancement methods (for example, total quality control (TQC), total productive maintenance (TPM), just-in-time (JIT), value engineering (VE) and return on sales (ROS)). The developments in these areas seem to be carefully integrated with and supportive of a wider array of strategic actions or systems (e.g investment in plant and equipment). The researchers found that the focus of management effort becomes describing and communicating the organization's goals and strategies and not designing complex systems that reflect the idiosyncrasies of markets and production processes. Later, Yoshikawa (1994) highlighted a number of important aspects of Japanese MAPs that differ from those found in the West. The differences tend to reflect the traditional Japanese culture. In Japan, where possible, management accounting is used in a way which fosters staff involvement through consultation. Management accounting is to improve employees 'visibility', to educate and remind employees of the strategic aims and the intended direction of their company so that they can contribute as much as possible to the company. Next, McMann and Nanni (1995) reviewed the literature on Japanese management accounting. They discussed the extant literature by reference to the following five themes: examining work using the 'eyes' of the market; focusing on the quality of work; employing 'waste' as the measure of cost; continually improving the way work is done and sharing knowledge through vertical and horizontal

communication. Most evidence shows that Japanese and Western management accounting techniques and methodology are quite similar. What does vary between the two countries are the way these techniques are applied and the context in which they are used. The five recurring research themes (as mentioned before) provide a framework for Japanese firms to use management accounting techniques in order to create competitive advantage.

In Australia, Smyth (1960) compared management accounting techniques in Australia with those in the U.S and Canada. He found that Australian management made less use of the management accounting techniques than managers do in the U.S and Canada. For example; Australian companies were less likely to employ long-range sales plans, long-range plans for capital expenditure, cash, and profits, and budgeting techniques than companies in the US and Canada. A more recent study by Chenhall and Langfield-Smith (1998) found that Australian companies have a relatively high level of adoption of management accounting techniques compared to other countries. On average, the rates of adoption of traditional MAPs were higher than the adoption of current techniques. There were higher adoption levels on budgeting, planning and performance evaluation; and somewhat lower adoption levels for target costing, value chain analysis and ABC. Wijewardena and De Zoysa (1999) looked at MAPs in large manufacturing firms in Australia and Japan. The results of the survey found a number of important differences between the two countries. The most striking difference was that while MAPs in Australian companies placed an emphasis on cost control tools such as budgeting, standard costing and variance analysis at the manufacturing stage, those of Japanese companies devoted much greater attention to cost planning and cost reduction tools based on target costing at the product planning and design stage. Further, the

Japanese companies seem to have introduced more frequent changes to MAPs than their Australian counterparts.

4.2.2 Management accounting practices in developing countries

Research in developing countries has been carried out in China, India, the Middle East and South East Asia. The examples of literature in each country are reviewed in the following subsections:

4.2.2.1 China

Firth (1996); Islam and Kantor (2005); and Wu et al. (2007) focused on MAPs in Chinese companies. Firth (1996) conducted a MAPs survey in local public companies (PRCs) and foreign partnered joint ventures. Survey results show that those Chinese enterprises who participated in foreign partnered joint ventures made more changes to their management accounting system when compared to similar PRCs who had no collaborative venture operations with foreign firms. Islam and Kantor (2005), who evaluated the development of quality MAPs, found that national culture and values practised for centuries by Chinese businesses influenced the outcomes of efforts for greater information dissemination and the development of MAPs. They argued that a lack understanding of Western MAPs had slowed the pace of development of Chinese MAPs. Wu et al. (2007) found that the level of adoption MAPs was most influenced by ownership type of the enterprise, joint venture (JV) or state owned enterprise (SOE), rather than the nature of the management accounting techniques to be adopted. Techniques such as budgeting and target costing are perceived to be more beneficial for SOEs than JVs. However, responsibility accounting and accounting for decision making is perceived to be less beneficial to SOEs than JVs.

4.2.2.2 Middle East

Alnamri (1993) who conducted a comparative analysis of Saudi and western approaches found that the western joint venture companies have a more sophisticated management accounting system and their accountants have a greater role to play in decision making and control. In addition the managers of the joint venture companies rely more on accounting information in decision making and control compared to their Saudi counterparts.

El-Ebaishi et al. (2003) found that, traditional management accounting techniques are perceived by Saudi manufacturing firms to be important and heavily used by responding firms. On the other hand, new management accounting techniques such as ABC and JIT are used by only a limited number of respondents. El-Ebaishi et al. (2003) concluded that this result was in line with outcomes from studies in developed countries.

Hutaibat (2005) investigated the state of MAPs within Jordan's industrial companies. The study found that the Jordan firms are still using traditional MAPs rather than newly-developed MAPs. In a more recent study Leftesi (2008) explored the state of traditional and advanced MAPs in Libyan medium and large manufacturing firms. The study reported that the adoption rates of MAPs in Libyan firms are noticeably lower than the adoption rates of MAPs currently described in the management accounting literature. However, the results are consistent with findings from the previous studies regarding the relatively high use of traditional MAPs as opposed to modern MAPs.

4.2.2.3 South East Asia

Ghosh and Kai Chan (1997) examined MAPs in Singaporean large companies operating in the manufacturing and services sectors. The results revealed a high level of adoption

of budgeting and capital budgeting (more than 80 per cent), moderate use, ranging from 56 per cent to 80 per cent of long-range planning, breakeven point analysis, return on investment and standard costing; and a very low uptake (11 per cent) of ABC.

Phadoongsitthi (2003) found similar results in Thailand to those established in Singapore and India (see Joshi, 2001). The study reported that for Thai companies in the manufacturing and services sectors the adoption of budgeting, planning and performance evaluation practices was high but the adoption of contemporary approaches such as target costing, product life cycle analysis and zero-based budgeting (ZBB) was low.

Sulaiman et al. (2004) summarized the previous findings on MAPs in developing countries. These findings were that while the use of contemporary management accounting tools is lacking in the four countries under examination (China, Singapore, India and Malaysia), the use of traditional management accounting techniques remains strong. The probable reasons for this were suggested to be: a lack of awareness of new techniques; a lack of expertise; and perhaps more importantly a lack of top management support.

In a more recent study, Nimtrakoon (2009) conducted a study of MAPs in Thailand. The findings confirm the popularity of the use of, and high perceived benefit from, traditional MAPs and reveal disappointing adoption rates of, and relatively low perceived benefit from, contemporary MAPs.

4.2.2.4 Other developing countries

In India, Joshi (2001) explored MAPs in the Indian manufacturing and services sectors. The study indicated that the uptake of traditional MAPs, such as budgeting and performance evaluation, was higher than for contemporary techniques. Waweru et al. (2004) analyzed management accounting change over time within four African retail companies and found considerable changes in management accounting systems within the four cases. Such changes include increased use of contemporary MAPs notably activity-based cost allocation systems and the balanced scorecard (BSC) for performance measurement. Lastly Frezatti (2007) surveyed MAPs in Brazilian medium and large companies operating in manufacturing and non-manufacturing sectors. The results showed that adoption was lower for recent management-accounting practices (e.g. ABC, BSC, in full and EVA) than for more traditional practices such as budgeting.

Overall based on research in developed and developing countries, it may be concluded that, traditional MAPs are widely employed but new more sophisticated practices are not yet widely adopted despite their claimed relevancy.

4.2.3 Research into specific areas of management accounting practices

The studies discussed above only cover MAPs at an overview level. This section reviews research into specific MAPs and techniques. The majority of studies have concerned costing systems; budgeting and performance evaluation. Decision support systems and strategic management accounting are less commonly studied.

4.2.3.1 Costing

Research indicates that the information on product costs generated by costing systems has a wide number of uses. These uses include, for example, pricing decisions; cost control, (Yoshikawa et al., 1989; Bright et al., 1992; Lukka and Granlund, 1996; Cinquini et al. 1999; Van Triest and Elshahat, 2007); an evaluation of production processes; and transfer pricing (Bjornenak, 1997). However research has focused on which costing systems are used by firms. The following discussion reviews evidence on the level of uptake of costing systems from previous studies.

The two main costing methods adopted were absorption costing and direct (variable) costing. Absorption costing system is general preferred globally. For example Drury et al. (1993) observed that 58 per cent of U.K firms often or always used absorption costing and Scherrer (1996) found that around half of German firms applied this technique. Meanwhile, Shields et al. (1991), who made a comparison between Japan and the U.S reported that Japanese companies indicated about 59 to 67 per cent usage against a slightly higher uptake at 65 to 75 per cent by U.S companies. More recently, Szychta (2002) found that 90 per cent of Polish firms adopted this technique. In developing countries uptake rates are similar. For example in India, Joshi (2001) reported half of Indian firms adopted this technique and Firth (1996) revealed 66 per cent of Chinese foreign-based companies applied this technique.

The use of direct (variable) costing is also widespread. Lukka and Granlund (1995) showed that 42 per cent of Finnish firms applied variable costing. Similarly, Abdel-Kader and Luther (2006) indicated just over 50 per cent of British firms implemented this technique. In contrast in developing countries, Firth (1996) reported an adoption rate of 76 per cent by locally based Chinese companies in China. Joshi (2001) and

Phadoongsitthi (2003) in India and Thailand respectively reported a similar rate of use to developed countries which is in excess of half of the surveyed firms.

A considerable amount of research has focused on activity-based costing (ABC) despite the survey evidence generally indicating that with the exception of the U.S and Australia, it is only used in a small minority of companies surveyed. In the UK uptake has been consistently poor (see for example, Drury and Tayles, 2000; or Abdel-Kader and Luther 2006); and in other European countries the position is similar at just below or just over 10 per cent (see for example, Israelsen et al., 1996; Cinquini et al., 1999 or Szychta, 2002). In New Zealand Lamminmaki and Drury (2001) found that NZ manufacturers appear to be more advanced in terms of ABC adoption than UK companies as a greater proportion of manufacturers had held discussions on ABC and a greater proportion indicated an intention to use ABC. A similar but slightly stronger uptake of ABC is shown by research in developing countries. For example, Ghosh and Chan, (1997) found a 13 per cent uptake in Singapore and Joshi (2001) reported a 20 per cent uptake in India. Interestingly, Van Triest and Elshahat (2007) found none of a sample of Egyptian companies adopted this method.

Contrary to the results in European countries and developing countries, U.S and Australia, results reveal a much higher uptake of ABC systems. Hrisak (1996) and Krumwiede (1998) indicated that ABC was adopted by just over half over U.S firms although later study by Ittner et al. (2002) reported uptake at just over a quarter of companies. Similarly, Chenhall and Langfield-Smith (1998) found that 56 per cent of Australian firms adopted ABC.

The extent of use of other costing techniques such as process costing and job costing has also been widely researched. For example, Shields et al. (1991) noted that Japanese firms report more a frequent use of process costing (55 per cent to 61 per cent) compared to U.S companies (24 per cent to 36 per cent). Meanwhile in Sweden, Lukka and Granlund (1995) indicated that 41 per cent of Swedish companies implement process costing compared to 38 per cent using job order costing. Lastly Wijewardena and De Zoysa (1999) discovered that more than half of the Australian companies used process costing (52 percent) or job-order costing (30 percent) as the main product costing method - which is a not dissimilar to the findings of Lukka and Grandlund (1995). The results probably reflect the mix of industries in the samples as the choice between job costing and process costing will probably depend on the suitability of the method to production processes behind products and services.

4.2.3.2 Budgeting

Budgeting is perceived as an important control system in almost all organizations (Hansen and Van der Stede, 2004). The main focus on budgeting has been on uptake rates and the purposes underlying its use.

Previous research indicates that the main purposes of budgeting are planning future performance; planning the future financial position; planning future cash flows; planning future day to day operations; and controlling costs (see for example, Lyne, 1988; Armstrong et al., 1996; Chenhall and Langfield-Smith, 1998; Sulaiman et al., 2004; Fruitticher et al., 2005; Abdel-Kader and Luther, 2006). Budgeting is also used for performance evaluation, communication of goals and strategy formation (Briers and Hirst 1990; Guilding et al., 1998; Hansen and Van der Stede, 2004; Sulaiman et al., 2004; Fruitticher et al., 2005), to coordinate activities across business units (Chenhall

and Langfield-Smith, 1998); and for timely recognition of problems and to improve the next period's budget (Joshi et al., 2003).

The use of specific types budgeting technique such as flexible budgets, rolling budgets, ZBB and operational budgets has been researched. Nik Ahmad et al. (2003) found that the uptake of flexible budgets in Malaysia is higher compared to those in UK and New Zealand. The relatively low results also were by few studies (see Pierce and O'Dea, 1998; Szychta, 2002; and Abdel-Kader and Luther, 2006). Szychta (2002) suggested that the reasons of low adoption include: 'generally no major change in activity within a year'; volumes do not move that significantly' and 'too difficult to report to non-financial departments'. The adoption rate of ZBB is on average less than 20 per cent. For example, Abdel-Kader and Luther (2006) reported a 16 per cent uptake in the UK; Szychta (2002) found 17 per cent in Poland and a study by Joshi (2001) showed only 5 per cent adoption in India. Evidence on rolling budgeting is limited to Hansen and Van der Stede (2004) who found that 23 per cent of U.S companies were using rolling budgets.

With respect to control aspects of budgeting, Puxty and Lyall (1989) found that majority of UK industrial companies were using both standard costing and budgeting system in their firms. Similarly Guilding et al. (1998) found that standard costing systems continue to be popular and that the majority of accountants surveyed did not envisage abandoning standard costing and variance analysis in advanced manufacturing technology environments. Their comparisons between budgeting and standard costing practices used in NZ and the UK revealed a high degree of consistency. De Zoysa and Kanthi Herath (2007) who conducted a study in Japan found that standard costing is still being used by a large number of firms both in developing and developed countries

which is consistent with Guilding et al. (1998). The research suggests that the importance of standard costing has not significantly declined despite technological changes. Sulaiman et al. (2005) found that standard costing is still being used by a large majority of firms in Malaysia. Thus, Malaysian companies (both Japanese and local) held that the basic principles of standard costing remain sound.

Dugdale and Lyne (2004) investigated the current use of budgets in forty UK medium and large companies. This research found that all respondents confirmed that their companies set budgets, typically starting the process four to six months before the start of the financial year. Some 80 per cent agreed that there were frequent revisions to the budget during the budgeting process. Szychta (2002) who conducted a study in Polish firms, found that annual operating financial budgets are prepared by a significant proportion of the companies studied, mainly large manufacturing and service enterprises (80% of the respondents). However, a complete or nearly complete master budget is prepared by a much smaller proportion of enterprises (17%). The remaining enterprises prepare varying numbers of component budgets, mainly sales, production and cost budgets. Joshi et al. (2003) revealed that most of the Bahrain companies surveyed prepared long-range plans and operating budgets.

Despite its widespread use, budgeting has over the years, been criticised on a number of grounds. Hansen et al. (2003) stated that the practitioners argue that budgets impede the allocation of organizational resources to their best uses and encourage myopic decision making and other dysfunctional budget *games*. They attributed these problems, in part, to traditional budgeting's financial, top-down, command and control orientation as embedded in annual budget planning and performance evaluation processes. Bourne (2004) undertook a worldwide review of budgeting. The study results showed a

widespread dissatisfaction with the budgeting process. The catalogue of complaints was consistent with previous research: the process was too time consuming, too costly, too distorted by gaming, too focused on cost control and so on. Most significantly, budgeting often seemed to be almost totally divorced from the company's overall strategic direction.

A new approach aimed at solving problems associated with traditional budgeting; the beyond budgeting round table (BBRT) aims to manage the company without a traditional budget. This approach was established to research the problems of budgeting and why it has become such a major barrier to improving organizational performance and to change (CAM-I¹¹, 2002). Cassel (2003) reported evidence that private sector organizations that have adopted BBRT have performed better than their conventionally budgeting peers.

However as noted above, despite all the weaknesses in traditional budgeting, the majority of researches have found that the use of traditional budgeting is still prevalent. For example Hansen et al. (2003) claimed that the vast majority of U.S. firms retain a formal budgeting process despite long list of problems and many calls for improvement in budgeting. Similarly Dugdale and Lyne (2004) found that budgeting is alive and well. They concluded that while traditional budgeting is now more likely to be combined with increased use of non-financial indicators, its demise seems unlikely.

4.2.3.3 Performance evaluation

Emmanuel et al. (1990) noted that performance evaluation was an important function of management accounting. Performance evaluation provides information for managers to

¹¹ Consortium for Advanced Manufacturing- International, Inc

support the achievement of their organization's strategic objectives (Jusoh and Parnell, 2008). Hall (2008) argued that in recent years organizations have sought to develop more comprehensive performance measurement systems (PMS) to provide managers and employees with information to assist in managing their operations. He added that comprehensive PMS include a more diverse set of performance measures, and performance measures that are linked to the strategy of the firm. Hall (2008) also stated the examples of the popular techniques for delivering a wider set of performance measures are the balanced scorecard (Kaplan and Norton, 1996), tableau de bord (Epstein and Manzoni, 1998) and performance hierarchies (Lynch and Cross, 1992). However the choice of measures to guide and evaluate the performance of business units is one of the most critical challenges facing organizations (Ittner and Larcker, 1998a). CIMA (2002) highlighted the frameworks for performance measurement and management which are the value-based management (VBM); ABC and activity-based management; balanced scorecard; European Foundation for Quality Management (EFQM) excellence model; benchmarking; strategic enterprise management (SEM); and six sigma. However the literature indicates that in general both financial and non-financial measures are used to measure performance (Gomes et al. 2004 and Demirbag et al., 2006).

Financial measures such as return on investment (ROI) and profit measures were extensively used in most countries: Research demonstrating this includes in the U.K Abdel-Kader and Luther (2006); in Japan Abdel-Maksoud et al. (2008); in Portugal Gomes et al. (2004); in Singapore Ghosh and Kai-Chan (1997); in India Joshi, (2001); in Egypt Ismail (2007) and in Malaysia Jusoh and Parnell (2008). For example, Gomes et al. (2004) argued that the high acceptance of financial measures may be attributed to the fact that information on these measures is the more readily available. Jusoh and

Parnell (2008) stated that relatively new financial measures, such as economic value-added (EVA), have been applied to some studies. However, earlier studies suggested that the use of EVA was not that popular because it is too complex for managers to understand and use (Ittner and Larcker, 1998a).

Newer performance measures based on non-financial measures, have been more widely applied by organizations over time (Drury and Tayles, 1993; Gomes et al., 2004; Ismail, 2007). Banker et al. (2000) argued that the primary reasons suggested for the use of nonfinancial performance measures are that these measures are better indicators of future financial performance than accounting measures, and they are valuable in evaluating and motivating managerial performance. This development is in response to the considerable criticisms of excessive emphasis and concern on the targeting of financial indicators. For example critics argued that stressing financial indicators may lead to short-term thinking (Gomes et al., 2004).

Within the family of non-financial performance measures, those related to customers have a higher adoption rate compared to the other non-financial measures. Drury and Tayles (1993) surveyed MAPs in 260 UK SMEs and the results supported the importance of non-financial measures, especially measures of customer satisfaction, product quality, delivery and supplier reliability. Abdel-Maksoud et al. (2008) found that customer related measures are widely reported and are perceived to be crucial- a number of other measures related to quality, timeliness and efficiency and utilisation are also widely monitored and considered very important. Other studies have focused on the BSC. Speckbacher (2003) showed that only a minority of German firms in his sample (26%) used BSCs and most of these appeared to use only a limited or incomplete version. Ismail (2007) reported that the BSC has wide spread use in the Egyptian

companies surveyed, but the extent of use of multi-dimensional indicators is low. The survey provided a number of insights into obstacles inhibiting the adoption of the BSC in a developing country - the most significant obstacle being the inadequacy of existing information systems.

4.2.3.4 Decision support system

Wu et al. (2007), hold that effective decision making is the most important key factor in today's rapid and changing competitive environment. The decision support analysis can be divided into short term and long term analysis. Abdel-Kader and Luther (2006) argued that for regular or short-term decisions management accountants can use cost-volume-profit (CVP) analysis, product profitability analysis, customer profitability analysis, and stock control models. For longer-term capital investment decisions management accountants can produce and review accounting rates of return and payback periods as well as complex signals based on discounted cash flow. Capital budgeting techniques capture both non-discounted and discounted approaches. Klammer et al. (1991) argued that the superiority of internal rate of return (IRR) and net present value (NPV) analysis has been repeatedly demonstrated under conditions of certainty. Under uncertainty, the techniques used are sensitivity analysis, increased required rates of return, game theory, and Monte Carlo computer based simulation.

The payback period method for investment evaluation is popular in most countries (see for example, Shields et al., 1991; Yoshikawa, 1994; Lazaridis, 2004; Abdel-Kader and Luther, 2006; and Hermes et al. 2007). A 41 per cent adoption rate was reported in the U.K by Abdel-Kader and Luther (2006) which is much lower than the 84 per cent in Japan (Shields et al., 1991) and 84 per cent in China (Hermes et al., 2007). This acceptance may be because of the simplicity of this method makes it easier to evaluate

projects. In contrast, techniques such as NPV and IRR/ROR have been adopted at relatively low rates; for example 19 per cent in the UK (Abdel-Kader and Luther, 2006) and around 15 per cent in Japan (Shields et al., 1991). However Hermes et al. (2007) found that NPV method is the most popular method (89 per cent) in the Dutch companies they surveyed.

Techniques for dealing with uncertainty have also been researched (see for example Shields et al., 1991; Lazaridis, 2004; Abdel-Kader and Luther, 2006). Abdel-Kader and Luther indicated that the U.K companies used computer simulation (6 per cent); and ‘what if’ analysis (22 per cent). Shields et al. (1991) found that only 19 per cent of Japanese firms were explicitly considering risk. In contrast, higher rates ranging from 48 per cent to 93 per cent were reported in the U.S. Another decision support technique; breakeven analysis had a relatively moderate adoption rate. For example, in the U.K the adoption rate was 38 per cent (Abdel-Kader and Luther 2006); and in Poland 47 per cent (Szychta, 2002). In contrast, Chenhall and Langfield-Smith (1998) found an 86 per cent adoption of breakeven analysis in Australia.

Product profitability analysis has been adopted to a significant extent in both developed and developing countries. For example, in U.K 69 per cent of respondents reported its use (Abdel-Kader and Luther, 2006); in Australia 89 per cent (Chenhall and Langfield-Smith, 1998); and in India 82 per cent (Joshi, 2001).

4.2.3.5 Strategic management accounting

A final set of MAPs is encompassed by strategic management accounting (SMA). Bromwich (1990) defined SMA as the provision and analysis of financial information on the firm’s product markets and competitors’ costs and cost structures and the

monitoring of the enterprise's strategies and those of its competitors in these markets over a number of periods. Drury (1994) argued that conventional management accounting does not provide the financial information required to monitor existing strategies or support strategy formulation. SMA seeks to remedy this situation by providing the financial analysis to support the formulation of successful competitive advantages (Drury, 1994 p. 454). Lord (1996) summarized the main themes from the previous literature in SMA and suggested three important elements: collection of competitor information, exploitation of cost reduction opportunities and matching of the accounting emphasis with strategic position. On the other hand, Guilding et al. (2000) highlighted 12 strategic management accounting techniques under three categories: strategic costing and pricing attribute costing; competitor accounting; and brand value accounting. More recently, Cadez and Guilding (2008) applied five dimensions of SMA usage: (1) costing, (2) planning, control, and performance measurement, (3) strategic-decision making, (4) competitor accounting, and (5) customer accounting.

Although there is strong academic support for the concept of SMA, Guilding et al. (2000) argued that, there appears to be negligible use of the term 'strategic management accounting' in organizations and practising accountants have a limited appreciation of what the term means. Smith (2007) who reviewed previous studies in Australia concluded that SMA techniques has not been adopted widely, nor is the term SMA widely understood or used. However, SMA has influenced the thinking and language of business, and the way in which companies undertake various business processes.

The majority of the studies report low to moderate adoption rates for SMA practices. For example, one of most well established techniques within the SMA umbrella, target costing, was only used by 24 per cent of U.K companies (Abdel-Kader and Luther,

2006); while the results from Australia and India show 38 per cent and 35 per cent uptake respectively (Chenhall and Langfield-Smith, 1998 and Joshi, 2001). More generally, Abdel-Kader and Luther (2006) revealed that although customer profitability analysis and competitive position analysis were employed by up to 51 per cent of respondents, other SMA techniques such as shareholder value analysis, industry analysis, and value chain analysis, were used by less than 20 per cent of respondents. Results from Australia and India support the low adoption of value chain analysis (Chenhall and Langfield-Smith, 1998; and Joshi, 2001). Guilding et al. (2000), who examined use of SMA techniques in the UK, U.S, and New Zealand similarly found that competitor accounting and strategic pricing are the most widely-used SMA techniques and that others have a low usage. Outside the Anglo-Saxon business world, Cadez and Guilding (2008) found that SMA techniques are adopted by 62 per cent of Slovenian companies.

4.2.4 Management accounting in SMEs

This section reviews the extent to which MAPs have been undertaken in SMEs which are the intended population for this thesis. Despite the economic and social importance of SMEs, there is a lack of research initiatives studying the provision for management accounting information and use of management accounting techniques by SMEs (Nandan, 2010). Kaplan (1994) suggests that this may be because research into MAPs is predicated in the belief that the discipline of management accounting is best served by studying (and so eventually facilitating the emulation of) the most innovative and successful practitioners. This position inevitably skews research towards larger entities. As Mitchell and Reid (2000) observed, this belief has led to empirical management accounting research designed to investigate technical innovation and development being concentrated on larger enterprises to the exclusion of smaller firms where the expertise

and capacity to innovate in management accounting is less likely to exist. Therefore this situation leaves a significant gap into the study of MAPs in SMEs. However, limited examples of research into MAPs in SMEs in developed countries exist. For example, Drury et al. (1993) found that small businesses generally reported using more simplistic techniques, and the use of techniques such as ABC, sensitivity analysis, market research and advanced quantitative techniques tended to be limited to the larger business units. This suggests that the gap between management accounting theory and practice may be particularly wide for small businesses. Similarly, Gunasekaran et al. (1999) in the U.K found that ABC has received little attention from SMEs in spite of the fact that it may have an important role to play in improving the competitiveness of SMEs. Later, Reid and Smith (2002) in a study of UK SMEs found that only a minority of small firms, typically around a third, set budgets; that payback was the most frequently applied investment appraisal technique and that the management accounting system (MAS) in a small firm has a significant effect on the operation and performance of the business. The impact of the MAS was greatest in those firms which are struggling to survive, where it can be used to monitor finances daily and can help to identify trends in key variables. Firms where financial performance is satisfactory, but static, tend to place less importance on the provision of management accounting information. Jarvis et al. (2000) stated that research has shown that small firms in the UK pursue a range of goals. It was, therefore, not surprising to find that owner-managers of small firms used a variety of measures and indicators to assess business performance. While cash flow indicators were considered to be critical, profit measures were found to be less important than conventional views suggest.

McChlery et al. (2004) investigated the scope of the financial management systems (including MAPs) operating within small firms. They found that management

accounting systems did not have the same level of use as financial accounting overall with the former having a reduced uptake compared to the latter. They also found that smaller businesses were most likely to be dissatisfied with their management accounting systems. In a later study, Sousa et al. (2006) determined the current state of knowledge related to performance measures and their degree of implementation in SMEs in the U.K. Overall, financial measures were the most widely used, while innovation and learning measures were rated less important and were less used. The most important performance measures were not consistent with criteria to win new orders. However, the low response rate of the survey precludes generalisation of the findings.

In Europe, Kraus et al. (2006), who examined strategic planning and performance in Austrian smaller enterprises, found that planning formalization has a positive and highly significant impact on the probability of belonging to a group of growth firms, whereas other aspects of strategic planning (time horizon, strategic instruments, and control) did not contribute to performance.

In U.S Demong and Croll (1981) concluded that although most U.S small businesses started without a cost accounting system, its usefulness became quickly apparent to the owner/managers. A well-designed cost accounting system with its budgets, standard costs and break-even analyses will enable managers to make better decisions. Demong and Croll (1981) suggested that all firms within the same industry will not require the same things from a cost accounting system. The larger firms will need a more sophisticated system to enable them to make frequent decisions on the prices and costs of their products. A smaller firm may only need a basic budget and some standard cost figures for their more infrequent pricing and cost decisions. In any case, all firms should have basic cost accounting systems with budgets and standard costs which can be used

for planning and control. This or any system should be easy to use, understand, and maintain. In addition, it should be flexible and cost effective. McIntyre and Icerman (1985) studied the use of the accounting rate of return (ARR) by U.S small businesses and provided evidence of the nature and magnitude of errors that result from using the ARR for investment decisions. The results show that the ARR often produces substantial errors, and its use may be misleading. Small businesses are encouraged to take advantage of recent advances in technology which place IRR calculations within reach of any business involved in investment analysis.

In Japan a survey of cost accounting in SMEs was undertaken by Hopper et al. (1999). The results indicate that costing systems in Japanese SMEs were similar to those of larger Japanese firms. Costing systems and cost management practices though not uniform, emphasized simple routine accounting. They were not used extensively for decision-making or performance evaluation. However, sophisticated detailed processes of cost management, which often centered on engineering and quality control, were the norm.

In developing countries research into MAPs in SMEs is still lacking. In Malaysia for example, as discussed in Chapter 3 section 3.6, studies of MAPs in SMEs are non-existent. This situation may be due to several factors. Sulaiman and Hashim (1999) observed that research into Malaysian SME is limited and not integrated in nature and an earlier study by Boocock and Wahad (1997) indicated that information on SMEs in Malaysia is inadequate, inconsistent and not easily available. Thus it can be concluded that research into MAPs in SMEs is limited and primarily relates to developed countries.

4.2.5 Summary

This section has explored research into the use of MAPs in developed and developing countries. It also looked at a research into specific areas of MAPs such as costing, budgeting, performance evaluation system, decision support system and SMA. The literature review revealed the following main points.

Firstly, the main body of research in broad area of MAPs initially commenced in developed countries in the 1990s. In developing countries, the majority of extant empirical evidence on this subject has been obtained in the twenty first century.

Secondly, there is a substantially body of research that focuses on specific MAPs and techniques: costing systems; budgeting and performance evaluation systems have been the most popular areas for study. Decision support systems and SMA have been less commonly studied.

Thirdly, the literature suggests that the uptake of traditional MAPs and techniques was perhaps not surprisingly higher for traditional management accounting techniques than for contemporary MAPs and techniques in both developed and developing countries. However, there are indications in recent studies, of an increasing use of more contemporary practices.

Fourthly, the literature indicates there is very little evidence on the uptake of MAPs among SMEs. Extant literature on this subject is very largely confined to developed countries.

The review has therefore identified a significant gap in research about MAPs among SMEs as there are very few studies related to developing countries. Addressing the first research question of the thesis will endeavour to close this gap and add to existing knowledge about the adoption of MAPs by providing information on the use of MAPs by SMEs in a developing county, Malaysia. The next section will review literature on the roles of management accounting.

4.3 The role of management accounting in the management of an organization

Management accounting plays an important role in the management of today's organisations. Chapter 2 examined definitions of this role as, for example, that provided by IFAC in 1989. This statement saw management accounting as an integral part of the management processes whose role was to provide information essential for; controlling the current activities of an organization; planning its future strategies, tactics and operations; optimizing the use of its resources; measuring and evaluating performance; reducing subjectivity in the decision making process; and improving internal and external communication (IFAC, 1998, p. 99).

The roles of management accounting have been examined by many researchers. Hiromoto (1988) stated that the primary objective of management accounting is to provide decision makers with timely, accurate, and relevant information, reflecting the financial performance of an organization. Similarly Garrison and Noreen (2000) agreed that management accounting information is used to help managers carry out their responsibilities of planning, directing, motivating, and controlling. Additionally Bhimani (2002) claimed that the main objective of management accounting has been to help organizations plan their future and then to monitor their performance. The emphasis has been on the internal processes, to analyze, investigate, and predict

information to assist managerial activities. Chenhall and Langfield-Smith (2007) agreed with this position arguing that management accounting has had a primary function in developing performance measures to assist managers in planning and controlling their organizations. Hutaibat (2005), who conducted a study into MAPs in a developing country; Jordan, concluded that the most literature is management accounting suggested planning, controlling, evaluating performance, improving and developing competitive strategies and making decisions, are the main functions of management accounting in attaining company goals.

Other scholars have suggested that, the roles of management accounting have shifted to broader area. Kaplan (1995) indicated that management accounting must move to a wider role in the management process. He argued that management accountants should:

- Become part of their organization's value-added team;
- Participate in the formulation and implementation of strategy;
- Translate strategic intent and capabilities into operational and managerial measures;
- and
- Move away from being scorekeepers of the past to become the designers of the organization's critical management information systems.

Freedman (1996) provided evidence that supported Kaplan's view in a survey which showed that most respondents believe that today's management accounting must provide an information resource that contributes to overall strategy implementation.

McNair (1997) observed that the role of management accounting in the new millennium would be oriented towards analysis and value added activities. Management accounting should be a participant and leader in decision-making. In addition, it should be strategically oriented and focused on performance improvement. Further, Bhimani

(2002) noted that management accounting in modern organizations has a wide and diverse role stretching from focusing on internal processes towards becoming externally oriented. New management accountants should benefit from the information revolution. They have to measure the non-financial metrics, provide operation managers with quantified non-financial information as well as control cost and produce current reports about cost behaviour for top management. IFAC (1998) has also recognized the evolution of management accounting through four main stages which has been previously portrayed in Figure 2.1 (see section 2.1.1 Chapter 2).

In a more recent study, Valančienė and Gimžauskienė (2007) studied the changing role of management accounting in Lithuania. They concluded that the role of modern management accounting has extended from data accumulation to providing information as to the progress of strategy implementation. Thus the role of management accounting has changed focus from being just directed toward shareholders to delivering customer-employee-shareholder integrated solutions. Those solutions are focused on permanent monitoring, measurement and management of strategic advantages and future outcomes (translation of strategy into appropriate set of goals and measures, strategy mapping). The results of the research suggest that modern management accounting concepts might be a precondition for a change in the role of management accounting but this in turn will depend on the organization's ability to implement and manage the capabilities of these concepts.

The role of management accounting in specific processes in firms has also been investigated. For example, May (1995) studied the role of management accounting in performance improvement. She argued that the role of the management accountant as leaders of business process re-engineering (BPR) and activity-based cost management

(ABCM) performance-improvement initiatives, can contribute significantly by building trust and breaking down functional barriers, acting as a catalyst, researching and providing analysis, assessing improvement proposals, facilitating workshops, improving communication by bringing together service providers and service receivers (internal customers and suppliers) in order to effect improvements. She added that by using Activity-based management accounting (ABMA), the management accountant can help everyone to understand what resources are consumed and outputs produced by each activity and process within the organisation, enabling better decision-making. Similarly, Perez et al. (2008) investigated the role of management accounting in a continuous improvement environment. Their survey findings indicate that management accounting plays a crucial role as provider of information for the continuous improvement in the quality of both product and business processes through the internal benchmarking practices. Ciaran and John (1995) examined the the role managers expect management accountants to play in the decision support process. They found that the main types of information supplied within the organisations consist of information relating to costs, volumes, inventories and sales analysis. One of the main ways by which the accounting group adds value is by the accumulation and consolidation of information from different departments and the delivery of this to the appropriate decision makers. The findings also suggest that management accountants are providing little external information to decision-makers. The current gap between top management's need for external information and what is being provided by the management accounting function is seen as an area of concern. Management accountants need to put greater effort into monitoring the external environment. Otherwise the challenge to provide external information to support the more important decisions will be taken up by other departments and will in time provide them with ever-increasing spheres of influence within top management.

Further Ramos (2004) explored the importance of management accounting information in supply chain relationships. He claimed that management accounting information is a primary informational source for decision making and control. Effective management accounting techniques can create considerable value for inter-organizational supply chains by: providing timely and accurate information about the activities required for their success (i.e to support and facilitate decisions throughout the organization); collecting and collating information about the efficiency and quality of task performance; and providing about the performance of managers and operating units. Lastly, Heidmann et al. (2008) explored the role of management accounting in strategic sense making. Their research provides evidence that managers do not primarily use management accounting to generate information relevant to strategic issues. Instead, this research suggests that managers use management accounting to find specific information that helps them to substantiate information about strategic issues from informal sources. Moreover, effective management accounting focuses organizational attention, helps middle managers to develop interpretations of strategic issues and provides information that enables top managers to identify and discuss these issues.

4.3.1 Summary

The literature review suggests that the roles of management accounting can be seen from various aspects of firm's activities. Management accounting continues to play a traditional role as information provider for planning, controlling, performance evaluation and decision making. However, in the modern business environment, management accounting has evolved to assist firms' management with information relevant to value creation, and formulating and implementing strategy.

Regarding to the choice of variables that measure the roles of management accounting in small firms, the research employs the list of roles provided by IFAC (1989, p.99) will be used as a template. This approach better reflects the small firm context of the population where it is reasonable to expect that the roles of management accounting concentrate on decision-making, planning and control. Therefore the six selected variables reflect the following roles of MAPs:

- planning the firm's future strategies, tactics and operations
- controlling the current activities of an organization
- optimizing the use of the firm's resources
- measuring and evaluating performance
- reducing subjectivity in the decision-making process
- improving internal and external communication

4.4 Management accounting within a contingency framework

Contingency-based research has a long tradition in the study of management accounting (Chapman, 1997; Chenhall, 2003; Gerdin and Greve, 2004). The contingency approach to management accounting is based on the premise that there is no universally appropriate accounting system which applies equally to all organisations in all circumstances (Otley, 1980). Rather, this theory suggests that particular features of an appropriate accounting system will depend upon the specific circumstances in which an organisation finds itself (Otley, 1980). Contingency theory must therefore identify specific aspects of an accounting system which are associated with certain defined circumstances and demonstrate an appropriate match. Researchers to date have attempted to explain the development or change of MAPs by examining designs that best suit contingent variables including the nature of the environment, technology, size, structure, and strategy. For example Halma and Laats (2002) view contingent variables

as external and internal factors. While internal contingencies are determined as technology, organizational aspects, and strategy; external factors indicate the features of external environment at the level of business and accounting that shape internal systems. The literature regarding these variables will be reviewed in the subsequent sections.

This section starts by elucidating the findings of contingency-based management control system (MCS) research before narrowing the focus to research into contingency-based management accounting practices (MAPs). According to Chenhall (2003) the terms management accounting (MA), management accounting systems (MAS), MCS, and organizational controls (OC) are sometimes used interchangeably. MA refers to a collection of practices such as budgeting or product costing, while MAS refers to the systematic use of MA to achieve some goal. MCS is a broader term that encompasses MAS and also includes other controls such as personal or clan controls. OC is sometimes used to refer to controls built into activities and processes such as statistical quality control, just-in-time management (Chenhall, 2003). Therefore the section starts with a review of MCS contingency theory and MAS contingency based research. This review is intended to identify contingent variables that are relevant to the extent of adoption of MAPs.

4.4.1 Early contingency studies

The identification of contextual variables potentially implicated in the design of effective MCS and MAPs can be traced to the original contingency frameworks developed within organizational theory. During the 1960s, organizational theory underwent a major upheaval, which led to the construction of a thorough-going contingency theory (Otley, 1980). This stemmed, initially, from the pioneering work of

Burns and Stalker (1961) and was reinforced by the works of Woodward (1965) and Lawrence and Lorsch (1967). Burns and Stalker (1961) examined the Scottish defence electronics industry and considered the effect of environmental uncertainty on an organization's structure. They outlined two types of organizational structure and associated them with being effective responses to conditions of either high or low uncertainty. The "mechanistic" organization was seen as a suitable response to a stable environment. In an unstable setting, environmental volatility meant that pre-planning was virtually impossible and the suitable response was the "organic" structure. This study also suggested that there were differences in styles of communication underlying the structural features of organizations, and directly addressed the issue of how control information is mobilized. Woodward (1965) extended this study by examining the effect of uncertainty and production technology on organizational structure. She identified five distinct categories of production technology: unit production, small batch, large batch, mass production, and process production. The findings showed that, in a relatively uncertain environment, small-batch, and custom-design technologies were suited to flat organizational structures with relatively few personnel. For the firms that faced a relatively certain environment mass-production technologies in tall organizational structures were most effective.

In subsequent literature Thompson (1967), considered the issue of interdependency between sub-units, and Perrow (1967) highlighted the issues relating to the routine or nature of technology. Thompson (1967) argued that organizations reduce uncertainty by forming boundary spanning units to reduce the uncertainty that production systems must confront. Consequently, he identified three types of interdependency among sub-units that are widespread in modern organizations (pooled, sequential and reciprocal) and examined how this interdependency related to the level of interaction among sub-units

or departments. The issue of routineness, discussed by Perrow (1967), suggested two dimensional formulations. Routine technologies present few exceptional cases or problems, and the analysis required to solve these problems tends to be well structured or programmed. Non-routine technologies present more exceptions which are not solvable in a structured, analytic manner (Ginzberg, 1980). Implicitly, both studies simultaneously raised the issues of complexity in an organization. This concern led Lawrence and Lorsch (1967) and Galbraith (1973), to examine how an organization should organize its sub-tasks and activities in complex environments. Lawrence and Lorsch (1967) considered that each organizational sub-section has its own unique environment and responds to this environment by developing unique attributes. Their study highlighted the need for an organization to arrange sub-tasks in a suitable manner, and suggested the establishment of different departments for different, specific tasks. The researchers related the difficulty of integrating these departments to two factors: the level of differentiation between the sub-tasks and the rate at which new products were to be introduced. On the other hand, Galbraith (1973) synthesized previous findings into a coherent framework in his book *Designing Complex Organizations*. He argued that, if the task is well understood prior to it being performed, much of the activity can be pre-planned. If it is not understood, more knowledge and information processing is required during task performance. Galbraith (1973) also outlined various sources of complexity. He commented that the greater the diversity of outputs, number of resources, and level of performance, the greater the number of factors and interactions between factors that must be considered simultaneously when making decisions.

Overall, the above studies have demonstrated that internal factors of technology, complexity of operations and interdependence among sub-unit are important variables in understanding the structure and activity of complex organizations, as is the external

factor of environment uncertainty. These studies have established the relevance of the contingency theory framework in studies of the determinants of the characteristics of MCS and MAPs. The next section provides a literature review of contingency-based MCS research.

4.4.2 An organizational framework for contingency-based management control system (MCS) research

Commentators have suggested that contingency frameworks have over time become the dominant logic underpinning hypothesis developed for research on control systems design (Dent, 1990). Two notable studies (Waterhouse and Tiessen, 1978; and Otley, 1980) provided a framework of contingency theory which permitted future studies to identify possible control requirements of various organizational types and to address a number of design issues related to management control systems. A review of the typological literature concerned with control system design also suggests that certain attributes of control systems are amenable to design choice. Anthony (1965), Ansari (1977), Gordon and Miller (1976), Mintzberg (1975), Bruns and Waterhouse (1975), and Simons (1987), Merchant (1981, 1984), Macintosh (1981), address the structural attributes of planning and control systems and suggest possible design modifications contingent upon the context of their use. Example of MCS attributes include: tightness of budget goals, use of cost control, frequency of reporting, and intensity of monitoring performance results (Simons, 1987). The next discussion explains the contingency variables that may be directly related to the degree of use of MCS attributes.

The external environment has been a key variable in contingency-based MCS research, with the majority of previous studies supporting the notion that environmental uncertainty does affect MCS. For example, Otley (1978), who studied the effect of

differences in the environment faced by unit managers within a single firm, found that, by distinguishing between a tough operating environment, in which it was difficult for a unit manager to show accounting profits, and a liberal operating environment, in which it was relatively easy to maintain profitable operations, senior managers used budgetary information to evaluate managerial performance in different ways in the two situations. Similarly, Gordon and Narayanan (1984), in research concerning the relationships among an organization's environment, structure and information systems, reported that the characteristics of information perceived to be important by decision-makers are related to perceived environmental uncertainty. They suggested that, when decision-makers perceive greater environmental uncertainty, they tend to seek external, non-financial and *ex ante* information, in addition to other types of information, and move increasingly toward an organic form of organization. Chenhall and Morris (1986) also suggested that where environmental uncertainty levels are relatively high, organizations tend to use non-financial (broad scope) MAS information to a greater extent in order to cope with external environmental uncertainty more effectively. Subsequently Gul and Chia (1994), and Fisher (1996) examined the impact of perceived environmental uncertainty (PEU) on the characteristics of MAS, and consistently supported the view that perceived environmental uncertainty was associated with certain MAS information characteristics.

Environmental uncertainty also includes the uncertainty caused by government policy, deregulation and globalization, as well as the political environment. For example, Waweru et al. (2004) found that, consistent with contingency theory, environmental change in South Africa arising from government reform/deregulation policy and global competitive environments contributed to management accounting and control system change processes. Kattan et al. (2007), who studied the effect of external factors on the

design and implementation of management accounting systems in Palestinian companies, concluded that management accounting and control systems are more mechanistic in times of environmental and political stability and more organic in periods of greater uncertainty.

Apart from the above contingent variables, a popular component of environmental uncertainty is market competition. Khandwalla (1972) argued that competition is likely to accentuate the use of controls, and hypothesized that the greater the competition, the greater the need to control costs, and to evaluate whether business functions are operating according to expectations. Thus the sophistication of accounting and control systems was influenced by the intensity of the competition. Similarly Libby and Waterhouse (1996) argued that companies operating in a competitive environment are expected to have a high rate of change in their management accounting systems as in such an environment appropriate costing systems and performance measurements are key to survival. They found moderate support for the proposition that more intensely competitive environments would lead to the use of a wider variety of management accounting systems. The rational explanation is that complex and different types of information are needed before making any crucial decisions in such an environment. These results were supported by Mia and Clarke (1999), who explained the relationship between intensity of market competition and business unit performance by incorporating into the model a variable related to managers' use of information provided by the MAS. The results showed that the intensity of market competition was a determinant of the use of the information, which, in turn, was a determinant of business unit performance.

