THE UNIVERSITY OF HULL

Organization Strategy, Management Techniques and Management Accounting Practices: Contingency Research in Thailand

being a Thesis submitted for the Degree of

Doctor of Philosophy

in the University of Hull

by

Sirinuch Nimtrakoon

B.Acc., the University of the Thai Chamber of Commerce (Thailand)
M.A., Chulalongkorn University (Thailand)
M.Res., the University of Hull (UK)

December 2009

Acknowledgements

This thesis was completed with the assistance and the encouragement from many people. First of all, I would like to express my appreciation to my dearest family especially my parents, Mr. Somsak and Mrs. Saengrawee Nimtrakoon, and my siblings, Miss Supintra and Mr. Suppawat Nimtrakoon, for their unconditional love and support throughout my life, which make the period at the University of Hull possible.

I would like to address my gratitude to my supervisor, Professor Michael E. Tayles, who has been not only a supervisor but also a very good friend to me. He introduced me to the world of management accounting research. He has been very supportive at every stage of this thesis. I very appreciate for his reading, correcting and commenting on the drafts of the thesis. Without his support and encouragement, this thesis could never have been completed.

I would also like to thank the University of the Thai Chamber of Commerce (UTCC) in Thailand who has granted the scholarship for my PhD study at the University of Hull. I am very grateful to my lecturers, colleagues and friends in Thailand, particularly Assistant Professor Janja Limpapakul, Assistant Professor Niyada Visetborisut, Assistant Professor Orapin Lourprasert, Miss Duangjai Ow-Jariyapithak and Miss Sarinee Thangsathapornphung for their support as well as comments on the draft of the questionnaire. Special thanks to my fellow doctoral students and all of my friends in Hull, especially YS, Vale, Nancy, Duan, and Bird for their friendship and encouragement.

Last but not least, this thesis will never be completed without the respondents for the survey and interviews. I would like to thanks those who kindly respond to the questionnaire as well as participate in the further interviews.

Abstract

There have been the recent calls for additional research in order to enhance the understanding of potential contingency factors which explain the adoption of management accounting practices (MAPs). This, allied to a lack of knowledge in relation to current use of MAPs, especially in developing countries, is the motivation for this research. Thus, this research attempts to explore the adoption and perceived benefit of MAPs as well as to examine their relationships with contingency factors affecting organizational performance in a developing country, Thailand. Two potential contingency factors are adopted for this research including a comprehensive set of strategic typologies and management techniques (MTs). Three forms of contingency fit, selection, interaction, and systems approaches, have been adopted in order to develop research questions and hypotheses.

A triangulation approach combining a survey and interviews is used in this research. The questionnaire was delivered to 'accounting managers' of 451 companies listed on the Stock Exchange of Thailand (SET). There were 135 returned and usable responses, resulting in 29.9 percent response rate. Semi-structured interviews of seven companies provide qualitative findings, which are in line with, but explain further, those from the survey.

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. There are some alignments between MAPs and strategic typologies and between MTs and strategic typologies. However, only a few moderation effects are detected. In line with expectations, the companies under differentiation/ prospector/ entrepreneurial/ build strategies tend to have higher organizational performance when they obtain higher benefit from contemporary MAPs and MTs concerning quality, employee empowerment, customization and flexibility. It was also found that the companies pursuing cost leadership/ defender/ conservative/ harvest strategies tend to have higher performance when they obtain higher benefit from traditional MAPs and MTs relating to cost reduction processes.

This study adds to the limited body of knowledge of MA in Asian countries, in particular Thailand. It represents a comprehensive survey and explanation of MAPs in Thailand. It is anticipated that this research will make academics and practitioners aware of the capability of alternative MAPs combined with the right match of MTs to improve firms' efficiency and effectiveness as well as its fit with the strategies. It is also expected that the findings of this research will provide valuable insights into the nature of MAPs, and assist the academics and practitioners in improving management accounting rules and practices in Thailand.

Table of Contents

Acknowledgements i
Abstract ii
Table of Contents iv
List of Tables viii
List of Figures x

Chapter 1: Introduction 1
1.1 Rationale and Motivation of the Study 1
1.2 Background of the Research Setting: Thailand 5
1.2.1 Thai Economy 6
1.2.2 Management Accounting Research in Thailand 8
1.3 Research Objectives, Research Questions and Research Model 10
1.4 Organization of the Thesis 13

Chapter 2: Literature Review 17
2.1 Management Control System (MCS), Management Accounting System (MAS) and Management Accounting Practices (MAPs) 17
2.1.1 Management Control System (MCS) 17
2.1.2 Management Accounting System (MAS) 18
2.1.3 Management Accounting Practices (MAPs) 20
2.1.4 The Relationship between MCS, MAS and MAPs 23
2.2 Management Accounting Change 25
2.2.1 The Evolution of Management Accounting 26
2.2.2 Traditional and Contemporary Management Accounting 28
2.3 Contingency Theory of Management Accounting 30
2.3.1 Contingency Theory Framework 30
2.3.2 Forms of Contingency Fit 32
2.3.3 Level of Analysis in Contingency Studies 35
2.3.4 Criticism of Contingency Theory 36
2.4 Contingency Factors 38
2.4.1 Strategy 38
2.4.1.1 Levels of Strategy 39
2.4.1.2 Classification of Strategy 40
2.4.1.3 The Use of Strategic Types in MA Research 45
2.4.2 Management Techniques 47
2.4.2.1 Human Resource Management 47
2.4.2.2 Integrating Systems 48
2.4.2.3 Team Based Structures 50
2.4.2.4 Quality Systems 53
2.4.2.5 Operating Systems Innovations 55
2.4.2.6 Improving Existing Processes 57
2.5 Previous MA Research based on Contingency Theory 58
2.5.1 Previous MA Research: Selection Approach 58
2.5.2 Previous MA Research: Interaction Approach 61
2.5.3 Previous MA Research: Systems Approach 65

Chapter 2: Literature Review (Continued)
2.6 Development of Hypotheses 67
2.6.1 Differentiation/ Prospector/ Entrepreneurial/ Build 68
2.6.2 Cost leadership/ Defender/ Conservative/ Harvest 69

Chapter 3: Research Methodology 74
3.1 Research Philosophy 75
3.1.1 Positivism 75
3.1.2 Interpretivism 76
3.1.3 Research Philosophy in Accounting 77
3.2 Research Approach 84
3.2.1 Deductive Approach 84
3.2.2 Inductive Approach 84
3.3 Research Strategies and Data Collection Methods 85
3.3.1 Survey 87
3.3.2 Case Study 89
3.4 Time Horizons 90
3.5 The Credibility of the Research 91
3.5.1 Reliability 91
3.5.2 Validity 91

Chapter 4: Research Questionnaire, Measurement, and Descriptive Analysis
4.1 Questionnaire Instrument 94
4.1.1 Population and Sample 94
4.1.2 Questionnaire Design and Pilot Study 96
4.1.3 Questionnaire Administration and Response Rate 98
4.1.4 Response and Non-Response Bias Analysis 99
4.2 Measurement of Variables 100
4.2.1 Measurement of Management Accounting Practices 100
4.2.2 Measurement of Management Techniques 100
4.2.3 Measurement of Strategic Variables 101
4.2.4 Measurement of Organizational Performance 102
4.3 Descriptive Analysis 103
4.3.1 Respondent Demographics 103
4.3.2 The Adoption and Benefit of Management Accounting Practices 106
4.3.3 The Adoption and Benefit of Management Techniques 112
4.3.4 Strategic Typologies 117
4.3.5 Organizational Performance 120
4.4 Examining the Data 121
4.4.1 Missing Data 121
4.4.2 Outliers 126
4.4.3 Testing the Assumptions 127

Chapter 5: Preliminary Statistical Analysis 132
5.1 Factor Analysis 132
5.1.1 Principle Component Analysis (PCA) versus Factor Analysis (FA) 133
5.1.2 Exploratory Factor Analysis (EFA) versus Confirmatory Factor Analysis (CFA) 135

Chapter 5: Preliminary Statistical Analysis (Continued)
5.1.3 Study Design of EFA 136
5.1.4 Extraction Method 137
5.1.5 The Selection of the Number of Factors 137
5.1.6 Rotation of Factors 139
5.1.7 The Significance of Factor Loadings 141
5.2 EFA for Management Accounting Practices 142
5.2.1 EFA for Contemporary Management Accounting Practices 143
5.2.2 EFA for Traditional Management Accounting Practices 148
5.3 EFA for Management Techniques 153
5.4 EFA for Strategic Priorities 158
5.5 Examining New Variables from FA 162
5.5.1 Sensitivity Analysis 162
5.5.2 Outliers 164
5.5.3 Testing the Assumptions 165