However, Merchant (1984) found that the market factor as a proxy for an element of environmental uncertainty is not systematically related to a firm's budgeting system. Merchant (1984) added that these negative results may be particular to the industry (electronics) or function (manufacturing) sampled, methodological limitations (especially measurement) or the hypotheses may simply have been incorrect, and concluded that further research on these questions was necessary. Williams and Seaman (2001) also found a significant and negative relationship between management accounting systems in Singapore and the intensity of competition. They reasoned that the firms were in a good position in terms of resources and had no pressure to innovate. Another general factor that has long been recognized as influencing the design of control systems is technology. Merchant, 1984 argued that:

If production processes are relatively routine and repetitive, task uncertainty is relatively low and organizational coordination is easily accomplished with programmed interactions (Hage & Aiken, 1967). This means it becomes easier to use budgeting, itself a programming process, and accounting performance measures as central parts of the organizational control system (Hirst, 1981; Bruns & Waterhouse, 1975; Khandwalla, 1974; Reeves & Woodward, 1970).

Consequently Merchant (1984) tested whether or not differences in approaches to budgeting at the departmental level were systematically related to differences in production technologies. The results showed that automation of processes and standardization of output, both indicators of the repetitiveness of technology, had a positive relationship with the reliance placed on budgeting, and custom technologies were associated with a de-emphasis on budgetary control and an increased reliance on other methods of control, such as direct supervision. More recent research has

established that other aspects of technology, such as information technology, have an effect on the MCS. For example, Waweru et al. (2004), in a field study of management accounting and control systems in South Africa, found that one of the main motivators of change in management accounting and control systems to be changes in technology, in particular information systems.

A further contingent variable is the departmental interdependence, that is, the extent to which departments depend upon each other for resources to accomplish their tasks (Gerdin, 2005). Hayes (1977), who extended the ideas of Lawrence and Lorsch (1967), developed a model of organizational performance for internal sub-units. He concluded that within a contingency context, the relevant assessment methods were determined by subunit type, subunit interrelationships and the extent of environmental influence on subunit functioning.

In a subsequent study, Macintosh and Daft (1987) found that the level of departmental interdependence impacted on the design and use of management controls. They investigated three elements of management controls: the operating budget; periodic statistical reports; standard operating policies and procedures, and reported that:

- standard operating procedures were an important control device when interdependence was low;
- budget and statistical reports were used more extensively when interdependence was moderate; and
- when interdependence among departments was high, the role of all three control systems diminished.

Extending this study, Gerdin (2005) examined the combined effect of departmental interdependencies and organizational structures on MAS design as one of the mechanisms of MCS. The results support the notion of a combined effect from departmental interdependence and organizational structure on MAS design. The findings also suggest that it may not be important to assume automatically that there is a one-to-one relationship between context and MCS design. Rather, different control mechanisms available in the control package may well combine in different ways in a particular context.

The size of a firm has also been shown to affect the way in which control systems are utilized. Blau (1970), for instance, argued that the expanding size of organizations gives rise to the increasing subdivision of responsibilities, facilitates supervision, widens the span of control of supervisors, and, simultaneously, creates structural differentiation and problems of coordination that require supervisory attention. Merchant (1981) added that contingency theory suggests that the larger the business, the more likely it is that management will want formal, rather than informal, information systems. Larger firms tend to make greater use of more formal administrative controls, as opposed to informal procedures. Merchant (1984) also reported that size was positively related to the degree of formality in the use of budgeting system. Similarly Puxty and Lyall (1989) indicated that larger companies were employing both standard costing and budgeting systems more frequently than smaller firms.

Increased size has, in turn, been associated with structural characteristics. Blau (1970) stated that a firm's size has affected the organizational structure of the firm, which as a consequence, has led to functional differentiation. Khandwalla (1972) found that large firms were more diversified in product lines, as well as more divisionalized, and

employed mass-production techniques and more sophisticated controls. Gordon and Miller (1976) argued, furthermore, that, as the administrative task becomes more complex, sub-tasks and responsibilities must be delegated to lower levels of management to ease the burden of decision-making. Thus, increased environmental dynamism, heterogeneity and hostility must often be accompanied by decentralization of power and responsibilities. Such decentralization might take the form of divisionalization and/or departmentalization. Flamholtz (1983) considered that several structural dimensions contribute to the process of control including the degree of centralization or decentralization, functional specialization, degree of vertical or horizontal integration and the span of control. Some dimensions of organizational structure (i.e. functional specialization or rules) facilitate control by reducing the variability of behavior and, in turn, increasing its predictability. Other dimensions (i.e. centralization) facilitate control by direct influence over the decision making process for non-programmable events. Merchant (1981) found that a greater diversity and degree of decentralization generated a need for more administrative control. Chenhall and Morris (1986) also found that decentralization was associated with a preference for aggregated and integrated information in MAS design. Gerdin (2005) argued that based on Bruns and Waterhouse (1975), and Merchant (1981, 1984), four design elements were identified, which have the potential to influence MAS design, namely degree of behavior formalization (i.e., the extent to which work processes are standardized), unit size, complexity (degree of differentiation), and degree of decentralization. These elements have also been found to be relevant in more recent contingency-style accounting-control research. Strategy has been identified as a possible contingent factor in MCS design. For example, Simons (1987) investigated the relationship between business strategy and accounting-based control systems. Simons' sample of 76 firms

was split into ‘defenders’ and ‘prospectors’¹², and he reported that significant differences were found between prospectors’ and defenders’ control systems. Simons concluded, furthermore, that effective prospectors used their financial control systems more intensively than defenders, with tighter budget goals and more frequent reporting, and placed more emphasis on forecasts and outputs than cost controls. Cunningham (1992), who examined management control and accounting systems under competition and competitive strategy, indicated that management control and accounting systems are not only adequate competitive strategies, but also are able to enhance the effectiveness of the strategies.

4.4.2.1 Evidence from SMEs

The role of MCS in small to medium-sized enterprises (SMEs) has received little attention in the contingency-based literature. The main studies in this area are Amat et al. (1994), and Reid and Smith (2000), who both conclude that various factors in the external environment impact on choice of MCS by SMEs. Amat et al. (1994) highlighted how the external environment affected MCS design by using a case-study-based approach on one company, DERESA. DERESA was a Spanish company and the research covered a period over which it developed from a family-run small business with an informal control style to a professionally managed medium-sized firm having a formal, MAS based control system. The research reported a direct link between DERESA’s development and changes in the Spanish economic and political systems, and observed that the legitimation of professional management had influenced changes in the MCS. They also concluded that a double-level focus on control, at both organizational and national levels, provided a better understanding of why certain control changes came about and why they took the form they did. Reid and Smith

¹² a ‘Defender’ tries to hold market position and seeks stability, while a ‘Prospector’ pioneers in new products and services (Collins et al. 1997)

(2000) in a wider population studied the impact of contingencies on MAS development in Scottish micro-firms. This study found that the timings of cash flow crises, funding shortages and innovation corresponded with significant stages in information system development, especially in the cases of cost management and computer applications. They also discovered that, except for technological aspect; production systems, strategy and the market environment determined the organizational form of the small firm. They also found that the complexity of the MAS adopted was determined significantly by sub-unit interdependence.

4.4.3 An organizational framework for contingency-based MAP research

The contemporary contingency theory of management accounting has the limited aim of explaining how particular circumstances (contingencies) shape the use of MAPs. Contingency-based MAP research applies and expands the contingent variables used in research into organizational structure and MCS, and attempts to use contingent variables to explain the MAPs in an organization.

As with organizational structures and MCS, major studies have stressed the importance of external factors, which are often characterized as environmental uncertainty or market forces, as explanatory variables when examining the development of MAPs. Bruns and Kaplan (1991) identified competition as the most important external factor for stimulating managers to begin to work on a new cost system. Anderson and Larnen (1999) explored the evolution of a broad range of MAPs in 14 Indian firms and found that changes in the external environment prompted changes in MAPs. Luther and Longden (2001) confirmed that contingent factors such as the intensity of competition and volatility of environment caused management accounting change in South Africa. Similarly, Haldma and Laats (2002), who examined the MAPs of Estonian

manufacturing companies, argued that environmental uncertainty had an impact on organizational structure, performance evaluation, budgeting and budgetary control, and is associated with more open and externally focused financial accounting systems. They also found that changes in MAPs are associated with shifts in the external business and accounting environment. Szychta (2002), who investigated the application of management accounting concepts and methods in Polish firms, concluded that one of driving forces behind the use of management accounting is shifts in business environment.

In contrast, Hoque and James (2000) found no support for their hypothesis of a positive association between a strong market position (market factor) and a greater reliance on the use of a newly developed MAP: the BSC. Similarly O'Connor et al. (2004) did not find support for the hypothesis that Chinese enterprises faced with increased market competition would make greater use of Western MAPs. This result is consistent with the findings of Merchant (1984), discussed above who concluded that there seemed to be little or no relationship between market factors and a firm's budgeting system.

Apart from external factors, the contingency variable of production technology has also been employed in examining the employment of MAPs. Tayles and Drury (1994) studied the impact of advanced manufacturing technologies (AMTs) on management accounting systems. This study reported three main results: (i). the methods used to evaluate investment in modern manufacturing made little distinction between an investment of an AMT or non-AMT nature; (ii). in general only a minority of accountants with experience of Just in Time (JIT) systems considered that JIT adoption caused change to occur in their company's accounting system for generating product costs. However, on balance, those with experience of flexible manufacturing system (FMS) (these were predominantly in motor vehicles and electrical industries) suggested

that a significant or very significant change did occur; and (iii). accountants with experience of the development of AMTs stated that these technologies had a significant or very significant effect on changing their company's management accounting system for performance measurement and control. Abdel-Maksoud et al. (2005) found that relatively sophisticated MAPs exist in firms that have made significant investment in AMT, Total Quality Management (TQM) and (JIT). Their findings were supported by Al-Omiri and Drury (2007), who reported that higher levels of cost system sophistication are positively associated with the extent of the use of JIT and lean production techniques. Similarly, Abdel-Kader and Luther (2008) concluded that differences in management accounting sophistication are explained by the adoption of AMT, TQM and JIT systems. Szychta (2002) also agreed that technology is one of driving forces behind the shift in use of MAPs in Poland.

As with other contingency studies, the size of firm has been shown to affect the design and scope of MAPs see for example, Holmes and Nicholls (1999), Lamminmaki and Drury (2001), Brown et al. (2004), Cadez and Guilding (2008), Abdel-Kader and Luther (2008). Research has also shown that larger firms have more sophisticated MAPs. For example, Hoque and James (2000) in a survey of 66 Australian manufacturing companies noted that larger firms make more use of a BSC. Joshi (2001) reported that the organisational size was found to be an important factor in the adoption of advanced MAPs in India. Similarly, Cadez and Guilding (2008) found that SMA usage is positively associated with company size. A possible reason is that larger organizations have greater resources than their smaller counterparts and can, therefore, afford to adopt more sophisticated MAPs (Haldma and Laats, 2002; Al-Omiri and Drury, 2007; and Abdel-Kader and Luther, 2008). Bjoernak (1997) argued that large organizations have large information fields and the necessary infrastructure which would facilitate the

adoption of sophisticated MAPs. Apart from that, as organizational size increases, formal management control, and sophisticated MAPs, may be expected to become more important.

As with MCS, another internal contingent variable is organizational structure. Abdel-Kader and Luther (2008) indicated that sophisticated MAPs are more widely applied in firms that have a decentralised structure.

The next internal factor, which is commonly advanced as a possible explanation for variations in MAPs, is firm strategy. Collins et al. (1997) investigated the relationship between business strategy and budgetary usage in the context of a perceived crisis in Latin America. Using the Miles and Snow (1978) typology, it was hypothesized that a 'Defender' and 'Reactor' strategy usage would be positively associated with crisis, while a 'Prospector' and 'Analyser' strategy usage would be negatively associated with crisis. However, the results indicated that the only significant relationship was between a Prospector strategy and budgetary usage. Gosselin (1997) showed that strategy influenced the extent to which strategic business units (SBUs) adopted ABC. Hoque (2004), meanwhile, discovered a significant and positive association between strategy and management's use of non-financial measures for performance evaluation. Cadez and Guilding (2008) examined the effect of strategic choices on SMA, finding that SMA usage is positively associated with adopting a prospector strategy, deliberate strategy formulation, and accountants' strategic decision making participation. However, Abdel-Kader and Luther (2008) found no evidence of a relationship between management accounting sophistication and competitive strategy.

A study by Brown et al. (2004) added a new organizational factor in the literature. They found that top management support influenced the transition from not having considered ABC to initiating interest in ABC. They argued that organizational factors may be more important in explaining the adoption of innovative MAPs than other factors.

4.4.3.1 Evidence from SMEs

Contingency factor research in smaller firms is very limited. However, the few studies that exist have identified several variables that may affect the development of MAPs in these firms. The possibility of a relationship between the external environment and strategic planning was hypothesized by O'Regan et al. (2008). The results found a positive association between the extent of awareness of the external environment with the uptake of strategic-planning processes in smaller firms.

In organizations such as SMEs, one important issue that might limit the adoption of MAPs is the abilities and competencies of the available human resources. Studies of SMEs have highlighted the importance of qualified accounting staff and owner/manager attitude as factors that may be associated with the adoption and development of MAPs. Collis and Jarvis (2002) examined the association between the use of financial information and the management of small, private companies. MAPs were identified in as a source of financial information, and the research concluded that qualified accountants, together with the generally high level of education and training of the accountant, may aid the generation and analysis of financial information. Collis and Jarvis (2002) also found a positive relationship between company turnover and the receipt of advice or recommendations from their external accountant at the time the statutory accounts are produced and the regular production of periodic management

accounts. The regular generation of budgeted information and use of sophisticated tools for financial planning and control were found to be dependent upon the availability of professional financial expertise within the company. McChlery et al. (2004), who analysed barriers and catalysts to sound financial management systems in SMEs, also argued that proactive external accountants or qualified staff/accountants play important roles in the development of management accounting in SMEs. Sousa et al. (2006), who examined performance measurement in English SMEs, found that poor training of employees was the major obstacle to the adoption of new performance measures. This situation may reflect a lack of skills by employees and a difficulty in understanding the performance measurement process.

Apart from the roles played by qualified staff, owner/managers also have part in the development of MAPs. Holmes and Nicholls (1989) reported that the education level of a business's owner/manager has a significant influence upon the acquisition or preparation of accounting information. Lybaert (1998), who analysed the influences on the information use in SMEs among Belgian SME owner/managers, found that a greater use of information in managing the firm was present when SME owner/managers had a greater strategic awareness, less experience of working in other firms prior to the present position and a greater desire for growth.

4.4.4 Summary

Section 4.4 has reviewed the extensive literature on the association between contingent factors and organizational structures with special reference to contingent factors that affect the application of MCS and MAPs. A significant portion of the studies are based on work in larger companies as research into contingent variables. However in SMEs is the research into this area is very limited especially in developing countries. The

addressing of research question three through testing hypothesis one will therefore provide much needed additional evidence in this area.

This section also attempts to collate the reviews and identify the contingent variables that are appropriate in the Malaysian SMEs context. The selection will be based on theoretical appropriateness and the availability of the information. Table 4.1 lists the possible variables based on the literature review that may explain the extent of use of MAPs in Malaysian SMEs.

Table 4.1: List of contingency variables and the types of literature where they have appeared.

No.	Contingent variables	Early Organizational theory	MCS	MAPs	SMEs
	<i>External factors</i>				
	Subsections	4.4.1	4.4.2	4.4.3	4.4.3.1
1	Environmental uncertainty	√	√	√	√
2	Market competition		√	√	
	<i>Internal factors</i>				
	Subsections	4.4.1	4.4.2	4.4.3	4.4.3.1
1	Technology - AMTs	√	√	√	
2	Departmental/sub-unit interdependence	√	√		
3	Size of a firm	√	√	√	
4	Decentralization		√	√	
5	Firm strategy		√	√	
6	Qualified accounting staff				√
7	Owner/manager participation			√	√

√ : Source of contingent variable

Table 4.1 analyses contingent variables between those based on external factors and those from internal factors that arise from within the firm. External factors that proxy for environmental uncertainty have been widely used in contingency studies including those into the adoption of MAPs and those testing the application of contingency theory in SMEs. External factors have also been represented by the narrower measure of market competition and this measure has been used widely in contingency studies focusing on MCS and MAPs but has not yet been tested in SMEs. Internal variables reflecting technology and size of a firm have been extensively tested except in SMEs. Other internal variables related to departmental interdependency, decentralization and strategy have also received attention in studies of organizational theory, MCS and MAPs but not in a SME context. The only two internal variables that have been found in studies of SMEs are qualified accounting staff and owner/managers' participation. For the purpose of this research, five contingent variables are selected, based on their relevance. Thus, four remaining variables are excluded because they are not suitable with nature of SMEs. The justifications for the exclusion of these variables will be addressed after the choice of variables has been explained.

The section first starts with the explanation for the choice of the five variables for testing the first hypothesis; that there is a positive relationship between selected contingent variables and the extent of use of MAPs. The five selected contingent variables are as follows:

1. External factors

- **The intensity of market competition.**

Market competition possibly has a greater overall impact on SMEs because the population of SMEs, which represents the largest share of the business population in

Malaysia, creates significant elements of competition in the market. It has been argued that the intensity of market competition can play a major role in encouraging management to enhance management accounting systems and adopt sophisticated MAPs (Khandwalla, 1972; Libby and Waterhouse, 1996; Bjornenak, 1997; O'Connor et al., 2004; and Al-Omiry and Drury, 2007). As competition increases, a more reliable management accounting information is likely to be needed by the firms to compete effectively and avoid planning based on erroneous information when making decisions (Cooper, 1988). Therefore market competition appears to be a more relevant for the purpose of this study and will be used in testing whether or not external factors positively affect the extent of use of MAPs in Malaysian SMEs.

2. *Internal factors*

- **Advanced manufacturing technology**

The use of modern technology in production activities has been shown to impact on the extent of use of MAPs in many populations but not for SMEs. Even though advanced production techniques may be limited to smaller firms, it is believed that manufacturing firms employ technology of some form in assisting their production activities. Moreover, in today's modern business, technology has been evolving very quickly and has been widely disseminated. For this reason, it is essential to test this variable as one of the potential contingent factors that explain the extent of use of MAPs in SMEs.

- **Size of a firm**

Previous studies (e.g., Merchant, 1984; Haldma and Laats, 2002; Al-Omiri and Drury, 2007; Abdel-Kader and Luther, 2008) have demonstrated consistently that a firm's size has impacted the use of MAPs in business organizations. A larger firm has greater total resources, and better internal communication systems that facilitate the diffusion of

MAPs. In addition larger firms are more complex and face more difficult problems. In consequent they require more control of, and information on, their business activities and, therefore, need more comprehensive and sophisticated MAPs. Thus it is essential to test whether the size of the SMEs will be associated with a greater use of MAPs. This study will examine two categories of SMEs - small-sized and medium-sized firms and will investigate whether there is a difference in the extent of use of MAPs between the two categories caused by their relative size.

- **Participation of owner/manager of firm**

An owner/manager by definition will be involved in the management of the firm, the participation of the owner/manager of the firm - but the level of this participation might vary and this might be a factor which influences the extent of use of MAPs. Previous research in management accounting supports this contention (see for example Shields, 1995; Lybaert, 1998; or Brown et al., 2004), therefore this variable will be a contingent variable for testing the first hypothesis that there is a positive relationship between the participation of the owner/manager and the extent of use of MAPs in SMEs.

- **The level of qualification of accounting staff**

In small firms, the existence of qualified internal accounting staff can be a significant factor underlying the adoption of MAPs. Most large firms have specific accounting and finance departments and prefer, therefore, to hire qualified internal staff to do professional reporting and consultation. However, in the case of SMEs, it is doubtful as to whether qualified internal accountants will have been hired in all firms and even if hired whether these staff have recognized qualifications. The differences between firms in the availability of staff to operate MAPs may explain differences in the use of MAPs

between SMEs. Therefore this variable is important and will be included for the purposes of testing the first hypothesis.

However, there are concerns as to whether qualified accounting staff should be treated as an exogenous variable or endogenous variable. This distinction depends on whether the presence of qualified accounting staff causes the adoption of MAPs or if their adoption leads to qualified accounting staff being employed. The former argument suggests that qualified accounting staff should be treated as an exogenous variable and the latter indicates the endogenous character of the variable. Previous literature provides some support for the exogenous nature of this variable. For example Halma and Laats (2002); Al-Omiri (2003) and Ismail and King (2007) suggest that the presence of competent accounting staff is associated with a high level of uptake of MAPs; while in a SME context, both Collis and Jarvis (2002) and McChlery et al. (2004) suggested that qualified accountants help the development of MAPs in SMEs. Haldma and Laats (2002) claimed that a shortage of qualified accountants may serve as a barrier to the wider application of modern management accounting techniques. Given these views, the level of qualification of accounting staff will be included as one of the exogenous factors that might affect the uptake of MAPs, but the use of this variable will be treated more cautiously in the multivariate analysis. The justifications for excluding the four other variables set out in Table 4.1 are as follows:

1 Environmental uncertainty

Small firms usually exist in a limited operating environment, as opposed to large companies, which have a larger market, either domestic or international. However, it cannot be denied that small firms are also exposed to environmental uncertainty, such as government regulations, the general economic environment, and political instability.

The impact of environmental uncertainty should be significant if the SMEs operate in the international market. However, generally, the overall impact of environmental uncertainty on SMEs that operate in a limited operating environment will be small and indirect. Therefore this variable is excluded.

2 and 3 Departmental/sub-unit interdependence and decentralization

As had been stated by Blau (1970), a firm's size has affected organizational structure of the firm. Large firms were more diversified in product lines, as well as accompanied by high interdependency and decentralization of power and responsibilities (see Khandwalla, 1972; and Gordon and Miller, 1976). It seems the small firms are not big enough to have both a departmental interdependence and decentralized structure. In general, small firms have less complex business activities and, therefore, require fewer departments in comparison to larger firms. As a result, the level of interdependency among these departments is lower, compared with large firms, and the need to decentralize the control authority is not as important as in large companies. Smaller firms are, rather, using more interpersonal control through centralized structures to gain full control of authority. For these reasons, therefore, both variables will not be taken into account in this study.

4 Firm strategy

Previous research into strategy as a contingent factor has employed models, such as the Miles and Snow (1978) strategy typology or the Porter (1980) model of generic strategies, in testing this variable. There are no studies examining the possibility of a relationship between a strategy variable and the extent of use of MAPs in an SME context. This situation may be due to the difficulties in obtaining information about strategies in SMEs probably because many SMEs will not have formalized strategic

planning processes. Given this lack of an available data source, this variable will be disregarded in this study.

Other potentially relevant factors such as profitability, age/maturity of firm, ownership of firm are not addressed due to limited evidence in the previous literature regarding the positive relationship between these variables and the use of MAPs particularly in the SMEs context. Therefore these factors are disregarded in this study and the research focuses only on selected contingent factors.

Additional factor: Industry sub-sector

It is likely that the industry sub-sector that the respondent firms are in may have certain relationship on the use of MAPs. This is premised on the belief that certain industries because of their nature would be likely to have certain management accounting systems. Therefore the data on the sort of manufacturing subsectors will be utilised in investigating whether the different subsectors have a relationship with the use of MAPs in Malaysian SMEs. This section has justified the selection of five contingent variables for this study (size of the firm, market competition, advanced manufacturing technology (AMT), participation of owner/manager and qualified accounting staff). The literature review of each of the factors asserts that these factors affect the extent of use of MAPs in an organisation. The literature review therefore supports the intended first hypothesis associated with the third research question as follows:

H1: There are significant and positive relationships between selected contingent factors and the use of MAPs.

The next section continues the review of prior literature by discussing the last topic the link between the use of MAPs and organizational performance.

4.5 Management accounting practices and organizational performance

Mia and Clarke, (1999) stated that the performance of an organization/division may be viewed as the extent to which the organization/division has been successful in attaining its planned targets. Examples of performance measures include: productivity, cost, quality, delivery schedule, market share, sales growth rate, operating profit, cash flow from operation, return on investment, new product development, R&D activity, and personnel development. Although many researchers have advanced the view that improved management accounting systems would lead to a better performance by firms (Mia and Clarke, 1999; Mitchell and Reid, 2000; and Reid and Smith, 2002), there is only limited research supporting this position. Recently, a number of studies have attempted to remedy this situation. These will now be considered. The studies in this area have either examined a hypothesized direct relationship between the use of MAPs and organizational performance or tested this association with MAPs as just one of a number of explanatory variables. These studies have found mixed results in terms of the impact of MAPs on organizational performance. The following review analyses studies between those yielding positive and negative results.

4.5.1 Positive results

Some positive results have been found on studies related to budgeting, performance measurement, ABC and other MAPs. These are documented below.

Positive evidence for an association between the use of budgeting and performance

Merchant (1981) was an early study which sought to establish a relationship between the use of budgeting and performance by testing for an association between organizational performance and the approach of the firm to budgeting. Two distinct approaches were defined and termed the formal administrative approach and the

interpersonal approach. The findings indicated that the formal administrative approach to budgeting was more strongly related to good performance in larger firms than in smaller firms, which tended towards a more interpersonal approach to budgeting. Tangentially, Hansen and Van Der Stede (2004) who investigated the reasons for budgeting in organizations and their link with performance found that three reasons-to-budget (operational planning, performance evaluation, and strategy formation) were positively associated with organizational unit performance.

Positive evidence on performance measurement and performance

Traditionally, performance measures have been internal, aggregate metrics of financial performance (Chenhall and Langfield-Smith, 2007). However the relevance of this measure has been challenged in the current business environment. Competition has compelled firms to implement management strategies and systems to overcome dissatisfaction with traditional short-term perspective financial measurement systems (Said et al., 2003). Hence, in recent years organizations have sought to develop more comprehensive PMS to provide managers and employees with information to assist in managing their firm's operations (Hall, 2008). The BSC approach to management (Kaplan and Norton 1992; 1993; 1996) has gained prominence in management accounting research as a way of integrating financial and nonfinancial performance measures (Hoque and James, 2000). The implementation of BSC and its impact on performance was investigated by Hoque and James (2000), and Jusoh et al. (2008). Maiga and Jacobs (2003), who tested for complementary effects between BSC and ABC, found that ABC, when combined with BSC, had a significant positive impact on organizational performance. Jusoh et al. (2008), who investigated the extent of multiple performance measures usage and effects on the performance of Malaysian manufacturers, suggested that the use of non-financial measures particularly, internal

business process and innovation and learning perspectives of the BSC, enhanced firm performance.

Positive evidence on non-financial performance measurement and performance

There has been an increased organizational use of non-financial measures for performance evaluations in recent years (Hoque, 2004). Studies reporting a positive association between this measure and its performance include those of Anderson et al. (1994); Abernethy and Lilis (1995); Ittner and Larcker (1998b); Banker et al. (2000); Said et al. (2003); and Bryant et al. (2004). Anderson et al. (1994) supported the hypothesis that, on average, customer satisfaction was positively related to contemporaneous accounting return on investment, Ittner and Larcker (1998b) provided evidence that customer satisfaction measures are leading indicators relating non-financial performance to accounting performance. In a subsequent study Banker et al. (2000) revealed a positive relationship between customer satisfaction measures and future accounting performance. Using a wider range of non-financial measures, Said et al. (2003) examined the current and future performance consequences of incorporating non-financial measures by reference to a set of performance metrics among U.S. companies. Based on performance measured as accounting-based measures (ROA) and market-based measures, they reported that the use of non-financial measures in evaluating performance had positively affected market performance. In a later study Bryant et al. (2004) suggested that when firms implement a PMS that contains both financial and non-financial measures, they will benefit more than the firms that rely solely on financial measures. In particular, they found that there is a positive relation between financial outcomes and both customer satisfaction and new product introductions which holds only for firms that use both financial and non-financial measures in their performance.

Positive evidence on ABC and performance

Shields (1995) found a positive association between the implementation of ABC and the success of the firm reporting that 75 percent of their sample had received a financial benefit from implementing ABC. Kennedy and Affleck-Graves (2001) adopted an event-study approach by matching 37 firms that adopted ABC between 1988 and 1996 with an equivalent number of non-adopting firms listed on the London Stock Exchange. They suggested that firms in the UK adopting ABC techniques outperformed matched non-ABC firms. Further analysis suggested that ABC added to firm value through better cost controls and asset utilization, coupled with greater use of financial leverage. Ittner et al. (2002) examined the association between ABC and manufacturing performance. Results using a cross-sectional sample of U.S. manufacturing plants indicated that extensive ABC use 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.

Positive evidence on the combined effect of MAPs and other factors on performance

A number of studies have investigated the use of MAPs in conjunction with other variables as determinants of performance. Abernethy and Lilis (1995) found that a greater reliance on efficiency-based performance measures had a greater positive effect on perceived performance in flexible firms than in non-flexible firms. Similarly, Hoque (2004) revealed the existence of a significant and positive association between management's strategic choice and performance which was related to management's high use of non-financial measures for performance evaluation. Hall (2008) integrated the effect of PMS on managerial performance through the mediating variables of role clarity and psychological empowerment. The results indicated that comprehensive PMS influenced managers' cognition and motivation, which, in turn, influenced managerial

performance. Another study by Hyvonen (2007) investigated the relationships between organizational performance and customer-focused strategies, performance measures and information technology. The results indicated that when a firm does not follow a customer-focused strategy, contemporary MAS in combination with advanced information technology are related to high customer performance. Finally, the results show that a fit between the customer-focused strategy and financial performance measures improves customer performance.

Beyond performance measurement, a number of studies have explored other mediating variables in understanding the relationship between MAPs and performance. For example, Choe (2004) integrated organizational learning in investigating the effects of management accounting information required by AMT for attaining improved production performance. The empirical results demonstrated that facilitators of organizational learning have a moderating impact on the relationship between provision of information and performance improvement. Therefore, it was concluded that when learning facilitators are well arranged and highly utilized, the provision of information is more likely to be linked to effective learning and, consequently, improved performance. Tayles et al. (2007) examined whether the level of intellectual capital (IC) influences MAPs and performance. Their research suggests that the level of investment in IC is associated with use of MAPs, business performance, and the ability to respond to future events. In a subsequent study, O'Regan et al. (2008) attempted to assess the link between strategic-planning, aspects of the external environment and overall corporate performance in U.K manufacturing SMEs. The results show that strategic-planning in manufacturing SMEs is positively linked to overall corporate performance.

Other related studies and positive results

Other studies that are closely related to MAPs also provide additional evidence as to the impact of MAPs on performance. For example, Gul (1991) examined the interaction effects of MAS and perceived environmental uncertainty on Australian small business managers' perceptions of their performance. The results confirmed the hypothesis that the effects of MAS on performance were dependent on environmental uncertainty. Under high levels of uncertainty, sophisticated MAS had a positive effect on performance but under low levels it had a negative effect. Mia and Chenhall (1994) examined the role of broad scope of MAS information in enhancing managerial performance. The proposition was that differentiation of activities into areas such as marketing and production is an organizational response to manage uncertainty. The results indicated that the association between the extent of use of broad scope MAS information and performance was stronger for managers of marketing than production activities. In a later study, Mia and Clarke (1999) investigated the relationship between the intensity of market competition and business unit performance by reference to managerial information provided by the MAS. Using perceptual measures, they found the intensity of market competition to be a determinant of the use of the information which, in turn, is a determinant of business unit performance. Similarly, Williams and Seaman (2002) explored the indirect effect of management accounting and control system (MACSs) change on departmental performance within 232 medium-sized Singaporean firms. The results showed that MACSs change affected performance but not directly. Instead, this relationship was mediated by managerial-relevant information (MRI) that is itself impacted by MACSs change, and which, in turn, enhances performance. Sim and Killough (1998) investigated whether manufacturing practices and MAS interactively affect performance among U.S manufacturing companies. The findings support the notion that production systems (TQM and JIT) and MAS (such as

performance contingent rewards) can have complementarities, or synergistic effects on performance. Later, Maiga and Jacob (2006) assessed whether firms involved in quality benchmarking projects achieved greater actual quality improvements. The results indicated a strong positive relationship between benchmarking antecedents and quality improvement and the significant impact of quality improvement on relative costs improvement, which in turn is significantly associated with profitability. The next section discusses studies that report negative results.

4.5.2 Negative results

As well as studies supporting a positive association between the use MAPs and performance, other studies found either no relationship or a negative one. For example, Klammer (1973) examined the relationship between the sophistication of capital budgeting techniques used by the firm and performance. No consistent significant association between performance and capital budgeting techniques was found. Klammer (1973) argued that the mere adoption of various analytical tools would not deliver superior performance, and that other factors, such as marketing, product development, executive recruitment and training and labour relations, are likely to have a greater impact on profitability. The finding re-affirms the message that sophisticated capital budgeting methods do not guarantee better performance. Perera et al. (1997) found that there is no association between the use of non-financial measures and perceived performance in plants that follow a customer-focused manufacturing strategy. Ittner and Larcker (1998b) found modest support for claims that customer satisfaction measures are leading indicators of customer purchase behavior, growth in the number of customers, and accounting performance. They also found some evidence that firm-level customer satisfaction measures can be economically relevant to the stock market but are not completely reflected in contemporaneous accounting book values. Young and Selto

(1993) found little evidence that the use of non-financial measures in JIT facilities was associated with differences in manufacturing performance. In the U.S, Gordon and Silvester (1999) used an event-study approach to investigate the impact on firm value of an announcement that firms were using ABC. They found that the announcement of ABC use did not affect firm stock values. This result is further supported by Ittner et al., (2002) who found extensive ABC use has no significant association with return on assets.

4.5.3 Types performance measures used in the literature

The majority of the studies can be categorized into those reliant upon available published data and those employing measures of the manager's perception of performance. The greater proportion of studies use secondary data such as stock price performance and data from the financial statements of public listed companies (see for example, Ittner and Larcker, 1998a; Kennedy and Graves, 2001; Choe, 2004; Maiga and Jacob, 2006) - but a significant number have relied on perceptual measures, for example Merchant (1981); Gul (1991); Lybaert (1996); Hoque (2004); Hall (2008); and Jusoh et al. (2008).

The use of perceptual measures reflects problems with the availability and reliability of objective performance data. For example, Garg et al. (2003) pointed to the reluctance of MDs/CEOs of manufacturing firms to provide detailed accounting data on their firm's performance. The problem is more acute in the case of privately owned SMEs where, as Lybaert (1996) argued, many SME owner/managers, as well as desiring secrecy, are unfamiliar with the precise internal 'hard' figures. For these reasons, a self-rating measure or subjective evaluation may be effectively used when objective performance data are unavailable (see for example Dess and Robinson, 1984; Gul, 1991) – and this is

commonly done. Hall (2008) noted that the Mahoney et al. (1965) scale is frequently used to measure managerial performance in accounting studies (see for example, Chong and Chong, 2002; or Parker and Kyj, 2006).

As can be seen both financial and non-financial measures have been used in measuring the performance of firm. Financial measure such as sales, ROI/ROA, profit and cash flow are the most frequently used (see Perera et al., 1997; Hoque and James, 2000; Hyvonen, 2007; and Jusoh et al., 2008). The use of measures in the non-financial category is more varied and covers measures based on internal processes, customers and employees. A summary of performance measures used in the number of the studies reviewed in this chapter is shown in Table A7 in the appendix.

4.5.4 Summary

Prior empirical studies provide inconsistent evidence on possible relationships between the extent of the use of MAPs, either individually or collectively, and performance. However on balance evidence of a positive relationship exceeds negative or equivocal results. Given this balance of evidence and since the objective of MAPs is to assist the managerial activities in firms, firms will expect a positive outcome from the implementation of MAPs. A hypothesis based on a positive and significant association between MAPs and performance appears sustainable. The literature review therefore supports the intended second hypothesis associated with the fourth research question as follows:

H2: There is a significant and positive relationship between the use of MAPs and organizational performance.

As discussed in section 4.5.3 performance measurement has commonly been based on financial data or on a perceptual measure of performance. For the purpose of this research, perceptual data will be adopted due to unavailability of financial data from SMEs due to the problems highlighted by Lybaert (1996) and Garg et al. (2003).

The choice of variables for measuring performance is based on the instruments used by Jusoh et al. (2008). The choice is based on the similarity of the context of study which should facilitate comparison of the results. Jusoh et al.'s (2008) research was conducted among Malaysian firms in the manufacturing sector as is this study. However Jusoh et al. (2008) only focused on Malaysian medium and large firms. Hence careful judgment will be needed to choose variables suitable for the SME context from the organizational performance variables used in the study. The following table shows the measures used by Jusoh et al. (2008).

Table 4.2: Organizational performance indicators used by a study by Jusoh et al. (2008).

No.	Organizational performance measures
1	Sales growth
2	Operating profit
3	Cash flow growth rate
4	Return on investment (ROI)
5	Manufacturing cost
6	Product quality
7	New product development
8	R&D activity
9	Number of on-time deliveries
10	Personnel development
11	Market share
12	Level of productivity

The following subset of six variables is selected for this study due to their relevance in the context of small business organizations.

Business level

- Sales growth
- Operating profit
- Cash flow growth rate

Operational level

- Product quality
- Number of on-time deliveries
- Level of productivity

The choice of six variables provides three variables that represent performance at a business level and another three variables that represent performance at an operational level. These six performance measures should provide a broad insight into areas of performance in SMEs. The reduction to six variables also reflects a desire not to overwhelm potential respondents with detail in order to improve the response rate.

4.6 Overall summary

Overall chapter four has reviewed the literature related to the four research questions. The literature review for the first research question; “*To what extent are MAPs used by Malaysian SMEs?*” (see section 4.2); indicated that studies into MAPs have investigated their deployment in developed countries and in developing countries. The literature review also found that traditional MAPs are widely used by organization despite the criticisms of their lack of relevance and that the use of newly-developed MAPs is growing but the uptake is still slow in most of developed and developing countries. The review also identified a significant gap in the literature related to the use of MAPs within SMEs especially in developing countries. In Malaysia, there is no

previous example of research in this area. Therefore addressing the first research question of the thesis will add to existing knowledge about the uptake of MAPs in Malaysian SMEs.

The literature review for the second research question; “*What are the roles played by management accounting in Malaysian SMEs management?*”; confirmed that management accounting plays important roles in the management process in organizations. Planning, controlling, evaluating performance and decisions making, have been identified as key roles for management accounting. Additionally management accounting is perceived to be involved in formulation and implementation of a firm’s strategy and value creation. The review also indicates that there is very little research into the role of management accounting in the management of SMEs in either developed or developing countries. This literature gap indicates that addressing research question two of the thesis will add to existing knowledge about the role of management accounting in SMEs. For the purpose of this research, the list of roles provided by IFAC (1989) will be utilized.

The literature review for the third research question; “*What factors affect the use of MAPs in Malaysian SMEs?*” highlighted the type of contingent factors used in contingency studies in the organizational theory context of MCS, MAPs and SMEs. The literature shows that the use of MAPs can be influenced by internal and external contingent factors. The majority of the previous research suggested a positive relationship between these factors and the use of MAPs. The review identified a significant gap in the literature related to contingency factors that affect the level of use of MAPs within SMEs. Addressing research question three of the thesis will add to existing knowledge about factors that influenced the use of MAPs in developing

countries within the SMEs environment. For this purpose five potential contingent variables for determining factors that might affect the level of use of MAPs within SMEs environment were identified.

The review of the current state of knowledge relating to the fourth research question; “*Is there a positive relationship between the use of MAPs and the performance of Malaysian SMEs?*” suggested that there is a positive relationship between the use of MAPs and firm performance, although it was acknowledged that there are a minority of studies that provide negative or inconclusive results. The review also found that although the majority of studies had used objective financial measures of performance, there were examples of research relying on perceptual measures of performance in samples where objective measures were not available - as is the case for the population of Malaysian SMEs. The review also identified a significant gap in the literature related to the evidence on the relationship between the use of MAPs and firm performance among SMEs especially in developing countries.

Seeking to address research question four of the thesis will add to existing knowledge about the possible relationship between the use of MAPs and the performance of SMEs. The literature suggests that perceptual measures of performance would be most appropriate to the SME context and six organizational performance indicators were selected from those used by Jusoh et al. (2008) as variables on which to base hypothesis testing.

The next chapter will discuss the methodology applied in the endeavour to answer the four research questions.

Chapter 5

Research design and methodology

5.1 Introduction

This chapter describes the research design and methodology used to collect and analyse the data required to address the research questions posed in this study. As discussed in Chapter 1, the research aims to gather empirical evidence capable of providing an overview of current MAPs in Malaysian manufacturing SMEs. The research also seeks to understand how MAPs assist the management of SMEs, what factors contribute to the extent of the use of MAPs in SMEs, and attempts to establish if MAPs help to improve firm performance. In Chapter 1 (section 1.5), these areas of inquiry were distilled into four specific research questions:

1. What is the extent of the use of MAPs by Malaysian SMEs?
2. What are the roles of management accounting in Malaysian SMEs' management?
3. What factors affect the extent of the use of MAPs by Malaysian SMEs?
4. Is there a positive relationship between the use of MAPs and the performance of Malaysian SMEs?

The above research questions led to the emergence of the following two hypotheses specifically aimed at answering the third and fourth research questions listed above.

H1: There are significant and positive relationships between selected contingent factors and the use of MAPs.

H2: There is a significant and positive relationship between the use of MAPs and organizational performance.

This chapter is organized into five sections. First, the choice of research design is explained. The second section discusses the population from which data will be collected and the approach to sample selection. The third section covers the data collection method, which focuses primarily on a postal survey. In the fourth section, data measurements and scaling are discussed. Finally, the choice of methods of data analysis is considered in terms of the research objectives and hypotheses.

5.2 Research design

A research design provides the basic directions for carrying out the project. In particular, a research design should provide relevant information that will most efficiently and effectively address the research questions or hypotheses (Hair et al., 2007). Hair suggested that there are three distinct research designs: exploratory; descriptive; and causal. Of these three, descriptive and causal research designs match the need to provide the relevant information for the above research questions and hypotheses. Descriptive data are needed to answer the first two research questions concerning the extent of the use of MAPs in Malaysian SMEs and the roles fulfilled by MAPs in the management of SMEs. Descriptive data will also provide information on contingent factors that affect the extent of the use of MAPs and the relationship between the extent of use of MAPs and firm performance for the causal research stage. Causal research which can also be termed as explanatory research (Saunders et al., 2009) will test whether one variable (the independent variable) is responsible for changes in another variable (the dependent variable) (Emory and Cooper, 1991). The need for this research design reflects the two hypotheses developed in this study where both independent and dependent variables are involved in order to form the required relationships. Specifically, the first hypothesis will test the relationship between selected contingency variables (independent variables) with the extent of the use of

MAPs (dependent variables). The second hypothesis will test whether there is the positive relationship between the extent of the use of MAPs (independent variable) and the performance of the firm (dependent variable). Thus, given the needs for descriptive data and hypotheses testing, this research calls for a descriptive and causal research design to facilitate meeting these needs. The exploratory research design, which attempts to discover a new relationships, patterns, themes or ideas and does not aim to test specific research hypotheses (Hair et al., 2007), does not conform to the study objectives and hence is not suitable for this study.

The above research design will use a quantitative approach because data collection will involve a large scale survey rather than interviews. Having reviewed the research design, the next section discusses the sample selection method.

5.3 Sample selection method

According to Hair et al. (2007) representative samples are generally obtained by following a set of well-defined procedures, which are: defining the target population; selecting a sampling method; and determining a sample size. Therefore as been recommended by Hair et al. (2007), this section will briefly explain the study's approach to these three main procedures for selecting the representative sample.

5.3.1 Target population

The research questions in this study concern the use of MAPs among Malaysian SMEs. The target population identified for gathering information regarding this concern is Malaysian SMEs from among the firms in the various industries that comprise the manufacturing sector. The research concentrates only on manufacturing sector in order to avoid irrelevant distractions arising from variations between sectors. As discussed in

Chapter 3 section 3.5.6, the SME manufacturing sector in Malaysia is responsible for an increase in Malaysian exports, contributes substantially to the economy in terms of employment and has been a key factor in sustained rapid economic growth. In recognition of this contribution, the Malaysian government is aggressively supporting this sector in various ways such as offering finance and business advice to boost its performance. Besides its importance to the Malaysian economy, this sector is suitable for research into MAPs as manufacturing SMEs have a higher proportion of medium sized firms who are most likely to use MAPs.

The target population can be divided into three possible sampling units. This is based on the three different sizes of enterprises that comprise Malaysian SMEs (micro, small and medium). The definition of these enterprises has been described earlier in Chapter 3. In deciding whether or not to include all SMEs in the sector as sampling units, the matter of suitability will be the root of selection. Management accounting is only likely to be found in larger enterprises and therefore it was decided to exclude micro-sized firms as they have either a turnover of less than RM 250,000 or fewer than five employees and are therefore likely to be too small to have management systems that rely on MAPs. For example, Hoque (2004) argued that a very small enterprise is less likely to have a real need for complex management systems, and Nayak and Greenfield (1994) stated that companies in the micro category will almost certainly have no qualified internal accounting capability and will also lack the resources to employ these systems. The research therefore will only focus on the small and medium enterprises within the Malaysian SME definition.

Members of the population will be derived from the directory of the Federation of Malaysian Manufacturers (FMM). This source, although not comprehensive, provides

detailed information about SMEs in the manufacturing sector. The FMM directory consists of comprehensive profiles of over 2,200 manufacturers from SMEs to large enterprises. This database, which is available on CD-ROM and as a hardcopy, is frequently used in survey research, which involves the manufacturing sector (see for example; Ahmed et al., 2004; Ismail and King, 2006; Jusoh and Parnell, 2008; and Jusoh et al., 2008). One main advantage of this directory is that it specifies the number of employees and average annual turnover, which allows users to classify the size of the firms. This source therefore provides sufficient information for categorizing each member of the population into a sampling unit (subgroup). The directory is not always up-to-date in terms of email addresses, telephone numbers and postal addresses. In order to reduce the effect of this shortcoming, the data in this directory was cross-checked with official websites or by making an initial call to the firms to confirm that the details, such as address and email address are correct.