Chapter 6: Hypotheses Testing Based on Selection Approach 168
6.1 Correlation Analysis 169
6.2 Multiple Regression Analysis 175
6.2.1 Research Design of Multiple Regression Analysis 177
6.2.2 Assumptions in Multiple Regression Analysis 180
6.3 Testing Hypotheses with Multiple Regression Analysis 183
6.3.1 Hypothesis 1 184
6.3.2 Hypothesis 2 194
6.3.3 Hypothesis 3 198
6.3.4 Hypothesis 4 199
6.3.5 Hypothesis 5 203
6.3.6 Hypothesis 6 209
6.3.7 Hypothesis 7 211
6.3.8 Hypothesis 8 212

Chapter 7: Hypotheses Testing Based on Interaction 215
7.1 Moderated Regression Analysis 215
7.2 Testing Hypotheses with Moderated Regression Analysis 220
7.2.1 Hypothesis 9 221
7.2.2 Hypothesis 10 232

Chapter 8: Hypotheses Testing Based on Systems Approaches 238
8.1 Cluster Analysis 238
8.1.1 Research Design in Cluster Analysis 240
8.1.2 Assumptions in Cluster Analysis 244
8.1.3 Partitioning Procedure 245
8.1.4 Limitations of Cluster Analysis 250
8.2 Hypothesis Testing with Cluster Analysis 251
8.3 Validating Cluster Solution 263

Chapter 9: Interviews 266
9.1 Background of the Case Companies 267
9.1.1 Company A: Financial firm 267
9.1.2 Company B: Retail stores 269
9.1.3 Company C: Property development 271
9.1.4 Company D: Hotel 273
9.1.5 Company E: Private hospital 275
9.1.6 Company F: Internet service provider 277
9.1.7 Company G: Manufacturer automotive 279
9.2 Data Analysis 281
9.3 Findings and Discussions 283
9.3.1 Management Accounting Practices (MAPs) 283
9.3.2 Management Techniques (MTs) 287
9.3.3 Relationships among the Constructs 293

Chapter 10: Discussion and Conclusions 302
10.1 Summary and Discussion of the Findings 302
10.1.1 Summary and Discussion of the Findings from Selection Approach 307
10.1.2 Summary and Discussion of the Findings from Interaction Approach 310
10.1.3 Summary and Discussion of the Findings from Systems Approach 312
10.1.4 Summary and Discussion of the Findings from Interviews 313
10.2 Originality of the Research 322
10.3 Contributions of the Research 325
10.4 Limitations and Future Research 326

References 330

Appendix
Appendix A: Research Instrument 348
Appendix B: Interview Protocol 357

List of Tables

1-1	Thailand Country Fact Sheet	6
1-2	Research Questions	11
2-1	A List of MAPs from Previous Research	21
2-2	Research Hypotheses	71
3-1	The Differences between Positivism and Interpretivism	77
3-2	Six Ontological Assumptions in Finance and Accounting Research	80
4-1	Summary of Survey Responses	99
4-2	Summary of Respondent Demographics	104
4-3	The Adoption of Management Accounting Practices (MAPs)	107
4-4	The Benefit of Management Accounting Practices (MAPs)	108
4-5	The Adoption of Management Techniques (MTs)	113
4-6	The Benefit of Management Techniques (MTs)	114
4-7	Descriptive Statistics of Strategic Priorities of Porter	118
4-8	Descriptive Statistics of Three Strategic Types	120
4-9	Descriptive Statistics of Organizational Performance	120
4-10	The Univariate Tests of Normality	129
5-1	Guidelines for Identifying Significant Factor Loadings based on Sample Size	142
5-2	List of Contemporary and Traditional Management Accounting Practices (MAPs)	143
5-3	KMO and Bartlett's Test of Factor Analysis on CMAPs	145
5-4	Pattern Matrix of Factor Analysis on CMAPs	146
5-5	Factor Correlation Matrix of Factor Analysis on CMAPs	148
5-6	Descriptive Statistics for CMAPs	148
5-7	KMO and Bartlett's Test of Factor Analysis on TMAPs	149
5-8	Pattern Matrix of Factor Analysis on TMAPs	151
5-9	Factor Correlation Matrix of Factor Analysis on TMAPs	152
5-10	Descriptive Statistics for TMAPs	152
5-11	List of Management Techniques (MTs)	153
5-12	KMO and Bartlett's Test of Factor Analyses on MTs	155
5-13	Factor Matrix of Factor Analysis on MTs	157
5-14	Descriptive statistics for MTs	158
5-15	List of Strategic Priorities	158
5-16	KMO and Bartlett's Test of Factor Analysis on Strategic Priorities	159
5-17	Pattern matrix of Factor Analysis on Strategic Priorities	161
5-18	Factor Correlation Matrix of Factor Analysis on Strategic Priorities	162
5-19	Descriptive Statistics for Strategic Priorities	162
5-20	Sensitivity Analysis	163
5-21	The Tests of Normality for New Variables	165
6-1	Research Hypotheses based on Selection Approach	168
6-2	Correlation Matrix: Spearman Correlation Coefficient	170
6-3	The Interaction among R^2, Sample Size, Significance Level (α), and the Numbers of Independent Variables	178
6-4	The Result from Multiple Regression Analysis for Hypothesis 1	185
6-5	Summary of the Result for Hypothesis 1	194
6-6	The Result from Multiple Regression Analysis for Hypothesis 2	195

List of Tables (Continued)

6-7	Summary of the Result for Hypothesis 2	198
6-8	The Result from Multiple Regression Analysis for Hypothesis 4	200
6-9	Result Summary for Hypothesis 4	203
6-10	The Result from Multiple Regression Analysis for Hypothesis 5	204
6-11	Summary of the Result for Hypothesis 5	208
6-12	The Result from Multiple Regression Analysis for Hypothesis 6	209
6-13	Summary of the Result for Hypothesis 6	211
6-14	The Result from Multiple Regression Analysis for Hypothesis 8	213
6-15	Summary of the Result for Hypothesis 8	214
7-1	Research Hypotheses based on Interaction Approach	215
7-2	The Result from Moderated Regression Analysis for Hypothesis 9	223
7-3	Analysis of Simple Regression Equations for Regression of Organizational Performance on Centered Traditional Costing at Three Values of Centered Customer Orientation	226
7-4	Analysis of Simple Regression Equations for Regression of Organizational Performance on Centered Strategic Management Aaccounting at Three Values of Centered Differentiation	228
7-5	Analysis of Simple Regression Equations for Regression of Organizational Performance on Centered Strategic Management Accounting at Three Values of Centered Strategic Mission of Gupta and Govindarajan	230
7-6	The result from moderated regression analysis for hypothesis 10	234
7-7	Analysis of Simple Regression Equations for Regression of Organizational Performance on Centered Strategic Management Accounting at Three Values of Centered Team Based Structure	236
8-1	Clustering Variables	252
8-2	Cluster Sizes for the Initial Hierarchical Cluster Analysis	253
8-3	Percentage Changes in Agglomeration Coefficient	254
8-4	Mean Scores of Variables within Clusters	258
8-5	Cluster Solution from Split Sample for Cross Validation	264
8-6	Assessing criterion validity	265
9-1	The Detail of the Interviews	267
9-2	Qualitative Data Analysis: Content versus Grounded Methods	282
9-3	Key Adopted Management Accounting Practices across Cases	284
9-4	Key Adopted Management Techniques across Cases	287
9-5	The Summary of Key Constructs for each Company	299
10-1	Key Findings	316

List of Figures

1-1	Map of Thailand	6
1-2	Research Model	12
1-3	Organization of the Thesis	16
2-1	The Dimensions of MAS	20
2-2	The Relationships between MCS, MAS and MAPs	24
2-3	Four Evolutionary Stages of MA by IFAC	27
2-4	Basic Contingency Theory Framework in MA	32
2-5	A Classificatory Framework for Mapping Different Forms of Contingency Fit	33
2-6	Levels of strategy	40
2-7	The integration of strategic types	46
2-8	A Proposed Combination of Strategic Types	46
2-9	The Scope of Integration	49
2-10	Types of Teams	52
3-1	The Research Process 'onion'	74
3-2	The Concepts of Deductive and Inductive Approaches	85
3-3	The Triangulation Design of Data Collections	87
3-4	Types of Questionnaire	88
5-1	Scree Test for CMAPs	145
5-2	Scree Test for TMAPs	150
5-3	Scree Test for MTs	156
5-4	Scree Test for Strategic Priorities	160
7-1	Typology of Specification Variables	216
7-2	Moderated Relationship Proposed in Hypothesis 9	221
7-3	Regression Lines Predicting Organizational Performance from Traditional Costing at Three Levels of Customer Orientation	227
7-4	Regression Lines Predicting Organizational Performance from Strategic Management Accounting at Three Levels of Differentiation	229
7-5	Regression Lines Predicting Organizational Performance from Strategic Management Accounting at Three Levels of Strategic Mission	231
7-6	Moderated Relationship Proposed in Hypothesis 10	233
7-7	Regression Lines Predicting Organizational Performance from Strategic Management Accounting at Three Levels of Team Based Structure	237
8-1	Euclidean Distance between Two Objects Measured on Two Variables	243
8-2	Dendrogram Using Ward's Method	255
8-3	Plotting Number of Clusters against Agglomeration Coefficient	257
9-1	Hypothesized Research Models	294
9-2	The Links between Key Constructs found from the Interviews	295