5.3.2 Sampling method

The target sample of this study comprises of two subgroups: medium sized enterprises and small enterprises as defined in Chapter 3 section 3.4. Given the preponderance of small enterprises as discussed in Chapter 3 section 3.5.3, it is important to ensure that cases from each group are adequately represented in the full sample. To control the relative size of each subsample, a stratified random sampling procedure will be used. In this procedure, a simple random sample is taken from each stratum and the subsamples are then joined to form the total sample (Judd et al., 1991). The idea of stratified random sampling is to ensure that every stratum gets an appropriate representation (Ghauri et al., 1995) through the stratification process. This method can also allow the results from subgroups to be compared to ascertain whether or not size difference affects the use of MAPs.

In order to determine the due proportion between the two subgroups, the stratification process can be done either by using proportionate or disproportionate stratified sampling. According to Hair et al. (2007), in a proportionate stratified sampling, the number of elements chosen from each stratum is proportionate to the size of particular strata, relative to the overall population size. On the other hand, disproportionate stratified sampling independently determines the sample size from each stratum without considering the size of the stratum relative to the overall sample size. In this procedure, the sample elements are chosen either according to another factor, such as their relative economic importance, or the variability of the data within each stratum (Hair et al., 2007). The variability among small and medium enterprises here relates to how the use of MAPs varies between small and medium-sized enterprises. However the information on this variability is unknown since no research has been done in this topic on these particular groups.

To determine the appropriate procedure, a comparison of sample sizes between a proportionate and a disproportionate stratified sampling approach is made. For disproportionate sampling, it will be based on economic importance of the subgroups since the information of the variability of the use of MAPs in both subgroups is unknown. Accordingly, Table 5.1 shows the effect of proportionate stratified sampling based on the number of establishments and Table 5.2 shows the effect of disproportionate stratified sampling based on economic contribution. The economic contribution uses contribution in economic value-added, output and employment and salaries as the bases for the economic contribution. These bases are used because they are the only current and available data revealed in the SMEs' annual report.

Table 5.1: The proportion of establishments in the small and medium category based on number of establishments.

Subgroup	% of number of establishments
Small	88.5
Medium	11.5
Total	100

Table 5.2: The proportion of establishments in the small and medium category based on contribution in economic value-added, output and employment and salaries.

Subgroup	% of contribution in employment and salaries	% of contribution in economic value-added	% of contribution in output
Small	62	48	44
Medium	38	52	56
Total	100	100	100

Data in Table 5.1 shows that any sample based on number of establishments would be heavily skewed towards the small category. Unless the sample size is almost the whole population, this imbalance will cause the sample size for the medium category to be insufficient to provide meaningful information for answering the research questions. This is an unsatisfactory position because a very large sample would be prohibitively expensive and would provide an excessive number of small SMEs for analysis. Further, it is important to have a significant sample from the medium SMEs because it is probable that this group will make greater use of MAPs than small enterprises. So on this ground, a proportionate approach was disregarded.

In contrast, disproportionate stratified sampling on each of the three bases gives a more equal proportion of sample size between the two subgroups. Data in Table 5.2 above, shows that almost equal numbers of the small and medium group will be sampled, if it

is based on percentage of contribution in economic value-added as both categories make an almost equal contribution to the total economic value-added. The basis of percentage of contribution in employment and salaries is skewed to the small category whereas the proportion, based on contribution in output is slightly skewed towards medium enterprises. Overall, the most reasonable basis for a disproportionate stratification process is based on using the percentage of contribution in economic value-added as this base allows a sufficient representativeness of both medium and small SMEs.

5.3.3 Sample size

The determination of sample size is influenced by many factors that need to be taken into account simultaneously. The factors include the cost and time constraints, variability of elements in the target population, required estimation precision and whether the findings are to be generalized and, if so, to what degree of confidence (Hair et al., 2007). In deciding the sample size, there is often a trade-off between the cost and time and large sample size. A larger sample size obviously requires more expenditure on collecting and analysing data (Henry, 1990). Thus this research must balance the trade-offs of obtaining a sufficient sample size within budget and time constraints. To know whether the sample size can work within these constraints, it is essential to discuss aspects in determining the sample size. There are number of statistical formulas available to calculate an appropriate sample size but these manually require data on variability (standard deviation), estimation precision and degree of confidence. However, information on variability is unavailable since the variability of the use of MAPs between small and medium SMEs has not yet been assessed in any of the previous research.

Other guides include references to consistent rules of thumb provided by statisticians to help in determining sample size. Roscoe (1975) proposed that sample sizes larger than 30 and less than 500 are appropriate for most research. This is supported by Stutely (2003) who advises a minimum number of 30 for statistical analyses. The minimum sample size arises because statisticians have proved that a sample size of 30 or more will usually result in a sampling distribution for the mean that is very close to a normal distribution; a position which is important to ensure that spurious results do not occur (Saunders et al., 2009). Thus with the larger absolute size of a sample, the more closely its distribution will be to the normal distribution and thus the more robust it will be (Saunders et al., 2009). From another point of view, Kent (2001) suggested that for any kind of quantitative analysis, a minimum of 100 cases is needed. This would help to get a more sensible statistical analysis and more meaningful result. On the other hand, Sekaran (2004) noted that for multivariate research (including multiple regression analyses), the sample size should be several times (preferably 10 times or more) larger than the number of variables in the study. In addition to the above guidelines, Oppenheim (1997) and Sekaran (2004) advise a minimum sample size for research that has a number of subsamples. According to Oppenheim (1992), the more subgroups, the larger the sample needed. As this study involves multivariate regression analysis with up to eight variables, it would be sensible to aim to have at least 100 cases to ensure successful quantitative analysis.

Past response rates are a basis for determining how large a sample must be to provide a response rate of at least 100 cases. Table 5.3 summarizes seven selected studies investigating Malaysian SMEs and their response rates.

Table 5.3: Response rate from selected studies in Malaysian companies

Researchers	Topic	Response rate	Number of target sample	Sector
Ahmed et al. (2004)	Total Productivity Management	9.1%	695 SMEs	Manufacturing
Abdullah et al. (2001)	SMEs' Support Programmes	10.4%	3,069 SMEs	Service, manufacturing and agriculture
Boocock and Shariff (2005)	Financing	12.3%	750 SMEs	Service, manufacturing and agriculture
Jusoh et al. (2008)	Performance Measure	12.3%	975 of small, medium and large companies.	Manufacturing
Zakaria and Hashim (2004)	Information Technology	13.0%	372 SMEs	Manufacturing
Rozali et al. (2006)	Financing	17.5%	1,317 SMEs	Service, manufacturing and agriculture
Ismail and King (2006)	Information Technology	25.0 %	1,230 SMEs	Manufacturing

Six out of seven studies received less than a 20% response rate. The reason for a response rate of over 20% in the seventh study (Ismail and King, 2006) is unclear but their population was based on SMEs that employed between 20 and 250 people. The population therefore excluded many micro and smaller enterprises who might well be less likely to respond.

The average response rate calculated for the first six studies is 12.4% and 14.3% for all seven studies. However, the average response rate is 11.5% if it is calculated from studies in the manufacturing sector only (except research by Ismail and King, 2006). The average response rate is 14.9% for all SMEs studies in the manufacturing sector. Overall, the range of average response rates in SMEs studies is between 12% and 15%. The low response rates in these studies may be due to the demographic factors of Malaysian SMEs. Boocock and Shariff (2005) explained that the low response rate

among Malaysian SMEs was associated with the mixed-race and multilingual nature of Malaysian society. They also argued that it is relatively rare for SMEs in Malaysia to receive academic questionnaires, and therefore there was a degree of suspicion concerning these documents. Boocock and Shariff's observations are consistent with research by Jusoh et al. (2008), who stated that a low response rate was not unusual for postal questionnaires in Malaysia because Malaysian managers are typically reluctant to participate in mail surveys and the sensitive and confidential nature of the information requested may contribute to low response rates.

Overall, in the Malaysian context, a low response rate must be expected and this indicates the need for a large enough sample to ensure that sufficient useable responses are received. Given an average response rate of between 12% and 15% response rate (as discussed above), a 100 cases requires 834 questionnaires to be sent out if the response rate is at the minimum level, and it would seem sensible to increase this to 1,000 to provide a margin of safety, in case the response rate is even lower. Table 5.4 shows the allocation of this sample size to each subgroups based on disproportionate stratified random sampling with two possible responses rates; worst and best.

Table 5.4: Sample size for each subgroup and the target number of responses

Subgroups	% of contribution in economic value-added	Sample size	Estimated responses	
			Worst (12%)	Best (15%)
Small	48.0	480	58	72
Medium	52.0	520	62	78
Total	100.0	1,000	120	150

Economic value added; the basis for stratification chosen in section 5.3.2, gives almost equal numbers in each subgroup. The last two columns shows the estimated responses

for each subgroup based on worst and best average response rates from past studies. The expectation is for between 120 to 150 responses from the 1,000 sample.

5.4 The method of data collection

This research employs a postal survey to collect data. The postal questionnaire is chosen because it is a popular instrument for eliciting opinions in empirical accounting research (Collier and Wallace, 1992). This approach permits data to be collected from a representative sample across many industries and geographical regions where companies have activities. In addition, this method is generally the least expensive means of collecting survey data (Groebner et al., 2008). If the questionnaires are posted, the major costs are limited to postage to and from the respondents and also printing costs.

Pilot testing is important to collect feedback about the questionnaire, the response rate and the timing of responses. Moreover, a pilot test will allow an examination of patterns of respondents' answers and thus their understanding of the questionnaire (Dillman, 1978). Accordingly, the questionnaire developed in this study was administered after pre-testing among fellow academics at the University of Exeter Business School. The pretesting aimed to clarify the wording of both the questionnaire instructions and questions. No significant issues were raised. After this pre-testing, a pilot test was run on 100 SMEs. A response rate of 13% was achieved, which was in line with expectations. It was also noted that completion of the questionnaire did not appear to present problems for the target audience. Therefore it was decided to proceed with the main mailing.

The postal survey package included a covering letter explaining the purpose of the survey, a copy of the questionnaire, and a prepaid envelope for returning the questionnaire (these documents are in the Appendix). The letter is addressed to the member of the accounting personnel in the firm who is the most eligible person to complete the questionnaire. In order to increase the response rate follow-ups were planned at three intervals:

- i. Two weeks after the initial mailing, a follow-up email;
- ii. Four weeks after the initial mailing, a new covering letter and questionnaire; and
- iii. Eight weeks after the initial mailing, a follow-up call, follow-up email and a third covering letter and questionnaire.

This lengthy process was designed to maximise the response rate.

5.5 Measurement and scaling

The questionnaire was split into five sections: profile of the firm; extent of the use of MAPs; factors which affect the extent of the use of MAPs; performance of the firm; and the roles of MAPs. Responses to questions in these sections will be measured through the use of scales. A scale is a measurement tool that can be used to measure a question with a predetermined number of outcomes (Hair et al., 2007). There are five scales available: nominal, binary, ordinal, interval and ratio. Of these scales, three of them will be utilized in designing the questionnaire. These scales are the binary, nominal scale and the ordinal scale. Nominal scales help to identify and classify some characteristics of the respondents (Hair et al., 2007) and allow the researcher to qualitatively distinguish groups by categorizing them into mutually exclusive and collectively exhaustive sets (Sekaran, 2004). This scale will be mainly used to measure the profile of the firms and also for the sort of industry. The data analysis for this scale is restricted mostly to counts of the number of responses in each category, calculation of the mode

or percentage for a particular question, and the use of the Chi-square statistic (Hair et al., 2007). Binary scale is scale that has two categories, one for cases that posse a characteristic and one for those that do not (Kent, 2001). Examples of this scale are poverty/ not in poverty; employed and unemployed; married/not married; and responding 'yes' or 'no' to a question. Binary scales (which sometimes called 'dichotomies') have interesting statistical properties not possessed by scales which have three or more categories (Kent, 2001). This scale will be utilized for the general 'yes/no' questions about whether the firm uses each particular MAP or not. On the other hand, the ordinal scale is used to measure concepts such as attitudes, perception, feelings, opinions and values through the use of rating scales (Hair et al., 2007) and will help to the order of the magnitude of the differences in each variable (Sekaran, 2004). The ordinal scale can be facilitated with the use of a summated rating scale or Likert scale. Summated scales often use a five-point or seven-point scale to assess the strength of agreement about a group of statements. When the scales for all the statements are summed it is referred to as a summated rating scale. When the scale is used individually it is referred to as a Likert scale (Hair et al., 2007). For the purpose of this research the five-point Likert scale will be used to measure the extent of the use of MAPs, factors which affect the extent of the use of MAPs, the perceived performance of the firm and the roles of MAPs. The use of a five-point scale is aligned with previous studies in the management accounting area for example those by Drury et al. (1993); Guilding et al. (1998); Hoque and James (2000); Hoque (2004); and Abdel-Kader and Luther (2006).

The use of a five-point Likert scale is not only consistent with the previous studies, but also provides a shorter scale to help respondents to complete the questionnaire. According to Hair et al. (2007), the desire for a higher level of precision must be balanced with the demands placed on the respondents. Respondents must be reasonably

well educated to process the information associated with a larger number of categories. They added that respondents exposed to scaling questions less often, can more easily respond to scales with fewer categories. Since survey research among SMEs is still new in Malaysia, especially in the management accounting, the fewer categories in Likert scales will probably help respondents understand the information required and thereby increase the response rate.

5.5.1 Questionnaire design

The most important aspect in drafting a questionnaire is how to select the variables that will be the subject of questions. The questionnaire design was informed by previous research into MAPs. These questionnaires, which largely focused on large companies, have been modified by choosing only variables that suit to the environment of SMEs and also those that can be easily understood by the target respondents. The objective is for the questionnaire to seek information only on mainstream practices of management accounting that are relevant to the Malaysian SME context. The final version of the questionnaire comprised 24 main questions covering 75 specific items. Questions were put into five sections so as to gather data on the key topics in an organized way. The details of the topics are as follows:

First Section: Profile of the firm

This section used nominal and ordinal measures in identifying the profiles of the firm. All questions were in a close-ended form and asked:

- (a) years of operations/business;
- (b) manufacturing activity (sector);
- (c) annual sales turnover;
- (d) number of employees.

Second Section: Extent of the use of management accounting practices

This section applied both binary (dichotomous) and ordinal measures in identifying the extent of use of MAPs among SMEs. MAPs were grouped into five major parts; costing system; budgeting system; performance evaluation system; decision support system; and strategic management accounting. Each part under this section (parts A to E) begins with questions to identify if the respondents have employed the respective set of MAPs. For example, Part A on costing system started with the first question, “Do you use a costing system in your firm?” The response option is given in a ‘yes’ or ‘no’ box. The subsequent statement directs where the respondents should next proceed in answering the questionnaire. For example, in Part A, the statement appears as follows, ‘If yes, please continue to question number 6 and onwards. If no, please proceed to part B (question 8).’ This format is similar in each part (A to E) under section 2.

If the respondents say ‘yes’ the subsequent questions in the section probe into the details on the extent of the use of MAPs in their firm. As discussed in section 5.5, a five-point Likert scale is used to indicate the extent of use of MAPs. The scale is 1 = never, 2 = rarely, 3 = occasionally, 4 = frequently and 5 = very frequently. This format of this scale is the same in each part under section 2. The detailed items which need to be answered by each respondent are as follows:

- Part A: Costing system

The questions under this part are divided into 2 main categories, the cost collection method and the costing technique. These categories were based on a synthesis of those used in previous research studies by Shields et al. (1991); Drury et al (1993); Innes and Mitchell (1995); Wijewardena and De Zoysa (1999); Lamminmaki and

Drury (2001); and Abdel-Kader and Luther (2006). The items under each category are:

- (a) Cost collection method:
 - (i) Job costing
 - (ii) Batch costing
 - (iii) Contract costing
 - (iv) Process costing

- (b) Costing technique:
 - (i) Absorption costing
 - (ii) Variable costing
 - (iii) Activity-based costing

- Part B: Budgeting system

The extent of use of budgeting practices is collected under three headings: type of budget; timings of budget; and type of budget method. The items under each heading are consistent with previous research by Shields et al. (1990); Szychta (2002); Joshi et al. (2003); Nik Ahmad et al. (2003); Hansen and Van der Stede (2004); and Abdel-Kader and Luther (2006). The followings are the details of the categories.

- (a) Type of budget:
 - (i) Sales budget
 - (ii) Purchasing budget
 - (iii) Production budget
 - (iv) Cash flow budget
 - (v) Financial position budget

- (b) Timings of budget:
 - (i) Monthly budgeting
 - (ii) Annual budgeting
 - (iii) Continuous/rolling budget

- (c) Type of budget method:
 - (i) Flexible budget
 - (ii) Incremental budgeting
 - (iii) Zero-based budgeting

- Part C: Performance evaluation system

The questions on the extent of use of performance evaluation systems are grouped under two headings: performance evaluation based on financial measures; and performance evaluation based on non-financial measures. The latter distinguishes between measures based on internal processes, customer and employees. The categories reflect a synthesis of previous work by Drury and Tayles (1993); Chenhall and Langfield-Smith (1998); Joshi (2001); Gomes et al. (2004); Abdel-Kader and Luther (2006); and Abdel-Maksoud et al. (2008). The information sought are as follows;

- (a) Performance evaluation based on financial measure(s):
 - (i) Operating income
 - (ii) Return on investment
 - (iii) Variance analysis
 - (iv) Sales growth
 - (v) Cash flows

- (b) Performance evaluation based on non-financial measure(s):

Internal processes

- (i) Number of warranty claims
- (ii) On-time delivery
- (iii) Manufacturing lead time
- (iv) Defect rate

Customer

- (v) Number of customer complaints
- (vi) Survey of customer satisfaction

Employees

- (vii) Employee turnover
- (viii) Absentee rates

- Part D: Decision support system

Decision support distinguishes between short-run analysis techniques and long-run analysis techniques. The techniques covered were selected with reference to past research by Klammer et al. (1991); Shields et al. (1991); Tayles and Drury (1994); Yoshikawa (1994); Joshi (2001); Szychta (2002); Lazaridis (2004); Abdel-Kader and Luther (2006); and Hermes et al. (2007). Questions were asked about the extent of use of the following techniques:

- (a) Short-run analysis:

- (i) Cost-volume-profit analysis (break-even analysis)
- (ii) Stock control model
- (iii) Product profitability analysis
- (iv) Customer profitability analysis

(b) Long-run analysis (Investment appraisal):

- (i) Payback
- (ii) Accounting rate of return
- (iii) Net present value
- (iv) Internal rate of return

- Part E: Strategic management accounting

Part E collects data on strategic management accounting (SMA). The questions were asked under two headings: strategic costing and pricing attribute costing; and competitor accounting. The items used in this study are based on the study by Guilding et al. (2000), who set up 12 indicators of SMA in their studies. However, only six indicators of SMA will be used in this research. This is because the other six indicators were not deemed relevant for SMEs. The techniques omitted were quality costing, attribute costing; brand value budgeting; monitoring brand value; competitor cost assessment, and competitor appraisal based on published financial statements. The six selected indicators of SMA that will be used in this study are as follows.

(a) Strategic costing and pricing attribute costing:

- (i) Target costing
- (ii) Strategic costing
- (iii) Value chain costing
- (iv) Strategic pricing
- (v) Product life-cycle analysis

(b) Competitor accounting:

- (i) Competitive position monitoring

Third Section: Factors which affect the extent of the use of management accounting practices

Based on the literature review (see Chapter 4 section 4.4.4), five contingent variables that may be positively associated with the extent of use of MAPs were identified. The measurements used as proxies for these contingent factors are detailed below.

(a) Part A: Intensity of market competition

The intensity of market competition as perceived by the respondent is measured based on the five-point Likert scale. The scale is 1= Not intense at all, 2 = Not intense, 3 = slightly intense, 4 = Intense, and 5 = Very intense. This approach is based on a study by Hansen and Van der Stede (2004).

(b) Part B: Qualification of accounting staff

The qualification status of the firm's accountant is measured simply by reference the type of qualifications that the accountant possesses. This part begins with a yes/no question asking whether or not the firm employs any accounting staff. This answer is followed by a brief statement that directs the respondent either to continue this part and detail their qualifications against a list of qualifications or to move to the next part. Both questions are in the closed-ended form.

(d) Part C: Participation of owners/directors of firms

The level of participation of owner/directors of the firm to the development of MAPs within the firm is measured using the five-point Likert scale. The scale is 1 = Not at all, 2 = Low extent, 3 = Moderate extent, 4 = High extent, and 5 = Very high extent. This measurement approach is based on a study by Ismail and King (2007).

(a) Part D: Advanced manufacturing technology

A five-point Likert scale is used to measure the extent of the use of advanced manufacturing technology (AMT) by the firm. Respondents are required to indicate the extent of the AMT usage using a Likert scale from 1 = Not used to 5 = Widely used. This measurement is identical to that used by Tayles and Drury (1994).

Fourth Section: Performance of the firm

As discussed in the literature review (see Chapter 4 section 4.5.3), the unavailability of objective data on performance from SMEs forced the questionnaire to request subjective, self-reported measures of performance to gauge the level of performance of firms. Respondents were asked to indicate the changes in the performance in the last three years using a self-rating scale. The data collected in this section will act as a proxy for recent improvements in actual firm performance and will give information for empirical testing of the research hypothesis 2. The constructs used are based on studies by Hoque (2004) and Jusoh and Parnell (2008). The performance of the firm based on various measures is determined using a five-point Likert scale. The scale is indicated by 1 = Decreased significantly, 2 = Decreased, 3 = No change, 4 = Increased, and 5 = Increased significantly. The following are six variables were used.

- (a) Level of productivity
- (b) Product quality
- (c) Number of on-time deliveries
- (d) Sales growth rate
- (e) Operating profit growth rate
- (f) Cash flow growth rate

Section 5: The roles of management accounting

The roles of MAPs in SMEs are derived from the traditional roles of management accounting as an information provider to the management of the firms. The questions are based on management accounting roles using the six headings provided by the International Federation of Accountant (IFAC) in their statement on Management Accounting Concepts (see appendix page 99; IFAC, 1998). For each role, respondents will be requested to indicate on a five-point Likert scale the extent that these roles apply in their firms. On the scale, 1 = Strongly disagree, 2 = Disagree, 3 = Slightly agree, 4 = Agree, and 5 = Strongly agree. The following are six roles used as the indicators:

- (a) planning the firm's future strategies, tactics and operations
- (b) controlling the current activities of an organization
- (c) optimizing the use of the firm's resources
- (d) measuring and evaluating performance
- (e) reducing subjectivity in the decision-making process
- (f) improving internal and external communication

5.5.2 Reliability and validity

Reliability and validity tests are important to ensure the accuracy and consistency of the variables. According to Hair et al. (2007) for a scale to be reliable the questions must be answered consistently by respondents in a manner that is highly correlated. If they do not, the scale would not be reliable. For the purpose of this research, the reliability of the questionnaire will be determined through Cronbach's α . This method allows for the calculation of the α coefficient if one variable is removed from the original set, making it possible to identify the subset that has the highest reliability coefficient. If all the results are above 0.7, the scales are judged to be reliable (Sousa et al., 2006). However Hair et al. (2007) stated that lower coefficients may be acceptable depending on the

research objectives. For example, Nunnally (1978) suggested that alpha coefficients of 0.50 to 0.60 will be deemed acceptable for exploratory research. The reliability checks of the pilot questionnaires produced a Cronbach's α value of 0.756 indicating a satisfactory internal reliability for the scale.

5.6 Method of data analysis

The data collected in this study will be used to generate descriptive statistics, and the dependent and independent variables for hypotheses testing using bivariate and multivariate statistical analysis. The descriptive measures that it proposed to use are frequency distributions, measures of central tendency and measures of dispersion. Frequency distributions will display the number of responses associated with each value of a variable in the questionnaire. Measures of central tendency will locate the centre of the distribution of the respective data using measures of the mean, median and mode. Measures of dispersion such as standard deviation will describe the tendency of data to depart from the central tendency. The descriptive approach will only help to answer the first two research questions and the details of this analysis will be set out in Chapter 6.

To test the two hypotheses of this study, a bivariate statistical analysis will be used whereby each contingent factor is tested individually against the dependent variable. Since the data is non-parametric. Kendall's tau correlation and Chi-square tests will be used to analyse the data. The results of these tests are presented in Chapter 7.

Finally, a logistic regression analysis approach will be employed to investigate the simultaneous effect of the relationship between all independent variables and the dependent variable. According to Hair et al. (2007) logistic regression is a special type of regression that can have a non-metric dependent variable. Since both dependent

variable and independent variables tested in hypothesis 1 and 2 are in non-metric form, a logistic regression is the most suitable method for multivariate analysis. The specific equation models for each hypothesis and the results from the analyses will be discussed in Chapter 8.

5.7 Summary

This chapter outlines the research design and methodology that will help to answer the four research questions posed in this study. In specific the chapter confirms that the objectives of the research will be approach quantitatively using a descriptive and causal research design. The target population comprises SMEs in the Malaysian manufacturing sector and the target sample is stratified into two subgroups, based on the sizes of the enterprises (small and medium). After detailed deliberations, the sample size was set at 1,000 establishments with a target of between 120 to 150 useable responses. Further a postal survey will be utilized in order to collect the data from the target sample. The structure of the questionnaire and the derivation of the questions asked were also discussed and explained and the pilot testing results referred to. Finally, it was determined that data analysis will involve descriptive statistics for the first two research objectives and bivariate analysis and logistic regression analysis for the hypothesis testing associated with the third and fourth research objectives. The results of the analyses will be discussed separately in the following next three chapters.

Chapter 6

Management accounting practices in Malaysian SMEs: Descriptive results

6.1 Introduction

The main purposes of this chapter are to provide a general description of the questionnaire responses and to present the findings relating to the first two research objectives listed in Chapter 1 section 1.4. These are (i) to investigate the extent to which MAPs are employed by Malaysian SMEs; and (ii) to identify the roles played by MAPs in Malaysian SMEs activities. After a discussion of the response rate and the possibility of non-response bias, the findings are presented systematically in the order of the questionnaire from section 1 to section 5.

Thus, section 6.2 discusses the response rate of the survey. Section 6.3 presents relevant information relating to the respondents and their organisations. The comprehensive results of descriptive data on the extent of use of MAPs are outlined in section 6.4. Section 6.5 clarifies the descriptive data related to contingent factors that might affect the extent of the use of MAPs. Section 6.6 presents the information on the respondents' perceptions of performance of the firms in certain areas and section 6.7 reveals the respondents' views of the roles of management accounting within the responding firms. The final section provides a summary of this chapter.

6.2 Response rate

In the previous chapter, details were provided as to the identification and potential size of the target sample required to achieve the desired number of respondents. The 1,000 target sample was composed of two subsets; small and medium firms. This has been determined in the Chapter 5 section 5.3.3. The sample was mailed with the first survey

package in April 2010 comprising a cover letter, questionnaire and a reply paid envelope. To encourage completion of the questionnaire, participants were promised a summary of the results and informed that their responses were anonymous. A month after the first mailing, 87 replies were received. These replies were split about 30% from small firms and 70% from medium firms. In order to enhance the number of responses, a number of follow-up processes were undertaken. First, a reminder together with a second copy of the questionnaire was sent out to all non-respondents four weeks after the initial mailing. Within this time contact by an-email and phone call was carried out on a randomly selected 20% of non-respondents reminding them to participate in the survey. The second distribution of the questionnaire boosted the number of responses to more than 150 replies. With the time and cost constraint, a month later, the last reminder as well as a copy of questionnaire and post-paid reply envelope was sent to 200 of the non-respondents. Those selected were the first 200 non-respondents from the listings of small and medium firms. At the end of the process a total of 176 questionnaires were received giving a response rate of 17.6% (176/1000). Of these 16 were unusable for the following reasons:

- the firm was too small, had ceased operation, or was from another sector;
- the questionnaire had not been completed; and
- the firm did not want to participate in the survey.

Hence, 160 usable questionnaires were received. According to Neuman (2005), non-responses due to persons being unreachable or ineligible should be excluded from the total number in the sample. The seven respondents who were too small had fallen into this category. Therefore the net usable response rate is 16.1% (160/993)¹³. Table 6.1

¹³ The usable response rate is calculated as follows: response rate = (number of completed and returned questionnaires) divided by (Number of respondents in sample – (non-eligible and non-reachable respondents))

summarizes the result of response rate of the survey. The usable response rate received in this survey is marginally better than the expected response rate of between 12% and 15%. - an expectation based on past response rates achieved by academic surveys of this type of population (discussed earlier in Chapter 5 section 5.2.3). Hence, it can be concluded that the usable response rate gained in this study is acceptable and sufficiently large for analysis.

Table 6.1: Summary of survey response

	No	(%)
Total number of target respondents	1000	100.0
Total responses received	176	17.6
Ineligible, firms had ceased operation	-7	-
Uncompleted questionnaires	-3	-
Refusals to participate in the survey	-6	-
Usable responses received	160	16.1

6.2.1 Non-response bias

Armstrong and Overton (1977) noted that the mail survey has been criticized for non-response bias. If persons who respond differ substantially from those who do not, the results do not directly allow the researcher to say how the entire sample would have responded - certainly an important step before the sample is generalized to the population. Bose (2001) argued that non-response bias is associated with both low response rates and strong differences in the estimates between respondents and non-respondents. Due to the relatively low response rate gained in this study, non-response bias is a major concern. An analysis of the usable responses by number of employees as shown in Table 6.2 indicates that responses are not uniformly spread throughout the sample. The response rate of medium firms is twice as high as for small firms indicating

the overall result may be biased towards the medium firms. Non-response bias tests therefore were conducted to confirm whether non-response bias was present.

Table 6.2 Analysis of the population and usable responses by number of employees

Number of employees	Total sample size	No of responses	% response rate
1-50	500	50	10%
51-150	500	110	22%

The possibility of non-response bias was investigated first by comparisons between the sample frame and the responding companies based on number of employees and type of manufacturing activities. For additional comfort a comparison of the profiles of ‘early’ and ‘late’ respondents was also undertaken.

6.2.1.1 Comparisons between the sample frame and the responding companies based on number of employees and type of manufacturing activities

The first step in assessing the non-response bias was conducted by comparing the size of the firm (based on number of employees) and industry sector of the 160 respondents with the same variables for the sample of 1000 firms. Due to the categorical nature of the variables, this comparison was done by using the chi-square test (χ^2) using the following hypotheses:

- i. there is no significance difference in the number of employees between responding firms and the sample frame; and
- ii. there is no significance difference in the type of manufacturing activities between responding firms and the sample frame

Table 6.3 shows the result of the chi-square test.

Table 6.3: Results of Chi-square test for non-response bias based on number of employees and manufacturing activities.

	Value	Df	Asymp. Sig.
Number of employees	19.449	1	0.000
Manufacturing activities	3.823	1	0.701

The table indicates that the number of employees is significant at a 5% significance level, causing the first null hypothesis to be rejected. This result suggests that the distribution of number of employees is not the same for the respondents and sample frame thus indicating non-response bias as already suggested by Table 6.2. However there is no significance difference found for type of manufacturing activities ($p > 0.05$) therefore the second null hypothesis cannot be rejected. This result indicates that type of manufacturing activities undertaken by the respondents has the same distribution as in the sample frame. This result does not indicate non-response bias.

The bias indicated by the number of employees in the sample against those responding arises from the disproportionate number of medium companies responding. The finding is not altogether unexpected as it is likely that firms with management accounting systems are more likely to respond and such applications will be found in larger firms. Any extrapolation of the findings of the research will need to bear this bias in mind.

A further analysis was taken in order to determine whether the responses are representative of medium and small firms separately based on number of employees. This test provides an indication of how directly the survey results can be extrapolated for each category of firms. A chi-square test was again employed to facilitate the analysis and the results are shown in table 6.4. No significant difference was found in medium firms ($p > 0.05$) suggesting that this group is reasonably representative of the

medium sized firms. However, a significant difference is shown in small firms indicating the responses from small sized firms are not necessarily representative.

Table 6.4: The results for test of representativeness of response rate for small and medium firms (based on number of employees).

	Value	Df	Asymp. Sig.
Small	3.977	1	0.046
Medium	1.372	1	0.241

6.2.2.2 Comparison of the characteristics of the profiles of ‘early’ and ‘late’ respondents

An additional step in evaluating non-response bias is a comparison of the result of ‘early’ and ‘late’ responses of this study (where the first and last 30% of respondents were compared). One of the key assumptions in this approach is that later respondents to a survey are more similar to non-respondents than earlier respondents (Bose, 2001). The tests on profile of respondents as well as the use and the extent of MAPs were undertaken using chi-square and Mann-Whitney U non-parametric test. Chi-square was used for nominal data in testing response differences between two sub-groups, and Mann-Whitney U was used to check the differences between groups that provided ordinal or continuous data. The results of the tests are shown in Appendix 3. With the exception of use of decision support system, the results of these two tests found no significant differences across two subgroups. The results provide some support for the absence of a non-response bias.

In conclusion, the results of tests described above show evidence of non-response bias due to the lower response rate obtained from small firms as indicated in Table 6.2. In particular, the evidence from tests on employee numbers shows that although responses

from medium sized firms are representative of the sample of these firms circulated, response from small firms are not. Any further analysis and conclusions must be interpreted within this limitation.

6.3 Profile of respondents

Profile information relating to the respondents was collected in section 1 of the questionnaire. Four questions were asked and covered the number of years that the business had been in operation, the type of manufacturing activities; the number of employees; and annual sales turnover. This information is helpful for understanding the background of respondents and also for providing data for further statistical analysis. Table 6.5 presents the information for the 160 responding firms.

Table 6.5: Profile of the responding firms

Profile of firms	Frequency	Percent
<i>Years of operations/business</i>		
1-3 years	2	1
4-10 years	17	11
More than 10 years	141	88
Total	160	100
<i>Manufacturing activities</i>		
Furniture	3	2
Food and beverages	26	17
Non-metallic products	5	3
Basic metals	15	10
Rubber and plastic	16	10
Chemicals & chemical products	30	19
Others	63	40
Total	158	100

Number of employees

5-50	50	31
51-150	94	59
More than 150	16	10
Total	160	100

Annual sales turnover

less than RM250,000	2	1
RM250,000 to RM1.0 million	7	4
RM1.0 to RM5.0 million	20	13
RM5.0 to RM10.0 million	24	15
RM10.0 million to RM25.0 million	73	45
More than RM25.0 million	34	22
Total	160	100

The results show that an overwhelming majority of the firms (88%) have been in business for more than 10 years. This is followed by respondents who have been in the business between 4-10 years (11%). In contrast, the numbers of newly operating firms (1-3 years) are only 1% of respondents. Thus, the vast majority of the responding firms are established businesses that might reasonably be expected to use management accounting techniques and have developed management accounting systems that are suitable for their business needs. The findings may arise from the use of the directory as a population source, as firms may only seek a directory entry when established rather than on formation.

In general, the manufacturing activities of responding firms are concentrated in chemicals and chemical products (19%) and food and beverages (17%). The next principal areas are basic metals and rubber and plastic with around 10% of respondents in each of them. The lowest responding activity areas are furniture and non-metallic products with less than 5% of respondents.

As mentioned in section 6.2.1, the response rate among medium firms is disproportionately higher than for small firms. The result indicates that the population is heavily biased towards firms with over 50 employees (69%) with only 31% of responding firms having 50 or less employees. This concentration of respondents in larger firms is also indicated by the information gathered on the annual sales turnover of the respondents. Almost half of the responding firms reported annual sales from RM10 to RM25 million. This is followed by annual sales below RM10 million (33%). The smallest group with less a quarter of total respondents is indicated by firms with annual sales turnover more than RM25 million.

6.4 Extent of the use of management accounting practices

Section 2 in the questionnaire enquired into the extent of use of five major MAPs. Part A discusses the use of costing systems; part B the types of budgeting systems employed; part C examines the range of performance evaluation systems; part D considers decision support techniques used; and part E explores the range of strategic management accounting techniques used. The questionnaire first ascertained whether or not the respondents used each particular practice in their firms. If yes, further enquiry was then made into the extent of the use based on a five-point Likert scale. The following subsections (6.4.1) and (6.4.2) summarize the results.

6.4.1 The use of management accounting practices

Table 6.6 details the extent to which there was any use of the designated MAPs. The table splits the data into three main columns; two based on category of the firm (small or medium) and the third the total result. The rank of MAPs by adoption is included at the end of each column to provide an overview of the results.

Table 6.6: The results relating to the use of management accounting practices and the ranking of practices

	Small			Medium			Total		
	<i>No</i>	<i>Yes</i>	<i>Rank</i>	<i>No</i>	<i>Yes</i>	<i>Rank</i>	<i>No</i>	<i>Yes</i>	<i>Rank</i>
Costing system	24	76	2	14	86	1	17	83	1
Budgeting system	36	64	3	19	81	2	24	76	3
Performance evaluation system	22	78	1	20	80	3	21	79	2
Decision support system	54	46	4	28	72	4	37	63	4
Strategic management accounting	65	35	5	42	58	5	49	51	5

Notes: Total number of responses for small firms = 50; medium =110 and total firms : 160

Table 6.6 shows that medium sized firms have a higher adoption of all MAPs as compared to small sized firms. This is especially true in the use of decision support system and SMA where usage is 26% and 23% higher respectively for medium sized firms. The greater use of these more sophisticated techniques by medium firms probably reflects the increased complexity of business activity in medium firms especially for the firms who deploy modern technologies and new management processes (Abdel-Kader and Luther, 2008). Besides, medium firms are usually more capital intensive and this additional investment in their business possibly leads to greater risk aversion which implies a more analytical approach to decision-making and the development of business strategy. A further reason for medium firms being relatively high adopters of recently-developed MAPs is their relatively greater access to resources to experiment with administrative innovations. Chenhall and Langfield-Smith (1998) noted that an impediment to implementing innovative management accounting systems is the prohibitive costs. Therefore the above three reasons might contribute to the higher use of sophisticated accounting systems among medium firms.

Findings also show that medium firms employ budgetary systems more frequently. Explanations for this can be based again on size of the firms. Larger organizational firms usually have more complex tasks thus these firms require a system that can help

them to achieve the common purpose and coordinate activities. Budgeting is one of such systems, thus this may explain why medium firms have a higher rate of adoption of budgeting system than small firms. In contrast, there is a little variation in the usage of the other two MAPs; performance evaluation system (2%) and costing system (10%). This finding suggests that monitoring business performance and the availability of cost information are equally important to both categories of firms.

In terms of ranking, the most popular practice is performance evaluation within the small firms and costing system in medium firms. However for all respondents, costing system is the most widely used practice. In contrast, the least favoured practice is SMA for both groups with only half of total respondents making any use of this practice suggesting that this technique is not yet practical for many small and medium firms in Malaysia.

In summary, the above discussion shows that the majority of respondents have used the five management accounting areas identified. Use of the costing system, budgeting system and performance evaluation system are significantly higher than for the decision support system and SMA, which indicates that the uptake of traditional MAPs is greater than for sophisticated MAPs. The results for all practices also indicate a higher usage by medium firms as opposed to small firms. The most significant differences relate to the use of decision support systems and SMA. It is argued that the discrepancies are attributable to the relevance of those practices to the different size of the firms. However, the impact of size on the variations on the use MAPs will be formally investigated through statistical analysis in Chapter 7. The last finding is that within the different size of firms, there is little difference in the ranking of adoption rates of MAPs between small and medium companies.

6.4.2 The extent of the use of management accounting practices

This section will further investigate the frequency of use of 46 specific MAPs under the broad headings discussed in section 6.4.1. The extent of the use of management accounting was examined by requiring the respondents, who responded yes to using broadly classified MAPs, to indicate the frequency of use of a range of detailed management accounting techniques using a five-point scale (where S1 indicates ‘never’ and S5 is ‘very frequently’). The results of uptake of each management accounting techniques are also included. The non-uptake refers to the number of respondents who responded with ‘1’ = never and ‘not applicable’= Non-use (those who answered ‘No’ in the general ‘Yes/No’ questions on the use of five areas of management accounting practices). The following five subsections discuss further details.

6.4.2.1 Part A : Costing system

As discussed in Chapter 5, this part covers two aspects of the costing system; cost collection method and specific costing technique. Table 6.7 shows the descriptive results for the extent of use of costing system at this detailed level. In this table, the ranking of techniques is based on mean value, which shows the average score of each individual technique based on five-point Likert scale (S1 to S5). The standard deviations are also provided to show the extent of diversity of responses.

Table 6.7 Descriptive statistics for costing systems and the ranking of techniques

	Total uptake (%)			Frequency of use (S4 & S5) within..		Other descriptive statistics		
	S	M	Total	Adopters	Total respondents	Mean	Standard deviation	Rank
Cost collection method								
Job costing	60	58	59	53	31	3.21	1.22	2
Batch costing	50	53	52	45	23	2.90	1.36	3
Contract costing	52	49	50	34	17	2.75	1.32	4

Process costing	66	75	73	68	50	3.76	1.13	1
Costing technique								
Absorption costing	46	49	48	60	29	3.21	1.40	1
Variable costing	50	53	52	45	23	3.19	1.14	2
Activity-based costing	36	46	44	50	22	2.87	1.44	3

Notes: S4: frequently; S5: very frequently S: Small; M: Medium

Total uptake of costing techniques

Table 6.7 shows a surprisingly high uptake of individual techniques, given that few firms will use probably more than one cost collection method or one costing technique. The overall uptakes of small and medium sized firms is similar except for process costing and ABC which are more commonly applied by medium sized firms.

In terms of cost collection methods, the total uptake ranges from 50% to 73%. Process costing is the most dominant method among respondents (73%). The next most used method is job costing which is employed by nearly 60% of total respondents. This situation probably reflects the type of business that the respondent firms are in. As discussed in section 6.4, significant numbers of responding firms are from the chemicals and chemical product industries; and the food and beverages industries (36% of respondents). Both these industries involve processing, and this might explain why process costing outnumbers the other cost collection techniques. In contrast, the lowest usage is of contract costing, which is expected given the industry profile of respondents.

For costing techniques, the uptake ranges from 44% to 52%. The most used technique is variable costing (52%). The second is absorption which is just 4% behind. ABC in contrast has a relatively low level of use (44%). However, this usage of ABC is higher than that reported in a number of previous studies. It may be that, this result is not wholly credible. Perhaps the response reflects a desire by those answering to overstate

their use of management accounting techniques to show a positive response for the survey. Another possible contributory reason is that some of the respondents might not understand the term and this led them to answer yes in case they did use it.

Total % of uptake of total adopters and total respondents who use costing systems frequently or very frequently

An indicator that might overcome this possible underlying overstatement is the proportion of respondents who answered that they made frequent (S4) or very frequent use (S5) of the method or technique. Process costing is frequently and very frequently used by almost two third of its users followed by job costing with 53% respondents. Contract costing was lowest with just 34%. When this uptake is compared to all respondents irrespective of whether or not they used a costing system (% of respondents using a costing system x % using a method or technique frequently or very frequently), the data shows that only 50% frequently or very frequently use process costing compared with just over 30% for job costing. Meanwhile only a small minority of all respondents (17%) frequently or very frequently apply contract costing.

Using the same measure for costing techniques, Table 6.7 shows that absorption costing predominates over other techniques. This technique is frequently and very frequently used by 60% of firms employing a costing system. Meanwhile only 45% indicate frequent or very frequent use of variable costing and 50% indicate frequent use of ABC. For all respondents, the results show that 29% firms frequently or very frequently used absorption costing against just less than a quarter for both variable costing and ABC. The uptake of 22% for ABC looks more realistic at this level.

Comparison of the results with those of previous studies

The result obtained for costing systems is at variance with previous studies. The dissimilarities are probably explained by differences in size of the firms, type of industries and country setting between these respondents and the respondents in prior studies.

The use of process costing among respondents in the present study is higher than for previous studies. For example Shields et al. (1991) and Wijewardena and De Zoysa (1999) who studied among Japanese and Australian firms respectively discovered that only just over 50% of respondents employed this technique and Lukka and Granlund (1995) found a slightly lower rate with just over 40% of Swedish companies having implemented process costing. The different results are possibly explained by the mix of industries surveyed in Malaysia, which include a significant portion that are identifiable as processing industries (36%).

Regarding the type of costing system, the findings show that absorption costing and variable costing dominate among respondents to the present study. Previous studies also noting the dominant use of absorption costing include Shields et al. (1990), Ask and Ax (1992) and Drury et al. (1993). Similarly the significant use of variable costing was also reported by Firth (1996), who indicated that more than 70% of Chinese firms were using this technique. Meanwhile both in India and Thailand the use of variable costing was found in more than 50% of firms (Joshi, 2001; Phadoongsitthi, 2003).

The lower use of ABC is consistent with most of the previous studies. For example, both studies by Armitage and Nicholson (1993) and Innes and Mitchell (1995) found that the uptake of ABC only up to 20% among respondents to their studies. A higher adoption of ABC is reported by a few U.S based studies. Studies by Green and

Amenkhienan (1992) and Hrisak (1996) claimed that around 50% of survey respondents firms used ABC to some extent but again this is not dissimilar to the percentage of those respondents making some use of ABC.

Conclusion

Overall it can be concluded that most of the respondents in this present study, make moderate use of techniques included under the heading ‘costing system’. Process costing is the most widely employed cost collection method and absorption and variable costing techniques are most commonly but by no means universally employed costing technique. The lower uptake for ABC is in line with previous research.

6.4.2.2 Part B: Budgeting system

The use of budgeting systems was investigated under the following three headings; type of budget prepared; timings of budgeting; and type of budget method. Table 6.8 summarizes the results.

Table 6.8 Descriptive statistics for budgeting systems and the ranking of techniques

	Total uptake (%)			% Frequency of use (S4 & S5) within..		Other descriptive statistics		
	S	M	Total	Adopters	Total respondents	Mean	Standard deviation	Rank
Type of budget								
Sales budget	58	80	73	91	67	4.41	0.75	1
Purchasing budget	58	75	70	73	51	3.96	1.09	5
Production budget	56	78	71	80	57	4.08	1.04	4
Cash flow budget	58	77	71	84	60	4.33	0.82	2
Financial position budget	58	78	72	84	60	4.23	0.87	3
Timings								
Monthly budget	54	51	52	66	35	3.38	1.42	2

Annual budget	64	77	73	84	61	4.27	0.92	1
Continuous/rolling budget	50	49	49	56	27	3.19	1.30	3
Methods								
Flexible budget	50	63	59	67	40	3.67	1.16	1
Incremental budgeting	44	57	53	58	31	3.24	1.33	2
Zero-based budgeting	24	41	36	26	9	2.38	1.23	3

Notes: S4: frequently; S5: very frequently S: Small; M: Medium

Total uptake of budgeting techniques

Table 6.8 shows that the majority of respondents have adopted a full financial position budget but medium firms have a significantly higher uptake over small firms in all aspects apart from monthly budgets. Of the five budgets listed, unsurprisingly the sales budget is the most dominant (73%) indicating the vital role of raising revenue for business success. Nevertheless, production, cash flow and financial position budgets are also well represented being adopted by around 70% of all respondents.

In terms of timing, an annual budget is widely considered (73%). Meanwhile monthly and continuous rolling budgets are reported by around half respondents. To examine the relationship between type of budgets and their timings (continuous, monthly or annual) in detail, a (pair wise) joint use between these categories was calculated. Table 6.9 summarizes the results. Within the type of budgets, all of the budgets are highly considered in a pair wise combination with every other budget especially the sales budget. The lowest pairing is shown by the purchasing budget with around 75% on average. These budgets are most commonly paired with annual budgets where around 85% of its respondents who reported it frequently or very frequently employ a full budgeting system on an annual basis and around half prepare it monthly. Meanwhile, only around a third of respondents who frequently or very frequently do full budgeting prepare it continuously.

Table 6.9: Pair usage of type of budgets and their timing

(Values shown as % of those using pairs of techniques)

		◇ Of those S4 and S5 using....					Timings of budget			
		Type of budget								
		SA	PC	PR	CF	FP	MT	AN	CN	
•what percent also S4/S5 use?	Type of budget	SA	-	98	96	94	94	93	95	91
		PC	75	-	84	76	74	75	71	66
		PR	81	93	-	83	82	82	80	82
		CF	84	89	88	-	91	84	84	77
		FP	85	88	88	92	-	87	87	82
	Timings	MT	48	50	49	48	49	-	49	68
		AN	87	85	86	85	88	87	-	89
		CN	37	35	51	35	37	55	40	-

This table should be interpreted as follows: '◇ Of those using COLUMN budget, •what percent also use ROW budget?' Because different numbers of respondents used each budget, the pair wise usages are not identical values, e.g., of those using sales budget (SA), 75% also use purchasing budget (PC); while of those using purchasing budget, 98% also use sales budget.

SA	Sales budget	MT	Monthly budget
PC	Purchasing budget	AN	Annual budget
PR	Production budget	CN	Continuous budget
CF	Cash flow budget		
FP	Financial position budget		

Notes S4: frequently; S5: very frequently

Under the type of budget methods, medium firms obviously have indicated higher uptakes of all budget methods in comparison with small firms. Of the three budget methods listed, flexible budgeting is used by 59% of all respondents with a budget system. Zero-based budgeting (ZBB) is the least reported. The extensive use of flexible budgets probably reflects the high level of uncertainty facing these small and medium firms.

Total % of uptake of total adopters and total respondents who use budgeting system frequently or very frequently

The sales budget is the budget with the highest percentage of frequent or very frequent users (91% of adopters and 67% of total respondents). The other budgets are also regularly applied by most of the respondents with a budget system (between 70% and 84%). Under the timings category, the annual budget is the most frequently used by the respondents with a budget system (84%), which translates into frequent or very frequent use by 61% of all respondents. In contrast, 40% or less of total respondents make frequent or very frequent use of monthly and continuous budget.

When frequency of use is considered, ZBB is little used as of the 36% reporting use and only 26% frequently or very frequently use which equates to only 9% of all respondents. In comparison flexible budget is frequently used by 40% of total respondents.

Comparison with previous research

The extensive use of full financial budgeting is consistent with Shields et al. (1990); Yoshikawa (1994) and Chenhall and Langfield-Smith (1998) who all concluded that in general budgeting systems are widely employed. Meanwhile the significant use of flexible budgeting is consistent with Ahmad et al. (2003), who conducted a study among Malaysian firms, and found that flexible budgeting has been widely implemented among those firms in Malaysia that use budgeting. This result is also similar to Drury et al. (1993) who found that 42% of UK firms adopted flexible budgeting which is in line with the 40% reported by total respondents of this study. A similarly result was reported by Pierce and O'Dea (1998); and Szychta (2002).

Meanwhile, the low uptake of ZBB is consistent with study by Joshi (2001) who found out that only 5% of Indian firms employed ZBB. Similarly Szychta (2002) found that only 28% companies in her survey utilized this technique.

Conclusion

Overall, the results show that the majority of respondents make use of budgeting systems in their firms and that budgeting is increasingly taken up as firms grow in size.

6.4.2.3 Part C: Performance evaluation system

In order to measure the extent of use of performance evaluation systems, a number of elements in performance measures, both financial and non-financial, were included in the questionnaire. The non-financial measures were grouped under three headings: customer; internal processes; and employees. Table 6.10 summarizes the results.

Table 6.10: Descriptive statistics for performance evaluation systems and the ranking of the techniques

	Total uptake (%)			% Frequency of use (S4 & S5) within..		Other descriptive statistics		
	S	M	Total	Adopters	Total respondents	Mean	Standard deviation	Rank
Financial								
Operating income	74	79	78	85	66	4.29	0.84	2
Return on investment	64	74	71	51	36	3.41	1.15	9
Variance analysis	60	77	72	66	48	3.74	1.12	5
Sales growth	76	79	78	86	67	4.30	0.78	1
Cash flow	72	77	76	79	60	4.17	0.89	3
Internal processes								
Number of warranty claims	58	62	61	35	22	2.80	1.31	13
On-time delivery	78	79	79	71	56	3.97	0.95	4
Manufacturing lead time	70	73	72	69	49	3.75	1.14	7
Defect rate	72	75	74	64	47	3.72	1.16	8
Customer								
Number of customer complaints	76	77	77	66	51	3.80	1.09	6

Survey of customer satisfaction	76	75	76	46	35	3.37	1.10	11
Employees								
Employee turnover	68	76	74	50	37	3.40	1.12	10
Absentee rates	68	75	73	46	33	3.36	1.10	12

Notes: S4: frequently; S5: very frequently S: Small; M: Medium

Total uptake of performance evaluation system

Table 6.10 indicates that the majority of firms reporting use of performance evaluation measures make considerable use of a range of performance measures with uptakes across categories varying from a minimum of 61% up to 79%. Medium firms have a much higher use of these measures compared to small firms. Nevertheless both small and medium firms show significant uptakes of most performance evaluation measures. Among 13 performance measures listed, operating income, sales growth, and on-time delivery are the most popular measures; with nearly 80% of the firms using performance measures reporting their use. In contrast, number of warranty claims is the least considered only being employed by 61% of respondents who reported use of performance measures.

Total % of uptake of total adopters and total respondents who use performance evaluation systems frequently or very frequently

The uptake based on frequency of use is more variable and exhibits greater differences in application rates of performance measures especially between financial and non-financial measures. In general there are very high use levels for financial measures based on operating income and sales growth. These measures are frequently or very frequently used by 85% and 86% respectively of those with any use of these performance measures, which translates into around two-thirds of all respondents. In contrast, the least used financial measure is return on investment with only 36% of total respondents reporting frequent or very frequent adoption.

Among non-financial measures, relating to internal processes, on-time delivery is the most frequently used measure with 71% using it frequently or very frequently. This uptake translates into 56% of all respondents using it frequently or very frequently. The measure least reported frequently or very frequently is the number of warranty claims at 35% or only 22% of total respondents. Perhaps this low figure arises because many respondents do not offer warranties. Meanwhile, both manufacturing lead time and defect rate are moderately used with around half of total respondents claiming frequent or very frequent adoption.

Measures relating to customers and employees respectively have a lower frequency of use. The most used measure in this category is the number of customer complaints where 66% of those indicating its adoption report frequent or very frequent use, which ranks it sixth among all performance measures. Customer satisfaction is little used perhaps because the respondents have already focused on number of customer complaints as a primary tool for evaluating their customer-based performance. Lastly both employee-based measures; employees' turnover and employees' absentee rates are frequently and very frequently used around half of those who reported use of those measures.

Comparison with previous research

The extensive use of financial measures of performance is consistent with other studies (see for example, Joshi (2001); Phadoongsitthi (2003); Abdel-Kader and Luther (2006); and Jusoh and Parnell (2008). Phadoongsitthi (2003) reported that most Thai firms still focus on financial performance measures such as budget variance analysis, return on investment, cash flow return on investment, and divisional profit. Similarly Jusoh and Parnell (2008) revealed that many Malaysian manufacturing firms placed a greater

emphasis on financial rather than non-financial measures. These studies however reported that return on investment was extensively employed which is inconsistent with the present study. As elsewhere, this difference probably reflects the size of the sample firms compared to those in these studies as smaller firms either have less involvement in investment activities or approach it less formally than larger firms.

With regard to non-financial performance measures, measures related to internal processes and customers are found have a high adoption rate among the majority of respondents in previous studies (see for example, Chenhall and Langfield-Smith (1998); Phadoongsitthi (2003); Abdel-Kader and Luther (2006); and Abdel-Maksoud et al. (2008). Phadoongsitthi (2003) indicated that Thai firms increase their focus on customer satisfaction and on-time delivery when considering performance. Likewise Abdel-Maksoud et al. (2005) indicated that the overwhelming majority of UK manufacturing companies measure performance in terms of delivery timeliness, number of complaints from customers and customer satisfaction.

Conclusion

The results show that a significant number of respondents have adopted one or more measures both financial and non-financial but that reliance on financial measures is greater than for non-financial measures. The main non-financial measures frequently used by respondents are on-time delivery, number of customer complaints and manufacturing lead time. These findings suggest that respondents, who use non-financial performance measures, are more internal-process and customer focused rather than employee focused. The lower use of non-financial measures is consistent with prior research but may also be attributed to the size of the firms as it is difficult for smaller firms to employ as many performance measures as larger firms because of cost and

other limitations. Besides as non-financial measures are more recently-developed measures, their adoption may not be as widespread as opposed to the traditional measures which have long been used by many firms. Thus these reasons might explain the low adoption of non-financial measures found in this study.

6.4.2.4 Part D: Decision support system

The extent of use of decision support systems was approached through dividing the area between short-run and long run decisions as indicated in Table 6.11, which summarises the responses.

Table 6.11: Descriptive statistics for the use of decision support systems and the ranking of techniques.

	Total uptake (%)			% Frequency of use (S4 & S5) within..		Other descriptive statistics		
	S	M	Total	Adopters	Total respondents	Mean	Standard deviation	Rank
Short-run								
Break-even analysis	40	63	56	55	31	3.60	1.08	2
Stock control model	44	65	58	55	32	3.55	1.00	3
Product profitability analysis	40	70	61	82	51	4.04	0.77	1
Customer profitability analysis	38	65	56	48	27	3.39	1.04	6
Long-run								
Payback	38	63	55	51	28	3.37	1.17	4
Accounting rate of return	36	56	50	46	24	3.17	1.23	7
Net present value	32	57	49	47	23	3.12	1.23	5
Internal rate of return	30	58	49	46	23	3.04	1.22	8

Notes: S4: frequently; S5: very frequently S: Small; M: Medium

Total uptake of decision support system

The overall uptake of decision support system is moderate. The short-run category has an adoption rate around 60% of respondents, who employed a decision support system, against around 50% for the long-run category. Medium firms have far greater uptake of

all techniques than small firms. For medium firms the uptake ranges from 56% to 70% which is significantly more than small firms (from 32% to 44%). This finding clearly suggests that larger firms are more likely to use a more sophisticated approach to management accounting. Under short-run analysis, the most used technique is product profitability analysis (61%). The other three techniques (stock control model, break-even analysis and customer profitability analysis) are adopted by a slightly lower percentage of those respondents who made some use of decisions support systems. Meanwhile under the long-run category, the overall uptakes are rather lower than the first category. Under this category, payback technique is the leader as 55% of respondents who made some use of decision support systems, adopted this technique. Meanwhile all the three discounted techniques are adopted by around 50% respondents of those who made some use of decision support systems.

Total % of uptake of total adopters and total respondents who use decision support system frequently or very frequently

In terms of frequency of use, among the four techniques listed under short-run category, product profitability analysis has the highest frequency of use. The table shows that 82% of product profitability analysis adopters use it frequently or very frequently, which equates to 51% of the overall respondents. Other short run techniques were employed less with between 48% and 55% of adopters using those techniques frequently or very frequently, which equates to between 27% and 32% of total respondents.

Unsurprisingly given the likely lack of repeated major investment decisions in firms of this size, the level of frequency shown under long run analysis is low. Out of the four long run analysis techniques, payback is frequently or very frequently use by 51% of

adopters. However when this uptake is compared to the total respondents only 28% respondents frequently or very frequently use this technique. Others long run techniques are only frequently or very frequently applied by around 45% of their adopters and not by more than a quarter of total respondents. Overall this result suggests that the capital investment techniques are infrequently used by respondents to this study.

Comparison with previous research

The percentage uptake of product profitability analysis overall is at the low end that reported in previous research findings. For example, Chenhall and Langfield-Smith (1998); Joshi (2001); and Drury and Tayles (2006) reported that product profitability technique was used by more than 80% of firms in their studies This is reasonable as the sample is taken from relatively small-size firms, whereas previous findings mostly included large companies. The other short-term analysis tool that was frequently reported on in previous studies is break-even analysis. These studies consistently reported infrequent use of this technique which is in line with the result of this study. For example in Poland, Szychta (2002) found that this technique was used by just under 50% respondents. Meanwhile Abdel-Kader and Luther (2006) found that just under 40% of U.K firms often or very often utilized this technique.

Capital investment analysis techniques have been widely investigated. The present study indicates a low use of all types of long-run analysis tools especially discounted cash flow based analyses and this is consistent with previous studies. For example, Shields et al. (1991); Lazaridis (2004); and Abdel-Kader and Luther (2006) reported use of NPV and IRR at between 9% and 19%. Payback is the most popular technique but the rates of uptake for Malaysian SMEs are lower than those reported in either Shields

et al. (1991) or Yoshikawa (1994) who reported usage rates well above 50% among Japanese firms.

Conclusion

Overall, it can be concluded that only a moderate number of respondents make use of short-term decision support analysis tools beyond product profitability, and that these respondents infrequently employ long-run decision-making techniques.

6.4.2.5 Part E: Strategic management accounting (SMA)

The extent of use of SMA is analysed by reference to the six relevant variables is shown in Table 6.12.

Table 6.12: Descriptive statistics of strategic management accounting and the ranking of techniques

	Total uptake (%)			% Frequency of use (S4 & S5) within..		Other descriptive statistics		
	S	M	Total	Adopters	Total respondents	Mean	Standard deviation	Rank
Target costing	34	55	49	60	29	3.77	1.00	2
Strategic costing	36	52	47	53	25	3.51	1.02	5
Value chain	36	54	48	60	28	3.65	0.99	4
Life cycle cost	36	55	49	64	31	3.70	1.01	3
Strategic pricing	36	56	50	69	35	3.92	0.87	1
Competitor position monitoring	36	55	49	54	26	3.59	1.01	6

Notes: S4: frequently; S5: very frequently S: Small; M: Medium

Total uptake of strategic management accounting

Table 6.12 indicates that the overall uptake of individual strategic MAPs is low among respondents who reported use of SMA techniques. Small firms have a considerably lower adoption rate than medium sized firms who report between 52% and 56% uptake of each listed technique. In term of total respondents, none of the techniques are adopted by more than half of total respondents. The result is in line with expectation to the size of the responding firms. As has been discussed in the previous section 6.4.1, given the SMA is an advanced management accounting practice and is therefore more likely to be employed by larger firms who will have a more sophisticated approach to strategic planning.

Total % of uptake of total adopters and total respondents who use strategic management accounting frequently or very frequently

The number of respondents using SMA techniques, frequently or very frequently, ranges from 53% to 69% among adopters which means that this level of use is undertaken by not more than 35% of total respondents. These results clearly confirm that SMA is only implemented frequently or very frequently by a minority of total respondents. Of the six techniques, strategic pricing is most frequently used either within adopters or overall respondents (69% and 35% respectively). The rest of the techniques are highly used by only between 25% and 31% of all respondents.

Comparison with previous research

Table 6.12 suggests that strategic pricing, target costing and life cycle costing are the top three techniques used by respondents. Nevertheless it is noted that the overall uptake and the frequency of use is low. The top position of strategic pricing is consistent with Guilding et al. (2000) who found that strategic pricing is the most

widely-used among large companies in New Zealand, the United Kingdom and the United States. In term of life cycle costing, the present result is consistent with studies by Chenhall and Langfield-Smith (1998) and Joshi (2001). However Abdel-Kader and Luther (2006) reported that only 5% UK firms often or very often employed this analysis.

The use of target costing by around 50% of total sample parallels results in prior studies. For example, Chenhall and Langfield-Smith (1998) reported that target costing was used by less than half of Australian firms and Cinquini et al. (1999) indicated a very low use of target costing in Italy where only 15% firms utilized this technique. Similarly Joshi (2001) reported that just over a third of Indian firms used this technique, and Abdel-Kader and Luther (2006) found that just under a quarter of British firms often and very often employed target costing.

The low use of value chain analysis and competitive monitoring position is also consistent with previous research. For example both Chenhall and Langfield-Smith (1998) and Joshi (2001) reported a relatively low use of value chain analysis in their studies. Further, Abdel-Kader and Luther (2006) revealed that competitive position analysis and value chain analysis is frequently used by 33% and 19% respectively of British firms which is not very different from the result in this study which is 26% and 28% respectively, although obviously the sample of SMEs represents small enterprises that examined by Abdel-Kader and Luther.

Conclusion

Overall, the usage of SMA practices is low. The reasons for this are probably similar to those accounting for the low use of decision in support system as discussed above. The

result of this study is consistent with that of Guilding et al. (2000), who in a multi-country study reported low usage rates for SMA techniques.

6.5 Factors which affect of the extent of the use of MAPs

Section 3 of the questionnaire survey examined the external and internal factors that might influence the extent of use of MAPs. Four variables were investigated: intensity of market competition (part A); qualifications possessed by accounting staff (part B); the participation of owner/manager (part C); and the use of advanced technology (part D). The selection of these variables and reasons for using such variables was discussed in detail in Chapter 4 section 4.4.4. The following sections present the findings relating to these issues.

6.5.1 Part A: Intensity of market competition

Respondents were asked to indicate the degree of intensity of competition for their product in the market on a five-point Likert scale where 1; 'not intense at all' to 5; 'very intense'. Of the 156 respondents to this question, Table 6.13 shows that 76% reported 'intense' or 'very intense' competition. The mean value of 3.98 and the most frequent response of S4 (46%), show that the average and median competition in their market is perceived as intense.

Table 6.13: Assessment of market competition by percentage of respondents

	n						Mean	Standard
	%	S1	S2	S3	S4	S5		deviation
How intense is competition?	98	2	3	19	46	30	3.98	0.901

Notes:n: number of respondents; S1: not intense at all;S2: not intense; S3: slightly intense; S4: intense; S5: very intense

Overall, competition is perceived as intense by virtually all responding firms. Since SMEs constitute the largest share of the business population in Malaysia, this population creates intense rivalry in markets, and therefore it is unsurprising to get this result.

6.5.2 Part B: Accounting staff employment

Section 3 of the questionnaire sought information as to accounting staff employment and the highest qualification held by the accounting staff. The results are presented in Table 6.14 and 6.15 respectively. Table 6.14 shows that all but three of the 160 respondent firms employed accounting staff.

Table 6.14: Accounting staff employment by percentage of respondents

	<i>n</i>	%
Yes	157	98
No	3	2
Total	160	100

Table 6.15 details the highest qualification held. On the assumption that a bachelor degree or ACCA/CIMA qualification would make an accountant highly qualified more than 80% of these accountants are well qualified and the rest have a qualification at low and moderate level (SPM¹⁴ and LCCI¹⁵ respectively). Overall, these results indicate that majority responding firms employ at least one staff member who is well qualified.

¹⁴ Sijil Pelajaran Malaysia, or Malaysian Certificate of Education (MCE)

¹⁵ The London Chamber of Commerce and Industry

Table 6.15: Qualification of accounting staff by percentage of respondents

Degree of qualification	Small	Medium	Total	%
SPM	6	4	10	6.4
LCCI	10	2	12	7.6
ACCA	10	35	45	28.7
Bachelor Degree	22	57	79	50.3
CIMA/Masters qualification	2	9	11	7
Total	50	107	157	100

Note: The data on LCCI, CIMA and Master are generated from the 'Others' categories.

Overall, more than 80% of firms employ qualified accounting staff. The existence of this pool of qualified internal accountants probably plays an important role in the development of management accounting in SMEs (McChlery et al., 2004). This finding then might account for the high uptake of many accounting practices in responding firms especially regarding the use of basic techniques of accounting.

6.5.3 Part C: Participation of owner/manager of firms

Table 6.16 summarises perceptions of the participation of the owner/manager towards the development of MAPs in their firms. Respondents were required to indicate their perceptions of the participation of the owner/manager to the development of MAPs on a five-point Likert scale (1 is not at all to 5 very high extent). The results indicate that 60% of the responding firms report a high extent or very high extent of owner/managers participation and over 95% perceived a moderate or greater participation. Therefore, owner/managers in the respondent firms are generally supportive of MAPs in their firms.

Table 6.16: Participation of owner/manager by percentage of respondents

	<i>n</i>						Mean	Standard
	%	S1	S2	S3	S4	S5		deviation
Participation of owner/manager	99	2	5	33	39	21	3.71	0.926

Notes: n: number of respondents; S1: not at all; S2: low extent; S3: moderate extent; S4: high extent; S5: very high extent

Overall, owner managers reported the presence of a moderate level of the participation by owners/managers concerning the development of MAPs. The varied participation by owner/manager might well produce different effects on the use of MAPs.

6.5.4 Part D: Use of advanced manufacturing technology

Table 6.17 shows the extent of use of AMT among responding firms. The composite score is calculated to see the average extent of use of AMT of respondents. In general, more than 80% of total respondents have some uptake of AMT. Of this figure, 46% on average of the responding firms have high use or wide use of AMT and more than 70% have a moderate or greater use. With the composite score of 3.27, the finding suggests that the overall average use of AMT is moderate among respondents.

Table 6.17: Use of advanced technology by percentage of respondents

	<i>Uptake</i>	% Frequency of use					Mean	Standard
	%	S1	S2	S3	S4	S5		deviation
Flexible manufacturing system	84	11	13	35	29	12	3.18	1.149
Computer numerical controlled machine	86	17	14	23	29	17	3.17	1.332
Others	7	0	9	0	27	64	4.45	0.934
Total average		13	13	28	29	17	3.27	1.105

Notes: S1: not used ;S2: low used; S3: moderate used; S4: high used; S5: widely used

Overall the result shows a fairly extensive use of advanced technology by responding firms. The high utilisation of modern technology might encourage the extensive use of MAPs among the responding firms. However it might be doubted that all of the respondents are familiar with the technology terms used in the survey (such as CNC and FMS) and might result in possible bias on the responses. Again it is believed that the S4 and S5 indicated more accurate results in representing the frequency of use of the certain technology.

The question whether these variables significantly affect the extent of use of MAPs will be confirmed in the next chapter (hypothesis testing).

6.6 Performance of the firm

The level of performance of responding firms was investigated through section 4 of the questionnaire. Two dimensions of organizational performance (financial and non-financial measures) were considered. Financial measures cover business performance which used sales growth rate; operating profit growth rate; and cash flow. Meanwhile non-financial measures cover operational performances which are level of productivity; product quality; and number of deliveries on time. Respondents were required to indicate their perceptions of changes in their firm's performance over the past three years on a five-point Likert scale (1 is decreased significantly to 5 increased significantly). Table 6.18 summarises the findings. The composite scores are computed in order to indicate the average performance of respondents.

Table 6.18 suggests that respondents' perceptions of operational performance is relatively higher than that for overall business performance as all items under operational performance have a mean greater than 3.68 whereas measures under

business performance have lower means. Nevertheless the overall response mean of more than 3.60 suggests that performance has been improving with only 11% of respondents reporting a decrease in performance.

Table 6.18: Performance of the firm: summary statistics shown by percentage of respondents.

	n	% Frequency of use					Mean	Standard deviation
	%	S1	S2	S3	S4	S5		
Level of productivity	99	0	13	17	60	10	3.68	0.824
Product quality	99	0	4	22	66	8	3.77	0.636
Number of deliveries on time	99	0	3	24	56	17	3.87	0.721
Sales growth rate	100	2	9	17	58	14	3.73	0.883
Operating profit growth rate	99	2	16	20	56	6	3.48	0.892
Cash flow growth rate	100	2	13	21	56	8	3.54	0.882
Total average		1	10	20	58.5	10.5	3.68	0.806

Notes : n: number of respondents; S1: decreased significantly ;S2: decreased; S3: no change; S4: increased; S5: increased significantly

6.7 The roles of management accounting

Section 5 enquired into the role of management accounting with respondents asked to indicate their perception of the extent of different roles apply in their firms based on a five-point Likert scale (1 is strongly disagree to 5 strongly agree). Table 6.19 sums up the findings. It can be seen that all roles of MAPs listed in the survey are valued by most respondents. Measuring and evaluating performance and controlling current activities are perceived as the highest valued roles with an individual mean value around 4.00. The lowest importance is attached to improving internal and external

communication with a mean of 3.73. Overall, the possible roles of management accounting identified resonate with a significant portion of respondents.

Table 6.19: Perceptions of the role management accounting by percentage of respondents.

	<i>n</i>	S1	S2	S3	S4	S5	Mean	Standard deviation
Planning the future strategies, tactics and operations	155	0	5	26	49	20	3.85	0.791
Controlling current activities	156	0	3	21	49	27	3.99	0.783
Measuring and evaluating performance	155	0	1	19	56	24	4.03	0.693
Optimizing the use of firm's resources	155	1	3	25	51	21	3.88	0.792
Reducing subjectivity in decision making process	155	0	6	25	53	16	3.79	0.779
Improving internal and external communication	156	0	8	26	51	15	3.73	0.806

Notes :n: number of respondents; S1: strongly disagree ;S2: disagree; S3: slightly agree; S4: agree; S5:strongly agree

6.8 Summary

This chapter reports results obtained from 160 useable responses to a questionnaire sent to a sample of 1,000 Malaysian SMEs in the manufacturing sector enquiring as to the extent of their use of MAPs. The narrative seeks to answer two of the research objectives of this study; firstly to investigate the extent to which management accounting is employed by Malaysian SMEs; and secondly to highlight the roles of

management accounting in the activities of SMEs. Additional information was also obtained regarding selected contingent factors and the respondents' perception of the performance level of their organisation over the past three years.

Before analysing the data obtained tests were carried out for non-response bias. The tests using the variable related to number of employees as a measure of size showed that the respondents are not representative of the sample largely because the response rate for medium-sized firms is approximately twice than for small firms. However, further tests on the sub-samples of small and medium-sized firms revealed that while medium-sized firm respondents are representative within their sub-sample, small firm respondents are not (see section 6.2.1.1), and thus the results for small category of firm cannot be generalised. Due to this bias, further statistical analysis excludes the small category of firms, thus requiring the hypotheses developed in Chapter 1 to be revised and limited to medium sized firms. However, for descriptive purposes, the whole sample is examined but with information that distinguishes between medium and small company results. Nevertheless, the unrepresentativeness of the sample of small enterprises must be borne in mind when considering the following results.

The extent of use of MAPs was investigated using a five point Likert scale; S1 (never) to S5 (very frequently). In order to provide an additional measure of usage, and because it is possible that responses on S2 and S3 scale (rarely and occasionally) are recording awareness rather than real use, statistics based on S4 and S5 (frequently and very frequently) responses were prepared. These figures will probably give a more accurate indication of the actual use of management accounting techniques as respondents who really employ the respective techniques will undoubtedly choose S4 and S5. The percentage of uptake on S4 and S5 was calculated based on both a total user and a total

population basis. The figures derived based on whole population appear more realistic and consistent with the results from previous studies than those based on users. This can be seen, for example, in the percentage use of modern techniques such as ABC, decision support system and SMA which look more likely to be representative of actuality when the uptake at S4 or S5 is related to whole population.

The following discusses findings regarding the first two research questions.

First research question:

To what extent are MAPs used by Malaysian SMEs?

Across the sample, all five categories of MAPs surveyed (costing, budgeting performance evaluation, decision support system and SMA) are adopted by the majority of responding Malaysian manufacturing firms. However if small firms are considered separately, only a minority utilised decision support systems and SMA. The results also show that the adoption rate for traditional management accounting techniques is higher for established practices (budgeting, performance evaluation and costing) than for more recently developed practices (decision support system and SMA). Results for all MAPs also indicate that a higher usage by medium sized firms as opposed to small firms. The most significant differences relate to the use of decision support system and SMA.

The study also investigated the extent of use by Malaysian SMEs of a range of specific management accounting techniques. Responses detailed the extent of use of 45 management accounting techniques grouped under the five broad headings for MAPs stated earlier. The results shows that process costing is the most widely used cost collection method, and absorption and variable costing are the most frequently applied

costing techniques. The high use of process costing is consistent with the sectors that respondents were in. The majority of the respondents also indicated high use of full financial budgeting and annual budgeting. The results also showed that there was consistent use of flexible budgeting among the respondents. In evaluating firm performance, most of the respondents indicated a high use of financial performance measures as opposed to non-financial measures. The most used among non-financial measures related to internal processes and customers, while those connected to employees are the least used. Techniques, listed under decision support system and SMA have a limited and lower frequency of use. Under the decision support system, the results show that product profitability analysis is used the most. SMA uptake was the lowest among all five areas of MAPs. Small and medium sized firms have similar uptakes on costing and performance evaluation systems. However medium sized firms had a higher uptake than small firms in the use of full financial budgeting, decision support systems and SMA.

The findings generate some new results on the use of MAPs by Malaysian SMEs. They suggest that in general, Malaysian SMEs and especially medium sized enterprises have adopted basic techniques of management accounting quite widely, for example, costing systems, full budgeting systems and financial performance measures. This prioritisation of basic techniques of accounting and management accounting is perhaps expected in a smaller business context. Furthermore since the respondents are based in a developing country, the employment of new management accounting skills, such as ABC, SMA and other modern techniques, might be expected to be lower than in developed countries. This view is in line with Chun et al. (1994) who claimed that Malaysian firms prefer to employ traditional management accounting systems to meet their needs for external and internal reporting purposes. Other research in developing countries such as

that of Joshi (2001) in India; El-Ebaishi et al. (2003) in Saudi Arabia; and Phadoongsitthi (2003) in Thailand also support this position. Joshi (2001) argued that the reasons for a low adoption of newly developed MAPs in Indian firms are the conservative attitude of Indian management, autocratic leadership, and long term orientation. They also suggest that many Indian companies believe that it is quite expensive to adopt the new management accounting techniques particularly, for benchmarking. Lack of training and expertise in these areas are other possible reasons. Phadoongsitthi (2003) in Thailand this perspective stating that the reasons for similar low adoption of newly developed MAPs in Thailand and India is because both countries have cultural similarities - large power distance and low individualism group and both countries face similar problems - the lack of training and expertise. Research in developed countries (see for example, Chenhall and Langfield-Smith, 1998; Pierce and O'Dea, 1998; and Abdel-Kader and Luther, 2006), although reporting an increasing usage of modern MAPs, agreed that basic or traditional MAPs are still dominant in most firms. It is argued that high acceptance of traditional techniques may be attributed to the fact that information and expertise relating to these measures is the most readily available as opposed to that relating to modern management accounting techniques. Consequently sophisticated systems are not widely adopted in practice possibly due to the uncertainties, practicalities and costs involved in obtaining the information.

The results also indicate some striking differences between the adoption level for newer techniques between small and medium sized firms. They suggest that the frequency of use of certain MAPs, especially sophisticated MAPs is significantly lower in small sized firms than in medium sized firms. The increased uptake of sophisticated MAPs by larger firms is in line with previous study results suggestion that size is a contingent variable associated with the use of such techniques (see for example Holmes and

Nicholls, 1999; Hoque and James, 2000; Lamminmaki and Drury, 2001; Collis and Jarvis, 2002; Al-Omiri and Drury, 2007; Ismail and King 2007; Cadez and Guilding, 2008; and Abdel-Kader and Luther, 2008) even though the population from which the target sample is drawn is perhaps different on the basis of the survey results in terms of country size and the developing country context.

It is concluded that within Malaysian small and medium sized firms, there is extensive use of basic MAPs. Medium sized enterprises make greater use of MAPs as compared to small enterprises - thus supporting the contingency theory of the impact of size on the use of MAPs. This difference in uptake is greater for modern MAPs, which are employed reasonably extensively by medium sized firms but markedly less so by small sized firms. Overall, the uptake among the respondents shows that management accounting is well embedded in responding Malaysian SMEs - as might be anticipated given the high level of employment of well qualified accounting staff.

Second research question:

What are the roles of management accounting in SMEs' management?

The results suggest that respondents believe that MAPs have an important role in helping the SMEs to plan, control, evaluate performance, optimize the use of resources, assist in decision making, and improve communication. Out of six roles, performance evaluation and controlling activities were perceived by respondents to be the key roles but most of the Malaysian SMEs in the manufacturing sector also perceived MAPs as useful in their management processes especially in providing the most appropriate information in their manufacturing environment.

The perceived roles of MAPs to evaluate performance are consistent with the descriptive findings reported in section 6.4.2.3, i.e. that respondent firms made extensive use of performance evaluation systems especially in terms of the use of financial performance measures. Based on these results, it is also likely that the evaluation is gradually widened to the other areas particularly internal processes and customer-based measures. Therefore these will provide greater information for performance evaluation in the firms.

The high perceived role for MAPs in controlling activities is again consistent with the extensive use of budgeting by respondent firms as has been reported in section 6.4.2.2, and as an adjunct to budget preparation and the use of costing systems. This suggests that Malaysian small and medium sized firms use traditional MAPs particularly financial-based measures to control the activities of manufacturing operations. The extensive use of budgeting systems should also indicate MAPs help the firm not only in controlling but also for planning. This is supported by the responses which show that the perceived role for MAPs as planning the future strategies, tactics and operations is high.

Overall it can be concluded that the results suggest that MAPs play a significant role in SMEs, and possibly suggests difference from past assertions from some commentators about a lack of relevance of management accounting to managerial needs especially in modern manufacturing (see, for example, Cooper, 1990 and Johnson and Kaplan, 1987).

Chapter 7

Bivariate analysis

7.1 Introduction

The chapter seeks to identify, for a sample of Malaysian medium sized firms statistically significant associations between selected contingent variables and the use of various MAPs, and statistically significant associations between the use of MAPs and perceptions of the performance of the firm. The restriction of the sample for testing from all respondents to medium enterprises arises from the result of a non-response bias test, which demonstrated concern about the representativeness of the small firm section of the original sample (see Chapter 6, section 6.2.1). Therefore the first and second hypotheses have been revised to include only medium sized firms. The hypotheses are now as follows:

H₁: There are significant and positive relationships for medium sized firms between selected contingent factors and the use of MAPs.

H₂: There is a significant and positive relationship for medium sized firms between the use of MAPs and perceptions of organizational performance.

The first hypothesis has 25 sub-hypotheses representing 25 relationships between five independent contingent variables and five dependent variables relating to the use of MAPs. Similarly, in the second hypothesis, 35 sub-hypotheses are developed representing 35 relationships between five independent variables (use of MAPs) and seven indicators of how performance is perceived (including one composite index of performance). These sub-hypotheses will be specified in the next two sections.

7.2 Bivariate association analysis

In this chapter, the hypothesis testing will be underpinned by bivariate association analysis (correlation). Correlation is an associative technique that determines if there is a consistent and systematic relationship between two or more variables (Hair et al., 2007). The existence of a correlation or association is a necessary precondition toward demonstration of the existence of a relationship between variables (Kent, 2001). Bivariate analysis provides a single figure for the strength of the relationship between variables. The value of correlation is measured within a range of -1 to +1. A value of +1 represents a perfect positive correlation. This means that the two variables are precisely related so that as values of one variable increases, values of the other variable will also increase by the same degree. In contrast, a value of -1 represents a perfect negative correlation which means that as the value of one variable increases those of the other decreases to a similar degree. A value of 0 means there is no relationship between the variables and they are perfectly independent (Saunders et. al, 2009). As regards intermediate values, Miles and Shevlin (2005), reference Cohen (1988) who defined a small correlation as having an absolute value of approximately 0.1, a medium correlation starting at 0.3 and a large correlation as 0.5 or greater. The following two sections provide the separate analyses for hypotheses one and two.

7.3 Tests for an association between the use of management accounting practices and selected contingent factors

In this section, the tests for an association analysis seek to answer the third research objective of this study; to determine the factors that affect the use of management accounting among medium sized firms. The objective is translated into a general hypothesis which is ‘there are significant and positive relationships for medium sized firms between selected contingent factors and the use of MAPs.

For the purpose of the analysis and hypothesis testing, there are two general classes of significance tests: parametric and nonparametric tests. Parametric tests are more powerful because the data are derived from interval and ratio measurements (Cooper and Emory, 1995). Such tests are normally valid only if four basic assumptions are met. Field (2000) lists these as (i) the variable is measured on a ratio or interval scale (ii) data are from a population with a normal distribution (iii) there is homogeneity of variance and (iv) data values in the variable are independent. If data is measured in categorical form (nominal or ordinal), or do not otherwise meet the other assumptions for parametric testing, nonparametric tests are used to test hypotheses (Cooper and Emory, 1995). Therefore in order to determine whether the appropriate test falls under parametric testing or not the nature of data should be examined. Table 7.1 below summarises the type of data that are used to test the first hypothesis.

Table 7.1: A summary of the type of data for the independent and dependent variables under the first hypothesis.

	Details	Type of data
Dependent variables		
Costing system	Yes/No	Binary
Budgeting system	Yes/No	Binary
Performance evaluation system	Yes/No	Binary
Decision support system	Yes/No	Binary
Strategic management accounting	Yes/No	Binary
Independent variables		
Size of the firm (sales turnover)	Ranking	Ordinal
Market competition	5-Likert scale	Ordinal
Participation of owner/manager	5-Likert scale	Ordinal
Advanced manufacturing technology	5-Likert scale	Ordinal
Qualification of accounting staff	Ranking	Ordinal

Table 7.1 shows that all the dependent variables relating to the use of MAPs comprise binary (dichotomous) data where Yes=1 and No=0; while the independent variables relating to contingent factors are ordinal data. Given the mix of binary and ordinal data, one of four basic assumptions for parametric testing is not met as data must be on a ratio or interval scale. Non-parametric tests will therefore be employed. The two most widely used non-parametric correlation analysis tests in business and management research are Spearman's rank correlation coefficient (Spearman's Rho) and Kendall's rank correlation coefficient (Kendall's tau). The tests can be used in a wide variety of contexts since they make few assumptions relating to the distribution of the variables and the nature of the relationship between variables (Bryman and Cramer, 2001). With regards to which of these non-parametric correlation measures should be reported, Bryman and Cramer (2001) argue that Spearman's rho is more commonly used. On the other hand, tau deals with tied ranks (i. e. two or more respondents are at the same rank) better than rho. In almost all situations the values of Spearman's rank correlation and Kendall's tau are very close and would invariably lead to the same conclusions (Crichton, 2001). Drawing on this discussion, since there is existence of tied ranks in data of this study, Kendall's tau is chosen to be the statistical method for hypothesis testing. Besides that this method has been commonly used in previous studies (see for example Scapens and Sale, 1985; Fry et al., 1998; Abdel-Maksoud et al., 2005; and Hutaibat, 2005). In term of the value of a measure of association, Botsch (2011) provides a guideline specifically for Kendall's tau is as follows:

- Less than + or – 0.10 : very small/weak
- + or – 0.10 to 0.19 : small/weak
- + or -0.20 to 0.29 : moderate
- + or -0.40 or larger : strong

Given that within business research it is extremely unusual to obtain perfect correlation (Saunders et. al., 2009), this guidance will be used in this study to describe the strength

of relationship found between pairs of variables. It is essential to establish the acceptable level of statistical significance in order to support or reject the hypothesis. Hair et al. (2007) state that the normal acceptable level of statistical significance for the test is $p < 0.05$ (p means probability). This means that this research would be accepting the possibility that as many as 5 in 100 samples might show a relationship where none exists in the population. Hair et al. (2007) also argued that some researchers will accept a lower probability level of $p < 0.10$ but $p < 0.05$ is more common and will be used when assessing the results in this study. The following five subsections discuss the results of association between the use of MAPs and selected contingent factors in detail.

7.3.1 Size of the firm (Annual sales turnover)

Annual sales turnover is used as a proxy for firm size. The data obtained for this variable are ranked from 1 (the lowest rank) to 6 (the highest rank) where, 1= less than RM250,000; 2= RM250,000 to RM1.0 million; 3= RM1.0 to RM5.0 million; 4= RM5.0 to RM10.0 million; 5= RM10.0 million to RM25.0 million; and 6= More than RM25.0 million. The following five sub-hypotheses (H_{1-1} - H_{1-5}) were developed for medium sized firms in order to guide the analysis.

H_{1-1} : There is a significant and positive relationship between size of the firm and the use of costing systems

H_{1-2} : There is a significant and positive relationship between size of the firm and the use of budgeting systems

H_{1-3} : There is a significant and positive relationship between size of the firm and the use of performance evaluation systems

H₁₋₄ : There is a significant and positive relationship between size of the firm and the use of decision support systems

H₁₋₅ : There is a significant and positive relationship between size of the firm and the use of strategic management accounting

Table 7.2: Kendall's tau correlation coefficient test results for the relationship between annual sales turnover and the use of management accounting practices.

	Hypothesis	Correlation coefficient	Sig. value
Costing system	H₁₋₁	0.296	0.000
Budgeting system	H ₁₋₂	0.075	0.201
Performance evaluation system	H₁₋₃	0.206	0.011
Decision support system	H ₁₋₄	0.089	0.159
Strategic management accounting	H ₁₋₅	0.091	0.155

Significant correlation in bold

The first five sub-hypotheses (H₁₋₁ to H₁₋₅) linking size of the firm based on annual sales turnover with five type of MAPs are not all supported. The results presented in Table 7.2 show a moderate, positive and significant relationship between annual sales turnover and the use of a costing system and a performance evaluation system. However, there is no support for any statistically significant relationship between annual sales turnover and the use of budgeting systems, decision support systems or SMA. Sub-hypotheses H₁₋₂, H₁₋₄ and H₁₋₅ may therefore be rejected but H₁₋₁ and H₁₋₃ are accepted. It may be concluded that the greater the turnover of the firm the more likely the firm is to use a costing system or a performance evaluation system. It was also noted that the direction of association was consistently positive in accordance with the hypothesised relationship.

7.3.2 Intensity of market competition

Respondent's perceptions of market competition were measured by using a five-point Likert scale ranging from 1; 'not intense at all' to 5; 'very intense'. The following five sub-hypotheses (H₁₋₆ to H₁₋₁₀) were developed for medium sized firms in order to guide the analysis.

H₁₋₆ : There is a significant and positive relationship between intensity of market competition and the use of costing systems

H₁₋₇ : There is a significant and positive relationship between intensity of market competition and the use of budgeting systems

H₁₋₈ : There is a significant and positive relationship between intensity of market competition and the use of performance evaluation systems

H₁₋₉ : There is a significant and positive relationship between intensity of market competition and the use of decision support systems

H₁₋₁₀ : There is a significant and positive relationship between intensity of market competition and the use of strategic management accounting

Table 7.3: Kendall's tau correlation coefficient test results for the relationship between intensity of market competition and the use of MAPs.

	Hypothesis	Correlation coefficient	Sig. value
Costing system	H₁₋₆	0.186	0.023
Budgeting system	H₁₋₇	0.180	0.027
Performance evaluation system	H₁₋₈	0.180	0.027

Decision support system	H ₁₋₉	0.091	0.165
Strategic management accounting	H ₁₋₁₀	0.095	0.154

Significant correlation in bold

Sub-hypotheses H₁₋₆ to H₁₋₁₀ address the relationship between intensity of market competition and the use of MAPs. The results presented in Table 7.3 provide some evidence for intensity of market competition effect on the use three specific MAPs. The results suggest a small, positive and significant relationship between the intensity of market competition and the use of costing systems, budgeting systems and performance evaluation systems. However, there are no significant relationships between the perceived intensity of market competition and the use of decision support systems and SMA although the direction of association was consistently positive in accordance with the hypothesised relationship. Therefore three sub-hypotheses (H₁₋₆, H₁₋₇ and H₁₋₈) are accepted and the other two sub-hypotheses H₁₋₉ and H₁₋₁₀ are rejected.

7.3.3 Participation of owner/manager

Participation of owner/manager of firms was measured by using a five-point Likert scale (1 is not at all to 5 very high extent). The following five sub-hypotheses (H₁₋₁₁ to H₁₋₁₅) were developed for medium sized firms in order to guide the analysis.