Chapter 1
Introduction

1.1 Rationale and Motivation of the Study

Over the past thirty years, there has been the appearance of various innovative management accounting practices (MAPs) across different industries. The noticeable examples of these practices are activity based costing (ABC), balanced scorecard (BSC), quality initiatives, increased benchmarking, greater customer orientation, and the emergence of various 'strategic' management accounting techniques (Ax and Bjørnenak, 2005; Chenhall, 2005; Abdel-Kader and Luther, 2008; Cadez and Guilding, 2008; Ma and Tayles, 2009). These contemporary MAPs have influenced the whole process of management accounting—planning, controlling, decision-making, and communication (Otley et al., 1995; Kaplan and Atkinson, 1998). The broader scope of the 'new' MAPs, which are informal, external and non-financial information, has evolved from the conventional concept of formal, internal and financial information (Chenhall, 2007).

Interest in the changes in management accounting (MA) was initially triggered by the seminal work, *Relevance Lost*, of Johnson and Kaplan (1987) arguing that traditional MA (e.g. standard costing, variance analysis, traditional budgeting, and cost volume profit (CVP) analysis) was 'in crisis', and may no longer be able to cope with decision making, planning and control requirements of the present business environment (Kaplan, 1984). The business environment, in which management accounting and control systems take place, has been rapidly changing. These changes have been driven by several factors including deregulation, globalised competition, the development in information technology, the transmission of new technologies, and the appearance of influential developing economies (Baines and Langfield-Smith, 2003; Lawrence et al., 2005; Waldron, 2005).

The characteristics of the new business environment are described as greater dynamism, uncertainty and continuous radical change (Nixon and Burns, 2005). This new environment affects not only manufacturing firms, but also the organizations in all other

sectors including services. It influences both production processes and post-production activities as well as organizational structures, business strategies and managerial philosophies (Yazdifar, 2003). For some businesses, this environment implies much shorter product life cycles, more advanced manufacturing techniques, less emphasis on labour in manufacturing processes, and high levels of competition (Sulaiman et al., 2004).

To survive and succeed in this environment, it is necessary for firms to reengineer, restructure and rethink their management and management accounting processes. It is believed that the companies must pay more attention to the demand and the concerns of all other legitimate stakeholders. Additionally, they should link their strategies to quality improvement, increased customization, and reduced lead times, inventories and production costs. More product and service diversity, higher quality, better delivery and increased flexibility are required. The extensive development of alliances and partnerships, outsourcing and off-shoring, E-commerce and technology transfer is needed. Organizations have been forced to become involved in team efforts in order to increase responsiveness to customers, and adopt new organizational structures, innovative management techniques (MTs) and advanced manufacturing technologies (AMTs) in order to respond effectively to changes (Nixon and Burns, 2005; Waldron, 2005).

As a result, a variety of new management techniques and innovative manufacturing processes have been implemented since the 1990s to assist firms in achieving quality improvement and international best practices, managing their organizational processes and structures, and coping with change. This also leads to the development of management accounting control system (MACS), innovative management accounting system (MAS) and new management accounting practices (MAPs) in order to provide information relevant to these innovative management and manufacturing techniques. Research into these developments has occurred for some time and is ongoing (Kellett and Sweeting, 1991; Chenhall and Langfield-Smith, 1998b; Baines and Langfield-Smith, 2003).

Over the past ten years, however, much of the research findings in MA literature have revealed a contradiction to this conventional wisdom. That is, the adoption rates of contemporary MAPs and their perceived benefits are surprisingly lower than researchers' expectations while some traditional MAPs such as traditional budgeting and costing retain

their importance in the majority of firms in many countries such as U.K., U.S., Australia, New Zealand and Asian countries (Bright et al., 1992; Drury et al., 1993; Szendi and Elmore, 1993; Chenhall and Langfield-Smith, 1998a; Adler et al., 2000; Guilding et al., 2000; Joshi, 2001; Luther and Longden, 2001; EI-Ebaishi et al., 2003; Phadoongsitthi, 2003; Sulaiman et al., 2004). Hence, it may be too early to conclude that traditional MAPs completely lack relevance. It also implies that using new MAPs may not guarantee efficiency, effectiveness or high organizational performance. Thus, the accounting and management techniques key to competitive advantage and better corporate performance for companies is an important research question.

It has long been of interest to explain the deployment of MAPs in organizations. Contingency theory, proposing the concept of fit between organizational characteristics and contingency factors, is often used to explain the adoption of different MAPs in organizations. The thrust of contingency theory to MA is that there is no unique management accounting system (MAS) for all organizations in all circumstances. Instead, the appropriate MAS is dependent on the specific circumstances of the organization, indeed, it is developed responding to a set of contingency factors (Otley, 1980). The concept of alignment in contingency theory suggests that organizational performance can be enhanced through the fit between organizational characteristics and contingencies reflecting from the organizational situation (Donaldson, 2001). Although management accounting research based on contingency theory has a long tradition, its importance to this research area has been confirmed by a stream of recent empirical articles (Gerdin and Greve, 2004; Luft and Shields, 2007). From the literature, many contingency factors have been examined such as environment, technology, organizational structure, size, strategy, and culture (Chenhall, 2003).

There have been the recent calls for additional research in order to enhance the understanding of potential contingency factors which explain the adoption of MAPs (Gerdin, 2005; Tillema, 2005; Chenhall, 2007). Additionally, there is a lack of knowledge in relation to current use of MAPs, especially in developing countries (Joshi, 2001; Hopper et al., 2008). Thus, this research attempts to explore the adoption and perceived benefit of MAPs as well as their relationships with contingency factors affecting organizational performance in a developing country, particularly Thailand. Thailand is selected as the

research setting because there are limited MA studies, especially exploring the relationships among constructs based on different forms of contingency fit in this country, and it is home country of the researcher.

Two contingency factors are adopted for this research, strategy and management techniques (MTs). Both of these contingency factors are expected to have influence on the adoption and the benefit obtained from MAPs. Concerning strategy, a comprehensive set of strategic typologies is incorporated to explore the viable combination of strategies of Thai firms. This also responds to the call for validating proposed combinations of strategies by Langfield-Smith (1997). These typologies are the strategic types of Miles and Snow (1978), strategic priorities of Porter (1980; 1985), strategic types of Miller and Friesen (1982), and strategic mission of Gupta and Govindarajan (1984a; 1984b). No previous published research has been undertaken integrating all of these strategic variables. Regarding MTs, there has been limited research explicitly using MTs as contingency factors in MA research apart from the study of Chenhall and Langfield-Smith (1998b). These MTs include human resource management policies, integrating systems, team-based structures, quality systems, operational systems innovations, and improving existing processes.

Three forms of contingency fit, which are drawn from the literature and prior studies, have been adopted in order to develop research questions and hypotheses. These are selection approach, interaction approach, and systems approach[1]. Hence, the study explores the relationships among constructs in both reductionist and holistic views.

It is believed that the originality of this research will add to the limited body of knowledge of MA in Asian countries, particularly Thailand. This study involves a comprehensive survey and explanation of MAPs in Thailand, an emerging economy. Its main contribution is to increase the understanding of current use and perceived benefit of MAPs and MTs as well as to explore the relationships between MAPs, MTs, and strategies, which might

[1] Selection approach aims to investigate the relationship between contextual factors and the aspects of MCS without being concerned about their relationship with performance. Interaction studies attempt to examine the moderation of contextual factors on the relationship between MCS and firms' performance. System models consider various combinations of multiple aspects of MCS and contextual factors in order to improve organizational performance (Chenhall, 2003, p.155).

influence organizational performance. This research also responds to the calls for additional contingency MA research in order to identify potential contingency factors to explain MAPs. It extends the body of knowledge by applying three forms of contingency fit to explore the relationships between key constructs. This research focuses on a comprehensive set of strategies as an important contingency factor. It is noted that no previous research has been involved in integrating all four strategic typologies; thus, it practically contributes to the incorporation of these strategic types, which are those which feature most prominently in the literature and in MA research.