H₁₋₁₁ : There is a significant and positive relationship between participation of owner/manager and the use of costing systems

H₁₋₁₂ : There is a significant and positive relationship between participation of owner/manager and the use of budgeting systems

H₁₋₁₃ : There is a significant and positive relationship between participation of owner/manager and the use of performance evaluation systems

H₁₋₁₄ : There is a significant and positive relationship between participation of owner/manager and the use of decision support systems

H₁₋₁₅ : There is a significant and positive relationship between participation of owner/manager and the use of strategic management accounting

Table 7.4: Kendall's tau correlation coefficient test results for the relationship between participation of owner/manager and the use of management accounting practices.

	Hypothesis	Correlation coefficient	Sig. value
Costing system	H ₁₋₁₁	0.187	0.374
Budgeting system	H ₁₋₁₂	0.134	0.067
Performance evaluation system	H ₁₋₁₃	0.129	0.075
Decision support system	H₁₋₁₄	0.224	0.049
Strategic management accounting	H₁₋₁₅	0.233	0.005

Significant correlation in bold

As stated in sub-hypotheses (H₁₋₁₁ to H₁₋₁₅) it was expected that the participation of owner/manager would be significantly and positively related with the development of MAPs. The results presented in Table 7.4 provide some evidence for an owner/manager relationship with the use two specific MAPs. The results suggest a moderate, positive and significant relationship between the participation of the owner/manager and the use of decision support systems and SMA. However, there is no support for any statistically significant relationship between participation of owner/manager and the use of costing systems, budgeting systems and performance evaluation system. Therefore two sub-hypotheses (H₁₋₁₄ and H₁₋₁₅) are accepted and the other three sub-hypotheses (H₁₋₁₁, H₁₋₁₂

and H_{1-13}) are rejected. It was also noted that the direction of association was consistently positive in line with the hypotheses.

7.3.4 Advanced manufacturing technology (AMT)

The use of AMT was based on the use of three broad classes of technological devices (i) flexible manufacturing system (FMS); (ii) computer numerical control machines (CNC) and (iii) 'others'. Respondents were asked to evaluate the level of use of these devices by using a five-point Likert scale from 1; 'not used' to 5; 'widely used'. The responses were aggregated using the composite score for testing the hypotheses. The composite score was calculated using the above three individual items scores where they were summated together and aggregated. The use of a composite score to measure the variable has some advantages. According to Foster and Swenson (1997) a composite score has the advantage over an individual question in the circumstances when either (1) the concept being measured is multidimensional and when the questions in that composite capture those multi-dimensions, or (2) there is measurement error in an individual question that is diversified away in aggregating individual questions into a composite. Meanwhile Judd et al. (1991) claimed that creating a single score to summarize several observed variables in a meaningful way can simplify the analysis and can improve reliability and validity of measurement. In addition to the use of a composite score as the main measure for hypothesis testing, individual analyses of each measure of AMT with MAPs were also conducted to provide additional information. The following five sub-hypotheses (H_{1-16} to H_{1-20}) were developed for medium sized firms in order to guide the analysis.

H_{1-16} : There is a significant and positive relationship between use of advanced manufacturing technology and the use of costing systems

H₁₋₁₇ : There is a significant and positive relationship between use of advanced manufacturing technology and the use of budgeting systems

H₁₋₁₈ : There is a significant and positive relationship between use of advanced manufacturing technology and the use of performance evaluation systems

H₁₋₁₉ : There is a significant and positive relationship between use of advanced manufacturing technology and the use of decision support systems

H₁₋₂₀ : There is a significant and positive relationship between use of advanced manufacturing technology and the use of strategic management accounting

Table 7.5: Kendall's tau correlation coefficient test results for the relationship between reported use of AMT (based on composite score) and the use of management accounting practices.

	Hypothesis	Correlation coefficient	Sig. value
Costing system	H₁₋₁₆	0.280	0.001
Budgeting system	H ₁₋₁₇	0.104	0.115
Performance evaluation system	H₁₋₁₈	0.250	0.002
Decision support system	H ₁₋₁₉	0.114	0.094
Strategic management accounting	H₁₋₂₀	0.285	0.000

Significant correlation in bold

Sub-hypotheses H₁₋₁₆ to H₁₋₂₀ address the relationship between the employment of AMT and the use of MAPs. The results in Table 7.5 show a moderate, positive and significant relationship between AMT and the use of costing systems, performance evaluation systems and SMA. This means that in general the firms with more use of AMT are more likely to use a costing system and have a system for performance evaluation and SMA.

Therefore sub-hypotheses H_{1-16} H_{1-18} and H_{1-20} are accepted and H_{1-17} and H_{1-19} despite having a consistently positive correlation coefficient in line with the hypothesis are rejected.

Meanwhile Table 7.6 shows the results of a bivariate testing for a positive relationship between individual measure of AMT and the use of MAPs.

Table 7.6: Kendall's tau correlation coefficient test results for the relationship between individual AMT measures and the use of management accounting practices.

	FMS	CNC	Others
Costing system	0.242 0.006	0.269 0.002	1.000
Budgeting system	0.147 0.064	0.076 0.202	0.367 0.157
Performance evaluation system	0.180 0.032	0.260 0.002	1.000
Decision support system	0.153 0.058	0.084 0.179	0.447 0.124
Strategic management accounting	0.222 0.011	0.321 0.000	0.070 0.424

Significant correlation in bold

The results of the individual analysis of each measure of AMT with MAPs (see Table 7.6) suggest that the use of FMS and CNC have positive and statistically significant relationships with the use of costing systems, performance evaluation systems, and SMA. 'Others' technology was only represented by 8 respondents who indicated the use of other AMT such as - material requirement planning (MRP); specific purpose NC (numerical control) and machine-oriented. While these responses indicate use or no use of three MAPs (budgeting systems, decision support systems and SMA), all of these responses similarly indicated the use of costing systems and performance evaluation

systems in the firms. Therefore it can be suggested the use of 'others' technology have positive association with the use of costing systems and performance evaluation systems. Meanwhile the rest of results under 'others' AMT show that there is no significant association with the use of budgeting systems, decision support systems and SMA. Based on the analysis, overall the results suggested that the greater uses of all individual devices are significantly associated with the use of costing systems and performance evaluation systems. Additionally the higher use of FMS and CNC also leads to the greater use of SMA. These results have driven the composite results (Table 7.5) to reflect significant association with these three MAPs.

7.3.5 The level of qualification of accounting staff

The qualification status of the firm's accountant was measured by reference to the type of qualifications that the accountant possesses. The data for this variable are ranked from 1 (the lowest rank) to 4 (the highest rank). To be specific, 1= No accountant; 2= SPM (Sijil Pelajaran Malaysia, or Malaysian Certificate of Education (MCE)); 3= LCCI (The London Chamber of Commerce and Industry); 4= Bachelor accounting; and 5= ACCA/CIMA/Masters in accounting. The following five sub-hypotheses (H_{1-21} to H_{1-25}) were developed for medium sized firms in order to guide the analysis.

H_{1-21} : There is a significant and positive relationship between the level of qualification of accounting staff and the use of costing systems

H_{1-22} : There is a significant and positive relationship between the level of qualification of accounting staff and the use of budgeting systems

H₁₋₂₃ : There is a significant and positive relationship between the level of qualification of accounting staff and the use of performance evaluation systems

H₁₋₂₄ : There is a significant and positive relationship between the level of qualification of accounting staff and the use of decision support systems

H₁₋₂₅ : There is a significant and positive relationship between the level of qualification of accounting staff and the use of strategic management accounting

Table 7.7: Kendall's tau correlation coefficient test results for the relationship between the level of qualification of accounting staff and the use of management accounting practices.

	Hypothesis	Correlation coefficient	Sig. value
Costing system	H ₁₋₂₁	0.147	0.055
Budgeting system	H ₁₋₂₂	-0.021	0.408
Performance evaluation system	H ₁₋₂₃	0.112	0.111
Decision support system	H ₁₋₂₄	0.055	0.273
Strategic management accounting	H ₁₋₂₅	0.048	0.301

Significant correlation in bold

Sub-hypotheses H₁₋₂₁ to H₁₋₂₅ addresses the relationship between the level of qualification of accounting staff and the use of five types of MAPs. The results show that there are no significant relationships between the level of qualification of accounting staff and the use of MAPs. Therefore sub-hypotheses H₁₋₂₁ to H₁₋₂₅ are rejected.

7.3.6 Tests for an association between the use of management accounting practices and industry type

In testing for a relationship between the use of accounting practices and contingent variables, it is possible that the industry that the respondent firms are in may have an impact on outcomes. This is premised on the belief that certain industries because of their nature would be likely to have certain management accounting systems. The data for this variable are based on nominal category where types of manufacturing activities (furniture; food and beverages; non-metallic products; basic metals; rubber and plastic; chemicals & chemical product and 'others' are simplified to three main groups 1 = High-tech industry; 2 = Light industry and 3= Heavy industry. High-tech means an industry that makes high-value products using modern technology and usually involves significant capital investment in R&D. While 'light industry' typically is a consumer industry that makes small products most are companies relatively in small scale. 'Heavy industry' typically is a large scale business that is capital intensive and is likely to make large products often bought by other manufacturing companies. Given the nominal nature of the data, a Pearson chi-square (χ^2) test will be used to test the significance of the relationships and a Cramer's V test will be used to establish the strength of relationships between variables. Below are the details of Pearson chi-square test and Cramer's V test. The chi-square test of association, also called Pearson's chi-square test, is used to discover if there is a relationship between two categorical variables. According to Smith (2003) this test is the most common test of statistical significance for use with nominal data. This test is applied to a contingency table¹⁶ to establish with what level of confidence it can be asserted that there is a relationship between the two variables in the population (Bryman, 2008). While Cramer's V measures association between two nominal variables (Saunders et al. 2009) Cramer's V is also a fairly robust

¹⁶ Contingency tables are generated so that patterns of association can be searched for (Bryman, 2008).

measure in that it can be applied in a wide range of circumstances and hardly produces nonsensical results even under differing sets of conditions. It also makes no assumptions about the shape of the population distribution of the variables from which it is computed and requires only categorical measurement (Kent, 2001). Therefore Cramer's V is a good statistic for measuring relationships between nominal and ordinal variables as employed in this study. The following additional five sub-hypotheses (H₁₋₂₆ to H₁₋₃₀) were developed for medium sized firms in order to guide the analysis.

H₁₋₂₆ : There is a significant relationship between the industry type and the use of costing systems

H₁₋₂₇ : There is a significant relationship between industry type and the use of budgeting systems

H₁₋₂₈ : There is a significant relationship between industry type and the use of performance evaluation systems

H₁₋₂₉ : There is a significant relationship between industry type and the use of decision support systems

H₁₋₃₀ : There is a significant relationship between industry type and the use of strategic management accounting

Table 7.8: Cramer's V correlation coefficient and Pearson chi-square test results for the relationship between industry type and the use of management accounting practices.

	Hypothesis	Correlation coefficient	Sig. value
Costing system	H ₁₋₂₆	0.025	0.792
Budgeting system	H ₁₋₂₇	0.023	0.808
Performance evaluation system	H ₁₋₂₈	0.045	0.634
Decision support system	H ₁₋₂₉	0.120	0.208
Strategic management accounting	H ₁₋₃₀	0.018	0.847

Significant correlation in bold

The results show that industry types of respondent firms have no statistically significant association with the use of MAPs. Therefore sub-hypotheses H₁₋₂₆ to H₁₋₃₀ are rejected.

Summary

Overall the above results have suggested limited relationships between contingent factors and MAPs. The use of a costing system and a performance evaluation system are consistently associated with three contingent variables (annual sales turnover, intensity of market competition and AMT) whereas enhanced use of budgeting systems, decision support systems and SMA is apparently solely dependent on the different contingent variables. The higher level of participation of the owner/manager appears significantly associated with the greater use of sophisticated MAPs.

The use or not use division is somewhat crude and further insight to relationships may be obtained by examining the frequency of use of individual management accounting techniques (MATs) within the five categories. Therefore the following section continues bivariate analysis testing for any statistically significant relationship between contingent factors and the frequency of use of MATs.

7.4 Additional analysis: Tests for an association between the selected contingent factors and frequency of use of management accounting techniques

The previous section tests the relationships between the use of MAPs and selected contingent factors. In these tests, MAPs are measured by using the binary scale (Yes=1/No=0). This section extends the analysis by employing 45 specific management accounting techniques (MATs) (measured in ordinal scale). This analysis is hoped to give additional insight, and as to the relationship between MATs and factors that affect the adoption of these techniques. Table 7.9 below, summarises the type of data that will be used in testing.

Table 7.9: A summary of the type of data for the new dependent variables under the first hypothesis.

	Details	Type of data
Dependent variables		
Costing system (7 techniques)	5-Likert scale	Ordinal
Budgeting system (11 techniques)	5-Likert scale	Ordinal
Performance evaluation system (13 techniques)	5-Likert scale	Ordinal
Decision support system (8 techniques)	5-Likert scale	Ordinal
Strategic management accounting (6 techniques)	5-Likert scale	Ordinal

Table above shows that all the dependent variables relating to the frequency of use of MATs are measured based on a five-point Likert scale where 1= never, 2= rarely, 3= occasionally, 4= frequently and 5= very frequently. Again non-parametric tests will be employed since the parametric approach needs the data to be interval based or on a ratio scale. The results of the tests are shown and discussed in the following sub sections.

7.4.1 Contingent variables and costing techniques

The results of Kendall's tau analysis between contingent variables and the frequency of use of costing techniques are presented in Table 7.10 below.

Table 7.10: Kendall's tau correlation coefficient test results for a relationship between contingent variables and the frequency of use of costing techniques.

No	Variables	1	2	3	4	5	6
1	Process costing	0.043	0.091	0.078	0.175*	0.096	0.005
		0.323	0.172	0.199	0.024	0.155	0.481
2	Job costing	-0.155	0.188*	-0.056	0.117	-0.070	0.083
		0.060	0.033	0.289	0.108	0.247	0.214
3	Batch costing	0.018	0.149	0.006	0.068	-0.065	-0.114
		0.429	0.069	0.477	0.235	0.408	0.122
4	Contract costing	-0.153	0.153	-0.055	0.013	-0.074	0.009
		0.063	0.068	0.293	0.477	0.160	0.366
5	Absorption costing	0.047	0.085	-0.001	0.276**	0.003	-0.115
		0.327	0.217	0.496	0.001	0.489	0.361
6	Variable costing	0.000	0.209*	0.030	0.177*	0.123	0.163
		0.500	0.027	0.391	0.041	0.133	0.229
7	ABC costing	-0.047	-0.010	-0.001	0.165*	0.015	-0.127
		0.325	0.463	0.495	0.050	0.444	0.433

1; Firm's size; 2: Market competition; 3: Participation of owner/manager; 4: AMT; 5: Qualification; 6: Manufacturing activities

The results indicate two significant relationships between contingent variables and costing techniques. First there are small, positive and significant relationships between the intensity of market competition and the frequency of use of job costing and variable costing and second there are small, positive and significant relationships between AMT and the frequency of use of four out of seven costing techniques.

7.4.2 Contingent variables and budgeting techniques

The results of Kendall's tau analysis between contingent variables and the frequency of use of budgeting techniques are presented in Table 7.11 below.

Table 7.11: Kendall's tau correlation coefficient test results for a relationship between contingent variables and the frequency of use of budgeting techniques.

No	Variables	1	2	3	4	5	6
1	Sales budget	0.137	0.229*	0.239**	0.350**	0.326**	0.039
		0.080	0.013	0.005	0.000	0.001	0.354
2	Cash flow budget	0.016	0.075	0.313**	0.108	0.271*	0.057
		0.433	0.231	0.001	0.122	0.003	0.347
3	Financial position budget	-0.102	0.106	0.295**	0.174*	0.245*	-0.004
		0.495	0.145	0.001	0.024	0.040	0.473
4	Production budget	0.038	-0.053	0.224**	0.228**	0.264**	0.015
		0.345	0.295	0.009	0.006	0.003	0.442
5	Purchasing budget	0.037	-0.013	0.267**	0.209**	0.274**	-0.001
		0.350	0.450	0.003	0.011	0.003	0.494
6	Annual budget	0.047	0.133	0.447**	0.244**	0.252*	0.067
		0.311	0.092	0.000	0.000	0.025	0.256
7	Monthly budget	-0.073	0.041	0.143	0.102	0.087	-0.040
		0.238	0.349	0.084	0.105	0.207	0.269
8	Continuous budget	-0.072	0.142	0.116	0.159	0.049	-0.156
		0.172	0.093	0.134	0.053	0.322	0.197
9	Flexible budget	0.019	0.114	0.346**	0.304**	0.130	0.150
		0.425	0.098	0.000	0.001	0.103	0.092
10	Incremental budgeting	-0.083	0.017	0.174**	0.300**	-0.020	0.026
		0.192	0.436	0.042	0.001	0.421	0.237
11	ZBB	-0.275*	0.109	-0.124	0.239*	-0.116	0.063
		0.005	0.164	0.126	0.010	0.146	0.164

1; Firm's size; 2: Market competition; 3: Participation of owner/manager; 4: AMT; 5: Qualification; 6:

Manufacturing activities

The results indicate five significant relationships between contingent variables and budgeting techniques. First there is a small, negative and significant relationship between size of firm and the frequency of use of ZBB. Second there is a small, positive

and significant relationship between the intensity of market competition and the frequency of use of sales budget. Third there are positive and significant relationships between the participation of owner/manager and the frequency of use of eight out of eleven budgeting techniques. The magnitude of the relationships ranges from small to medium. Next, there are positive and significant relationships between AMT and the frequency of use of eight out of eleven budgeting techniques. The magnitude of the relationships ranges from small to medium. Lastly there are positive and significant relationships between the level of qualification of accounting staff and the frequency of use of six out of eleven budgeting techniques. The magnitude of the relationships ranges from small to medium.

7.4.3 Contingent variables and performance evaluation techniques

The results of Kendall's tau analysis between contingent variables and the frequency of use of performance evaluation techniques are presented in Table 7.12 below.

Table 7.12: Kendall's tau correlation coefficient test results for a relationship between contingent variables and the frequency of use of performance evaluation techniques.

No	Variables	1	2	3	4	5	6
1	Sales growth	-0.127	0.143	0.251**	0.034	0.154	-0.054
		0.097	0.078	0.005	0.356	0.060	0.150
2	Operating income	-0.013	0.123	0.281**	0.116	0.261**	-0.020
		0.447	0.112	0.002	0.107	0.004	0.424
3	Cash flows	-0.028	-0.022	0.373**	0.119	0.162*	0.063
		0.384	0.394	0.000	0.062	0.004	0.206
4	On-time delivery	-0.119	0.136	0.137	0.126	0.148	0.016
		0.102	0.079	0.072	0.079	0.059	0.437
5	Variance analysis	0.008	0.234*	0.157**	0.099	0.193*	0.072
		0.465	0.008	0.047	0.134	0.021	0.233
6	Number of customer complaints	-0.084	0.111	0.250**	0.090	0.266*	0.116
		0.184	0.122	0.004	0.157	0.002	0.119
7	Manufacturing lead time	-0.149	0.093	0.188**	0.189**	0.059	0.062

		0.057	0.167	0.023	0.017	0.267	0.268
8	Defect rate	0.015	0.128	0.183*	0.065	0.200*	0.039
		0.435	0.091	0.025	0.233	0.017	0.345
9	Return on investment	-0.120	0.049	0.142	-0.050	0.219*	-0.096
		0.100	0.306	0.064	0.287	0.010	0.164
10	Employee turnover	-0.293**	0.100	0.138	0.196*	0.138	0.090
		0.001	0.471	0.065	0.012	0.070	0.176
11	Survey of customer satisfaction	-0.202*	0.125	0.152*	0.182*	0.227*	0.065
		0.014	0.092	0.049	0.018	0.007	0.252
12	Absentee rates	-0.193*	0.111	0.284**	0.161*	0.050	0.111
		0.019	0.124	0.001	0.036	0.262	0.069
13	Number of warranty claims	-0.071	-0.010	0.148	-0.022	0.196*	0.098
		0.223	0.461	0.072	0.402	0.020	0.095

1; Firm's size; 2: Market competition; 3: Participation of owner/manager; 4: AMT; 5: Qualification; 6:

Manufacturing activities

The results indicate five significant relationships between contingent variables and performance evaluation techniques. First, there are small, negative and significant relationships between size of firm and the frequency of use of an employee turnover survey, customer satisfaction and number of warranty claims. Second, there is a small, positive and significant relationship between the intensity of market competition and the frequency of use of variance analysis. Third, there are positive and significant relationships between the participation of owner/manager and the frequency of use of nine out of thirteen performance evaluation techniques. The magnitude of the relationships ranges from small to medium. Next, there are small, positive and significant relationships between AMT and the frequency of use of four out of thirteen performance evaluation techniques. Lastly, there are small, positive and significant relationships between the level of qualification of accounting staff and the frequency of use of eight out of thirteen performance evaluation techniques.

7.4.4 Contingent variables and decision support techniques

The results of Kendall's tau analysis between contingent variables and the frequency of use of decision support techniques are presented in Table 7.13 below.

Table 7.13: Kendall's tau correlation coefficient test results for a relationship between contingent variables and the frequency of use of decision support techniques.

No	Variables	1	2	3	4	5	6
1	Product profitability analysis	-0.044	0.205*	0.245**	0.049	0.059	-0.056
		0.334	0.025	0.008	0.308	0.285	0.302
2	Break-even analysis	-0.039	0.160	0.172**	0.155	0.265**	0.310**
		0.353	0.063	0.046	0.056	0.005	0.002
3	Stock control model	0.023	-0.021	0.110	0.069	0.008	0.016
		0.411	0.419	0.140	0.239	0.471	0.440
4	Payback	-0.105	0.077	0.176*	0.128	0.358**	0.037
		0.148	0.226	0.039	0.088	0.000	0.366
5	Net present value	-0.076	-0.007	0.107	0.118	0.230*	0.099
		0.226	0.471	0.146	0.109	0.013	0.068
6	Customer profitability analysis	-0.123	0.245**	0.140	-0.028	-0.135	-0.114
		0.113	0.010	0.082	0.388	0.095	0.144
7	Accounting rate of return	-0.215*	-0.030	0.124	0.190**	0.103	-0.098
		0.017	0.388	0.111	0.024	0.128	0.182
8	Internal rate of return	-0.033	-0.009	0.036	0.171*	0.203*	0.092
		0.372	0.466	0.360	0.036	0.024	0.090

1; Firm's size; 2: Market competition; 3: Participation of owner/manager; 4: AMT; 5: Qualification; 6: Manufacturing activities

The results indicate six significant relationships between contingent variables and decision support techniques. First, there is a small, negative and significant relationship between size of firm and the frequency of use of accounting rate of return. Second there are small, positive and significant relationships between the intensity of market competition and the frequency of use of product profitability analysis and customer profitability analysis. Next, there are small, positive and significant relationships between the participation of owner/manager and the frequency of use of three out of eight decision support techniques. Fourth, there are small, positive and significant relationships between AMT and the frequency of use of two out of eight decision support techniques. Fifth, there are positive and significant relationships between the level of qualification of accounting staff and the frequency of use of four out of eight

decision support techniques. The magnitude of the relationships ranges from small to medium. Lastly there is a medium, positive and significant relationship between industry type and the frequency of use of accounting rate of return.

7.4.5 Contingent variables and strategic management accounting techniques

The results of Kendall's tau analysis between contingent variables and the frequency of use of SMA techniques are presented in Table 7.14 below.

Table 7.14: Kendall's tau correlation coefficient test results for a relationship between contingent variables and the frequency of use of strategic management accounting techniques.

No	Variables	1	2	3	4	5	6
1	Strategic pricing	-0.155	0.099	0.244*	0.224*	0.190*	-0.013
		0.083	0.194	0.015	0.018	0.050	0.456
2	Target costing	-0.237*	0.132	0.040	0.245*	0.097	0.054
		0.016	0.123	0.359	0.010	0.198	0.322
3	Life cycle cost	-0.203*	-0.123	0.078	0.130	0.088	0.043
		0.033	0.139	0.212	0.081	0.187	0.357
4	Value chain	-0.235*	0.014	0.141	0.152	0.128	-0.050
		0.017	0.452	0.104	0.050	0.099	0.336
5	Strategic costing	-0.159	0.087	0.158	0.093	0.069	-0.068
		0.077	0.223	0.079	0.190	0.246	0.282
6	Competitor position monitoring	-0.147	0.136	0.120	0.298**	-0.118	-0.120
		0.091	0.114	0.139	0.002	0.152	0.153

1; Firm's size; 2: Market competition; 3: Participation of owner/manager; 4: AMT; 5: Qualification; 6: Manufacturing activities

The results indicate four significant relationships between contingent variables and SMA techniques. First, there are small, negative and significant relationships between size of firm and the frequency of use of three out six SMA techniques. Second, there is a small, positive and significant relationship between the participation of

owner/manager and the frequency of use of strategic pricing. Next, there are small, positive and significant relationships between AMT and the frequency of use of three out of six SMA techniques. Lastly, there is a small, positive and significant relationship between the level of qualification of accounting staff and the frequency of use of strategic pricing.

Summary

The examination of the relationship between individual techniques and contingent factors reveals that there were positive and significant associations between the five main contingent variables and certain management accounting techniques under five broad areas of MAPs. The position revealed as with the examination of the relationship between accounting practices and contingent variables is not clear cut but a number of points can be gleaned.

First, the results reveal that the size of the firms (which is measured by the annual sales turnover) has a very small and negative association with the use of 18% (eight out of 45) management accounting techniques. The negative results are contrary with the earlier findings that the direction of association for MAPs was positive. The results do not contradict the finding that larger firms make greater use of costing and performance evaluation systems as the size of firms were only negatively correlated with the least used management accounting techniques that fall outside these practices such as ZBB, employees turnover, absentee rate and value chain analysis.

Second, the result shows that the intensity of market competition has a small association with the use of 13% (6 out of 45) techniques under all areas of MAPs except SMA. These results provide some evidence of a relationship between market competition and

the use of management accounting techniques which is consistent with the earlier analysis (Kendall's tau). Overall the results suggest that the intensity of market competition has minimal impact on the adoption of management accounting techniques within medium sized firms.

Third, the participation of owner/manager has 47% (21 out of 45) significant associations with techniques under four out of the five areas of management accounting practice (the exception being use of a costing system). This is consistent with the previous analysis except that a relationship to some performance evaluation techniques was found. This result strongly suggests that the owner/manager potentially plays a key role in increasing the use of various management accounting techniques in medium sized firms.

Similarly, the use of AMT was widely associated with the use of the 47% (21 out of 45) management accounting techniques under all area of MAPs. This result is consistent with the results for accounting practices and even includes techniques within budgeting which was a practice for which no significant relationship was found when testing MAPs. Therefore this result strengthens the previous results that manufacturing technology has a strong impact on the use of MAPs in medium sized firms.

Lastly, the level of qualification of accounting staff has 42% (19 out of 45) significant associations with techniques under four out of the five areas of management accounting practice (the exception being costing system). These results are at variance with the analysis for MAPs that reported no significant relationship between the use of MAPs and qualified accounting staff. This result suggests that the higher the qualification of

accounting staff, the higher the frequency of use of certain techniques in various area of management accounting.

Overall the additional tests have provided additional evidence for a relationship between contingency factors and management accounting techniques. Owner/manager participation and AMT appear to be associated positively with almost half of the MATs listed thus suggesting that there is a considerable positive impact on the level of adoption of management accounting techniques from the participation of owner/managers and the extensive use of technology.

7.5 Association analysis of management accounting practices and perceptions of firm performance

In this section, the tests for association analysis seek to answer the fourth research objective of this study; to explore the relationship between the use of MAPs and the perceptions of performance of medium sized firms. The objective is translated into the second hypothesis that ‘there are significant and positive relationships for medium sized firms between the use of MAPs and perceptions of firm performance’.

Before going further, the nature of the data employed in the relationship should be examined in order to determine the type of test relevant for the hypothesis testing. Table 7.15 below summarizes the details.

Table 7.15: A summary of the type of data of independent and dependent variables under the second hypothesis.

	Details	Type of data
Dependent variables		
Level of productivity	5-Likert scale	Ordinal
Product quality	5-Likert scale	Ordinal
Number of deliveries on time	5-Likert scale	Ordinal
Sales growth rate	5-Likert scale	Ordinal
Operating profit growth rate	5-Likert scale	Ordinal
Cash flow growth rate	5-Likert scale	Ordinal
Average of performance	Average	Ordinal
Independent variables		
Costing system	Yes/No	Binary
Budgeting system	Yes/No	Binary
Performance evaluation system	Yes/No	Binary
Decision support system	Yes/No	Binary
Strategic management accounting	Yes/No	Binary

Six indicators are employed to measure perceptions of the firm performance. These indicators are measured using a five-point Likert scale (1 is ‘decreased significantly’ to 5 ‘increased significantly’). In addition, a composite index of those indicators is also computed to present an assessment of the perception of performance as a whole - ‘average of performance’. The composite score was calculated using the above six individual performance indicators scores summated for each respondent. The potential advantages of using a composite index have been discussed in section 7.3.4. Since both dependent and independent variables are in binary and ordinal respectively, thus, as in the section 7.3, a Kendall’s tau test will be used to test the significance and the strength of the relationships.

The next five subsections discuss the results in detail.

7.5.1 Costing system and perceptions of firm performance

The following seven sub-hypotheses (H₂₋₁ to H₂₋₇) were developed for the relationship between costing system and perceptions of firm performance within medium sized firms.

H₂₋₁ : There is a significant and positive relationship between the use of costing systems and perceptions of performance in the level of productivity

H₂₋₂ : There a significant and positive relationship between the use of costing systems and perceptions of performance in product quality

H₂₋₃ : There is a significant and positive relationship between the use of costing systems and perceptions of performance in the number of deliveries on time

H₂₋₄ : There is a significant and positive relationship between the use of costing systems and perceptions of performance in sales growth rate

H₂₋₅ : There is a significant and positive relationship between the use of costing systems and perceptions of performance in operating profit growth rate

H₂₋₆ : There is a significant and positive relationship between the use of costing systems and perceptions of performance in cash flow growth rate

H₂₋₇ : There is a significant and positive relationship between the use of costing systems and perceptions of performance in average of performance

Table 7.16: Kendall's tau correlation coefficient test results for a relationship between the use of a costing system and the perceptions of firm performance.

	Hypothesis	Correlation coefficient	Sig. value
Level of productivity	H₂₋₁	0.219	0.008
Product quality	H ₂₋₂	0.055	0.276
Number of deliveries on time	H ₂₋₃	0.127	0.082
Sales growth rate	H₂₋₄	0.177	0.023
Operating profit growth rate	H ₂₋₅	0.147	0.051
Cash flow growth rate	H₂₋₆	0.325	0.006
Average of performance	H₂₋₇	0.217	0.004

Significant correlation in bold

The results show a positive and significant relationship between the use of costing system and perceptions of performance relating to level of productivity, sales growth rate, cash flow growth rate and average of performance. However there appears to be no support for any statistically significant relationship between the use of a costing system and the other three performance indicators. Therefore both sub-hypotheses number H₂₋₁, H₂₋₄, H₂₋₆ and H₂₋₇ are accepted. Sub-hypotheses H₂₋₂, H₂₋₃ and H₂₋₅, although they have positive correlation coefficients in line with the hypothesis, are rejected.

7.5.2 Budgeting system and perceptions of firm performance

The following seven sub-hypotheses (H₂₋₈ to H₂₋₁₄) were developed for the relationship between budgeting system and perceptions of firm performance within medium sized firms.

H₂₋₈ : There is a significant and positive relationship between the use of budgeting systems and perceptions of performance in the level of productivity

H₂₋₉ : There is a significant and positive relationship between the use of budgeting systems and perceptions of performance in the product quality

H₂₋₁₀ : There is a significant and positive relationship between the use of budgeting systems and perceptions of performance in the number of deliveries on time

H₂₋₁₁ : There is a significant and positive relationship between the use of budgeting systems and perceptions of performance in sales growth rate

H₂₋₁₂ : There is a significant and positive relationship between the use of budgeting systems and perceptions of performance in operating profit growth rate

H₂₋₁₃ : There is a significant and positive relationship between the use of budgeting systems and perceptions of performance in cash flow growth rate

H₂₋₁₄ : There is a significant and positive relationship between the use of budgeting systems and perceptions of the average of performance

Table 7.17: Kendall's tau correlation coefficient test results for a relationship between the use of a budgeting system and the perceptions of firm performance.

	Hypothesis	Correlation coefficient	Sig. value
Level of productivity	H ₂₋₈	0.106	0.120
Product quality	H ₂₋₉	-0.051	0.287
Number of deliveries on time	H ₂₋₁₀	0.106	0.122
Sales growth rate	H ₂₋₁₁	0.141	0.056
Operating profit growth rate	H₂₋₁₂	0.321	0.007
Cash flow growth rate	H₂₋₁₃	0.149	0.048
Average of performance	H₂₋₁₄	0.167	0.021

Significant correlation in bold

Table 7.17 shows a positive and significant relationship between the use of budgeting system and perceptions of performance relating to operating growth rate, cash flow growth rate and average of performance. However there appears to be no support for any statistically significant relationship between the use of a budgeting system and the other five performance indicators. Therefore both sub-hypotheses number H_{2-12} , H_{2-13} and H_{2-14} are accepted. The rest of the sub-hypotheses except sub-hypothesis H_{2-9} have positive correlation coefficients in line with the hypothesis. However all of these sub-hypotheses are rejected.

7.5.3 Performance evaluation system and perceptions of firm performance

The following seven sub-hypotheses (H_{2-15} to H_{2-21}) were developed for the relationship between the use of a performance evaluation system and perceptions of firm performance within medium sized firms.

H_{2-15} : There is a significant and positive relationship between the use of performance evaluation systems and perceptions of performance in the level of productivity

H_{2-16} : There is a significant and positive relationship between the use of performance evaluation systems and perceptions of performance in the product quality

H_{2-17} : There is a significant and positive relationship between the use of performance evaluation systems and perceptions of performance in the number of deliveries on time

H_{2-18} : There is a significant and positive relationship between the use of performance evaluation systems and perceptions of performance in sales growth rate

H₂₋₁₉ : There is a significant and positive relationship between the use of performance evaluation systems and perceptions of performance in operating profit growth rate

H₂₋₂₀ : There is a significant and positive relationship between the use of performance evaluation systems and perceptions of performance in cash flow growth rate

H₂₋₂₁ : There is a significant and positive relationship between the use of performance evaluation systems and perceptions of average of performance

Table 7.18: Kendall's tau correlation coefficient test results for a relationship between the use of a performance evaluation system and the perceptions of firm performance.

	Hypothesis	Correlation coefficient	Sig. value
Level of productivity	H₂₋₁₅	0.152	0.045
Product quality	H ₂₋₁₆	-0.084	0.179
Number of deliveries on time	H ₂₋₁₇	0.041	0.327
Sales growth rate	H ₂₋₁₈	0.094	0.144
Operating profit growth rate	H ₂₋₁₉	0.136	0.066
Cash flow growth rate	H ₂₋₂₀	0.143	0.055
Average of performance	H ₂₋₂₁	0.111	0.089

Significant correlation in bold

Table 7.18 indicates that there is a small, positive and significant relationship between the use of performance evaluation systems and perceptions of performance relating to level of productivity. Therefore only sub-hypothesis H₂₋₁₅ is accepted. The remaining sub-hypotheses although all except one have positive correlation coefficients in line with the sub-hypotheses, are rejected.

7.5.4 Decision support system and perceptions of firm performance

The following seven sub-hypotheses (H₂₋₂₂ to H₂₋₂₈) were developed with respect to the relationship between decision support system and perceptions of firm performance within medium sized firms.

H₂₋₂₂ : There is a significant and positive relationship between the use of decision support systems and perceptions of performance in the level of productivity

H₂₋₂₃ : There is a significant and positive relationship between the use of decision support systems and perceptions of performance in the product quality

H₂₋₂₄ : There is a significant and positive relationship between the use of decision support systems and perceptions of performance in the number of deliveries on time

H₂₋₂₅ : There is a significant and positive relationship between the use of decision support systems and perceptions of performance in sales growth rate

H₂₋₂₆ : There is a significant and positive relationship between the use of decision support systems and perceptions of performance in operating profit growth rate

H₂₋₂₇ : There is a significant and positive relationship between the use of decision support systems and perceptions of performance in cash flow growth rate

H₂₋₂₈ : There is a significant and positive relationship between the use of decision support systems and perceptions of the average of performance

Table 7.19: Kendall’s tau correlation coefficient test results for a relationship between the use of a decision support system and the perceptions of firm performance.

	Hypothesis	Correlation coefficient	Sig. value
Level of productivity	H ₂₋₂₂	0.087	0.166
Product quality	H ₂₋₂₃	0.017	0.424
Number of deliveries on time	H ₂₋₂₄	0.099	0.137
Sales growth rate	H ₂₋₂₅	0.057	0.268
Operating profit growth rate	H₂₋₂₆	0.175	0.026
Cash flow growth rate	H₂₋₂₇	0.212	0.009
Average of performance	H ₂₋₂₈	0.126	0.063

Significant correlation in bold

Table 7.19 shows a positive and significant relationship between the use of decision support system and perceptions of performance relating to operating profit growth rate and cash flow growth rate. Therefore only sub-hypothesis H₂₋₂₆ and H₂₋₂₇ are accepted. The remaining sub-hypotheses despite having a consistently positive correlation coefficient in line with the hypothesis are rejected.

7.5.5 Strategic management accounting and perceptions of firm performance

The following seven sub-hypotheses (H₂₋₂₉ to H₂₋₃₅) were developed for the relationship between SMA and perceptions of firm performance within medium sized firms.

H₂₋₂₉ : There is a significant and positive relationship between the use of strategic management accounting and perceptions of performance in the level of productivity

H₂₋₃₀ : There is a significant and positive relationship between the use of a strategic management accounting and perceptions of performance in the product quality

H₂₋₃₁ : There is a significant and positive relationship between the use of a strategic management accounting and perceptions of performance in the number of deliveries on time

H₂₋₃₂ : There is a significant and positive relationship between the use of a strategic management accounting and perceptions of performance in sales growth rate

H₂₋₃₃ : There is a significant and positive relationship between the use of a strategic management accounting and perceptions of performance in operating profit growth rate

H₂₋₃₄ : There is a significant and positive relationship between the use of a strategic management accounting and perceptions of performance in cash flow growth rate

H₂₋₃₅ : There is a significant and positive relationship between the use of a strategic management accounting and perceptions of the average of performance

Table 7.20: Kendall's tau correlation coefficient test results for a relationship between the use of strategic management accounting and the perceptions of firm performance.

	Hypothesis	Correlation coefficient	Sig. value
Level of productivity	H₂₋₂₉	0.157	0.040
Product quality	H ₂₋₃₀	0.070	0.221
Number of deliveries on time	H₂₋₃₁	0.161	0.039
Sales growth rate	H ₂₋₃₂	0.121	0.169
Operating profit growth rate	H₂₋₃₃	0.180	0.036
Cash flow growth rate	H₂₋₃₄	0.215	0.011
Average of performance	H₂₋₃₅	0.193	0.013

Significant correlation in bold

Table 7.20 shows that the use of SMA has moderate, positive and significant relationship with perceptions of performance relating to level of productivity, number of deliveries on time, operating profit growth rate, cash flow growth rate and average of performance. This indicates that the use of SMA is associated with perceptions of improved performance in a number of areas. Therefore, H₂₋₂₉, H₂₋₃₁, H₂₋₃₃, H₂₋₃₄ and H₂₋₃₅ are accepted. The remaining sub-hypotheses, despite having positive correlation coefficients in line with the sub-hypothesis are rejected.

7.5.6 Association analysis of industry type and perceptions of firm performance

Perceptions of performance may be affected by the nature of the industry that the firm works within as certain industries may outperform or underperform others irrespective of the management accounting practice use. If this is true industry type may need to be a control variable in the multivariate model. The following additional seven sub-hypotheses (H₂₋₃₆ to H₂₋₄₃) were developed for medium sized firms in order to guide the analysis.

H₂₋₃₆ : There is a significant relationship between industry type and perceptions of performance in the level of productivity

H₂₋₃₇ : There is a significant relationship between industry type and perceptions of performance in the product quality

H₂₋₃₈ : There is a significant relationship between industry type and perceptions of performance in the number of deliveries on time

H₂₋₃₉ : There is a significant relationship between industry type and perceptions of performance in sales growth rate

H₂₋₄₀ : There is a significant relationship between industry type and perceptions of performance in operating profit growth rate

H₂₋₄₁ : There is a significant relationship between industry type and perceptions of performance in cash flow growth rate

H₂₋₄₂ : There is a significant relationship between industry type and perceptions of the average of performance

Table 7.21: Pearson chi-square and Cramer's V correlation coefficient test results for a relationship between the type of manufacturing activities and the perceptions of firm performance.

	Hypothesis	Correlation coefficient	Sig. value
Level of productivity	H ₂₋₃₆	0.198	0.232
Product quality	H ₂₋₃₇	0.058	0.947
Number of deliveries on time	H ₂₋₃₈	0.073	0.901
Sales growth rate	H ₂₋₃₉	0.076	0.959
Operating profit growth rate	H ₂₋₄₀	0.131	0.761
Cash flow growth rate	H ₂₋₄₁	0.091	0.924
Average of performance	H ₂₋₄₂	0.350	0.762

Significant correlation in bold

Table 7.21 suggests that there are no significant relationships between the type of industry that the respondent is in and perceptions of firm performance. Therefore all

seven sub-hypotheses (H_{2-36} to H_{2-43}), are all rejected. This in turn would suggest that there is no need to control for industry in the multivariate model.

Summary

Overall above results provide some evidence as to significant relationships between the use of MAPs and perceptions as to the level of firm performance. The greater use of costing systems and SMA are positive and significantly associated with a higher level of perceived performance in a number of areas especially those at business level. Similarly the use of budgeting systems and decision support systems appear to have limited significant relationships with performance measures at business level. Lastly the results also indicate that the greater use of performance evaluation systems is solely associated with one indicator of performance (level of productivity).

As in the previous section, a further insight to relationships between the use of management accounting and performance will be undertaken. This can be done by examining the analysis for MATs instead of MAPs. The following section continues using bivariate analysis for testing the relationship between the frequency of use of MATs and perceptions of firm performance.

7.6 Additional analysis: Test for an association of the frequency of use of management accounting techniques and perceptions of firm performance

This section extends the analysis by investigating whether the 45 specific techniques of MAPs are correlated with perceptions of firm performance. Table 7.22 below, summarises the type of data that will be used in testing.

Table 7.22: A summary of the type of data for the new independent variables.

	Details	Type of data
Independent variables		
Costing system (7 techniques)	5-Likert scale	Ordinal
Budgeting system (11 techniques)	5-Likert scale	Ordinal
Performance evaluation system (13 techniques)	5-Likert scale	Ordinal
Decision support system (8 techniques)	5-Likert scale	Ordinal
Strategic management accounting (6 techniques)	5-Likert scale	Ordinal

Given to the nature of the data and for the reasons explained in section 7.4, a Kendall's tau test is used. The results of the tests are discussed in the following sub sections.

7.6.1 Costing techniques and perceptions of firm performance

The results of Kendall's tau analysis between the frequency of use of costing techniques and perceptions of performance are presented in Table 7.23.

Table 7.23: Kendall's tau correlation coefficient test results for a relationship between the frequency of use of costing techniques and the perceptions of firm performance measured in seven ways.

No	Items	1	2	3	4	5	6	7
1	Process costing	0.015	-0.020	0.029	-0.003	0.004	0.064	0.024
		0.424	0.398	0.356	0.485	0.482	0.205	0.368
2	Job costing	-0.052	0.093	-0.030	0.018	-0.051	-0.070	-0.039
		0.266	0.134	0.359	0.415	0.267	0.197	0.301
3	Batch costing	0.075	0.231*	0.013	0.082	0.045	0.106	0.062
		0.183	0.010	0.447	0.160	0.291	0.098	0.204
4	Contract costing	0.268**	0.391**	0.297**	0.181*	0.246**	0.131	0.296**
		0.004	0.000	0.002	0.034	0.007	0.096	0.001
5	Absorption costing	0.075	0.035	-0.051	0.138	0.126	0.194*	0.098
		0.240	0.350	0.282	0.093	0.076	0.033	0.112
6	Variable costing	-0.091	-0.071	-0.258**	-0.084	-0.011	0.053	-0.070
		0.156	0.220	0.008	0.177	0.450	0.276	0.196
7	ABC costing	-0.155	-0.231**	-0.002	-0.125	-0.191*	-0.170	-0.176*
		0.057	0.014	0.490	0.078	0.033	0.051	0.031

1: Level of productivity; 2: Product quality; 3: Number of deliveries on time; 4: Sales growth rate ; 5: Operating profit ; 6: Cash flow growth rate; 7: Average of performance

Table 7.23 finds five significant relationships between the frequency of use of costing techniques and the perceptions of firm performance. First, there is a small, positive and significant relationship between the frequency of use of batch costing and the perception of product quality. Second, there are positive and significant relationships between the frequency of use of contract costing and the perception on six out of seven indicators of performance. The magnitude of the relationships ranges from relatively small to moderate. Third, there is a small, positive and significant relationship between the frequency of use of absorption costing and the perception of cash flow growth rate. Next, there is a small, negative and significant relationship between the frequency of use of variable costing and the perception of number of deliveries on time. Lastly, there

are small, negative and significant relationships between the frequency of use of ABC and three out of seven indicators of performance.

7.6.2 Budgeting techniques and perceptions of firm performance

The results of Kendall's tau analysis between the frequency of use of budgeting techniques and perceptions of performance are presented in Table 7.24.