1.2 Background of the Research Setting: Thailand

Thailand is regarded as a developing country[2] located in the East Asia and Pacific region. It is also regarded as an emerging economic country in East Asia because of its high economic growth rate as shown in the World Bank's executive summary for East Asia updated in April 2007 (WorldBank, 2007a). Thailand is a member of the Association of Southeast Asian Nations (ASEAN) established in August 1967 (ASEAN, 2007). The capital and the largest city is Bangkok, which has become the center of development and accordingly the wealthiest part of the country. The basic infrastructure of Bangkok is remarkable compared to that of neighbour countries. The city is practically comparable to Singapore for a regional center of air travel within Southeast Asia (WorldBank, 2009d).

Thai people use Thai language as their official language and the currency is Thai Baht (THB). The average exchange rate in 2008 was 33.36 THB per US$ (BOT, 2009). The population in 2008 is 67.39 million while the average life expectancy is 69 years. Gross domestic product (GDP) in 2008 is 260.69 US$ billion, and GDP growth rate is 2.6 percent in 2008 (WorldBank, 2009a). Thailand country fact sheet is shown in Table 1-1 and map of Thailand is shown in Figure 1-1.

[2] Developing countries refers to the countries within low-income and middle-income groups. All World Bank member economies were classified into three main income groups, low income, middle income (subdivided into lower middle and upper middle), and high income, based on 2005 gross national income (GNI) per capita. The groups are: low income, $875 or less; lower middle income, $876–3,465; upper middle income, $3,466–10,725; and high income, $10,726 or more. The information is available in World Bank list of economies (WorldBank, 2007b).

Table 1-1: Thailand Country Fact Sheet

Population:	67.39m (2008)
Population Growth:	0.60% (2008)
Life Expectancy:	69 years (2008)
Total Area:	513,100 sq km
Region:	East Asia and Pacific
Language:	Thai
Capital:	Bangkok
Fiscal Year:	1st October – 30th September
Currency:	Baht (THB) 33.36 per US$ (2008 average)
GDP:	260.69 US$ billion (2008)
GDP Growth:	2.6 % (2008)
Income Group:	Middle income
Inflation rate:	3.6% (2008)

Source: Thailand Data and Statistics (WorldBank, 2009a) and Key Economic Indicators from Bank of Thailand (BOT, 2009).

Figure 1-1: Map of Thailand

Source: World Bank (2009d).

1.2.1 Thai Economy

Thailand, a middle-income country in Southeast Asia, has made significant improvement in social and economic development, although it has experienced years of financial and economic crisis in the late 1990s and has been influenced by political uncertainty over the past years. The long term trend of Thai economy has indeed been robust. In the decade

prior to 1995, Thailand was identified as one of the world's fastest growing economies with an average rate of 8-9 percent a year. After the 'Asian Crisis' in 1997-1998, the Thai economy quickly recovered with the average growth rate at 5.6 percent from 2002-2006. Poverty has been sucessively reduced, which can be seen from the number of 'poor' people in Thailand which fell from 18.4 million in 1990 to 6.1 million by 2006 (WorldBank, 2009d).

Economic growth has recently been slowing as a result of weak private consumption, and investment demand. These together with the recent coup, successive political uncertainty, and the frustration with Thailand's political crisis have diminished investors and consumers confidence since 2006. Due to the magnitude and speed of the contraction in foreign demand, the Thai economy contracted 5.7 percent between the last quarter of 2008 and the first quarter of 2009. Although there was only a minor effect of the global financial crisis on Thai banks, its impact on other sectors was greater than expected. This reflected in a contraction of export volumes by 8.9 percent in the last quarter of 2008 and 16 percent in the first quarter of 2009. Consequently, there is the first annual contraction since the Asian financial crisis of 1997-1998. The real GDP in 2008 was 2.6 percent down from 4.8 percent in 2007, and it is expected to contract by 2.7 percent in 2009 (WorldBank, 2009b).

However, Thailand's relatively strong financial position has been confirmed by market indicators, indicating a signal for recovery. The Stock Exchange of Thailand (SET) gained 36 percent in 2009, which is similar to the regional average and recovered some of its 48 percent deterioration in 2008. In line with other emerging market currencies, the Thai Baht had depreciated against the US dollar in the first quarter of 2009, and it had appreciated since mid March (WorldBank, 2009c). A resumption of robust long term growth of Thailand may be subject to its positioning for the post-crisis environment. It is vital for Thailand to eliminate restrictions to domestic consumption and improve productivity in order to allow exports of higher value added products into new markets. In doing so, the quality of education is required to be improved, which may mitigate skills shortages and income inequality. When income inequality is reduced, the purchasing power of the middle class increases, which together with stronger social safety nets, reduces precautionary

savings from individuals. Eventually, these may assist in boosting domestic demand (WorldBank, 2009b).

1.2.2 Management Accounting Research in Thailand

Research on accounting in developing countries has been increasing over the past two decades possibly due to the increasingly globalised environment. However, most of the research has been related to financial accounting (FA) rather than management accounting (MA). A literature review of MA in less developed countries (LDCs) has recently been carried out by Hopper et al. (2008) in order to evaluate MA research in those countries and provide suggestions for its development. They reviewed the existing literature of MA research in LDCs published in several leading journals in Accounting[3]. There were 75 empirical papers from 29 countries in total. MA research was categorised by country, stage of development, topic, methods and theory. Apparently, there has been very limited MA research in Thailand as there is the only one paper on MA research conducted in Thailand by Virameteekul et al. (1995); this was an exploratory study of budgetary participation, motivation and performance in Thailand.

Other evidence of MA research in Thailand can be discerned from Master and PhD theses. Most of these focus on a single contemporary MA practice e.g. activity based costing (ABC). Some studies explore ABC, its benefit, and its implementation without the link to other organizational variables. Khaisaeng (1998) examined the problems from the existing traditional cost accounting system and the introduction of a new cost system, specifically ABC system, to overcome the problems. The benefits of the ABC system and its step-by-step implementation process were elaborated with a case of a manufacturing firm in Thailand.

[3] The journals searched covered Abacus; Accounting, Auditing, and Accountability Journal; Accounting and Business Research; Accounting, Organizations, and Society; Accounting Review; Advances in International Accounting; British Accounting Review; Critical Perspectives on Accounting; Journal of Accounting Research; Journal of Business Finance and Accounting; International Journal of Accounting; Journal of International Financial Management; Journal of Accounting and Organizational Change; Journal of Management Accounting Research; Management Accounting Research; Qualitative Research in Accounting and Management; and Research in Third World Accounting (now Research in Accounting in Emerging Economies) (Hopper et al., 2008, p.470).

Other studies consider ABC in relation to various organizational variables. Morakul (1999) and Morakul and Wu (2001) investigated the impacts of organizational culture on the implementation of ABC systems in three Thai companies using interviews and questionnaires. Behavioural attributes are used as intervening variables in their research model. Particularly, they explored the relationship between culture factors and resistance levels via behavioural variables in order to explain the differences in resistance levels. The results indicated that a higher resistance level will be found with an ABC system involving empowerment and redistribution of power.

Chongruksut (2002) examined the relationship between ABC adoption of Thai firms and the Thai economic crisis of 1997 via theoretical models of organizational learning. It was found that the economic crisis was a significant factor encouraging Thai firms to establish organizational learning through the adoption of accounting innovations, particularly ABC. Additionally, many Thai firms had adopted and implemented ABC in order to respond to environmental changes and the inadequacy of the traditional cost systems.

Rather than focusing on a single accounting practice, Phadoongsitthi (2003) examined the current use of a range of MAPs in Thailand and the changes in their adoption over the period 1996-2001 as well as the causes of these changes. She also investigated the degree of perceived benefits from, and the future emphases on, MAPs. The findings indicated significant changes in the adoption of MAPs, and their perceived benefits in Thailand over the period 1996-2001. The study reported causes of such changes as high competition and a shift in new information and production technology.

In summary, MA research in Thailand is obviously limited, and it is therefore difficult for Thai academics and practitioners to establish a coherent body of MA knowledge. There is no previous MA research based on contingency theory using strategy and management techniques as contingency factors conducted in Thailand; hence, the current study aims to extend MA research and fill this gap.