Table 7.24: Kendall's tau correlation coefficient test results for a relationship between the frequency of use of budgeting techniques and the perceptions of firm performance measured in seven ways.

Rank	Techniques/Performance	1	2	3	4	5	6	7
1	Sales budget	0.267**	0.183*	0.293**	0.271**	0.250*	0.293**	0.289**
		0.003	0.033	0.002	0.003	0.005	0.001	0.001
2	Cash flow budget	0.238*	0.274**	0.239*	0.203*	0.241**	0.303**	0.302**
		0.007	0.003	0.008	0.018	0.007	0.001	0.000
3	Financial position budget	0.284**	0.273**	0.226*	0.168*	0.233**	0.222**	0.283**
		0.002	0.002	0.010	0.037	0.008	0.010	0.001
4	Production budget	0.233*	0.158*	0.198*	0.152	0.164*	0.197*	.222**
		0.025	0.050	0.019	0.052	0.042	0.018	.058
5	Purchasing budget	0.288**	0.272**	0.270**	0.207*	0.279**	0.319**	0.322**
		0.001	0.002	0.003	0.014	0.002	0.000	0.000
6	Annual budget	0.201*	0.126	0.125	0.143	0.113	0.134	0.210**
		0.019	0.098	0.099	0.066	0.121	0.181	0.008
7	Monthly budget	0.087	0.172*	0.040	-0.018	0.096	-0.034	0.091
		0.198	0.049	0.350	0.430	0.175	0.369	0.123
8	Continuous budget	0.089	0.091	0.081	0.067	0.002	0.014	0.023
		0.195	0.194	0.217	0.224	0.491	0.436	0.388
9	Flexible budget	0.111	0.179*	0.064	-0.016	-0.029	-0.032	0.063
		0.137	0.040	0.263	0.437	0.387	0.375	0.210
10	Incremental budgeting	0.034	-0.012	-0.014	-0.030	-0.041	-0.017	0.052
		0.365	0.453	0.446	0.381	0.341	0.432	0.253
11	Zero-based budgeting	0.046	0.213*	0.150	0.010	0.009	0.112	0.087
		0.336	0.024	0.082	0.462	0.467	0.147	0.186

1: Level of productivity; 2: Product quality; 3: Number of deliveries on time; 4: Sales growth rate; 5: Operating profit; 6: Cash flow growth rate; 7: Average of performance

Table 7.24 suggests four significant relationships between the frequency of use of budgeting techniques and the perceptions of firm performance. First, there are positive and significant relationships between the frequency of use of sales budget, cash flow budget; financial position budget; purchasing budget and all indicators of performance. The magnitude of the relationships ranges from relatively small to moderate. Second, there are small, positive and significant relationships between the frequency of use of production budget and six out of seven indicators of performance. Third, there are small, positive and significant relationships between the frequency of use of annual budget and perceptions on the level of productivity and total performance. Lastly there are small, positive and significant relationships between the frequency of use of monthly budgets, flexible budgets and ZBB and perceptions as to the level of product quality.

7.6.3 Performance evaluation techniques and perceptions of firm performance

The results of Kendall's tau analysis between the frequency of use of performance evaluation techniques and perceptions of performance are presented in Table 7.25.

Table 7.25: Kendall's tau correlation coefficient test results for a relationship between the frequency of use of performance evaluation techniques and the perceptions of firm performance measured in seven ways.

Rank	Techniques/Performance	1	2	3	4	5	6	7
1	Sales growth	0.159	0.113	0.215**	0.154	0.189*	0.245**	0.210**
		0.051	0.127	0.014	0.055	0.026	0.006	0.005
2	Operating income	0.111	0.157	0.124	-0.033	0.037	0.036	0.100
		0.126	0.057	0.104	0.366	0.351	0.328	0.088
3	Cash flows	0.229**	0.081	0.174*	0.203**	0.205*	0.239**	0.210**
		0.008	0.204	0.036	0.016	0.016	0.006	0.008
4	On-time delivery	0.187*	0.245**	0.242**	0.098	0.187*	0.142	0.191*
		0.022	0.005	0.005	0.144	0.022	0.062	0.012

5	Variance analysis	0.088 0.171	0.038 0.343	0.153 0.051	-0.025 0.391	0.105 0.130	0.070 0.224	0.091 0.143
6	Number of customer complaints	0.020 0.413	0.078 0.206	0.163* 0.040	0.020 0.413	0.026 0.369	0.055 0.235	0.086 0.155
7	Manufacturing lead time	0.199* 0.016	0.235** 0.007	0.254** 0.003	0.103 0.132	0.164* 0.038	0.224** 0.008	0.223** 0.004
8	Defect rate	-0.017 0.428	0.012 0.449	0.098 0.148	-0.040 0.330	0.004 0.471	0.036 0.318	0.037 0.330
9	Return on investment	0.189* 0.020	0.205* 0.015	0.269** 0.002	0.160* 0.040	0.250** 0.003	0.242** 0.003	0.245** 0.002
10	Employee turnover	0.030 0.370	0.082 0.149	0.267** 0.002	0.057 0.227	-0.024 0.379	0.023 0.383	0.125 0.067
11	Survey of customer satisfaction	-0.038 0.493	0.028 0.359	0.111 0.074	0.003 0.484	-0.055 0.236	-0.034 0.325	-0.002 0.492
12	Absentee rates	0.018 0.422	0.103 0.097	0.267** 0.002	0.128 0.081	-0.013 0.443	0.088 0.169	0.133 0.059
13	Number of warranty claims	0.025 0.393	0.149 0.059	0.194* 0.019	0.005 0.477	0.048 0.302	0.125 0.088	0.133 0.059

1: Level of productivity; 2: Product quality; 3: Number of deliveries on time; 4: Sales growth rate; 5: Operating profit; 6: Cash flow growth rate; 7: Average of performance

Table 7.25 suggests three significant relationships between the frequency of use of performance evaluation techniques and the perceptions of firm performance. First, there are small, positive and significant relationships between the frequencies of use of sales growth; cash flows; on-time delivery; manufacturing lead time; with at least four out seven indicators of performance. Second, there are small positive and significant relationships between the frequency of use of return on investment and all indicators of performance. Lastly, there are small, positive and significant relationships between the frequency of use of measures as to employee turnover; absentee rates; number of warranty claims and the perception on the level on number of deliveries on time.

7.6.4 Decision support techniques and perceptions of firm performance

The results of Kendall's tau analysis between the frequency of use of decision support techniques and perceptions of performance are presented in Table 7.26.

Table 7.26: Kendall's tau correlation coefficient test results for a relationship between the frequency of use of decision support techniques and the perceptions of firm performance measured in seven ways.

No.	Variables	1	2	3	4	5	6	7
1	Product profitability analysis	0.232*	0.064	0.184*	0.114	0.138	0.136	0.166*
		0.012	0.244	0.037	0.129	0.062	0.066	0.022
2	Break-even analysis	0.122	0.055	0.144	0.072	0.072	-0.002	0.122
		0.086	0.273	0.054	0.211	0.211	0.491	0.068
3	Stock control model	-0.005	0.075	0.097	0.081	0.004	0.108	0.074
		0.477	0.204	0.140	0.181	0.483	0.112	0.181
4	Payback	0.035	-0.060	0.106	0.053	0.109	0.075	0.085
		0.346	0.252	0.115	0.272	0.109	0.198	0.146
5	Net present value	0.043	0.110	0.097	0.040	0.047	-0.007	0.039
		0.316	0.112	0.139	0.325	0.298	0.470	0.316
6	Customer profitability analysis	0.140	0.097	0.223**	0.180*	0.064	0.047	0.135
		0.082	0.173	0.014	0.036	0.235	0.298	0.050
7	Accounting rate of return	0.182*	0.129	0.125	0.062	0.121	0.047	0.140*
		0.036	0.106	0.110	0.268	0.088	0.298	0.043
8	Internal rate of return	0.067	0.138	-0.024	-0.064	-0.026	-0.042	0.011
		0.254	0.089	0.406	0.236	0.385	0.318	0.448

1: Level of productivity; 2: Product quality; 3: Number of deliveries on time; 4: Sales growth rate; 5: Operating profit; 6: Cash flow growth rate; 7: Average of performance

Table 7.26 finds three significant relationships between the frequency of use of decision support techniques and the perceptions of firm performance. First, there are small, positive and significant relationships between the frequency of use of product profitability analysis and three out of seven indicators of performance. Second, there are small, positive and significant relationships between the frequency of use of customer profitability analysis and perceptions on the level of number of deliveries on time and sales growth rate. Lastly, there is small, positive and significant relationship between the frequency of use of accounting rate of return and perceptions on the level of productivity.

7.6.5 Strategic management accounting techniques and perceptions of firm performance

The results of Kendall's tau analysis between the frequency of use of SMA techniques and perceptions of performance are presented in Table 7.27.

Table 7.27: Kendall's tau correlation coefficient test results for a relationship between the frequency of use of strategic management accounting techniques and the perceptions of firm performance measured in seven ways.

No.	Variables	1	2	3	4	5	6	7
1	Strategic pricing	0.086	0.150	0.180	0.000	0.036	0.002	0.054
		0.221	0.094	0.055	0.500	0.372	0.494	0.300
2	Target costing	0.207*	0.331**	0.261**	0.141	0.162	0.133	0.219*
		0.030	0.002	0.009	0.099	0.070	0.114	0.016
3	Life cycle cost	0.142	0.239*	0.151	0.100	0.007	0.048	0.128
		0.098	0.016	0.086	0.152	0.471	0.330	0.103
4	Value chain	-0.019	0.030	0.080	-0.046	-0.080	-0.105	-0.030
		0.433	0.395	0.236	0.336	0.233	0.172	0.386
5	Strategic costing	0.129	0.236*	0.083	0.146	0.138	0.173	0.138
		0.124	0.018	0.229	0.093	0.313	0.060	0.088
6	Competitor position monitoring	0.268**	0.242*	0.163	0.085	0.081	0.088	0.112
		0.007	0.015	0.070	0.218	0.228	0.210	0.134

1: Level of productivity; 2: Product quality; 3: Number of deliveries on time; 4: Sales growth rate; 5: Operating profit; 6: Cash flow growth rate; 7: Average of performance

Table 7.27 finds four significant relationships between the frequency of use of SMA techniques and the perceptions of firm performance. First, there are positive and significant relationships between the frequency of use of target costing and four out of seven indicators of performance. The magnitude of the relationships ranges from small to medium. Next, there are small, positive and significant relationships between the frequency of use of life cycle cost and strategic costing and perceptions on the level of product quality. Lastly, there are small, positive and significant relationships between

the frequency of use of competitor position monitoring and two out of seven indicators of performance.

Summary

The analysis at the level of specific techniques provided some positive and significant associations between the five main contingent variables and certain management accounting techniques. The position revealed, as with the examination of the relationship between MAPs and performance of firm, is not clear cut but a number of points can be gleaned.

The majority of significant relationships with various measures of performance perception arose with the frequency of use of techniques related to budgeting system and performance evaluation system. Five out of eleven budgeting techniques which represent full financial budgeting system have positive and significant relationships with majority of indicators of perception of performance. The other three budgeting techniques were significantly associated with at least half of the perception of performance indicators. Under the performance evaluation system, five out of thirteen performance evaluation techniques were significantly associated with at least 60% indicators of perception of performance. The other four techniques were significantly associated with one indicator of performance. These results suggest that the greater use of certain budgeting and performance evaluation techniques will result in a higher level of perceived performance in a number of areas.

There were also a few significant relationships between certain techniques under costing systems, decision support systems and SMA and certain indicators of perceptions of performance. Three out of six costing techniques are positively and significantly related

to certain indicators of perceptions of performance. Contract costing is significantly associated with 87% of indicators of performance. Surprisingly, the use of variable costing and ABC costing has negative and significant relationships with at least one indicator of perceptions of performance. Three out of eight decision support techniques are positively and significantly related with at least two indicators of perceptions of performance. Lastly, four out of six SMA techniques are positively and significantly related with at least one indicator of perception of performance. Target costing is the most associated of the techniques as it has positive and significant relationships with more than 50% of indicators of perceptions of performance.

Overall the additional tests have shown some interesting evidence for a relationship between the use of management accounting techniques and the performance of a firm. The use of both budgeting and performance evaluation techniques appear to be widely associated with a large number of performance indicators thus suggesting that a careful planning, controlling and monitoring of the firm performance can lead to the increase in performance of firm at both operational and business level.

7.7 Summary

This chapter evaluates and reports on the results of the bivariate analysis of data obtained from medium sized firms in the Malaysian manufacturing sector firstly to explore for possible relationships between selected contingent variables and the use of MAPs; and secondly to test whether there was any relationship between the use of MAPs and perceptions of firm performance.

The methodological approach for the first area of study is based on contingency theory, a theoretical perspective that emphasises how contingent factors such as technology and

environment affect the design and functioning of organisations (Abdel-Maksoud et al., 2005). Otley, (1980) observed that the firm's management accounting system is a significant element of its organisational structure and the features of an appropriate accounting system will depend upon the specific circumstances that the company faces. The contingency variables used in this study include those most commonly identified in the contingency theory literature which are size of the firm, market environment (intensity of market competition), and production technology (AMT). In addition another two variables are added to the analysis; participation of the owner/manager of a firm and the level of qualification of accounting staff since these are also among the significant factors found in small business contingency theory studies related to management or accounting. One control variable, industry type is also added as a sixth variable because it is believed that there is possibility that the industry that the respondent firms are in may have an impact on results.

The results of the bivariate analysis of the relationships between selected contingent variables and the use of MAPs in terms of the five main categories show that the direction of association of all 25 proposed sub-hypotheses was positive in line with the hypothesised relationship. However of these hypotheses ten were accepted and the other 15 were rejected. Table 7.28 below presents the summary of accepted sub-hypotheses.

Table 7.28: Positive results of a test for a statistically significant relationship between contingent variables and the use of management accounting practices.

	Hypotheses
Size of firm (Annual sales turnover)	
• Costing system	H ₁₋₁
• Performance evaluation system	H ₁₋₃
Intensity of market competition	

• Costing system	H ₁₋₆
• Budgeting system	H ₁₋₇
• Performance evaluation system	H ₁₋₈
Participation of owner/manager	
• Decision support system	H ₁₋₁₄
• Strategic management accounting	H ₁₋₁₅
Advanced manufacturing technology	
• Costing system	H ₁₋₁₆
• Performance evaluation system	H ₁₋₁₈
• Strategic management accounting	H ₁₋₂₀

The results indicate that four out of five explanatory variables were positively and significantly associated with at least two out of five MAPs. Interestingly three of these variables (annual sales turnover, intensity of market competition and AMT) are all associated with the use of costing systems and performance evaluation systems. This suggests that the use of a costing system and a performance evaluation system appear to be driven by different contingent variables to use of budgeting systems, decision support systems and SMA.

For use of costing systems and performance evaluation within medium sized firms there is evidence that as these firms grow they are more likely to employ costing and performance evaluation systems, perhaps in response to increased complexity and the need for more formalised control procedures. Further in a more complex manufacturing environment, there will need to be greater control over costs and the technology itself may well generate costing and performance information automatically.

The results also find that a greater use of information provided by two sophisticated MAPs (decision support system and SMA) are present when SME owner/managers have a greater participation and support for use of these systems. The results suggest

that, in medium sized firms, the owner/manager may drive pressure for improved information for decision support analysis and strategically information for planning and controlling. The demand for the greater use of sophisticated MAPs might be attributed to demands from the owner/manager of firm for information for handling more complex decision making and also for helping them in strategic planning. Likewise, the greater use of AMT has been positively and significantly associated with a higher level of use of SMA which indicates that the improved information for strategic planning and controlling is crucial in response to increased complexity in firm operations. The result also indicates that intensity of market competition is the only variable that has a positive and significant relationship with the use of budgeting systems. This suggests that as the medium sized firms face more intense competition, they are more likely to utilize more formalized planning through the use of budgeting systems. Overall the results suggest that intensity of market competition and the use of AMT appears the most significant contingent variables associate with the wider use of MAPs among medium sized firms in Malaysia.

Lastly the results do not suggest any significant relationship between industry type and the use of MAPs. This indicates that the use of the five categories of MAPs is unaffected by the industry in which the respondents operate.

The additional analyses of a relationship between contingency factors and management accounting techniques also confirmed that intensity of market competition; owner/manager participation; and AMT appear to associate with nearly half of the management accounting techniques listed, thus suggesting that these are the crucial contingent factors that would affect the level of adoption of management accounting techniques in medium sized firms.

This study shows that the contingency framework helps to structure the impact of various factors upon the use of MAPs in smaller firms particularly in a developing country. In contingency-based research on management accounting in business, the size of the firm, the degree of market competition and use of technology have been identified as major factors affecting the stability of an organisation's environment, and in turn its organisational structure and choice of management accounting system. The results of this study are consistent with this theory.

The results of the bivariate analysis of the relationships between the use of MAPs and the perception of firm performance show that 15 sub-hypotheses were accepted and the other 20 were rejected. Table 7.29 below presents the summary of accepted sub-hypotheses.

Table 7.29: Positive results of a test for a statistically significant relationship between the use of management accounting practices and the perceptions of firm performance.

	Hypotheses
Costing system	
• Level of productivity	H ₂₋₁
• Operating profit growth rate	H ₂₋₅
• Cash flow growth rate	H ₂₋₆
• Average of performance	H ₂₋₇
Budgeting system	
• Operating profit growth rate	H ₂₋₁₂
• Cash flow growth rate	H ₂₋₁₃
• Average of performance	H ₂₋₁₄
Performance evaluation system	
• Level of productivity	H ₂₋₁₅
Decision support system	
• Operating profit growth rate	H ₂₋₂₆
• Cash flow growth rate	H ₂₋₂₇

Strategic management accounting	
• Level of productivity	H ₂₋₂₉
• Number of deliveries on time	H ₂₋₃₁
• Operating profit growth rate	H ₂₋₃₃
• Cash flow growth rate	H ₂₋₃₄
• Average of performance	H ₂₋₃₅

The results indicate that all five MAPs are significantly associated with 43% (15 out of 35) indicators of performance. The costing system is positive and significantly related to four indicators of performance (level of productivity, operating profit growth rate, cash flow growth rate and average of performance). These results imply that the greater use of costing information will result in a higher level of perceived performance in a number of areas.

Secondly the use of budgeting system is positive and significantly related to operating profit growth rate, cash flow growth rate and overall performance. These results suggest that the increased use of planning and controlling activity is related with a higher level of perceived performance at business level and overall firm performance. Next, the use of decision support system has a positive and significant relationship with operating profit growth rate and cash flow growth rate which suggest that the improved use of decision support analysis will result in a higher level of perceived performance mostly at business level.

Lastly SMA is positively and significantly related to perceptions about five indicators of performance (level of productivity, number of deliveries on time, operating profit growth rate, cash flow growth rate and average of performance). This result possibly could suggest that those firms who have a greater use of SMA might perceive an increase in the number of areas of firm performance. However the results only provide a

limited evidence for a significant relationship between the use of performance evaluation systems and performance.

In general there are some supports for the second hypothesized relationship to the effect that the use of MAPs is associated with statistically significant increases in perceptions of performance. A higher use of SMA appears to be associated with wide area of performance thus suggesting that this practice is one of the crucial practices that can possibly help to increase the performance of the medium sized firms. An additional analysis based on specific management accounting techniques also found some evidence of significant associations between the use of management accounting techniques and performance. Overall, there are evidences for the positive relationships between the use of MAPs and performance although most of the strengths of the relationships are small. Hence the results also suggest that the use of MAPs alone will not improve the performance of firms but nevertheless there may be other complementary or synergistic factors inside or outside of the firms that might affect performance.

The analysis in this chapter has explored only the single relationship between each contingent variable and the extent of the use of MAPs and also the single relationship between the use of MAPs and perceptions of performance. The analysis did not identify the interrelationships among variables in explaining variation in the extent of using MAPs and different level of performance. Moreover, bivariate analyses may overstate the apparent overall explanatory power of a set of variables (independent variables). Therefore a more sophisticated analysis based on multivariate regression will be employed to seek additional evidence regarding the hypothesised relationships.

Chapter 8

Multivariate analysis

8.1 Introduction

The previous chapter reported the results of tests aimed at establishing whether there were any statistically significant associations between the use of MAPs and individual explanatory variables derived from contingency theory. The chapter also examined whether there were any relationships between the use of MAPs and perceptions of firm performance within Malaysian medium-sized firms in the manufacturing sector. This chapter will extend the analysis in order to seek to answer the following two questions, namely what is the influence of selected contingent variables on the use of MAPs if the interactive effect between explanatory variables is taken into account, and what is the influence of the use of MAPs on firm performance if the interactive effect between explanatory variables is taken into account. These questions will be answered by conducting multivariate tests using logistic (logit) regression analysis on 110 Malaysian medium sized firms in the manufacturing sector. The next section explains the justification for using logistic regression analysis.

8.2 Logistic regression analysis

Multivariate regression analysis is a statistical technique that examines the association between a single dependent variable and a number of independent variables (Hair et al., 1998). Conducting multivariate regression analysis minimises the possibility of overstating the apparent overall explanatory power of a group of independent variables which could occur using a series of bivariate analyses (Patton and Zelenka, 1997).

Multiple regression analysis or the regression model is the most commonly used statistical method in social sciences (Long, 1997). This method has become an integral component of data analysis concerned with describing the relationship between a response variable and one or more explanatory variables. The regression model assumes that the dependent variable is continuous and has been measured for all cases in the sample. Yet, many outcomes of fundamental interest to social scientists are not continuous or are not observed for all cases (Long, 1997). In such cases, logistic regression provides an alternative. This analysis is the natural complement of the regression model as it is specifically designed for categorical dependent variables. Hence it can be seen over the last decade the logistic regression model has become, in many fields, the standard method of analysis if the outcome variable is discrete (Hosmer and Lemeshow, 1989). Since the dependent variables of this study are in categorical forms, logistic regression analysis is chosen for multivariate analysis purpose. Furthermore, this approach has been widely used and reported in management accounting research (see Holmes and Nicholls, 1989; Kaplan and Mackey, 1992; Bjornenak, 1997; Gosselin, 1999; Ittner et al., 2002; Said et al., 2003; and Al-Omiri, 2003).

The choice of logistic regression analysis depends on the nature of the categorical variables. Long (1997) stated that categorical or limited dependent variables can be in several forms i.e binary, nominal, ordinal, censored and count variables. Once the form of the dependent variable is determined, it must be matched to the model used for the type of categorical variable. If the model does not match the measurement scale of the dependent variable, the estimates from the model could be biased, inefficient, or simply inappropriate (Long, 1997). *Binary* logit and probit models are appropriate for binary outcomes. The *ordered* logit and probit models explicitly deal with the ordered nature

of the dependent variable (ordinal outcomes). *Multinomial* logit is appropriate for nominal outcomes. The *tobit* model is designed for censored outcomes. Furthermore, a variety of models such as *Poisson* and *negative binomial* regression can be used for count outcomes (Long, 1997).

In this study, the dependent variables are in dichotomous and ordinal forms. The dichotomous (binary form) dependent variable is used in the first relationship (factors that affect the use of MAPs) where two possible outcomes exist: 1 equals use of a specific management accounting practice, and 0 equals a failure to use a management accounting practice. Meanwhile the ordinal dependent variable is used in the second relationship (the effect of the use of MAPs on firm performance) where a five-point Likert scale measuring the perceptions of firm performance is utilized. Therefore the binary logistic regression analysis is the best method for explaining the interactive effect between dependent variable and independent variables in the first situation and the ordered or ordinal logistic regression analysis is the best method in the second case. The following sub-section provides more details of these analyses.

8.2.1 Logistic regression: Model and underlying assumptions

Logistic regression involves the transformation of a dichotomous dependent variable for linearizing sigmoid distributions of proportions (Armitage and Berry, 1994). The transformation is called logit transformation and can be in odds and probability forms:

The odds ratio of an event happening is calculated using the formula:

$$\text{Odds ratio} = \frac{P(\text{event})}{1 - P(\text{event})}$$

Where $P(\text{event})$ refers to the probability of a particular event occurring, and $1 - P(\text{event})$ refers to the probability of the event not occurring. This odds ratio can be converted to a probability by using the formula:

$$P(\text{event}) = \text{odds}(\text{event}) / [1 + \text{odds}(\text{event})]$$

The above formulas will not extend the value of predicted outcome below zero. An odds ratio of 0 represents an event that will never happen, and is equivalent to a probability of 0. So in order to allow the predicted value to go below zero the final stage is to take the natural logarithm (\log) of the odds ratio, which gives the logit. The natural log of the odds ratio can stretch to plus or minus infinity ($\pm\infty$), but when it is converted back to a probability, it is bounded between zero and one.

$$\text{logit}(p) = \ln [p / 1-p]$$

The equation for the relationship between the dependent variable and the independent variables will become:

$$\text{logit}(p) = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \dots + \beta_k X_k$$

The logit (p) can be converted back to the odds by exponentiation, calculating $\text{Odds} = e^{\text{logit}(p)}$. This results in the equation

$$\text{odds}(p) = e^{\ln[\text{Odds}(p)]} = e^{\alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \dots + \beta_k X_k}$$

and it can convert the odds back to the probability using the following equation

$$P(\text{event}) = \frac{e^{\alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \dots + \beta_k X_k}}{1 + e^{\alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \dots + \beta_k X_k}}$$

Ordinal logistic regression

The ordinal regression model (ORM) is another natural extension of the binary-outcome model, build around a latent regression in the same manner as the binary logit or probit (Liao, 1994). This model can be derived from a measurement model in which a latent

variable y^* ranging from - infinity to infinity is mapped to an observed variable y . The variable y is thought of as providing incomplete information about an underlying y^* according to the measurement equation:

$$y_i = m \text{ if } \mu_{m-1} \leq y^* I < \mu_m \text{ for } m = 1 \text{ to } J$$

Where y is observed in j number of ordered categories, and the μ_m are unknown threshold or cutpoints parameters separating the adjacent categories to be estimated with β_s .

The general form for the probability in the ordinal regression model is as follows:

$$P(y=j) = F \left[\mu_j - \sum_{k=1}^K \beta_k x_k \right] - F \left[\mu_{j-1} - \sum_{k=1}^K \beta_k x_k \right]$$

The above equation gives the general form for the probability that the observed y falls into category j , and the μ_s and the β_k are to be estimated with a respective models. A general cumulative distribution function, F is used rather than specifying a particular form of distribution (which might be the logistic or the normal). In order for all the probabilities to be positive, it should be

$$0 < \mu_2 < \mu_3 < \dots < \mu_{j-1}$$

The first threshold parameter, μ_1 , is typically normalized to zero so that there is one less parameter to estimate. This is feasible because the scale is arbitrary and can start or finish with any value. Without this normalization there would be $j-1$ number of μ_s to estimate because the number of threshold is always one smaller than the number of categories; with the normalization ($\mu_1 = 0$), there will be $j-2$ number of μ_s to estimate (Liao, 1994).

Therefore the ordinal regression model in logit link function is as follows:

The ordinal logit model

$$\log [P(y \leq j | x) / 1 - P(y \leq j | x)] = \mu_j - \sum_{k=1}^K \beta_k x_k, \quad j=1,2,\dots,j-1$$

The only difference between the ordinal and the binary logit model is that the ordinal outcome model allows a sequence of log-odds or logit specified with the same β s and x s but different μ s. The left hand side of the ordinal model is also called a cumulative logit (Agresti, 1990). The same logit relation in probability can be expressed as following:

$$P(y \leq j) = p(y^* \leq \mu_j) = \frac{e^{\mu_j - \sum_{k=1}^K \beta_k x_k}}{1 + e^{\mu_j - \sum_{k=1}^K \beta_k x_k}}$$

Assumptions in regression analysis

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 (Osbourne and Waters, 2002). In regression analysis, the assumptions are made based on ordinary least squares (OLS) algorithms. Following are the specific assumptions that must be satisfied in OLS:

1. *Measurement*: All independent variables are interval, ratio, or dichotomous, and the dependent variable is continuous, unbounded and measured on an interval or ratio scale. All variables are measured without error.
2. *Specification*: (a) all relevant predictors of the dependent variable are included in the analysis, (b) no irrelevant predictors of the dependent variable are included in the analysis, and (c) the form of the relationship (allowing for transformations of dependent or independent variables) is linear.
3. *Expected value of error*: Expected value of the error, ε is zero.

4. *Homoscedasticity*: The variance of the error term, ε is the same, or constant, for all values of the independent variables.
5. *Normality of errors*: The errors are normally distributed for each set of values of the independent variables.
6. *No autocorrelation*: there is no correlation among the error terms produced by different values of the independent variables. Mathematically $E(\varepsilon_i, \varepsilon_j) = 0$
7. *No correlation between the error terms and the independent variables*: The error terms are uncorrelated with the independent variables Mathematically $E(\varepsilon_i, X_j) = 0$
8. *Absence of perfect multicollinearity*: for multiple regression, none of the independent variables is a perfect linear combination of the other independent variables.

When a dichotomous dependent variable is involved, logistic regression is designed to provide an alternative to the OLS approach. Logistic regression does not require many of the key assumptions of linear regression that are based on OLS algorithms particularly regarding linearity, normality, homoscedasticity, and measurement level¹⁷. Firstly, since proportions and probabilities are bounded by 0 and 1, the logistic regression does not need a linear relationship between the dependent and independent variables. It can handle all sorts of relationships, because the technique applies a non-linear log transformation to the predicted odds ratio. Secondly, the independent variables do not need to be normally distributed – although multivariate normality yields a more stable solution. Also the error terms (the residuals) do not need to be normally distributed. Thirdly, homoscedasticity is not needed. Logistic regression does not need variances to be heteroscedastic for each level of the independent variables. Lastly, it can handle ordinal and nominal data as independent variables. The

¹⁷ <http://www.statisticssolutions.com/resources/directory-of-statistical-analyses/assumptions-of-logistic-regression>

independent variables do not need to be metric (interval or ratio scaled). However, the technique does have the following underlying assumptions according to Aldrich and Nelson (1984):

- (i) The dependent random variable, Y is binary (0,1). The outcomes on the dependent variable are assumed to be mutually exclusive and exhaustive;
- (ii) The dependent variable is dependent on one or more observable exogenous variables;
- (iii) The relationship between the dependent and the independent variables is related in the manner assumed by the transformation used in logit or probit.
- (iv) Model should have little or no multicollinearity. There must be no exact linear dependencies among the independent variables. If this exists then problems of computational imprecision, unstable estimates and large sampling error may occur.

As discussed previously, the first dependent variable used in the analysis is in binary form therefore the first underlying assumption was met. The second dependent variable will use an ordinal regression model, which is an extension of the binary logit model, for dependent variables in an ordinal form. In terms of choice link functions, both models (binary and ordinal) will be transformed by using a logit function. An alternative would have been the probit model but as Long (1997) states the choice between the logit and probit models is largely one of convenience and convention, since the substantive results are generally indistinguishable. For some users, the simple interpretation of logit coefficients as odds ratios is the deciding factor. Basically the choice between these models largely depends on individual preferences (Long, 1997) and the logit model is preferred as it is familiar to the researcher.

8.2.2 Multicollinearity between independent variables

Multicollinearity exists when some or all of the independent variables are highly correlated (Field, 2001). When this condition exists, the estimated regression coefficients can fluctuate widely from sample to sample, making it risky to use the coefficients as an indicator of the relative importance of predictor variables (Cooper and Emory, 1995). In order to examine whether or not multicollinearity problems exist in multivariate analysis, most previous studies and statistical literature examined the issue through a correlation matrix of all the independent variables in the regression model. If the correlation analysis reports a very high association among these independent variables, this means that a multicollinearity problem exists. Correlation coefficients should not be considered harmful until they exceed 0.80 (Hair et al., 2007). Tables 8.1 and 8.2 show the correlation results for all independent variables used in future hypothesis testing.

Analysis of independent variables (contingent variables) under the first hypothesis

Table 8.1: Correlation matrix between five contingent variables.

	Size	Competition	Participation	AMT	Qualification
Size	1.000				
Market competition	0.162	1.000			
Participation	0.067	0.021	1.000		
AMT	0.029	0.150	0.147	1.000	
Qualification	0.045	0.066	0.057	0.061	1.000

Analysis of independent variables (management accounting practices) under the second hypothesis

Table 8.2: Correlation matrix between five main areas of management accounting practices.

	Costing	Budgeting	PMS	DSS	SMA
Costing	1.000				
Budgeting	0.432	1.000			
PMS	0.541	0.567	1.000		
DSS	0.391	0.555	0.580	1.000	
SMA	0.393	0.375	0.441	0.499	1.000

As none of the correlation values exceed 0.60, it may be concluded that there is no significant level of multicollinearity between independent variables that might affect outcome of any logistic multivariate analysis for either hypothesis. Another common method for detecting a multicollinearity problem is assessment of the Tolerance value and its inverse- the Variance Inflation Factor (VIF) (Hair et al., 2007). Tolerance is a very slight extension of R^2 ; the tolerance of an independent variable is the extent to which that independent variable cannot be predicted by the other independent variables (Miles and Shevlin, 2005). Tolerance for a variable is calculated as $1-R^2$, where the variable is being considered is used as the dependent variable in a regression analysis and all other variables are used as independent variables. Tolerance varies between zero and one. A tolerance value of 0 for a variable means that it is completely predictable from other independent variables and that therefore there is perfect collinearity. If a variable has a tolerance value of 1, this means that the variable is completely uncorrelated with the other independent variables (Miles and Shevlin, 2005).

The variance inflation factor (VIF) is closely related to the tolerance. It is calculated using the following formula $VIF= 1/ \text{tolerance}$. The VIF is useful because it is relates to

the amount that the standard error of the variable has been increased because of collinearity (Miles and Shevlin, 2005). Overall, both the Tolerance value and the VIF value reflect the strength of the relationship among independent variables included in the regression analysis. Hair et al. (2006) recommend that a very small tolerance value (0.10 or below) or a large VIF value (10 or above) are regarded as an indication of the existence of a multicollinearity problem. The tests as shown in Table 8.3 indicated that no VIF exceeded the threshold value of 10 (the highest VIF was 2.049) and the tolerance values indicated that collinearity does not explain more than 10% of any independent variable's variance. Thus, no support was found for the existence of multicollinearity. Therefore the requirement for logit analysis that there is an absence of multicollinearity has been satisfied.

Table 8.3: Collinearity statistics

	Collinearity statistics	
	Tolerance	VIF
Annual sales turnover	0.973	1.028
Market competition	0.959	1.042
Participation	0.963	1.039
AMT	0.969	1.032
Qualification	0.968	1.033
Costing	0.646	1.548
Budgeting	0.564	1.772
PMS	0.488	2.049
DSS	0.542	1.845
SMA	0.699	1.431

These tests confirm the conclusion from Tables 8.1 and 8.2 to the effect that there is no significant level of multicollinearity between independent variables that might affect the outcome for either hypothesis of any logistic multivariate analysis.

8.3 Important statistics in the logistic regression analysis

The following sections present the results of the final models for logistic regression analysis. These results consist of the following important statistics that determine the robustness of the model and the significance of independent variables.

1. Model fitting analysis

There are two approaches to testing the null hypothesis that the predictor does not affect the response, or $H_0 : \beta = 0$ namely Wald test and Likelihood ratio test. The Wald test is analogous to the t-test, as it is designed to test one slope parameter at a time, whereas the likelihood ratio test is analogous to the F-test as it can test several slope parameters at one (Azen and Walker,2011). According to Silva and Abreu (2010) a "likelihood" is a probability, specifically the probability that the observed values of the dependent variable may be predicted from the observed values of the independent variables. The log likelihood (LL) is its log, this varying from 0 to minus infinity. LL is calculated through iteration, using maximum likelihood estimation. Because $-2LL$ has approximately a Chi-Square distribution, it can be used for assessing the significance of logistic regression (Silva and Abreu, 2010). Therefore for the purpose of the analysis, the Chi-Square $-2 \log$ likelihood test will be used to determine if the overall model is statistically significant ($p < 0.05$) and to measure of how well the independent variables affect the outcome or dependent variable, whereas the Wald test statistics to determine if the individual the predictor is statistically significant ($p < 0.05$).

2. Goodness-of-fit coefficients

While in a linear regression model the coefficient of determination R^2 is the standard measure of fit, there is no clear choice for models with categorical outcomes (Long, 1997). There have been numerous attempts to construct a counterpart to R^2 but no one

measure is clearly superior and none has the advantages of a clear interpretation in terms of explained variation (Long, 1997). A wide variety of pseudo-R-squares measures (e.g. *Cox and Snell's*, *Nagelkerke's*, and *McFadden's*) have been proposed to evaluate the goodness-of-fit of logistic models. The model-fitting statistic measures the success of the model in explaining the variations in the data (Chen and Hughes, 2004). According to Silva and Abreu (2010) the name "pseudo" is due to the fact that these coefficients look like R-squared in the sense that they are on a similar scale, ranging from 0 to 1 with higher values indicating better model fit. The pseudo R square is calculated depending upon the likelihood ratio. The *Cox and Snell's* coefficient is an attempt to imitate the interpretation of multiple R-Square based on the log likelihood of the final model versus the log likelihood for the baseline model, but its maximum value can be (and usually is) less than 1.0 making it difficult to interpret. The *Nagelkerke's* coefficient is a modification of *Cox and Snell* undertaken to ensure that the outcome is between 0 and 1. This is achieved because the *Nagelkerke's R2* divides *Cox and Snell's* by its maximum in order to achieve a measure that ranges from 0 to 1. Therefore, *Nagelkerke's R2* will normally be higher than the *Cox and Snell* measure. Lastly, the *McFadden's* coefficient is a less common pseudo-R2 variant, based on loglikelihood kernels for the full versus the intercept-only model (Silva and Abreu, 2010).

3. The logistic regression coefficients

The logistic regression coefficients (B) indicate the amount of change expected in the log odds when there is a one unit change in the predictor variable with all of the other variables in the model held constant. A coefficient close to 0 suggests that there is no change due to the predictor variable¹⁸. Meanwhile Exp (B) is the odds ratios for the predictor. This value is given by default because odds ratios can be easier to interpret

¹⁸ <http://www.ats.ucla.edu/stat/sas/notes2/>

than the coefficient, which is in log-odds units. The following two sections provide the separate analyses for relationship one and two.

8.4 Binary logistic regression analysis testing for a relationship between the use of management accounting practices and a range of contingent factors.

In this section, the regression analysis seeks to answer the question ‘what is the influence of selected contingent variables on the use of MAPs if the interactive effect between explanatory variables is taken into account’. A binary logit model or logistic regression model is used to facilitate the analysis since the dependent variable is in binary form with the two possible outcomes in the forms: 1= use of a specific management accounting practice; and 0 = no use of a specific management accounting practice. The details are shown in Table 8.4 below.

Table 8.4: A summary of the type of data of independent and dependent variables for testing the first hypothesis

	Details	Type of data	Code
Dependent variable			
Costing system	No /Yes	Binary	0,1
Budgeting system	No /Yes	Binary	0,1
Performance evaluation system	No /Yes	Binary	0,1
Decision support system	No /Yes	Binary	0,1
Strategic management accounting	No /Yes	Binary	0,1
Independent variable			
Size of the firm (Sales turnover)	Ranking	Ordinal	1,2,3,4
Market competition	5-Likert scale	Ordinal	1,2,3,4,5
Participation of owner/manager	5-Likert scale	Ordinal	1,2,3,4,5
Advanced manufacturing technology	5-Likert scale	Ordinal	Composite index* (1,2,3,4,5)
Qualification of accounting staff	Ranking	Ordinal	0,1,2,3,4

* The development of the composite index can be seen earlier in section 6.5.4 of chapter 6.

Given the nature of the dependent variable, binary logistic regression is the appropriate tool for multivariate regression analysis.

8.4.1 Binary logit regression model

The model tests for a positive relationship between five contingent variables and the use of MAPs. The five types of MAPs are regarded as the dependent variable and factors related to the adoption of MAPs are independent variables. Therefore five specific models are developed in order to test the hypothesis – these are as follows:

Model 1:

$$\ln(P \text{ of costing system}) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5$$

Model 2:

$$\ln(P \text{ of budgeting system}) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5$$

Model 3:

$$\ln(P \text{ of performance evaluation system}) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5$$

Model 4:

$$\ln(P \text{ of decision support system}) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5$$

Model 5:

$$\ln(P \text{ of strategic management accounting}) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5$$

The quantity to the left of the equal sign is called a logit. It is the log of the odds that an event occurs. (The odd that an event occurs is the ratio of the number of people who have the specific MAPs to the number of people who do not). X_1 to X_5 represents five explanatory variables (contingent factors) where X_1 is the variable of size of the firm, X_2

is the variable the intensity of market competition, X_3 , is the variable of participation of owners/directors of firms, X_4 is variable of the use of advanced manufacturing technology and X_5 is the level of the qualification of accounting staff.

Given the discussion on whether or not the level of qualification of accounting staff is an exogenous or endogenous variable (see Chapter 4, section 4.4.4) the analyses will be run with and without this variable. The analyses reported in the next five sections will first looking at the regression without inclusion of the variable for the level of qualification of accounting staff.

8.4.2 Factors that affect the use of a costing system

Table 8.5 reports the result of binary logistic regression of a model relating to the contingent factors that affect the use of a costing system.

Table 8.5: Logistic regression analysis relating to the factors that affect the use of a costing system.

	B	S.E.	Wald	p-value	Exp(B)
Annual sales turnover	1.453	0.481	9.130	0.002	4.276
Intensity of market competition	1.233	0.612	4.061	0.022	3.431
Participation of owner/manager	0.538	0.474	1.287	0.129	1.712
Advanced manufacturing technology	1.729	0.520	11.046	0.001	5.633
Constant	-16.453	4.561	13.014	0.000	0.000
Chi-square	0.000				
Cox and Snell R square	0.345				
Nagelkerke R square	0.630				
McFadden R square	0.534				
Log likelihood	35.498				

Significant predictor

The chi-square statistic in Table 8.5 shows the model is statistically significant ($p < 0.05$) suggesting that the independent variables are a good predictor of the dependent variable. Meanwhile the results of three Pseudo-R square coefficients indicate the proportion of variance explained by the predictor variables vary from 34.5% to 63% thus we may infer that the outcome variable is moderately well explained by the explanatory variables. The Wald results show that size proxied by annual sales turnover, perceptions of respondents as to the intensity of market competition and AMT are significant predictors of some use of a costing system ($p < 0.05$). All variables in the model have a positive regression coefficient in line with the hypothesised direction of the relationship.

8.4.3 Factors that affect the use of a budgeting system

Table 8.6 reports the result of binary logistic regression of a model relating to the contingent factors that affect the use of a budgeting system.

Table 8.6: Logistic regression analysis relating to the factors that affect the use of a budgeting system.

	B	S.E.	Wald	p-value	Exp(B)
Annual sales turnover	0.029	0.287	0.011	0.459	1.030
Intensity of market competition	0.925	0.377	6.035	0.007	2.522
Participation of owner/manager	0.611	0.289	4.459	0.018	1.842
Advanced manufacturing technology	0.190	0.264	0.516	0.236	1.209
Constant	-5.126	2.160	5.634	0.009	0.006
Chi-square	0.011				
Cox and Snell R square	0.127				
Nagelkerke R square	0.205				
McFadden R square	0.140				
Log likelihood	79.658				

Significant predictor in bold

The chi-square statistic in Table 8.6 shows the model is statistically significant ($p < 0.05$) suggesting that the independent variables are a good predictor of the dependent variable. However, the results of three Pseudo-R square coefficients indicate that the proportion of variance explained by the predictor variables vary from 12.7% to 20.5% thus we may infer that the outcome variable is poorly explained by the explanatory variables. The Wald results suggest that both intensity of market competition and participation of owner/manager are significant predictors of some use of a budgeting system ($p < 0.05$). All variables in the model have a positive regression coefficient in line with the hypothesised direction of the relationship.

8.4.4 Factors that affect the use of a performance evaluation system

Table 8.7 reports the result of binary logistic regression of a model relating to the contingent factors that affect the use of a performance evaluation system.

Table 8.7: Logistic regression analysis relating to the factors that affect the use of a performance evaluation system.

	B	S.E.	Wald	p-value	Exp(B)
Annual sales turnover	0.634	0.307	4.271	0.020	1.884
Intensity of market competition	0.842	0.409	4.233	0.020	2.321
Participation of owner/manager	0.454	0.308	2.177	0.070	1.575
Advanced manufacturing technology	0.683	0.301	5.155	0.012	1.980
Constant	-8.559	2.568	11.108	0.001	0.000
Chi-square	0.000				
Cox and Snell R square	0.198				
Nagelkerke R square	0.327				
McFadden R square	0.237				
Log likelihood	68.414				

Significant predictor

The chi-square statistic in Table 8.7 shows the model is statistically significant ($p < 0.05$) suggesting that the independent variables are a good predictor of the dependent variable. The results of three Pseudo-R square coefficients indicate that the proportion of variance explained by the predictor variable varies from 19.8% to 32.7%, thus we may infer that the outcome variable is moderately explained by the explanatory variables. The Wald results indicate that annual sales turnover, perceptions of respondents as to the intensity of market competition and AMT are significant predictors of some use of a performance evaluation system ($p < 0.05$). All variables in the model have a positive regression coefficient in line with the hypothesised direction of the relationship.

8.4.5 Factors that affect the use of a decision support system

Table 8.8 reports the result of binary logistic regression of a model relating to the contingent factors that affect the use of a decision support system.

Table 8.8: Logistic regression analysis relating to the factors that affect the use of a decision support system.