1.3 Research Objectives, Research Questions and Research Models

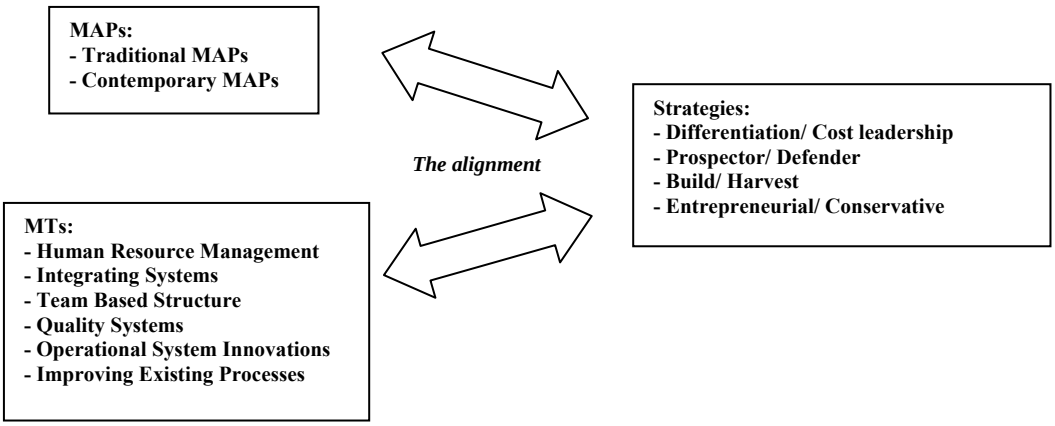
There are three main objectives, which this research intends to achieve. First, it aims to explore the extent to which MAPs and MTs are being adopted in companies in Thailand as well as the benefits gained from those practices and techniques. Second, it aims to investigate the relationship between MAPs, MTs, and strategies as well as their impact on organizational performance based on contingency theory framework. This framework proposes that an appropriate combination of MAPs and MTs is important in order to improve firm's performance under particular strategies. Finally, it attempts to explore the viable combinations of strategies of Thai firms in order to validate the proposed combinations of strategic typologies. Drawing from the objectives, research questions are articulated in Table 1-2, and research model is displayed in Figure 1-2.

Table 1-2: Research Questions

Approach	Research Questions
Descriptive Analysis	1. What are MAPs (both traditional and contemporary) that companies in Thailand use and what is the extent of the benefit perceived from these MAPs? 2. What are MTs that companies in Thailand use and what is the extent of the benefit perceived from these MTs?
Selection Approach (See Figure 1-2, Panel A)	3. What are the MAPs and MTs that provide benefits to the companies with different strategic priorities in Thailand? a. To what extent is there alignment of MAPs to different strategic typologies? b. To what extent is there alignment of MTs to different strategic typologies?
Interaction Approach (See Figure 1-2, Panel B)	4. What are positive combined effects of MAPs and contingency factors on organizational performance? a. To what extent is there any interaction effect of different strategies on relationship between MAPs and organizational performance? b. To what extent is there any interaction effect of MTs on relationship between MAPs and organizational performance?
Systems Approach (See Figure 1-2, Panel C)	5. What are the viable combinations of strategies that Thai firms pursue? Do they reflect appropriate combinations of strategy (e.g. it may be more appropriate when prospector/ entrepreneurial firms complete through differentiation and pursue a build mission)? 6. What are the appropriate combinations between MAPs and MTs for companies with different strategic typologies in order to enhance their performance? a. What are the appropriate combinations between MAPs and MTs for the companies with a differentiation/ prospector/ build/ entrepreneurial strategy in order to enhance their performance? b. What are the appropriate combinations between MAPs and MTs for the companies with a cost leadership/ defender/ harvest/ conservative strategy in order to enhance their performance?
Interviews and Cases	7. What are firms' experiences with the adoption of MAPs and MTs? 8. In what way can those appropriate combinations affect firms' performance under different strategies?

Figure 1-2: Research Models

Panel A: Selection Approach



Panel B: Interaction Approach

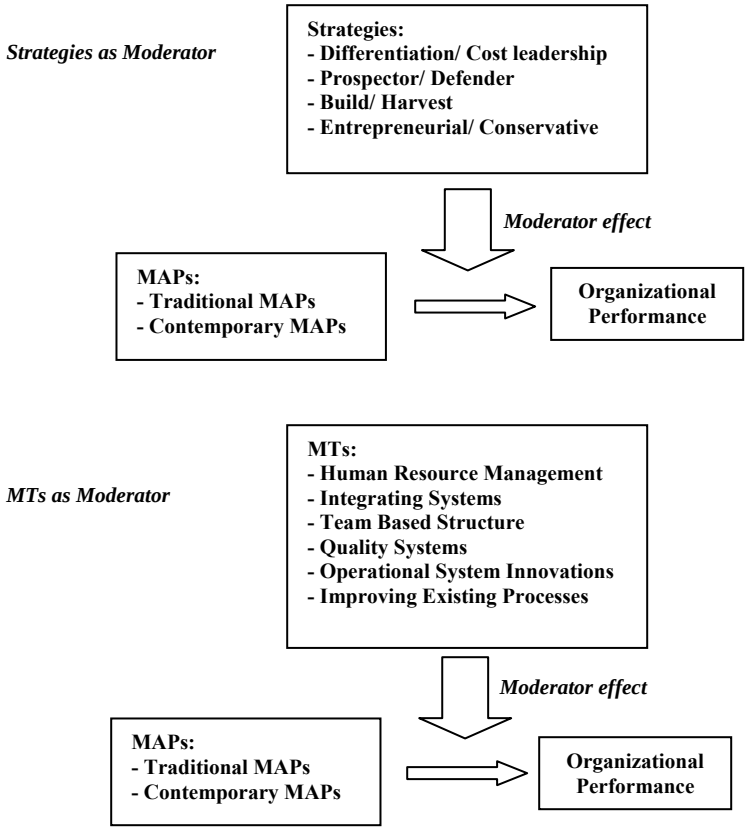
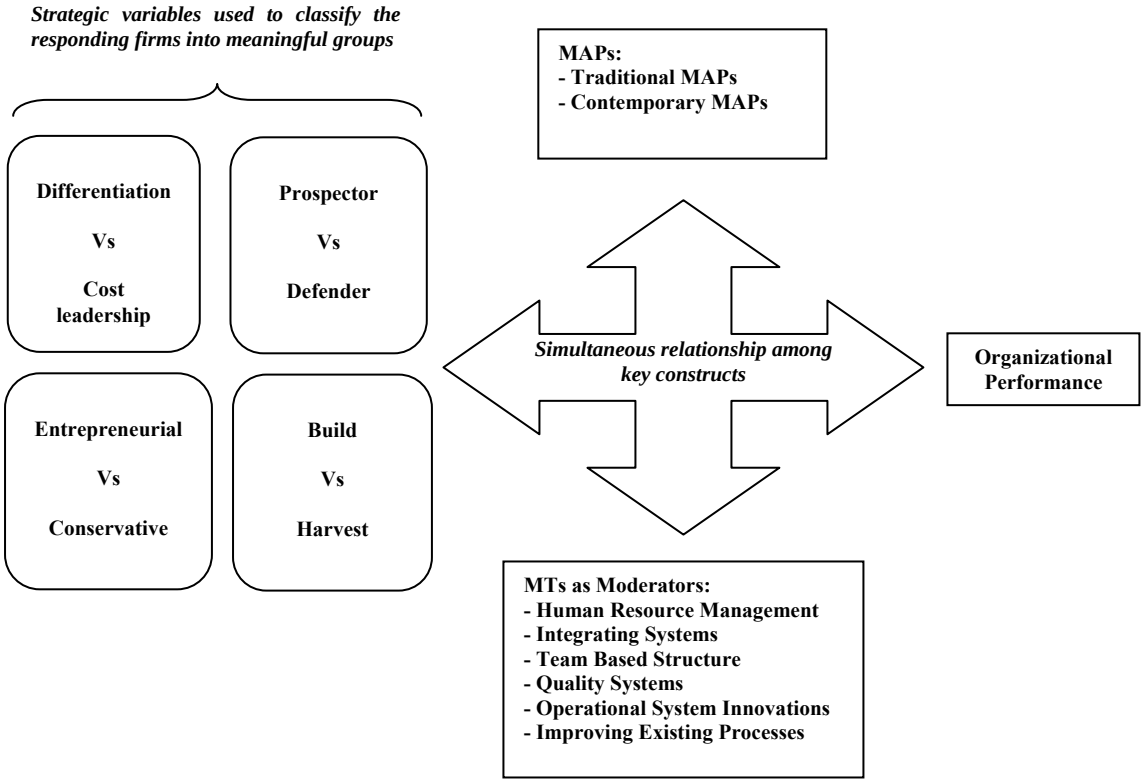


Figure 1-2: Research Model (Continued)

Panel C: Systems Approach



1.4 Organization of the Thesis

The rest of the thesis is organised as follows. A literature review is shown in chapter 2. It covers the management control system (MCS), management accounting system (MAS), and management accounting practices (MAPs) as well as their relationships. Management accounting (MA) is discussed in terms of the evolution of MA from traditional concepts to the broader scope of contemporary MA. Contingency theory of MA is also explored; this includes contingency theory framework, forms of contingency fit, level of analysis in contingency studies, and criticism of contingency theory. This is followed by an explanation of the contingency factors used in this study; strategies and MTs. A discussion of previous MA research based on different forms of contingency fit is also provided. Chapter 2 concludes with the development of hypotheses.

Chapter 3 explains the research methodology employed in this research. This includes research philosophy, especially research philosophy in accounting, and research approach. Research strategies and data collection methods are then explored including survey and case interviews. The time horizons and credibility of the research are also addressed.

The research questionnaire, measurement of variables and descriptive analysis is shown in chapter 4. It begins with the questionnaire instrument, population and sample, questionnaire design and pilot study, questionnaire administration and response rate, and response and non-response bias analysis. This is followed by the measurement of all variables including MAPs, MTs, strategic variables, and organizational performance. A descriptive analysis is undertaken in terms of respondent demographics, the adoption and benefit of MAPs and MTs, and descriptive statistics. It concludes with an examination of the data; missing data, outliers, and testing assumptions.

Chapter 5 provides preliminary statistical analysis. Factor analysis is explained such as design of exploratory factor analysis, extraction methods, selection of the number of factors, rotation methods, and significance of factor loadings. Factor analyses are then conducted to reveal the structure underpinning the questionnaire items including MAPs, MTs and strategic priorities. Summated scales are calculated for all factors and used as variables in further analyses. The sensitivity analysis, outliers, and testing of assumptions then takes place.

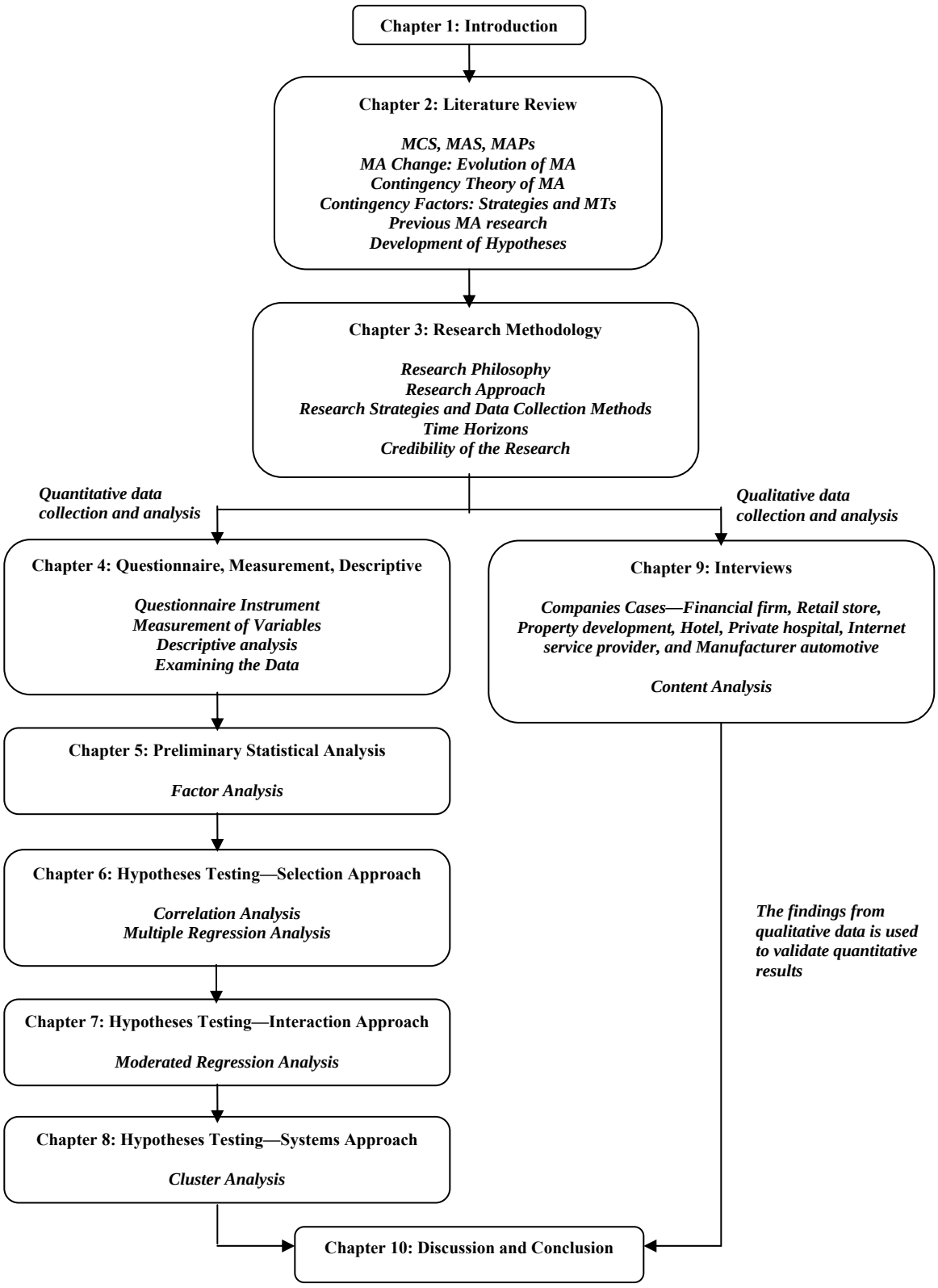
Chapters 6, 7 and 8 contain hypothesis testing using various statistical techniques. Hypotheses based on selection approach are tested in chapter 6. Correlation analysis and multiple regression analysis have been undertaken. Chapter 7 provides hypothesis testing for hypotheses developed based on interaction approach by using moderated regression analysis while chapter 8 presents hypothesis testing based on systems approach using cluster analysis.

Qualitative data analysis is provided in chapter 9. It commences with background of the case companies elaborating the business environment in which they are operating as well as strategies they pursue. Their experiences in adopting particular MAPs and MTs are also

explored. Content analysis is adopted as qualitative data analysis. It concludes with a discussion of the qualitative findings.

Chapter 10 provides discussion and conclusions of the thesis. The findings and the implications from descriptive analysis, selection approach, interaction approach, systems approach, and interviews are summarised and discussed. Originality and contributions of the research are then mentioned followed by limitations of the work and opportunities for future research. Figure 1-3 illustrates the organization of the thesis.

Figure 1-3: Organization of the Thesis



Chapter 2
Literature Review

2.1 Management Control System (MCS), Management Accounting System (MAS), and Management Accounting Practices (MAPs)

2.1.1 Management Control System (MCS)

A number of definitions of management control system (MCS) have appeared in management accounting literature. Some authors defined it in broad terms while others described it in a narrower concept. Merchant and Otley (2007) captured broad conceptualizations of control, which can incorporate factors such as strategic development, strategic control, and learning processes as 'almost everything in organization is included as part of the overall control system' (p.785). It is noted that some of these are naturally outside the scope of management accounting. A narrower concept of MCS is provided in Merchant and Van der Stede (2007). Without the relation to strategic control, they defined MCS as the control system dealing with employees' behaviour.

Different aspects of MCS have been studied and categorized by several researchers. Particularly, Anthony et al. (1989) classified MCS as formal and informal controls; Ouchi (1977) separated control systems into output and behaviour controls; Ouchi (1979) also divided controls into market, bureaucracy and clan controls; Hopwood (1976) described controls as administrative and social controls; Merchant (1985) organized control systems as results, action and personnel controls. These classifications were discussed in the paper of Langfield-Smith (1997), which can be summarized as follows. Formal control refers to more visible and objective components of the control systems such as rules, standard operating procedures and budgeting systems. Formal controls of a feedback nature are used to guarantee the achievement of specific outcomes, and often involve the use of financial monitoring and corrective actions such as output and result controls. Formal controls of a feedforward nature are administrative controls, personnel controls, and behaviour controls. In contrast to formal controls, informal controls refer to unwritten policies of the organization often based on the organizational culture, such as clan control. However,

some formal controls also arise from culture such as a formal organizational mission reflecting the values of organizational culture.