	B	S.E.	Wald	p-value	Exp(B)
Annual sales turnover	0.323	0.255	1.603	0.103	1.381
Intensity of market competition	0.280	0.320	0.769	0.191	1.324
Participation of owner/manager	0.505	0.263	3.685	0.028	1.657
Advanced manufacturing technology	0.341	0.233	2.155	0.071	1.407
Constant	-4.644	1.973	5.540	0.010	0.010
Chi-square	0.034				
Cox and Snell R square	0.103				
Nagelkerke R square	0.151				
McFadden R square	0.095				
Log likelihood	99.679				

Significant predictor

The chi-square statistic in Table 8.8 shows the model is statistically significant ($p < 0.05$) suggesting that the independent variables are a good predictor of the dependent variable. The results of three Pseudo-R square coefficients indicate the proportion of variance explained by the predictor variables vary from 9.5% to 15.1% thus we may infer that the outcome variable is poorly explained by the explanatory variables. The Wald results indicate that participation of owner/manager is the only significant predictor of some use of a decision support system ($p < 0.05$). All variables in the model have a positive regression coefficient in line with the hypothesised direction of the relationship.

8.4.6 Factors that affect the use of strategic management accounting

Table 8.9 reports the result of binary logistic regression relating to the factors that affect the use of SMA.

Table 8.9: Logistic regression analysis relating to the factors that affect the use of strategic management accounting.

	B	S.E.	Wald	p-value	Exp(B)
Annual sales turnover	0.333	0.271	1.513	0.110	1.395
Intensity of market competition	0.347	0.321	1.166	0.140	1.414
Participation of owner/manager	0.918	0.298	9.490	0.001	2.506
Advanced manufacturing technology	0.788	0.245	10.328	0.001	2.198
Constant	-8.625	2.337	13.621	0.000	0.000
Chi-square	0.000				
Cox and Snell R square	0.260				
Nagelkerke R square	0.353				
McFadden R square	0.226				
Log likelihood	99.119				

Significant predictor

The chi-square statistic in Table 8.9 shows the model is statistically significant ($p < 0.05$) suggesting that the independent variables are a good predictor of the dependent variable. Meanwhile the results of three Pseudo-R square coefficients indicate that the proportion of variance explained by the predictor variables vary from 22.6% to 35.3% thus we may infer that the outcome variable is moderately well explained by the explanatory variables. The Wald results show that both participation of owner/manager and AMT are significant predictors of some use of a SMA ($p < 0.05$). All variables in the model have a positive regression coefficient in line with the hypothesised direction of the relationship.

8.4.7 Additional analysis: Binary logistic regression analysis in factors related to the use of management accounting practices (with level of qualification of accounting staff)

As discussed in section 8.4.1, an additional set of analyses were carried out to ascertain whether inclusion of an independent variable for the level of qualification of accounting staff would affect the outcome. Below is the summary of binary logistic regression results for factors related to the use of MAPs taking into account the level of qualification of accounting staff.

Table 8.10: Comparisons of models fitting and R squares with and without qualified accounting staff.

	Model fitting (p-value)		Range of Pseudo R square	
	With	Without	With	Without
Model 1 (Costing system)	0.000	0.000	29.5 to 57.1%	34.5 to 63%
Model 2 (Budgeting system)	0.010	0.011	14.9 to 24.3%	12.7 to 20.5%
Model 3 (PMS)	0.006	0.000	16.2 to 28.4%	19.8 to 32.7%
Model 4 (DSS)	0.086	0.034	8.6 to 14.6%	10.3 to 15.1%
Model 5 (SMA)	0.000	0.000	27 to 41.1%	26 to 35.3%

Overall the results for the five models are not markedly different with the exception that Model 4 (where use of a decision support system was the dependent variable) was not significant if qualified accounting staff was included as exogenous variable. The proportions of variance (Pseudo R square) explained by the predictor variables are similar with three models marginally improved (model 1, model 3 and 4) and the others marginally worse. Table 8.11 shows comparisons of significance value of predictors with and without qualified accounting staff.

Table 8.11: Comparisons of significance value of predictors with and without qualified accounting staff.

Significant predictors	Significance value (p)	
	with	without
Costing system		
Annual sales turnover	0.005	0.002
Intensity of market competition	0.025	0.022
Participation of owner/manager	0.122	0.129
Advanced manufacturing technology	0.002	0.001
Qualification of accounting staff	0.458	-
Budgeting system		
Annual sales turnover	0.229	0.459
Intensity of market competition	0.010	0.007
Participation of owner/manager	0.012	0.018
Advanced manufacturing technology	0.204	0.236
Qualification of accounting staff	0.336	-
Performance evaluation system		
Annual sales turnover	0.091	0.020
Intensity of market competition	0.054	0.020
Participation of owner/manager	0.027	0.070
Advanced manufacturing technology	0.015	0.012
Qualification of accounting staff	0.484	-
Decision support system		

Annual sales turnover	0.106	0.103
Intensity of market competition	0.267	0.191
Participation of owner/manager	0.026	0.028
Advanced manufacturing technology	0.079	0.071
Qualification of accounting staff	0.435	-
Strategic management accounting		
Annual sales turnover	0.070	0.110
Intensity of market competition	0.092	0.140
Participation of owner/manager	0.001	0.001
Advanced manufacturing technology	0.001	0.001
Qualification of accounting staff	0.177	-

The overall results appear to be similar with the original analysis except as they relate to the factors that affect performance evaluation system. In the analysis with qualified accounting staff, use of a performance evaluation system is not only affected by AMT but also by participation of owner/manager, and some use of a performance evaluation system is not longer significantly affected by the size of firm and the level of intensity of market competition.

Given the uncertainty regarding the exogeneity of this variable, reported results will focus on models that exclude the variable related to the level of qualification of accounting staff.

8.5 Ordinal logistic regression analysis testing for a relationship between the use of management accounting practices and perceptions as to the level of firm performance.

In this section, the regression analysis seeks to answer the question - what is the influence of the use of MAPs on firm performance if the interactive effect between

explanatory variables is taken into account. Since the outcome variable is in an ordered category, ordinal regression which is designed explicitly for ordinal outcomes is chosen.

8.5.1 Background of ordinal logistic regression

Ordinal measures in response to questions asked are very common in the social sciences. Attitudinal questions on social and public opinion surveys often take the form of Likert-type scales covering a range from 'strongly disagree' to 'strongly disagree' or from 'least important' to 'most important'. These responses are normally coded 0,1,2,3,4 and so on (or 1,2,3,4,5 etc). However, many researchers have treated ordinal outcome variables as if they were continuous and applied a linear regression model (LRM) in their analysis, sometimes claiming support from studies that find little bias from assuming interval measurement for ordinal variables (Winship and Mare, 1984). Yet these studies may be misleading because they are typically atheoretical simulations of limited scope (Winship and Mare, 1984). Long (1997) stated that examples where regression of ordinal outcome have provided misleading results were reported by both McKelvey and Zavoina (1975, p. 117) and Winship and Mare (1984, p.521-523). Given this risk, it is more prudent to apply ordinal regression analysis which is specifically designed for use with ordinal variables.

As noted in discussion of the underlying logistic assumption (see section 8.2.1) it is implausible to assume the normality and homogeneity of variance for ordered categorical dependent variables when that ordinal dependent variable contains merely a small number of discrete categories (Chen and Hughes, 2004). Thus the ordinal regression model becomes a preferable modelling tool that does not assume the normality and constant variance, but requires the assumption of parallel lines across all

levels of the categorical outcome (Chen and Hughes, 2004). The test of parallel lines is designed to make judgement concerning the model adequacy.

In ordinal regression analysis, the two major link functions e.g. logit link or the complementary log-log (cloglog) links are used to build specific models. There is no clear-cut method to distinguish the preference of using different link functions. However the logit link is generally suitable for analyzing the ordered categorical data evenly distributed among all categories. The cloglog link may be used to analyze the ordered categorical data when higher categories are more preferable (Chen and Hughes, 2004). For the purpose of this study, the logit link functions will be used first. However if the analysis fails to find significant models or fails to meet the parallel lines assumption, the complementary log-log link will be run to see if it yields improved results.

In this study, ordinal regression analysis is utilized in order to fulfil the fourth research objective which is to explore the relationship between MAPs and the performance of medium sized firms. The outcome variable is the perceptions of changes in firm performance measured by a five-point Likert scale (1 'decreased significantly' to 5 'increased significantly'). Six individual dependent variables tested for measuring firm performance are: level of productivity; product quality; number of deliveries on time; sales growth rate; operating profit growth rate; and cash flow growth rate. The independent variables are whether or not some use is made of MAPs categorized in the five main areas specified previously.

8.5.2 The ordinal regression model (Cumulative odds (CO) logit models)

Ordinal model

The ordinal regression model is called a cumulative logit model because the model is built based on cumulative response probabilities $y_j(X)$ of being in category (j) or lower given the known explanatory variables (Chen and Hughes, 2004). In general, the ordinal model assumes that while intercepts will be different across these logistic regression equations, the slopes are equal (parallel lines assumption)

$$\ln(\pi_j/1-\pi_j) = \alpha_{oj} + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n$$

where π_j is the probability of being at or below category j of an ordinal variable with k categories, $1 \leq j \leq k-1$. With the model written as above, positive coefficients would indicate an association of increases in the predictor variable with lower scores on the dependent variable. To make the interpretation of coefficients more intuitive

$$\ln(\pi_j/1-\pi_j) = \alpha_{oj} - (\beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n)$$

The alpha α_{oj} is expected log odds of $Y \leq j$ when all predictors are 0, where j goes from 1 to the number of categories minus. It represents a separate intercept or threshold for each cumulative probability.

β_n show the amount of change in expected log odds of being at or below any category of the dependent variable for each 1 unit increase in X_n . The minus sign before the coefficients for the predictor variables instead of the customary plus sign is done to make the interpretation of coefficients more intuitive. That is done so that larger

coefficients indicate an association with larger scores. Thus, *positive coefficients* indicate an association of increases in the predictor variable with higher scores on the dependent variable, controlling for the rest of predictors in the model. *Negative coefficients* indicate an association of increases in the predictor variable with lower scores on the dependent variable, controlling for the rest of predictors in the model.

The next subsections discuss the results in detail.

8.6 The ordinal regression between the use of management accounting practices and perception of firm performance.

The results of an ordinal regression analysis on a relationship between the use of MAPs and perception of firm performance failed to find any significant models or predictors that could explain the proposed relationship. Given these poor results and based on the discussion in Section 8.3.8, cloglog was run as an additional step and the results compared to those obtained using logit link, the results under the complementary log-log link are mostly similar or worse (See Appendix 4 for details). Given that a log odds link was deemed more appropriate for the data, the subsequent discussion focuses on the results based on this linkage. Table 8.12 below provides a summary of the results of regression analyses for a relationship between the use of MAPs and perceptions of changes in firm performance.

Table 8.12: Results summary of ordinal regression analysis between the use management accounting practices and perceptions of firm performance.

Predictors	Productivity		Product quality		Deliveries on time	
	B	Sig.	B	Sig.	B	Sig.
Costing system	0.869	0.093	0.498	0.237	0.618	0.179
Budgeting system	0.001	0.499	-0.363	0.289	0.371	0.277
Performance evaluation system	0.277	0.339	-0.977	0.083	-0.696	0.153

Decision support system	-0.306	0.292	0.307	0.297	0.093	0.434
Strategic management acc.	0.432	0.171	0.447	0.173	0.566	0.108
Model fittings	0.300		0.613		0.425	
Goodness of fit	0.585		0.289		0.985	
Test of parallel lines	0.123		0.018		0.444	
Pseudo R square						
Cox and Snell R square	0.054		0.032		0.044	
Nagelkerke R square	0.060		0.037		0.050	
McFadden R square	0.024		0.017		0.021	
	Sales growth		Operating profit		Cash flow growth	
Predictors	B	Sig.	B	Sig.	B	Sig.
Costing system	0.767	0.115	0.298	0.324	0.907	0.079
Budgeting system	0.617	0.150	0.884	0.073	0.153	0.399
Performance evaluation system	-0.216	0.367	-0.328	0.311	-0.438	0.249
Decision support system	-0.353	0.257	0.270	0.311	0.606	0.132
Strategic management acc.	0.327	0.229	0.404	0.185	0.519	0.126
Model fittings	0.412		0.158		0.085	
Goodness of fit	0.809		0.418		0.564	
Test of parallel lines	0.884		0.054		0.007	
Pseudo R square						
Cox and Snell R square	0.045		0.071		0.084	
Nagelkerke R square	0.049		0.078		0.093	
McFadden R square	0.018		0.030		0.037	

The ordinal regression analysis between the use of MAPs and perceptions of firm performance indicate that none of the models fitting are statistically significant ($p > 0.05$). The value of Pseudo squares are very low across the analyses where they range from 1.7% up to 8.4%. The results also indicate that none of the predictor variables are significant at 5% level of significance. The associations are positive in line with the hypothesised relationship for costing systems, budgeting systems and SMA but there are two negative associations for performance evaluation and decision support systems. Thus it can be concluded that there are no or only very weak relationships between the use of MAPs and perceptions of firm performance. The results probably reflect one of three situations. First the nature of the dichotomy in the independent

variable between some use and no use of MAPs is too crude. Second that the dependent variable, perceptions of performance does not proxy well for actual performance and third that the hypothesis is mis-specified or does not hold.

One possible way around the problem with the independent variable might be to look at specific techniques within the MAPs. 31 out of 45 management accounting techniques under five main management accounting areas were selected for the analysis. Techniques that were identified as the lowest used technique under each category were excluded from the analysis (most of them had a value below the mean of 2.50). The selected management accounting techniques were grouped based on their specific functions/areas. This resulted in the development of nine main independent variables. These groups had been earlier identified in the analysis described in Chapter 5, section 5.5.1. A mean score was calculated for each of the management accounting techniques under each group. These mean scores for management accounting techniques were averaged to represent an overall usage of the respective defined groups to act as an independent variable. Table 8.13 presents the details of these groups and the techniques used in them.

Table 8.13: Details of independent variables developed from specific management accounting techniques.

Independent variables	Composite index of
Costing system	
<i>1. Method of costing</i>	Absorption costing
	Variable costing
Budgeting system	
<i>2. Full budgeting system</i>	Sales budget
	Purchasing budget
	Production budget

	Cash flow budget
3. <i>Timings of budget</i>	Annual budget
	Monthly budget
4. <i>Method of budgeting</i>	Flexible
	Incremental
Performance evaluation system	
5. <i>Financial performance measures</i>	Operating income
	Variance analysis
	Return on investment
	Sales growth
	Cash flows
6. <i>Non-financial performance measures</i>	On-time delivery
	Manufacturing lead time
	Defect rate
	Number of customer complaints
Decision support system	
7. <i>Short run analysis</i>	Break-even analysis
	Stock control model
	Product profitability analysis
8. <i>Long run analysis</i>	Payback
	Accounting rate of return
	Internal rate of return
Strategic management accounting	
9. <i>Strategic management accounting</i>	Target costing
	Strategic costing
	Value chain costing
	Strategic pricing
	Product life-cycle analysis
	Competitor position monitoring

The above table shows the nine main management accounting techniques which were utilised based on their specific character. Under the costing system, only a method of

costing is used in representing the extent of use of costing. Costing techniques (one of the category under costing system) were excluded from the analysis since their adoption is very much dependent on the system of manufacturing employed. Therefore its combination as one index score would be meaningless. The division of certain management accounting techniques based on their specific functions as shown in Table 8.13 will help to identify any possible association between the extent of their use and perceptions of performance.

The next subsections present the ordinal logit regression results from testing for a hypothesized relationship between the level of use of management accounting techniques and firm performance.

8.6.1 Management accounting techniques and perceptions of performance in the level of productivity

Table 8.14 reports the result of ordinal logistic regression relating to a relationship between the level of use of management accounting techniques and perceptions of performance relating to the level of productivity.

Table 8.14: Ordinal logistic regression analysis relating to the level of use of management accounting techniques within nine categories and perceptions of performance measured by the level of productivity.

	Estimate	Std. Error	Wald	df	Sig.
[Productivity = 2]	-1.044	0.424	6.047	1	0.007
[Productivity = 3]	0.040	0.373	0.011	1	0.458
[Productivity = 4]	1.928	0.418	21.244	1	0.000
Method of costing	0.106	0.095	1.255	1	0.132
Partial financial budgeting	0.005	0.161	0.001	1	0.489
Timing of budget	0.073	0.176	0.172	1	0.340
Method of budgeting	0.005	0.162	0.001	1	0.488

Financial measure	0.363	0.176	4.239	1	0.020
Non financial measures	-0.202	0.168	1.433	1	0.116
Short run DSS	-0.130	0.167	0.608	1	0.218
Long run DSS	-0.107	0.165	0.426	1	0.257
SMA	0.216	0.118	3.344	1	0.034
Model fitting	0.120				
Goodness-of-fit	0.263				
Pseudo R-Square					
Cox and Snell	0.129				
Nagelkerke	0.143				
McFadden	0.060				
Test of parallel lines	0.139				

The results show that the degree of use of financial performance measures and of SMA are positively and significantly associated with the perceptions of improved productivity performance. The results of three Pseudo-R square coefficients indicate the proportion of variance explained by the predictor variables vary from 6% to 12.9% thus we may infer that the outcome variable is poorly explained by the explanatory variables. The model fitting statistic shows the model is not statistically significant ($p > 0.05$). However the Pearson's chi-square indicates that the observed data are consistent with the estimated values in the fitted model. The test of parallel lines indicates that there is no significant difference for the corresponding regression coefficients across the response categories, suggesting that the model assumption of parallel lines is not violated in the complete model.

8.6.2 Management accounting techniques and perceptions of performance in product quality

Table 8.15 reports the result of ordinal logistic regression relating to a relationship between the level of use of management accounting techniques and perceptions of performance relating to product quality.

Table 8.15: Ordinal logistic regression analysis relating to the level of use of management accounting techniques and the perceptions of performance measured by product quality

	Estimate	Std. Error	Wald	df	Sig.
[Product quality = 2]	-3.016	0.771	15.307	1	0.000
[Product quality = 3]	-0.592	0.613	0.933	1	0.167
[Product quality = 4]	2.818	0.702	16.108	1	0.000
Method of costing	0.106	0.162	0.423	1	0.258
Partial financial budgeting	-0.077	0.272	0.081	1	0.388
Timing of budget	0.430	0.297	2.091	1	0.074
Method of budgeting	-0.246	0.276	0.791	1	0.187
Financial measure	-0.089	0.291	0.095	1	0.379
Non financial measures	-0.250	0.282	0.786	1	0.188
Short run DSS	0.111	0.281	0.157	1	0.346
Long run DSS	-0.199	0.278	0.513	1	0.237
SMA	0.374	0.199	3.516	1	0.031
Model fitting	0.589				
Goodness-of-fit	0.272				
Pseudo R-Square					
Cox and Snell	0.070				
Nagelkerke	0.081				
McFadden	0.037				
Test of parallel lines	0.205				

The results show that the extent of use of SMA is positively and significantly associated with the perception of improved product quality performance. The results of three Pseudo-R square coefficients indicate the proportion of variance explained by the predictor variables vary from 3.7% to 8.1% thus we may infer that the outcome variable is poorly explained by the explanatory variables. The model fitting statistic shows the model is not statistically significant ($p > 0.05$). However the Pearson's chi-square indicates that the observed data are consistent with the estimated values in the fitted model. Lastly, the test of parallel lines indicates that there is no significant difference for the corresponding regression coefficients across the response categories, suggesting that the model assumption of parallel lines is not violated in the complete model.

8.6.3 Management accounting techniques and perceptions of performance in the number of deliveries on time

Table 8.16 reports the result of ordinal logistic regression relating to a relationship between the level of use of management accounting techniques and perceptions of performance measured by the number of deliveries on time.

Table 8.16: Ordinal logistic regression analysis relating to the level of use of management accounting techniques and the perceptions of performance measured by the number of deliveries on time

	Estimate	Std. Error	Wald	df	Sig.
[Deliveries on time = 2]	-2.916	0.662	19.403	1	0.000
[Deliveries on time = 3]	-0.600	0.380	2.489	1	0.058
[Deliveries on time = 4]	1.258	0.375	11.262	1	0.001
Method of costing	0.002	0.097	0.001	1	0.491
Partial financial budgeting	0.438	0.171	6.531	1	0.006
Timing of budget	-0.312	0.184	2.861	1	0.046
Method of budgeting	0.020	0.166	0.015	1	0.452
Financial measure	-0.115	0.180	0.410	1	0.261
Non financial measures	0.126	0.175	0.517	1	0.236
Short run DSS	0.067	0.172	0.152	1	0.349
Long run DSS	-0.222	0.173	1.650	1	0.100
SMA	0.198	0.120	2.709	1	0.050
Model fitting	0.139				
Goodness-of-fit	0.128				
Pseudo R-Square					
Cox and Snell	0.124				
Nagelkerke	0.140				
McFadden	0.061				
Test of parallel lines	0.544				

The results show that the degree of use of partial financial budgeting systems and of SMA is positively and significantly associated with perceptions of improved deliveries on time. The results of three Pseudo-R square coefficients indicate the proportion of variance explained by the predictor variables vary from 6.1% to 14.0% thus we may

infer that the outcome variable is poorly explained by the explanatory variables. The model fitting statistic shows the model is not statistically significant ($p > 0.05$). However the Pearson's chi-square indicates that the observed data are consistent with the estimated values in the fitted model. Lastly, the test of parallel lines indicates that there is no significant difference for the corresponding regression coefficients across the response categories, suggesting that the model assumption of parallel lines is not violated in the complete model.

8.6.4 Management accounting techniques and perceptions of performance in sales growth rate

Table 8.17 reports the result of ordinal logistic regression relating to a relationship between the level of use of management accounting techniques and perceptions of performance related to the sales growth rate.

Table 8.17: Ordinal logistic regression analysis relating to the level of use of management accounting techniques and the perceptions of performance measured by sales growth rate.

	Estimate	Std. Error	Wald	df	Sig.
[Sales growth rate = 1]	-3.114	0.898	12.025	1	0.001
[Sales growth rate = 2]	-0.887	0.590	2.259	1	0.067
[Sales growth rate = 3]	0.311	0.571	0.296	1	0.294
[Sales growth rate = 4]	2.981	0.658	20.550	1	0.000
Method of costing	0.390	0.157	6.162	1	0.007
Partial financial budgeting	0.652	0.262	6.185	1	0.007
Timing of budget	0.133	0.279	0.227	1	0.317
Method of budgeting	-0.475	0.263	3.266	1	0.036
Financial measure	0.001	0.270	0.000	1	0.499
Non financial measures	-0.298	0.263	1.276	1	0.130
Short run DSS	0.027	0.265	0.011	1	0.459
Long run DSS	-0.302	0.263	1.318	1	0.126
SMA	0.205	0.186	1.223	1	0.135

Model fitting	0.022				
Goodness-of-fit	0.262				
Pseudo R-Square					
Cox and Snell	0.172				
Nagelkerke	0.187				
McFadden	0.074				
Test of parallel lines	0.422				

The results show that the extent of use of the method of costing, of partial financial budgeting systems and of the method of budgeting are positively and significantly associated with perceptions of improved sales growth rate. The results of three Pseudo-R square coefficients indicate the proportion of variance explained by the predictor variables vary from 7.4% to 18.7% thus we may infer that the outcome variable is poorly explained by the explanatory variables. The model fitting statistic shows the model is statistically significant ($p < 0.05$). The Pearson's chi-square indicates that the observed data are consistent with the estimated values in the fitted model. Lastly, the test of parallel lines indicates that there is no significant difference for the corresponding regression coefficients across the response categories, suggesting that the model assumption of parallel lines is not violated in the complete model.

8.6.5 Management accounting techniques and perceptions of performance in operating profit growth rate

Table 8.18 reports the result of ordinal logistic regression relating to a relationship between the level of use of management accounting techniques and perceptions of performance in operating profit growth rate.

Table 8.18: Ordinal logistic regression analysis relating to the level of use of management accounting techniques and the perceptions of performance measured by operating profit growth rate.

	Estimate	Std. Error	Wald	df	Sig.
[Profit growth rate = 1]	-2.968	0.777	14.578	1	0.000
[Profit growth rate = 2]	-0.584	0.406	2.074	1	0.075
[Profit growth rate = 3]	0.341	0.381	0.798	1	0.186
[Profit growth rate = 4]	2.412	0.475	25.739	1	0.000
Method of costing	0.027	0.097	0.075	1	0.393
Partial financial budgeting	0.285	0.171	2.766	1	0.048
Timing of budget	0.202	0.183	1.221	1	0.135
Method of budgeting	-0.276	0.172	2.571	1	0.055
Financial measure	0.206	0.179	1.324	1	0.125
Non financial measures	0.283	0.172	2.704	1	0.050
Short run DSS	0.020	0.171	0.013	1	0.455
Long run DSS	-0.064	0.169	0.145	1	0.352
SMA	0.179	0.121	2.177	1	0.070
Model fitting	0.032				
Goodness-of-fit	0.935				
Pseudo R-Square					
Cox and Snell	0.164				
Nagelkerke	0.180				
McFadden	0.075				
Test of parallel lines	0.060				

The results show that the extent of use of partial financial budgeting systems and of non financial performance measure is positively and significantly associated with the perceptions of improved operating profit growth rate. The results of three Pseudo-R square coefficients indicate the proportion of variance explained by the predictor variables vary from 7.5% to 18.0% thus we may infer that the outcome variable is poorly explained by the explanatory variables. The model fitting statistic shows the model is statistically significant ($p < 0.05$). The Pearson's chi-square indicates that the observed data are consistent with the estimated values in the fitted model. The test of parallel lines indicates that there is no significant difference for the corresponding regression

coefficients across the response categories, suggesting that the model assumption of parallel lines is not violated in the complete model.

8.6.6 Management accounting techniques and perceptions of performance in cash flow growth rate

Table 8.19 reports the result of ordinal logistic regression relating to a relationship between the level of use of management accounting techniques and perceptions of performance in terms of cash flow growth rate.

Table 8.19: Ordinal logistic regression analysis relating to the level of use of management accounting techniques and the perceptions of performance measured by cash flow growth rate.

	Estimate	Std. Error	Wald	df	Sig.
[Cash flow growth rate = 1]	-2.820	0.781	13.047	1	0.000
[Cash flow growth rate = 2]	-0.706	0.424	2.774	1	0.048
[Cash flow growth rate = 3]	0.410	0.385	1.134	1	0.144
[Cash flow growth rate = 4]	2.491	0.483	26.601	1	0.000
Method of costing	0.182	0.100	3.323	1	0.034
Partial financial budgeting	0.426	0.170	6.302	1	0.006
Timing of budget	-0.140	0.180	0.605	1	0.219
Method of budgeting	-0.246	0.171	2.062	1	0.076
Financial measure	0.070	0.176	0.158	1	0.346
Non financial measures	-0.059	0.171	0.119	1	0.365
Short run DSS	0.053	0.173	0.095	1	0.379
Long run DSS	-0.088	0.170	0.270	1	0.302
SMA	0.220	0.123	3.204	1	0.037
Model fitting	0.005				
Goodness-of-fit	0.920				
Pseudo R-Square					
Cox and Snell	0.203				
Nagelkerke	0.223				
McFadden	0.093				
Test of parallel lines	0.060				

The results show that the degree of use of the method of budgeting, of partial financial budgeting systems and of SMA is positively and significantly associated with the perceptions of improved cash flow growth rate. The results of three Pseudo-R square coefficients indicate the proportion of variance explained by the predictor variables vary from 9.3% to 22.3% thus we may infer that the outcome variable is poorly explained by the explanatory variables. The model fitting statistic shows the model is statistically significant ($p < 0.05$). The Pearson's chi-square indicates that the observed data are consistent with the estimated values in the fitted model. The test of parallel lines indicates that there is no significant difference for the corresponding regression coefficients across the response categories, suggesting that the model assumption of parallel lines is not violated in the complete model.

8.7 Summary

This chapter reports the results of the logistic regression analysis of data obtained from medium sized firms in the Malaysian manufacturing sector. The objectives of the analysis were firstly to investigate for significant relationships between a number of contingent variables and the use of specific MAPs; and secondly to investigate whether there was any significant relationship between the use of MAPs and perceptions of firm performance. Two main logistic regression analyses (binary logistic regression and ordinal regression) were employed to investigate these hypothesized relationships.

8.7.1 Possible relationship between the use of management accounting practices and contingent factors

The results of a binary logistic regression analysis of the relationships between selected contingent variables and the use of MAPs in terms of the five main categories show that four contingent variables (size of firms, intensity of market competition, participation of

owner/manager and AMT) were statistically significant predictors for at least two out of five MAPs examined. Table 8.20 below presents the summary of significant predictors in the first relationship.

Table: 8.20: Summary of statistically significant results from binary logistic regression tests.

Annual sales turnover
• Costing system
• Performance evaluation system
Intensity of market competition
• Costing system
• Budgeting system
• Performance evaluation system
Participation of owner/manager
• Budgeting system
• Decision support system
• Strategic management accounting
Advanced manufacturing technology
• Costing system
• Performance evaluation system
• Strategic management accounting

These results may be interpreted as suggesting that contingent factors are important predictors that shape the use of MAPs within Malaysian medium sized firms in the manufacturing sector. Costing systems and performance evaluation systems have consistently been positively and significantly affected by similar contingent factors which are size of the firm, intensity of market competition and use of AMT. These three variables may be viewed as reflecting the complexity of business environment in which the firms operate. Thus these results suggest that medium sized firms have been prompted to seek and analyse more detailed information on costing and performance evaluation when they have faced a higher level of complexity caused by external and

internal factors. This perhaps shows the importance of firms having comprehensive records on production costs as well as an evaluation of progress or performance so that firms are able to act wisely and competitively. Additionally both intensity of market competition and the use of AMT have also significantly affected the use of other MAPs. First intensity of market competition is positively and significantly associated with a higher level of use of budgeting systems. This finding implies that increased market competition causes medium sized firms to be more prudent in planning and controlling their activities in order to survive and compete effectively in the market. Second the result indicates that the use of AMT has been positively and significantly associated with a greater use of SMA. This result suggests that as a firms' business environment becomes increasingly dynamic (i.e through the use of modern technology), firms have found it increasingly important to use management accounting to develop coherent and logically consistent business strategies.

Table 8.20 also shows that the participation of the owner/manager has a positive and significant relationship with the use of a budgeting, decision support systems and SMA. Therefore owner/managers have major influence on the use of MAPs that related to decision making in the short-run, and planning and control including the development of strategy. This is perhaps because in smaller firms, which probably exhibit an entrepreneurial organization structure, the owner/manager acts as the main decision maker and is usually the shaper of the future of the business (Thong et al., 1996). Therefore committed owner/managers would have the means to press for MAPs that deliver appropriate managerial information to assist them achieve their strategic goals and objectives. The results fail to find positive and significant relationship between participation of owner/manager and use of a costing system or performance evaluation system.

Overall, the results show that not all practices are affected by the same contingent variables. In particular use of a costing system and performance evaluation are dependent on internal and external pressures whereas the use of other practices largely depends on owner/manager participation. In conclusion, the hypothesis is partially accepted and provides support for a contingency based explanation for the extent of use of MAPs by respondents.

8.7.2 Comparison of results with previous research.

The first contingent variable; size of the firms was only found to be positively and statistically significant related to use of a costing system and a performance evaluation system. The results are consistent with studies by Halma and Laats (2002), who found that the application of cost accounting tends to increase in line with company size, and Hoque and James (2000) who found a link between size and the use of performance measures. However the present results fail to find a relationship between size of the firms and the use of sophisticated management accounting and this is contrary to findings by, for example, Abdel-Kader and Luther (2008) and Cadez and Guilding (2008). Abdel-Kader and Luther (2008) found that differences in management accounting sophistication are explained by size of a firm and Cadez and Guilding (2008) revealed that SMA usage is positively associated with company size. Similarly Hansen and Van der Stede (2004) reported that organizational size drives the use of budgets for performance evaluation and communication of goals. As has been previously observed, these differences in findings probably reflect the narrow size band of the firms who responded.

The second contingent variable; intensity of market competition has a positive and statistically significant relationship with use of a costing system, performance

evaluation and a budgeting system. The result is consistent with a number of previous findings such as by Chenhall and Moris (1986); Mia and Clarke (1998); and Abdel-Maksoud et al. (2005). For example, Abdel-Maksoud et al. (2005) speculated that companies in difficult competitive situations measure performance on all the dimensions available to them. However the findings are at variance with the majority previous studies, which have reported a positive and significant association between market competition and the use of sophisticated MAPs. For example, Khandwalla (1972) and Al-Omiri and Drury (2007) found a positive relationship between intensity of market competition and the employment of sophisticated management controls. A possible reason for these different findings is the narrow base from which the respondents came. It is probable that firms in a limited number of sectors and not widely varied in size face a similar competitive environment. Thus the variation in reported intensity of competition is insufficient to generate statistically significant relationships.

The third contingent variable, participation of owner/manager has a positive and statistically significant relationship with use of budgeting system, decision support system and SMA. This result supports the argument and findings of the previous studies that an owner/manager's participation plays a critical role in the effectiveness of information system implementation in SMEs. For example, Thong and Yap (1995) held that the owner/manager is an entrepreneur figure, who is crucial in determining the innovative attitude of a small business. Hence the participation of the owner/manager is the determinant of the overall management style of the business and would possibly affect the adoption level of MAPs. Lybaert (1998), who analysed the influences on information use among Belgian SMEs, also found that owner/managers play a role in

the development of MAPs. Al-Omiri (2003) also reported that top management was significantly associated with ABC implementation success.

The fourth contingent variable, AMT, has a positive and statistically significant association with use of costing system, performance evaluation system and SMA. This suggests that technology can be an important factor that affects the use of MAPs in the smaller firm context. The association between technology with the use of costing system and performance evaluation system is consistent with several previous findings. For example Tayles and Drury (1994) reported AMT had a significant or very significant effect in changing company's management accounting system for performance evaluation system. Similarly Chenhall (1997) and Fullerton and McWatters (2002), who examined the interaction between JIT and TQM and the use of performance measures, similarly discovered a positive relationship between these two variables. Al-Omiri and Drury (2007) found a positive association between higher levels of cost system sophistication and the extent of the use of JIT and lean production techniques.

A significant link between AMT and SMA is consistent with past research. For example, Abdel-Maksoud et al. (2005) found that relatively sophisticated MAPs exist in firms that have made significant investments in AMT, TQM and JIT, and Abdel-Kader and Luther (2008) concluded that differences in management accounting sophistication are explained by the adoption of AMT, TQM and JIT systems.

8.7.3 Possible relationship between perceptions of firm performance and the use of management accounting practices

The results of ordinal regression analysis of the relationships between the use of MAPs and the perception of firm performance indicate that none of the models were satisfactory either in terms of significance or explanatory power. Therefore, it may be concluded that there is no support for the existence of any statistically significant relationship between the use of MAPs and perceptions of firm performance. A second attempt to establish a significant relationship was undertaken by reforming the information on MAPs into nine categories of management accounting techniques. The results were little improved as the majority of models were not statistically significant and all lacked significance and explanatory power but some associations for particular measures were found as shown in Table 8.21 below:

Table: 8.21: Summary of statistically significant results from ordinal regression tests for an association between nine accounting techniques and perceptions of firm performance

Method of costing
• sales growth rate
• cash flow growth rate
Partial financial budgeting system
• sales growth rate
• operating profit growth rate
• cash flow growth rate
Method of budgeting
• sales growth rate
Non financial performance measures
• operating profit growth rate
SMA
• cash flow growth rate

Table 8.21 indicates that the degree of use of a method of costing, a partial financial budgeting system, a method of budgeting, non-financial performance measures and SMA in models that although they have poor explanatory power are significant. Therefore, given that the results exhibit no consistent or coherent pattern and the models are generally unsatisfactory, it may be concluded that there is no support for the second hypothesis and that there is no positive relationship between the use of MAPs and perception of firm performance. This outcome may be explained by the reliance on perceptions of performance rather than actual performance data. Perceptions of performance are inevitably subjective and will exhibit less variability than measures of a firm's actual performance. It was noted, for example, that the majority of the respondents perceived their performances to be fairly good. Given this pattern of answers, the demonstration of an association between the use of MAPs and performance would be hard to establish.

8.7.4 Comparison of results with previous research.

The results fail to provide any consistent or coherent evidence for any relationship that would support the second hypothesis. Thus the study is at variance with some previous research, for example Shields (1995) and Kennedy and Graves (2001), who found a significant association between the use of costing systems and firm performance, and Hoque and James (2000); Maiga and Jacobs (2003); and Jusoh et al. (2008) who reported strong evidence for an association between the use of performance measures and firm performance.

However, the results are consistent with other studies that report a weak or negative association between the use of MAPs and performance measurement. For example, Perera et al. (1997) found no association between the use of non-financial measures and

perceived performance, Young and Selto (1993) reported that there is little evidence of an association between the use of non-financial measures in a modern manufacturing environment and differences in manufacturing performance, and Ittner et al. (2002) found weak evidence for any relationship between the use of a costing system and performance.

Chapter 9

Conclusions, limitations, and recommendations for future research

9.1 Introduction

This chapter summarises the conclusions reached with respect to the research questions and hypotheses developed in this study. The chapter starts by reiterating the research problem, the research questions and the hypotheses before stating the conclusions reached on each research questions. Lastly, the limitations of the research and some areas for further research are identified.

9.2 The research problems and conclusions

The importance of small and medium-sized enterprises for the Malaysian economy is undeniable. As discussed in chapter 3, SMEs in Malaysia play a crucial role by providing employment opportunities and boosting the growth of the economy. The SME sector has also proved valuable in helping Malaysia to achieve sustainable economic growth as the sector has been resilient to the adverse impact of global economic challenges that impact on the Malaysian economy. Among the different sectors in which SMEs operate, the manufacturing sector is most significant in terms of the contribution to GDP and exports from Malaysia, whereas the service and agriculture sectors contribute most in terms of employment. On balance it is reasonable to claim that the manufacturing sector is the most important SME sector in Malaysia and to make it the focus of the research.

A major contributor to the success of SMEs has been support from the Malaysian government to this sector. Given the various potential advantages from a thriving SMEs sector, the Malaysian government/policy makers have enacted various policies and

interventions to promote SME development and to ensure the sector's sustainability and survival. Financial assistance as well as training in technical aspects of business, marketing and management skills is among the support from the government for this sector. These policies and support have successfully stimulated the growth of this sector. Despite the increasing interest in the SME sector, there is a dearth of academic research into Malaysian SMEs including their use of MAPs.

Research has shown that MAPs have a role in ensuring that the management of a firm is efficient and effective and may also improve performance. MAPs also permit firms to compete in the market place and reduce the likelihood of business failure. Given these advantages from MAP use, it is important to promote knowledge and awareness of MAPs among small business in Malaysia so that firms may benefit from the advantages that have been highlighted above. Furthermore, in a Malaysian context, this lack of research into MAPs and SMEs may result in a failure by government to appreciate the importance of MAPs for SMEs. For example, knowledge of MAPs is not included in management skills training for entrepreneurs provided by the government. This research may ensure that policy makers are better informed. Therefore the thesis addressed this literature gap by investigating four research questions:

1. What is the extent of the use of MAPs by Malaysian SMEs?
2. What are the roles of management accounting in SMEs' management?
3. What factors affect the extent of the use of MAPs by SMEs?
4. Is there a positive relationship between the use of MAPs and the performance of SMEs?

Research questions 3 and 4 were expressed in terms of the following two general hypotheses for empirical testing:

H1: There are significant and positive relationships between selected contingent factors and the use of MAPs.

H2: There is a significant and positive relationship between the use of MAPs and organizational performance.

The four research questions were answered through evidence obtained from a survey of 1,000 Malaysian SMEs, which elicited 160 useable responses. Three main type of analyses; descriptive; bivariate and multivariate were undertaken to help answering the above research questions. The main conclusions for each research question are as follows:

Research question 1

This research question investigates the current state of the extent of use of MAPs in Malaysian manufacturing SMEs. Five sub-divisions for MAPs (costing, budgeting, performance evaluation, decision-making and SMA) were identified. The results showed a significant uptake of these MAPs in both small and medium sized firms. The percentage of respondents making some use of these practices varied from 35% to 76% for small firms and from 58% to 86% among medium sized enterprises. The unexpectedly high uptake of MAPs may be partly explained by the extensive employment of qualified accountants by these enterprises with 68% of small firms and 94% of medium sized firms having qualified accountants and the majority of the remainder employing part-qualified accountants. The employment of qualified accounting staff is significantly higher in medium sized enterprises compared to small sized firms and this may account for the relatively higher uptake of MAPs by medium sized enterprises as opposed to small enterprises. However, it must be remembered that

non-response bias tests showed that the sample of small sized firms may not be representative of the total sample and therefore it is possible that the position is unrepresentative. The obvious concern is that responses from small sized firms are biased towards respondents who use MAPs.

The results also indicated that use of traditional MAPs (costing systems and budgeting systems and performance evaluation systems) was higher than for more sophisticated MAPs (decision support system and SMA). The significantly lower adoption of sophisticated MAPs (between 51% and 63%) as opposed to traditional MAPs (76% to 83%) may be because either management is doubtful of the relevancy of those practices for the relatively small sized of firms or because management is unaware of them. Apart from that, since newly developed MAPs were created initially for large firms especially in developed countries, firms in less a developed country may take more time to learn new ideas and techniques, especially smaller sized firms. Perhaps, also some of the practices are not yet practical for firms in a developing country due to differences in culture, state of technology or level of market competitiveness.

The study also investigated the specific extent of use of a range of specific MAPs by Malaysian SMEs detailing the extent of use of 46 management accounting techniques under five broad headings of MAPs. Again the results confirm that the use of traditional management accounting techniques was relatively higher than the use of more recently-developed management accounting techniques. Financial-based management accounting techniques such as full financial budgeting, financial performance measures, product profitability analysis and conventional costing systems, such as process costing, variable costing and job costing, were widely used by both small and medium sized enterprises.

The results also showed that non-financial performance measures related to internal processes and to customers are clearly very important in small and medium sized enterprises. The predominance of the use of these measures indicates the importance for manufacturing firms to assure the performance of their supply chain. The rest of recently-developed management accounting techniques largely related to SMA and decision support systems predictably received less attention from the Malaysian SMEs. The result is consistent with most of the previous literature relating to management accounting in developing countries (see for example, Joshi, 2001; Phadoongsitthi, 2003; and El-Ebaishi et al., 2003).

In terms of category of enterprises, the research showed that medium sized enterprises outnumbered the small sized enterprises in all five areas of the use of MAPs. The most significant differences can be seen in the use of techniques under budgeting systems and both sophisticated MAPs (decision support systems and SMA).

The study concludes that although both Malaysian small and medium sized firms make extensive use of traditional MAPs they only selectively use modern MAPs. Such adoption of MAPs by Malaysian SMEs may be largely attributed to the broad employment of qualified accounting staff with more than 80% of small and medium sized enterprises indicating that they have hired qualified or part-qualified accounting staff in their firms. The difference in uptake is greater for sophisticated MAPs, which are employed reasonably extensively by medium sized enterprises but markedly less by small enterprises. In addition a significant uptake of traditional MAPs by Malaysian SMEs may be attributed to the fact that information on these measures is more readily available as opposed to modern management accounting techniques which may be perceived as more uncertain, less practical and costly. Apart from that size of firms may

be a key factor in these results. As argued before, larger firms need more sophisticated MAPs to manage the complexity of their operation due to their larger investment. Besides, larger firms have advantages in term of a greater access of resources to employ new management practices in their firm (see Chenhall and Langfield-Smith, 1998 and Abdel-Kader and Luther, 2008). As such the results support the contingency theory of the impact of size on the level of use of sophisticated MAPs.

Research question 2

The results suggest that MAPs were perceived as playing important roles in the management of Malaysian SMEs - despite assertions from some commentators that management accounting is irrelevant to meeting managerial needs especially in a modern manufacturing environment (see for example Johnson and Kaplan, 1987 and Cooper, 1990). The results confirm that in Malaysian SMEs MAPs are perceived as relevant and useful to today's organizations. Respondents agreed that MAPs have a specific role in helping these SMEs to plan, control, evaluate performance, optimize the use of resources, assist in decision making, and improve communication.

Research question 3

The analyses of factors that affect the use of MAPs among Malaysian SMEs only considered data from medium sized enterprises. This was due to the concerns about non-response bias in the responses from small enterprises. Table 9.1 below provides a summary of the results.

Table 9.1: Summary of the results of bivariate and multivariate analyses regarding factors affecting the use of MAPs.

	Bivariate analysis	Multivariate analysis
Annual sales turnover	<ul style="list-style-type: none"> • Costing system • Performance evaluation system 	<ul style="list-style-type: none"> • Costing system • Performance evaluation system
Intensity of market competition	<ul style="list-style-type: none"> • Costing system • Budgeting system • Performance evaluation system 	<ul style="list-style-type: none"> • Costing system • Budgeting system • Performance evaluation system
Participation of owner/manager	<ul style="list-style-type: none"> • Decision support system • Strategic management accounting 	<ul style="list-style-type: none"> • Budgeting system • Decision support system • Strategic management accounting
Advanced manufacturing technology	<ul style="list-style-type: none"> • Costing system • Performance evaluation system • Strategic management accounting 	<ul style="list-style-type: none"> • Costing system • Performance evaluation system • Strategic management accounting
The level of qualification of accounting staff	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None

The analyses using bivariate and regression approaches delivered relatively consistent results in that size of firm, intensity of market competition and AMT were found to have positive and statistically significant relationships with the use of certain MAPs in both analyses. Those contingent variables have similarly associated with the use of costing systems and performance evaluation systems. Further the use of budgeting and more sophisticated MAPs is largely associated with participation of the owner/manager of firm. The last variable; the level of qualification of accounting staff was only tested by bivariate analysis. The variable was found not to have positive and significant relationships with the use of any MAPs. Given the uncertainty regarding the exogeneity of this variable, it was excluded in the multivariate analysis. Even if it is included, the variable was found not to have a statistically significant association with any of the five categories of MAPs which is consistent with the results in the bivariate analysis.