It is claimed that variations and inconsistencies in the concepts of control studies may obstruct the development of a coherent body of knowledge in MCS (Langfield-Smith, 1997). The attempts to mitigate this problem have recently been made by many authors. For instance, Auzair and Langfield-Smith (2005) incorporated five distinctive dimensions of MCS from previous research to capture and form composite measures of MCS in service firms. In the study of Malmi and Brown (2008) proposing the concept of MCS operating as a package, they provide discussion on the definitions and the constitutions of MCS package and offer a comprehensive but parsimonious typology for MCS package, which integrates a range of controls to assist management to achieve organizational goals and elevate organizational performance.

2.1.2 Management Accounting System (MAS)

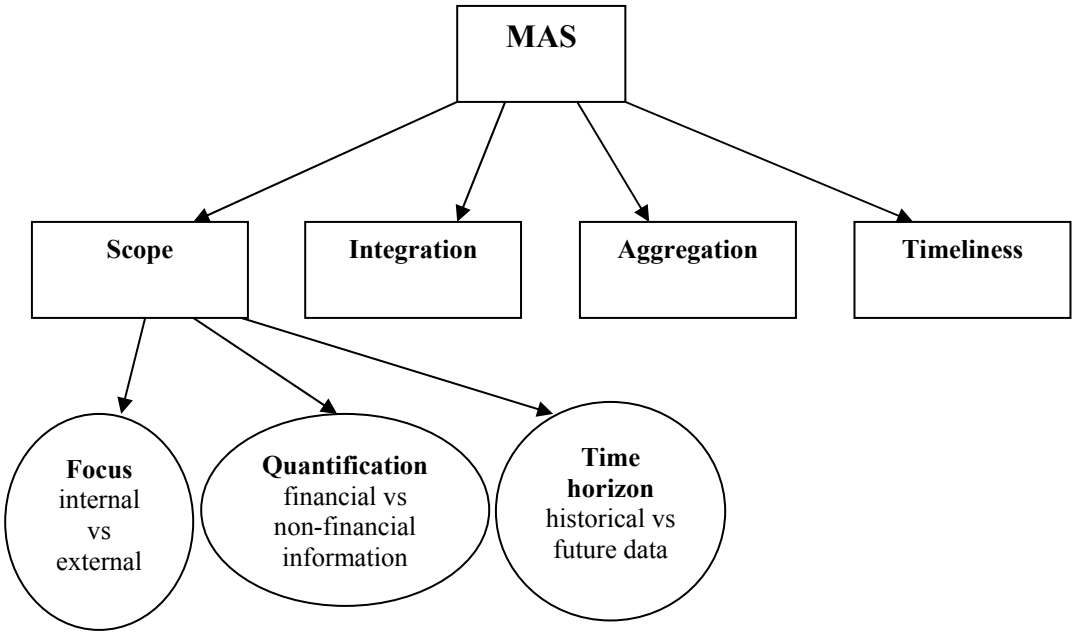
A management accounting system (MAS) is defined as 'those parts of the formalized information system used by organizations to influence the behaviour of their managers that leads to the attainment of organizational objectives' (Gerdin, 2005, p.103). It is also articulated as 'a formal system designed for providing managers with the requisite information to facilitate decision making and evaluation of managerial activity' (Agbejule, 2005, p.295). It is noted that two distinct roles of MAS have been revealed from these definitions; decision-making and control.

The design of MAS is considered in terms of four dimensions or 'information characteristics' including scope, integration, aggregation and timeliness. Scope refers to 'the dimension of focus, quantification and time horizon of management accounting systems (MAS)' (Tillema, 2005, p 102). Focus is concerned with whether the information provided by MAS focuses on internal or external events to an organization. Quantification is concerned with whether the information is quantified in financial or non-financial terms. Time horizon is concerned with whether the information relates to historical or future data (Chenhall and Morris, 1986).

Integration refers to the information characteristic that improves coordination among departments within an organization. It contains the information about the activities from other departments, and decision-making results from one department that may have impacts on other departments' performance as well as the information about inputs, outputs, processes and technology consumed by other departments (Bouwens and Abernethy, 2000).

Aggregation provides summary information in various forms such as aggregation by area of interest, period of time or formal decision models (Chenhall and Morris, 1986). Aggregated information by area of interest such as responsibility centres and functional area will involve reporting activities, such as results or outcomes from different functions or business units. Aggregated information by time periods such as monthly or yearly may allow managers to review their decisions. Aggregated information may be required by the users of decision models such as discounted cash flow analysis, cost-volume-profit analysis and inventory models. Timeliness is concerned with frequency and speed of the reporting. Frequency of the reporting refers to how often the report is produced whereas speed of the reporting refers to the time interval between when the report is requested and when the report is provided (Bouwens and Abernethy, 2000). Figure 2-1 illustrates the dimensions of MAS.

Figure 2-1: The Dimensions of MAS



2.1.3 Management Accounting Practices (MAPs)

The definition of management accounting practices (MAPs) as a whole is provided by Chenhall (2003) as 'a collection of [management accounting] practices such as budgeting or product costing' (p 129). However, the definition of individual MAP (most if not all) is provided by the Chartered Institute of Management Accountants (ICMA) in 'CIMA Official Terminology' (CIMA, 2005). From the literature of MA research over the past decade, it is revealed that some researchers focused their studies on a single MAP, mainly budgeting, activity based costing (ABC), balanced scorecard (BSC), and performance measurement both financial and non-financial measures. Others explored a specific group of MAPs such as a category of strategic management accounting (SMA), and even a broad range of MAPs, which include both traditional and contemporary practices. Nevertheless, the purpose here is to identify the list of MAPs from prior studies, not to elaborate their research findings in any more detail. The list of MAPs, which has previously been studied, is shown in Table 2-1.

Table 2-1: A List of MAPs from Previous Research

Panel A: Single practice

MAPs	Previous studies of*													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Budgeting	-	-	-	√	-	√	-	-	-	-	-	-	-	-
ABC	√	-	-	-	√	-	-	-	-	-	-	-	-	-
BSC	-	-	-	-	-	-	√	-	-	-	√	-	√	-
Performance measures	-	√	√	-	-	-	-	√	√	√	-	√	-	√

*1 Bjornenak (1997)
2 Chenahll (1997)
3 Perera et al. (1997)
4 Abernethy and Brownell (1999)
5 Malmi (1999)
6 Van der Stede (2000)
7 Malina and Selto (2001)
8 McAdam and Bailie (2002)
9 Itter et al. (2003)
10 Said et al. (2003)
11 Ax and Bjornenak (2005)
12 Chenhall (2005)
13 Jusoh et al. (2006)
14 Van der Stede et al. (2006)

Panel B: List of SMA practices

MAPs	Previous studies of				
	Guilding (1999)*	Guilding et al. (2000)	Cadez (2006)	Cadez (2007)	Cadez and Guilding (2008)
Attribute costing	-	√	√	√	√
Life-cycle costing	-	√	√	√	√
Quality costing	-	√	√	√	√
Target costing	-	√	√	√	√
Value-chain costing	-	√	√	√	√
Benchmarking	-	-	√	√	√
Integrated performance measurement	-	-	√	√	√
Strategic costing	√	√	√	√	√
Strategic pricing	√	√	√	√	√
Brand valuation	-	√	√	√	√
Competitor cost assessment	√	√	√	√	√
Competitive position monitoring	√	√	√	√	√
Competitor performance appraisal	√	√	√	√	√
Customer profitability analysis	-	-	√	√	√
Lifetime customer profitability analysis	-	-	√	√	√
Valuation of customers as assets	-	-	√	√	√
Capital budgeting	-	-	√	-	-

*In this paper, it is noticed that the practices are called ‘competitor-focused accounting’ rather than ‘strategic management accounting’.