Overall the results indicate that some use of particular MAPs depends upon specific contingent factors. Four out of five contingent factors; size of the firm, intensity of market competition, participation of owner/manager of firm and AMT have a positive and statistically significant relationship with the use of certain MAPs. Therefore, it is probable that the Malaysian SMEs make more use of MAPs when their firms face environmental complexity either internally or externally or when the owner/manager is committed to their use.

Research question 4

The possibility of a relationship between the use of MAPs and firm performance was analysed using both bivariate and multivariate analysis. Some moderate evidences were found in the bivariate analysis. However in the multivariate analysis, only a few potential statistically significant relationships were traced, however the overall strength of the regression models involved were generally extremely weak and thus the results must be deemed unreliable. Therefore, the results from the two analyses find no coherent pattern of association between the use of MAPs and firm performance. The results suggest that MAPs do not directly produce an improvement in firm performance. Probably MAPs act as supporting tools that can help to increase efficiency and help management to effectively manage activity rather than directly improve the performance of firms.

9.3 Implications and recommendation

This research concerns the use of MAPs by SMEs. Although there is a body of literature examining the use of MAPs, the focus has been on larger firms and no previous research has exclusively addressed the use of MAPs in SMEs particularly in a developing country. This research therefore makes its own specific contribution by providing knowledge of MAPs in SMEs in a developing country. The research is distinct not only because it documents the uptake of MAPs among SMEs; but also because it addresses the roles of MAPs in the management of SMEs; investigates factors affecting the use of MAPs, and examines the impact of MAPs on the performance of firms in SME sector.

By filling this research gap, this study has sought to advance understanding of recent developments of MAPs in SMEs particularly in a developing country context by adding new empirical evidence to the body of knowledge on the use of MAPs as well as responding to calls for research into MAPs in small business (see Mitchell et al., 1998; Mitchell and Reid, 2000; and Nimtrakoon, 2009).

This research considers a broad range of MAPs instead of focusing on a single MAP or a limited set of MAPs. The information will increase an understanding on how far small businesses have taken advantages of the available MAPs and whether they have adopted newly developed techniques to some extent.

Using the notion of contingency theory as a foundation, this research has also advanced the current state of knowledge by shedding light on factors influencing the use of MAPs in small businesses in a developing country. The findings indicate that MAPs can be influenced by external environment as well as by factors within the organization. As

such this research has responded to the recent calls for additional contingency based research in management accounting in order to enhance understanding of potential contingency factors which explain the use of MAPs (Chenhall and Langfield-Smith, 1998; and El-Ebaishi et al., 2003). It extends the body of knowledge that use contingency theory to explore the significance of contingency variables in small businesses.

Further this research has made at contribution by exploring the roles of MAPs in the management of SMEs and examining for a possible association between the some use of MAPs and improved firm performance. As such this research has highlighted the importance of management accounting in the management as well as the relationship of their use to organisational performance. Consequently this research has extended the findings of Chenhall and Langfield-Smith (1998) and El-Ebaishi et al. (2003) among others.

This research has increased knowledge of MAPs in a SMEs context. Malaysia as a developing country has strived to move to parity with more developed economies, and find the research useful to provide relevant knowledge that can support efforts to enhance the performance of Malaysian SMEs. The findings will be informative for policy makers intent on developing management accounting skills among Malaysian SMEs. In specific it is hoped that the Malaysian government will enhance the existing training programmes to the Malaysian entrepreneurs or young graduates by subsidising the training in the use of MAPs so that the SMEs. The training should bring more awareness to the use of MAPs particularly to the use of more modern MAPs. More broadly this research will promote interest among Malaysian researchers as well as researchers of other countries to take the SMEs sector as a focus of interest for their

research. This study can be also a starting point for further investigations and analysis of MAPs among SMEs in Malaysia.

The study suggests that there is ample room to increase both awareness of and understanding of the importance of MAPs within smaller firms since these practices are vital ingredients in the success of any organizations. The results indicated that traditional and financially oriented MAPs have high level of usage but the adoption of newly-developed MAPs remains patchy. Perhaps Malaysian policy makers could provide training in these techniques for entrepreneurs or future graduates in Malaysia.

In conclusion, the work presents a comprehensive survey and explanations of the use of MAPs in SMEs and therefore makes a contribution to the awareness of management accounting in small firms particularly in a developing economy.

9.4 Limitations of the study

The study has the following limitations. First, the low response to the questionnaire survey potentially introduces non-response bias especially for small sized enterprises category where such bias was identified by testing. For small sized enterprises, this bias restricted generalization of the findings and prevented further statistical analyses for this group but caution must also be exercised when generalizing from the results for medium sized enterprises given the low response rate. However, data collection for SMEs is difficult and therefore the limitation of low response rates cannot be avoided.

Second, the performance of firms across different dimensions was measured using qualitative perceptions rather than quantitative results. As argued before, organizational performance is complex and difficult to measure. Hence the concept of

multidimensionality has been used increasingly in many management accounting researches (Nimtrakoon, 2009). Although a self-rating scale has been criticised on grounds of a lack of objectivity, it is the only source available given that SMEs are unwilling to divulge quantitative results. However, Dess and Robinson (1984) reported that subjective perceptions of top management on performance were consistent with actual performance; hence the use of subjective measures is appropriate in the absence of objective measures.

Third, this research only focused on one sector (manufacturing sector) because it contained the largest concentration of medium sized firms and had the greatest economic significance of any sector. The sampling design therefore restricts the generalisability of the research findings to all SMEs.

Fourth, the range of contingent variables used in this study is quite small. This reflects the less complex environment in which SMEs operate. The limited number of variables was also decided upon to avoid confusing respondents or discouraging them from responding by excessive complexity. Considerations that is especially important given that the sample is unused to academic research questionnaires.

The use of a postal survey imposes some restrictions in terms of the nature and volume of questions and it does not facilitate follow-up questions to explore potentially interesting areas or apparently inconsistent responses. The possibility of misinterpretation or misunderstanding of questions by respondents can never be ruled out. As the study examined a large number of items, it is possible that respondents may have misinterpreted some items. Furthermore, the results were derived from the responses of a majority of accounting managers who are likely have some biased views

in the success of management accounting techniques and practices. This is why a few results such as the use of ABC and target costing are relatively higher than in the previous study.

Lastly, this study contained complex aspects of MAP usage within yes or no questions or Likert scale questions and as with all surveys, it is possible that respondents may have misinterpreted some questions. This possibility was minimised through the pilot study and the care taken to ensure that the survey was completed by accounting executive or accounting manager.

Despite these limitations, the study provides evidence of the state of MAP usage by Malaysian SMEs with additional information on the significant factors that affected the use of MAPs in Malaysian SMEs and the effect of the use of MAPs on organizational performance. It is suggested that, this piece of work has made an important contribution to research on the employment of MAPs and has successfully responded to the need for research into MAP usage by SMEs in developing countries.

9.5 Recommendations for future research

The results of this research raise several issues that warrant future research.

First, the sample of small firms should be extended to achieve a valid set of responses. This would enable differences based upon size to be clearly identified and highlight the effect of contingent factors in different contexts. However, this may prove difficult as there must be the possibility that small firms without MAPs will be much less likely to complete the questionnaire and thus bias the responses.

Second, in the context of contingency theory it might be advantageous to focus on a sample from one particular industry such as electric and electronics or food and beverages in the manufacturing sector. This would mean that the sample would be more homogeneous and might be expected to use certain types of MAPs or certain techniques. This might make the contingent factors explaining differences more distinct. Alternatively a case study approach might be employed to highlight differences and reasons for them in a more detailed context so that how and why practices and techniques are applied or not applied would be identifiable.

Third the nature of the dependence between traditional and recently-developed MAPs needs further investigation. The lower use of sophisticated MAPs raises the question of the conditions necessary to effectively implement these techniques within smaller firms. Again a qualitative case study approach would be likely to provide additional insights beyond those that can be gleaned from a questionnaire survey approach.

Fourth, the next few years are likely to see increased global competitiveness in the Malaysian industrial markets; therefore it would be interesting to expand the survey to provide a longitudinal study of management accounting change by documenting changes over time in the adoption of specific management accounting techniques in a more detailed way.

Lastly, research in this area can be developed by conducting a comparative study of the Malaysian situation on adoption of MAPs against that in other developing countries in order to explore differences in terms of cultural and other contingent factors.

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Glossary 1: Management accounting practices

Costing system

- Activity-based costing (ABC)
Cost contribution to cost units on the basis of benefit received from indirect activities e.g ordering, setting-up and assuring quality.
- Traditional absorption costing
The procedure which charges fixed as well as variable overhead to cost units.
- Direct costing systems
The accounting system in which variable costs are charged to cost units and fixed costs of the period are written-off full against the aggregate contribution. Its special value is in decision-making.

Budgeting

- Incremental budgeting
Incremental budgeting bases a period's expenditure level for a discretionary item on the amount spent for that item during the previous period.
- Zero-based budgeting
A method of budgeting whereby all activities are re-evaluated each time a budget is set. Discrete levels of each activity are valued and a combination chosen to match funds available.
- Operational budgeting
Budget of the profit and loss account and its supporting schedules such as monthly forecasts of sales, production, and operating expenses.
- Financial budgeting
Those budgets that identify the expected financial consequences of the activities summarized in the operating budgets. This includes balance sheets, income statement and cash flow statements.
- Flexible budget
A budget which, by recognizing different cost behaviour patterns, is designed to change as volume of output changes.
- Rolling budget
Method in which a budget established at the beginning of an accounting period is continually amended to reflect variances that arise due to changing circumstances.

Performance evaluation

- Performance evaluation based on financial measures (s)
The financial measures such as return on investment, budget variance analysis, divisional profit
- Performance evaluation based on non-financial measure(s) related to customers
The measures which include customers satisfaction survey and customer complaints.
- Performance evaluation based on non-financial measures related to operations
The measures which include ongoing supplier evaluation, stock turnover and product quality.
- Performance evaluation based on non-financial measure(s) related to employees
The measures which include team performance and employee attitude.

- **Benchmarking**
Benchmarking within an organization or with outside organizations on operational process, product characteristics, management process and strategic priorities.

Decision support system

- **Cost-volume-profit analysis**
The study of the effects on future profit of changes in fixed cost, variable cost, sales price, quantity and mix.
- **Stock control model**
Stock control is the systematic regulation of stock levels. A model such as Economic order quantity, and JIT.
- **Investment appraisal discounting techniques (e.g. NPV, IRR)**
A valuation of investment projects by adjusting cash flows for the time value of money using techniques as net present value (NPV) or internal-rate-of-return (IRR)
- **Investment appraisal non-discounting techniques (e.g. Payback, ROI)**
A valuation of investment projects which does not consider the time value of money. For example payback period and return on investment.
- **Customer profitability analysis**
Customer profitability (CP) is the difference between the revenues earned from and the costs associated with the customer relationship in a specified period.
- **Product profitability analysis**
An analysis on the relative profitability attributable to individual product.

Strategic management accounting

That body of Management Accounting concerned with the provision of strategically orientated information for decision-making and control.

- **Target costing**
A product cost estimate derived from a competitive market price. Used to reduce costs through continuous improvement and replacement of technologies and processes.
- **Quality costing**
Quality costs are those costs associated with the creation, identification, repair, and prevention of defects. These can be classified into three categories; prevention, appraisal, and failure costs. Cost of quality reports are produced for the purpose of directing management attention to prioritize quality problems.
- **Strategic costing**
The use of cost data based on strategic and marketing information to develop and identify superior strategies that will sustain a competitive advantage.
- **Strategic pricing**
The analysis of strategic factors in the pricing decision process. These factors may include: competitor price reaction; price elasticity; market growth; economies of scale; and experience.
- **Value chain costing**
An activity-based costing approach where costs are allocated to activities required to design, procure, produce, market, distribute, and service a product or service.

- **Competitor cost assessment,**
The provision of regularly updated estimates of a competitor's costs based on, for example, appraisal of facilities, technology, economies of scale. Sources include direct observation, mutual suppliers, mutual customers and ex-employees.
- **Competitive position monitoring**
The analysis of competitor positions within the industry by assessing and monitoring trends in competitor sales, market share, volume, unit costs, and return on sales. This information can provide a basis for the assessment of competitor's market strategy.
- **Product life cycle analysis**
The appraisal of costs based on the length of stages of a product or service's life. These stages may include design, introduction) growth, decline, and eventually abandonment.
- **Process costing**
Process costing is a method of costing used to ascertain the cost of the product at each process, operation or stage of manufacture

Glossary 2: Standard Definition of SMEs

Primary agriculture

General definition:

"A small and medium enterprise in primary agriculture is an enterprise with full-time employees not exceeding 50 or annual sales turnover not exceeding RM5 million."

Specific definitions:

"A micro enterprise in primary agriculture is an enterprise with full-time employees of less than 5 or with annual sales turnover of less than RM200,000."

"A small enterprise in primary agriculture is an enterprise with full-time employees of between 5 and 19 or with annual sales turnover of between RM200,000 and less than RM1million."

"A medium enterprise in primary agriculture is an enterprise with full-time employees of between 20 and 50 or with annual sales turnover of between RM 1 million and RM5 million."

Manufacturing (including Agro-Based) and manufacturing-related services (MRS)

General definition:

"A small and medium enterprise in manufacturing (including agro-based) and MRS is an enterprise with full-time employees not exceeding 150 or with annual sales turnover not exceeding RM25 million."

Specific definitions:

"A micro enterprise in manufacturing (including agro-based) and MRS is an enterprise with full-time employees of less than 5 or with annual sales turnover of less than RM250,000."

"A small enterprise in manufacturing (including agro-based) and MRS is an enterprise with full-time employees of between 5 and 50 or with annual sales turnover of between RM250,000 and less than RM10 million."

"A medium enterprise in manufacturing (including agro-based) and MRS is an enterprise with full-time employees of between 51 and 150 or with annual sales turnover of between RM10 million and RM25 million."

Services sector (including ICT)

General definition:

"A small and medium enterprise in services is an enterprise with full-time employees not exceeding 50 or annual sales turnover not exceeding RM5 million."

Specific definitions:

"A micro enterprise in services is an enterprise with full-time employees of less than 5 or with annual sales turnover of less than RM200,000."

"A small enterprise in services is an enterprise with full-time employees of between 5 and 19 or with annual sales turnover of between RM200,000 and less than RM1million."

"A medium enterprise in services is an enterprise with full-time employees of between 20 and 50 or with annual sales turnover of between RM 1 million and RM5 million."

Table A1: Major studies in management accounting practices

Studies	Classification of management accounting practices
<i>Developed countries</i>	
Smyth (1960) : Australia	Delegation of authority and responsibility; budgets and budgetary control; standards of performance; control reports and device.
Chow et al. (1988) : U.S	Cost accounting system design, decision making, planning, control, and the use of quantitative methods.
Shields et al. (1990) :U.S and Japan	Cost accounting system design, short term decision making, capital budgeting decisions, operational budgeting, operational control and management control.
Scarborough et. al (1991)	Product costing and inventory valuation, cost analysis and planning, and control and performance evaluation.
Drury et al. (1993) :U.K	Product costing; budgetary control; capital investment; AMT environment; divisional control; changes in practices.
Yoshikawa (1994) :Japan	Costing systems, cost management activity, budgeting systems, and long-term decision-making.
Tayles and Drury (1994) : U.K	Use for costing, performance measurement, control and investment appraisal.
McMann and Nanni (1995) : Japan	Five themes in Japanese literature review 1. the ‘eyes’ of market; 2. Quality of work; 3. ‘Waste’ as the measure of cost; 4. Continually improving the way work is done; and 5. Sharing knowledge through vertical and horizontal communication.
Bhimani (1996) : Europe	Literature review of European studies
Shields (1997) : U.S	Review on topics, setting, theories, research methods and results.
Chenhall and Langfield-Smith (1998) : Australia	Long term planning, detailed budgeting systems, product costing, performance evaluation, and decision support systems
Wijewardena and De Zoysa (1999) : New Zealand	Investment appraisal, budgeting, overhead allocation, inventory level, quantitative techniques, performance evaluation, product costing, costing systems
Abdel-Kader and Luther (2006) : U.K	Costing system; budgeting; performance evaluation information for decision making; and strategic analysis
Pierce and O’ Dean (1998)	Traditional and ‘new’ management accounting techniques, long-term planning and appraisal of investment efficiency, information usefulness of the accounting system
Szychta (2002) : Poland	Cost accounting systems and operational budgeting.
Preda and Watts (2004) : Australia	Value-based Management (VBM), Total Quality Management (TQM), BSC, ABC and ABM.
Hyvo`nen (2005) : Finland	Long term planning; detailed budgeting systems; product costing; performance evaluation, and decision support systems.
<i>Developing countries</i>	
Firth (1996) : China	Product cost systems, budgeting, planning, and uses of accounting data.
Ghosh and Kai Chan (1997):Singapore	Control and planning, decision support system, ABC and pricing method.
Sulaiman et al. (2004) review on the works of Abdul Rahman et al. (1998) and Thou et al. (1998): Malaysia	Budgeting, standard costing, performance evaluation, CVP, and contemporary techniques
Anderson and Lanen (1999) : India	Cost management; planning and control; performance measurement and evaluation.
Joshi (2001) : India	Long term planning; detailed budgeting systems; product costing; performance evaluation and decision support systems.
Phadoongsitthi (2003) : Thailand	Long term planning, Detailed budgeting systems, Product costing, Performance evaluation, and Decision support systems
O’Connor et al. (2004) : China	Formal procedures, approval procedures, total quality control procedures, budget targets, performance targets
Sulaiman and Mitchell (2005) : Malaysia	Management accounting change
Frezatti (2007) : Brazil	Structured and formalized costing system; strategic plan and budget; .management reports; waste-reduction program; value-management system.

Wu et al. (2007) : China	Product cost systems; budgeting systems; detailed budgeting systems; performance evaluation and rewards; decision support systems; planning and control and responsibility accounting
Sulaiman et al. (2007) : Malaysia	Management accountants' roles, skills and techniques.
<i>SMEs</i>	
Dunne et al. (1980) : U.S	Planning and control
Demong and Croll (1981) : U.S	Cost accounting
Mcintyre and Icerman (1985) : U.S	Rate of return
Hopper et al. (1999) : Japan	Cost accounting
Gul (1991) : Australia	MAS and performance
Mitchell et al. (1998) : U.K	A case for researching management accounting in SMEs.
Gunasekaran et al. (1999) : U.K	Justification of ABC
Marriott and Marriott (2000) : U.K	Management accounting service
Jarvis et al. (2000) : U.K	Performance measurement
Mitchell and Reid (2000) : U.K	Editorial MAPs and SMEs
Berry et al. (2002) : U.K	Financial management
Collis and Jarvis (2002) : U.K	Financial information and management
Reid and Smith (2002) : U.K	Management accounting system and SMEs
Abdul Hamid et al. (2004) : Malaysia	Managerial Practices in SMEs
Kraus et al. (2006) : Denmark	Strategic Planning and Performance
Sousa et al.(2006) : U.K	Performance measurement
Alawattage et al. (2007)	An introduction MA in LDCs
O'Regan et al. (2008) : U.K	Strategic planning and performance
Hopper et al. (2009) : Japan	Costing systems and cost management

Table A2: Costing systems

Studies	Specific area
Bhimani and Pigott (1992) : U.K	ABC (Behavioral and organisational impact)
Bright et al. (1992) : U.K	Costing techniques and practices
Mitchell (1994) : U.K	Commentary on ABC application
Innes and Mitchell (1995) : U.K	A survey on ABC
Yoshikawa et al. (1995) : Japan	Functional cost analysis (FCA)
Lukka and Granlund (1996) : Finland	Cost accounting practices
Dugdale and Jones (1997) : U.K	ABC use; comment on Innes and Mitchell
Innes and Mitchell (1997) : U.K	ABC use: reply to Dugdale and Jones
Malmi (1999) : Finland	ABC diffusion
Gunasekaran et al. (1999) : U.S	Justification of ABC in SMEs
Cinquini et al. (1999) : Italy	Cost accounting practices
Drury and Tayles (2000) : U.K	Cost system design
Kennedy and Graves (2001) : U.K	ABC and performance
Mishra and Vaysman (2001) : U.S	Cost-system choice and ABC
Brierley et al. (2001) : Europe	Product costing practice
Lamminmaki and Drury (2001) : N. Zealand and U.K	Product costing: Practice comparison.
Ittner et al. (2002) : U.S	ABC and performance
Lin and Yu (2002) : China	Responsibility cost control system
Cotton <i>et al.</i> (2003) : New Zealand	ABC survey
Baird et al. (2004) : Australia	Activity management practices
Liu and Pan (2007) : China	ABC implementation
Van triest and Elshahat (2007) : Egypt	Cost accounting practices
Brierley et al. (2008) : U.K	Types of cost system

Table A3: Budgeting systems

Studies	Specific area
Swieringa and Moncur (1972)	Managers' budget oriented behavior
Otley (1978) : U.S	Budget use and performance
Lyne (1988) : U.K	The role of budget
Brownell (1982) : U.S	Budgetary participation

Cress and Pettijohn (1985) : U.S	A budget survey
Merchant (1985) : U.S	Budgetary slack
Chenhall and Brownell (1988) : Australia	Effect of participative budgeting
Briers and Hirst (1990) : U.K	Budgetary information in performance evaluation
Penno (1990) : U.S	Participation in budgeting and performance
Dunk (1993) : U.S	Budget emphasis and budget participation and slack
Armstrong et al. (1996) : U.K	Budgetary control
Holzmann and Mendoza (1997) : Latin America	Strategy and budgeting
Guilding et al. (1998) : New Zealand and U.K	Budgeting and standard costing practices
Ekholm and Wallin (2000) : Finland	Annual budget
Van der Stede (2000) : U.S	consequences of budgetary controls
Tsui (2001) : China	Culture impact on budget.
Fisher et al. (2002) : U.S	Effect of resource allocation on budget slack
Edwards et al. (2002) : U.K	Standard costing and budgetary control
Hansen et al. (2003)	Practice development in budgeting
Subramaniam and Mia (2003) : Australia	Budget emphasis and managers' commitment
Joshi et al. (2003) : Bahrain	Budget planning, control and evaluation
Nik Ahmad et al. (2003) : Malaysia	A budget survey
Hansen and Van der Stede (2004) : U.S	Multiple facets of budgeting
Fruitticher et al. (2005) : U.S	Budget practices
Sulaiman et al. (2005) : Malaysia	Standard costing
Marginson and Ogden (2005) : U.K	Budgeting and innovation
Dugdale and Lyne (2006) : U.K	Budgeting
De Zoysa and Kanthi Herath (2007) : Japan	Standard costing

Table A4: Performance evaluation system

Studies	Specific area
Hopwood (1972) : U.S	Performance evaluation
Coates et al. (1992)	Multinational companies performance evaluation
Bhimani (1993) : U.K	Performance measurement
Fullerton and McWatters (2002) : U.S	Performance measures and JIT
CIMA, 2002	Trends in corporate performance measurement
Speckbacher (2003) : German	Balanced scorecards
Davis and Albright (2004) : U.S	Balanced scorecards and performance
Gomes et al. (2004) : Portugal	Performance evaluation
Abdel-Maksoud (2004) : U.K	Shop floor non-financial performance measures
Abdel-Maksoud et al. (2005) : U.K	Non-financial performance measurement
Ismail (2007) : Egypt	Performance evaluation
Abdel-Maksoud et al. (2008) : Japan	Shop-Floor non-financial performance measures (SFNFPMs)
Jusoh and Parnell (2008) : Malaysia	Competitive strategy and performance evaluation
Hall (2008) : U.K	Performance measurement and performance

Table A5: Decision support system

Studies	Specific area
Haka (1987) : U.S	Capital budgeting technique and contingency
Klammer et al. (1991) : U.S	Capital budgeting practices
Collier and Gregory (1995) : U.K	Investment appraisal in service industry
Lazaridis (2004) : Cyprus	Capital budgeting practices
Drury and Tayles (2006) : U.K	Profitability analysis
Hermes et al. (2007) : Netherlands and China	Capital budgeting practices

Table A6: Strategic management accounting

Studies	Specific area
Bromwich (1990) : U.K	The case for strategic management accounting

Monden and Hamada (1991) : Japan	Target costing and Kaizen costing
Smith and Dikolli (1995) : Australia	Customer profitability analysis: ABC approach
Tani et. al (1994) : Japan	Target costing
Ito (1995) : Japan	Quality costing
Collier and Gregory (1995) : U.K	SMA
Lord (1996) : U.K	SMA review
Carr and Tomkins (1996) : U .K., U.S, German	Strategic investment decisions
Cauwenbergh et al. (1996) : Belgium	Strategic investment decisions
Shank (1996) : U.S	Strategic cost management (SCM)
Guilding et al. (2000) : N.Z,U.K, U.S	SMA comparison
Roslender and Hart (2002) : U.K	The case for strategic management accounting
Smith (2002) : Australia	SMA: Public sector
Dekker (2003) : U.K	Value chain analysis
Dekker and Smidt (2003) : Denmark	Target costing
Roslender and Hart (2003) : U.K	SMA: Theoretical and field study perspectives
Dunk (2004) : Australia	Product life cycle cost analysis
Blumentritt (2006) : U.S	Integrating SMA and budgeting
Maiga and Jacobs (2006) : U.S	SMA and performance
Tillmann and Goddard (2008) : U.K	SMA and sense-making
Cadez and Guilding (2008) : U.K	SMA and contingency model
Langfield-Smith (2008)	SMA review
Burney et al. (2009) : U.S	Strategic performance measurement system

Appendix 2: List of performance measures in management accounting

Table A7: Performance measures used by previous research

Authors	Level of performance	Performance measures
Merchant (1981)	Departmental	A self-rating of overall performance. Managers were asked to rate their department on a scale from 1 (well below average) to 5 (well above average).
Shields (1995)	Technique	1. "Overall, how successful do you believe the ABC initiative in your firm has been?," with a 7-point scale response scale anchored by 1=Extremely Unsuccessful and 7=Extremely Successful. 2. asking whether a financial benefit had or had not been received from ABC
Hansen & Van Der Stede (2004)	Technique	Respondents were asked to answer self-rated the global performance of their organizational unit. 1. Past budget period; 2. Ideal versus actual budget period 3. Relative to competitors. Using the 5-point Likert scale
Hall (2008)	Managers	Managerial performance: Planning, investigating, coordinating, evaluating, supervising, staffing, negotiating, representing, overall. 7-point Likert scale (1 = not at all to 7 = to a great extent)
Abernethy and Lilis (1995)	Firm	General managers were asked to rate the performance of the firm relative to that of competitors on a 5-point scale anchored at the extremes with 1 (well below average) and 5 (well above average)
Perera et al. (1997)	Firm	3 dimensions of annual rate of growth in sales, profitability and ROA over the past three years. On a 5-point Likert-type scale, anchored on "Well below (above) industry", respondents were asked to rate performance against industry average.
Hoque and James (2000)	Firm	ROI, margin on sales, capacity utilization, customer satisfaction, and product quality on a scale from 1 = below average to 5 = above average
Hoque (2004)	Firm	Operating profits, ROI, sales growth rate, market share, cash flow from operation, new product development, market development, R&D, cost reduction programmes, personnel development, workplace relations and employee health and safety. across 12 dimensions on a 5-point Likert-type scale, ranging from 1 (well below average) to 5 (well above average)
Hyvonen (2007)	Firm	Market share, sales volume, market developments, development of new products, political-public affairs, personnel developments, cost control, ROI, profit, cash flow from operations. Respondents were asked to evaluate the performance of their business unit relative to competitors for 10 different dimensions on a scale from 1 to 7.
Tayles et al. (2007)	Firm	Profit, growth, ROA, stock performance, leadership, competitiveness, new product success, overall performance. the scale of 1 to 7
Jusoh et al. (2008)	Firm	Productivity, cost, quality, delivery schedule, market share, sales growth rate, operating profit, cash flow from operation, ROI, new product development, R&D activity, and personnel development. Identify the changes in the performance measures in the last three years using the scale of 1 to 7 (decreased tremendously = 1, no change = 4, and increased tremendously = 7).

Appendix 3: Non-response bias test

Table A8: Pearson chi-square result of early and late responses test

	Value	Df	Asymp. Sig. (2-sided)
--	-------	----	-----------------------

Years of operation/business	2.714	2	0.257
Manufacturing activities	7.860	6	0.249
Number of employees	1.170	2	0.557
Manufacturing activities	5.301	3	0.380
Use of costing system	0.278	1	0.598
Use of budgeting system	0.227	1	0.634
Use of performance evaluation system	0.067	1	0.796
Use of decision support system	4.226	1	0.040
Use of strategic management accounting	1.137	1	0.286

Table A9: Mann-Whitney U test result of early and late responses test

	Sig
Job costing	0.180
Batch costing	0.735
Contract costing	0.099
Process costing	0.137
Absorption costing	0.077
Variable costing	0.959
Variable and absorption costing	0.121
Activity based costing (ABC)	0.383
Sales budget	0.505
Purchasing budget	0.983
Production budget	0.674
Cash flow budget	0.750
Financial position budget	0.971
Monthly budget	0.604
Annual budget	0.766
Continuous/rolling budgeting	0.898
Flexible budget	0.423
Incremental budgeting	0.780
Zero-based budgeting	0.364
Operating income	0.144
Return on investment	0.990
Variance analysis	0.064
Sales growth	0.180
Cash flows	0.170
Number of customer complaints	0.705
Survey of customer satisfaction	0.873
Number of warranty claims	0.670
On-time delivery	0.614
Manufacturing lead time/cycle time	0.864
Defect rate	0.122
Employee turnover	0.299
Absentee rates	0.576
Break-even analysis	0.950
Stock control model	0.983
Product profitability analysis	0.926
Customer profitability analysis	0.153
Payback	0.816
Accounting rate of return	0.335
Net present value	0.871
Internal rate of return	0.575
Target costing in the design of new products?	0.542
Strategic costing in determining the firm's strategy?	0.775
An analysis of the costs incurred in each of the activities in the firm's value chain?	0.921
Monitoring the costs that occur across stages of product development?	0.933
Taking into account any strategic factors when setting price decision?	0.240
The systematic collection of data on competitors' price reaction, demand	0.836

reaction, and market position?	
How intense is competition for the firm's main product/product lines? How intense is competition for the firm's main product/product lines?	0.547
To what extent did your owner/manager participate in the development of management accounting practices for your firm?	0.880
Flexible manufacturing system	0.523
Computer numerically controlled machines	0.504
Others	0.519
Level of productivity	0.724
Product quality	0.455
Number of deliveries on time	0.978
Sales growth rate	0.766
Operating profit growth rate	0.589
Cash flow growth rate	0.313
planning the future strategies, tactics and operations	0.537
controlling current activities	0.194
measuring and evaluating performance	0.501
optimizing the use of firm's resources	0.213
reducing subjectivity in the decision making process	0.281
improving internal and external communication	0.392

Appendix 4: Results summary of ordinal regression analysis between the use management accounting practices and perceptions of firm performance using Cloglink

Table A10: Results summary of ordinal regression analysis between the use management accounting practices and perceptions of firm performance using Cloglink

Predictors	Productivity		Product quality		Deliveries on time	
	B	Sig.	B	Sig.	B	Sig.
Costing system	-0.575	0.088	-0.509	0.115	-0.434	0.149
Budgeting system	0.049	0.449	-0.167	0.333	-0.448	0.123
Performance evaluation system	-0.563	0.091	0.811	0.028	0.514	0.112
Decision support system	0.406	0.119	-0.129	0.356	0.115	0.368
Strategic management acc.	-0.306	0.135	-0.129	0.324	-0.431	0.061
Model fittings	0.119		0.567		0.263	
Goodness of fit	0.674		0.487		0.989	
Test of parallel lines	0.001		0.004		0.444	
Pseudo R square						
Cox and Snell R square	0.078		0.035		0.058	
Nagelkerke R square	0.086		0.041		0.066	
McFadden R square	0.035		0.018		0.028	

(table continues)

Predictors	Sales growth		Operating profit		Cash flow growth	
	B	Sig.	B	Sig.	B	Sig.
Costing system	-0.480	0.115	0.030	0.472	-0.328	0.217
Budgeting system	-0.561	0.066	-0.717	0.039	-0.216	0.286
Performance evaluation system	-0.055	0.445	0.146	0.366	0.131	0.374
Decision support system	0.408	0.117	-0.019	0.479	-0.289	0.202
Strategic management acc.	-0.140	0.303	-0.561	0.027	-0.447	0.056
Model fittings	0.285		0.050		0.076	
Goodness of fit	0.829		0.317		0.322	
Test of parallel lines	0.884		0.000		0.000	
Pseudo R square						
Cox and Snell R square	0.056		0.098		0.088	
Nagelkerke R square	0.060		0.107		0.096	
McFadden R square	0.022		0.043		0.038	

Appendix 5: Questionnaire

Title: Management Accounting Practices in Malaysian SMEs

This questionnaire has 5 sections.

Questionnaire-Section 1: Profile of the firm

1. **Years of operations/business**

- | | | | |
|------------|-----|--------------------|-----|
| 1-3 years | [] | More than 10 years | [] |
| 4-10 years | [] | | |

2. **Manufacturing activities (sector)**

- | | | | |
|-------------------------------|-----|-------------------------------|-----|
| Furniture | [] | Rubber and plastic | [] |
| Food, and beverage | [] | Chemicals & chemical products | [] |
| Non-metallic mineral products | [] | Others (Please specify) | |
| Basic Metals | [] | | |

3. **Number of employees**

- | | | | |
|---------|-----|---------------|-----|
| 0 to 4 | [] | 51 to 150 | [] |
| 5 to 50 | [] | More than 150 | [] |

4. **Annual sales turnover**

- | | | | |
|------------------------------|-----|--------------------------------|-----|
| Less than RM 250,000 | [] | RM 5.0 to RM 10 million | [] |
| RM 250,000 to RM 1.0 million | [] | RM 10 million to RM 25 million | [] |
| RM 1.0 to RM 5.0 million | [] | More than RM25 million | [] |

Section 2: Extent of the use of management accounting practices
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Part A: Costing system

5. Do you use a costing system in your firm? (Please tick in the appropriate box)

Yes	[]
No	[]

If yes please continue to question number 6 and onwards. If no please proceed to part B (question 8).

Please use the following scale for questions 6 and 7. Please circle your answer.

Never	Rarely	Occasionally	Frequently	Very Frequently
1	2	3	4	5

6.	Please indicate the extent to which the following cost collection systems				
Job costing	1	2	3	4	5
Batch costing	1	2	3	4	5
Contract costing	1	2	3	4	5
Process costing	1	2	3	4	5

7.	Please indicate the extent to which the following costing systems are used in your firm				
Absorption costing	1	2	3	4	5
Variable costing	1	2	3	4	5
Variable and absorption costing	1	2	3	4	5

Activity based costing (ABC)	1	2	3	4	5
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Part B: Budgeting system

8. Do you use a budgeting system in your firm? (Please tick in the appropriate box)

Yes	[]
No	[]

If yes please continue to question number 9 and onwards. If no please proceed to the part C (question 12).

Please use the following scale for questions number 9 to 11. Please circle your answer.

Never	Rarely	Occasionally	Frequently	Very Frequently
1	2	3	4	5

9.	Please indicate which budgets are prepared.				
Sales budget	1	2	3	4	5
Purchasing budget	1	2	3	4	5
Production budget	1	2	3	4	5
Cash flow budget	1	2	3	4	5
Financial position budget	1	2	3	4	5

10.	Please indicate the frequency of budget preparation				
Monthly budget	1	2	3	4	5
Annual budget	1	2	3	4	5
Continuous/rolling budgeting	1	2	3	4	5

11.	Please indicate the extent to which the following type of budgeting are employed				
Flexible budget	1	2	3	4	5
Incremental budgeting	1	2	3	4	5
Zero-based budgeting	1	2	3	4	5

Part C: Performance evaluation system

12. Do you use a performance evaluation system in your firm? (Please tick in the appropriate box)

Yes	[]
No	[]

If yes please continue to question number 13 and onwards. If no please proceed to part D (question 14).

Please use the following scale for questions number 13. Please circle your answer.

Never	Rarely	Occasionally	Frequently	Very Frequently
1	2	3	4	5

13.	Please indicate the extent to which the following measures of performance evaluation are used				
<i>Financial measures</i>					
Operating income	1	2	3	4	5
Return on investment	1	2	3	4	5
Variance analysis	1	2	3	4	5
Sales growth	1	2	3	4	5
Cash flows	1	2	3	4	5
<i>Non-financial measures</i>					
Number of customer complaints	1	2	3	4	5
Survey of customer satisfaction	1	2	3	4	5
Number of warranty claims	1	2	3	4	5
On-time delivery	1	2	3	4	5
Manufacturing lead time/cycle time	1	2	3	4	5
Defect rate	1	2	3	4	5
Employee turnover	1	2	3	4	5
Absentee rates	1	2	3	4	5

Part D: Decision support system

14. Do you use decision support system in your firm? (Please tick in the appropriate box)

Yes	[]
No	[]

If yes please continue to question number 15 and onwards. If no please proceed to part E (question 16).

Please use the following scale for questions number 15. Please circle your answer.

Never	Rarely	Occasionally	Frequently	Very Frequently
1	2	3	4	5

15.	Please indicate the extent to which the following analysis are used in your firm				
<i>Short-run analysis</i>					
Break-even analysis	1	2	3	4	5
Stock control model	1	2	3	4	5
Product profitability analysis	1	2	3	4	5
Customer profitability analysis	1	2	3	4	5
<i>Long-run analysis</i>					
Payback	1	2	3	4	5
Accounting rate of return	1	2	3	4	5
Net present value	1	2	3	4	5
Internal rate of return	1	2	3	4	5

Part E: Strategic Management Accounting

16. Do you use strategic management accounting in your firm? (Please tick in the appropriate box)

Yes	[]
No	[]

If yes please continue to question number 17 and onwards. If no please proceed to section 3, part A (question 18).

Please use the following scale for questions number 17. Please circle your answer.

Never	Rarely	Occasionally	Frequently	Very Frequently
1	2	3	4	5

17.	To what extent do you employ the following practices				
Target costing in the design of new products?	1	2	3	4	5
Strategic costing in determining the firm's strategy?	1	2	3	4	5
An analysis of the costs incurred in each of the activities in the firm's value chain?	1	2	3	4	5
Monitoring the costs that occur across stages of product development? *	1	2	3	4	5
Taking into account any strategic factors when setting price decision? **	1	2	3	4	5
The systematic collection of data on competitors' price reaction, demand reaction, and market position?	1	2	3	4	5

*for example costs of installation, operation, support, maintenance and disposal.

** for example factors: competitor price reaction, elasticity, market growth, economies of scale, and experience.

Section 3 : Factors which affect of the extent of the use of management accounting practices

Part A: Market competition

Please use the following scale for question 18. Please circle your answer.

Not intense at all	Not intense	Slightly intense	Intense	Very intense
1	2	3	4	5

18.	How intense is competition for the firm's main product/product lines?	1	2	3	4	5
-----	---	---	---	---	---	---

Part B: Qualified internal accountant

Please tick in the appropriate box for question 19 and 20.

19. Do you employ any accounting staff?

Yes	[]
No	[]

If yes, please continue to question 20 and onwards, if no please proceed to Part C (question 21)

20. Please indicate the highest qualifications of your firm's internal accountant.

PMR/SRP	[]	Bachelor Degree in accounting/finance	[]
SPM	[]	Others (please specify)	
ACCA	[]		

Part C: Owner/manager participation

Please use the following scale for question 21. Please circle your answer.

Not at all	Low extent	Moderate Extent	High Extent	Very High Extent
1	2	3	4	5

21.	To what extent did your owner/manager participate in the development of management accounting practices for your firm?	1	2	3	4	5
-----	--	---	---	---	---	---

Part D: Technology

Please use the following scale for question 22. Please circle your answer.

Not used	Low used	Moderate used	High Used	Widely Used
1	2	3	4	5

22.	Please indicate the extent of use of the following technologies					
	Flexible manufacturing system	1	2	3	4	5
	Computer numerically controlled machines	1	2	3	4	5
	Others (Please Specify)	1	2	3	4	5

Section 4: Performance of the firm

Please use the following scale for question 23 and onwards. Please circle your answer.

Decreased significantly	Decreased	No change	Increased	Increased significantly
1	2	3	4	5

23.	During the last three years, in your opinion have the following					
	Level of productivity	1	2	3	4	5
	Product quality	1	2	3	4	5
	Number of deliveries on time	1	2	3	4	5
	Sales growth rate	1	2	3	4	5
	Operating profit growth rate	1	2	3	4	5
	Cash flow growth rate	1	2	3	4	5

Section 5: The functions of management accounting

Please use the following scale for question 24. Please circle your answer.

Strongly Disagree	Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5

24.	In your firm, management accounting practices have helped management in;				
planning the future strategies, tactics and operations	1	2	3	4	5
controlling current activities	1	2	3	4	5
measuring and evaluating performance	1	2	3	4	5
optimizing the use of firm's resources	1	2	3	4	5
reducing subjectivity in the decision making process	1	2	3	4	5
improving internal and external communication	1	2	3	4	5

Thank you very much for your participation.

Please place this questionnaire in the self-addressed envelope provided and mail it back. Add any additional comments on a separate piece of paper and include these in the envelope.

Appendix 6: Covering letter to target respondent

Dear Accounting Manager,

29 December, 2009

I am a lecturer at the University of Tun Hussien Onn Malaysia (UTHM) who is undertaking a Ph.D as part of my job requirement. My thesis is based on a study of the management accounting practices and their impact on the performance of SMEs in Malaysia. I am writing to invite you to participate in this research through the completion of the enclosed questionnaire.

This survey is being conducted as part of my Ph.D. research at the University of Exeter Business School. The questionnaire should take approximately 20 minutes to complete.

Please be assured that all information collected will be treated as strictly confidential. No individual identities will be revealed and only aggregate results will be presented. The numbers at the end of the questionnaire are used only as a code for following up non-respondents.

After answering the questions at your leisure over a one to two week period, please place the attached questionnaire in the postage- paid envelope provided. If you would like to review the results of the study when completed, please place a business card in the envelope and I will send you a copy of the executive summary of my research as a token of my appreciation.

If you have any questions, please feel free to contact me at my e-mail address below.

The success of this study depends upon your responses, accordingly your participation is much appreciated.

Yours sincerely,

Kamilah Ahmad
Ph.D Candidate in Accounting
Business School
University of Exeter
Streatham Court, Exeter
EX4 4PU, United Kingdom
ka260@exeter.ac.uk

Home address
Kamilah Ahmad
Di alamat:
Surya Azlina Ibrahim
Sekolah Keb. Sri Cheras
Km. 5, Jalan Cheras
56100, Kuala Lumpur, Malaysia
kamilah@uthm.edu.my

Appendix 7: Covering letter : 1st Follow-up

Dear Accounting Manager,

29 December, 2009

I am a lecturer at the University of Tun Hussien Onn Malaysia (UTHM) who is undertaking a Ph.D as part of my job requirement. Two months ago a questionnaire was mailed to your firm seeking your perceptions on management accounting practices among Malaysian SMEs. As of today I have not yet received your completed questionnaire.

This survey is being conducted as part of my Ph.D. research at the University of Exeter Business School. The questionnaire should take approximately 20 minutes to complete.

In case you did not receive the questionnaire that I sent to you previously, I have enclosed another questionnaire. Please complete and return the questionnaire at your earliest convenience. For your views to be included in this important study, your completed questionnaire must be received no later than January 15th 2010.

Please be assured that all information collected will be treated as strictly confidential. No individual identities will be revealed and only aggregate results will be presented. The numbers at the end of the questionnaire are used only as a code for following up non-respondents.

After answering the questions, please place the attached questionnaire in the postage-paid envelope provided. If you would like to review the results of the study when completed, please place a business card in the envelope and I will send you a copy of the executive summary of my research as a token of my appreciation.

If you have any questions, please feel free to contact me at my e-mail address below.

The success of this study depends upon your responses, accordingly your participation is much appreciated.

Yours sincerely,

Kamilah Ahmad
Ph.D Candidate in Accounting
Business School
University of Exeter
Streatham Court, Exeter
EX4 4PU, United Kingdom
ka260@exeter.ac.uk

Home address
Kamilah Ahmad
Di alamat:
Surya Azlina Ibrahim
Sekolah Keb. Sri Cheras
Km. 5, Jalan Cheras
56100, Kuala Lumpur, Malaysia
kamilah@uthm.edu.my

Appendix 8: Covering letter: 2nd Follow-up

Dear Account Manager,

22 March, 2010

I am writing to you about the survey of management accounting practices among Malaysian SMEs. As of today I have not yet received your completed questionnaire. This survey is being conducted as part of my Ph.D. research at the University of Exeter Business School. The questionnaire should take approximately 15 minutes to complete.

In case you did not receive the questionnaire that I sent to you previously, I have enclosed another questionnaire. May I urge you to complete it and return it as soon as possible. Please be assured that all information collected will be treated as strictly confidential. No individual identities will be revealed and only aggregate results will be presented.

After answering the questions, please place the attached questionnaire in the postage-paid envelope provided. If you would like to review the results of the study when completed, please place a business card in the envelope and I will send you a copy of the executive summary of my research as a token of my appreciation.

If you have any questions, please feel free to contact me at my e-mail address below.

The success of this study depends upon your responses, accordingly your participation is much appreciated.

Yours sincerely,

Kamilah Ahmad
Ph.D Candidate in Accounting
Business School
University of Exeter
Streatham Court, Exeter
EX4 4PU, United Kingdom
ka260@exeter.ac.uk

Home address
Kamilah Ahmad
Di alamat:
Surya Azlina Ibrahim
Sekolah Keb. Sri Cheras
Km. 5, Jalan Cheras
56100, Kuala Lumpur, Malaysia
kamilah@uthm.edu.my