Table 2-1: A List of MAPs from Previous Research (Continued)

Panel C: Broad range of MAPs

MAPs	Previous studies of*						
	1	2	3	4	5	6	7
Formal strategic planning	-	√	-	√	-	√	-
Capital budgeting techniques	-	√	-	√	-	√	√
Strategic plans developed together with budgets	-	√	-	√	√	-	-
Strategic plans developed separate from budgets	-	√	-	√	-	-	-
Long range forecasting	-	√	-	√	√	√	√
Budgeting system for controlling costs	-	√	-	√	√	-	√
Budgeting system for compensating managers	-	√	-	√	-	√	-
Budgeting system for coordinating activities across the business units	-	√	-	√	√	√	-
Budgeting system for linking financial position, resources and activities (e.g. activity based budgeting—ABB)	-	√	-	√	√	-	√
Budgeting system for planning day-to-day operations	-	√	-	√	√	-	-
Budgeting system for planning cash flow	-	√	-	√	√	√	-
Budgeting system for planning financial position	-	√	-	√	√	-	-
Absorption costing	-	√	√	√	-	√	-
Variable costing	-	√	√	√	√	√	-
Activity based costing (ABC)	√	√	√	√	√	√	√
Target costing (target cost planning)	√	√	√	√	-	√	√
Performance evaluation based on budget variance analysis	-	√	-	√	√	√	-
Performance evaluation based on controllable profit	-	√	-	√	-	√	-
Performance evaluation based on divisional profit	-	√	-	√	√	√	-
Performance evaluation based on residual income	-	√	-	√	√	√	√
Performance evaluation based on ROI	-	√	-	√	√	√	-
Performance evaluation based on CFROI	-	√	-	√	√	√	-
Performance evaluation based on non-financial measures	-	√	-	√	√	-	√
Performance evaluation based on team performance	-	√	-	√	-	√	-
Performance evaluation based on employee attitudes	-	√	-	√	√	√	√
Performance evaluation based on qualitative measures	-	√	-	√	-	-	-
Performance evaluation based on balanced scorecard (BSC)	-	√	-	√	√	√	-
Performance evaluation based on customer satisfaction surveys	-	√	-	√	√	√	√
Performance evaluation based on ongoing supplier evaluations	-	√	-	√	-	√	-
Cost-volume-profit analysis (e.g. breakeven analysis)	-	√	-	√	-	√	√
Product life-cycle analysis (life cycle costing)	√	√	√	√	-	√	√
Activity based management (ABM)	-	√	-	√	√	-	-
Product profitability analysis	-	√	-	√	√	√	√
Benchmarking of product characteristics	-	√	-	√	√	√	-
Benchmarking of operational processes	-	√	-	√	√	√	-
Benchmarking of management processes	-	√	-	√	√	√	-
Benchmarking of strategic priorities	-	√	-	√	-	√	-
Benchmarking carried out within the wider organization	-	√	-	√	-	√	-
Benchmarking carried out with outside organization	-	√	-	√	-	-	-
Shareholder value analysis	-	√	-	√	√	√	√
Value chain analysis	-	√	-	√	√	√	√
Operations research techniques	-	√	-	√	-	√	-
Cost modelling/ stimulation	√	-	√	-	-	-	-
Cost of quality reporting	√	-	√	-	-	-	√
Strategic management accounting	√	-	√	-	-	-	-
Throughput accounting	√	-	√	-	-	-	-

Table 2-1: A List of MAPs from Previous Research (Continued)

Panel C: Broad range of MAPs (Continued)

MAPs	Previous studies of*						
	1	2	3	4	5	6	7
Backflush relief of inventory (backflush costing)	√	-	√	√	-	-	-
Standard costing	-	-	√	√	-	√	-
Zero based budgeting	-	-	-	√	-	√	√
Investment appraisal using DCF	-	-	-	-	√	-	√
Calculation and use of cost of capital	-	-	-	-	√	-	-
Budgeting with sensitivity (what if?) analysis	-	-	-	-	√	-	√
Flexible (with level of activity) budgeting	-	-	-	-	√	-	√
Performance evaluation based on product/ service quality	-	-	-	-	√	-	-
Stock control models	-	-	-	-	√	-	√
Budget revisions for changes in prices/ exchange rates	-	-	-	-	√	-	-
Critical path analysis	-	-	-	-	√	-	-
Budgeting for planning and control of operation	-	-	-	-	-	√	-
Using a plant-wide overhead rate	-	-	-	-	-	-	√
Performance evaluation based on financial measures	-	-	-	-	-	-	√
A separation is made between variable/ incremental costs and fixed/ non-incremental costs	-	-	-	-	-	-	√
Using departmental overhead rates	-	-	-	-	-	-	√
Using regression and/or learning curve techniques	-	-	-	-	-	-	√
Budgeting for planning							√
Budgeting for long-term strategic plan	-	-	-	-	-	-	√
Evaluating the risk of major capital investment projects by using probability analysis or computer simulation	-	-	-	-	-	-	√
Performing sensitivity 'what if' analysis when evaluating major capital investment projects	-	-	-	-	-	-	√
Benchmarking	-	√	-	√	√	√	√
Customer profitability analysis	-	-	-	-	-	-	√
Industry analysis	-	-	-	-	-	-	√
Analysis of competitive position	-	-	-	-	-	-	√
The possibilities of integration with suppliers' and/or customers' value chains	-	-	-	-	-	-	√
Analysis of competitors' strengths and weaknesses	-	-	-	-	-	-	√

*1 Bright et al. (1992)
2 Chenhall and Langfield-Smith (1998a; 1998b)
3 Adler et al. (2000)
4 Joshi (2001)
5 Luther and Longden (2001)
6 Phadoongsitthi (2003)
7 Abdel-Kader and Luther (2008)

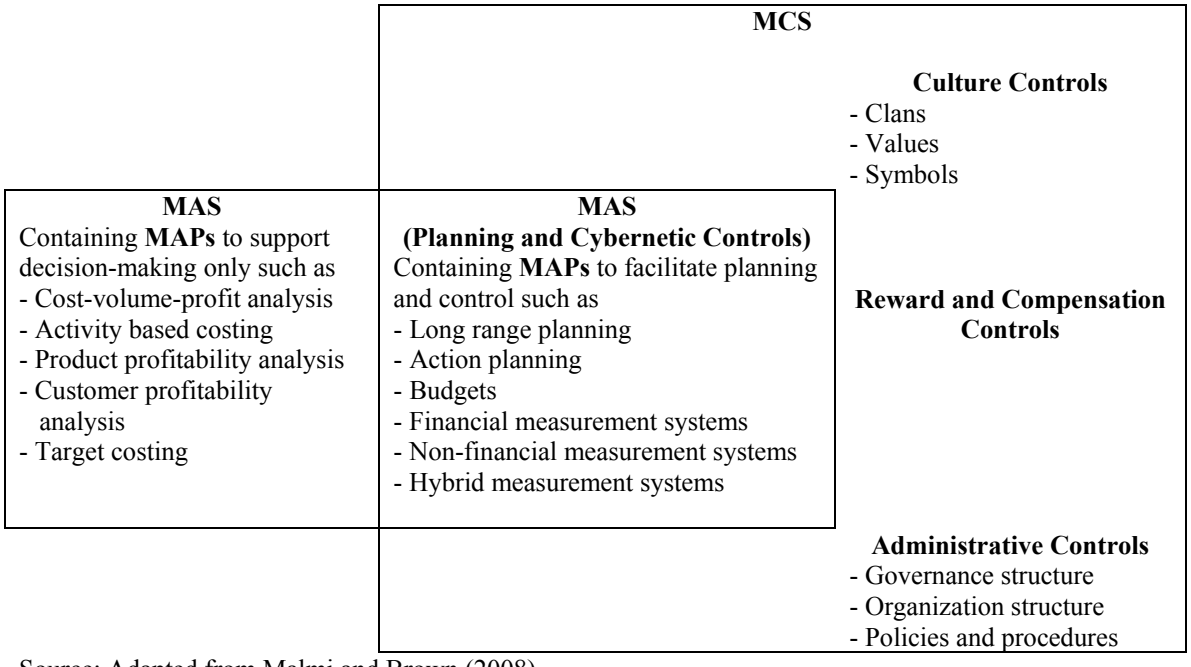
2.1.4 The Relationships between MCS, MAS and MAPs

The relationships between MCS, MAS and MAPs have appeared in the work of Chenhall (2007), who claimed that these terms are sometimes used interchangeably. He defined management accounting (MA) as 'a collection of practices such as budgeting or product costing', management accounting system (MAS) as 'the systematic use of MA to achieve some goal', management control system (MCS) as 'a broader term that encompasses MAS

and also includes other controls such as personal or clan controls', and organizational controls (OC) as 'controls built into activities and processes such as statistical quality control, just-in-time management' (p.164-165).

From these definitions, it implies that MAPs are the smallest elements encompassed in MAS, which are part of MCS. However, it is suggested that the objectives of accounting systems should be recognized whether for decision-making or control purposes. Zimmerman (1997; 2001) provided one possibly useful difference between decision-making and control as some accounting systems aim to provide information in order to facilitate decision-making processes while others aims to direct employees' behaviour. Malmi and Brown (2008) suggested that accounting systems, which are designed to support decision-making activities with no monitoring procedures, should be called MAS rather than MCS. They however include accounting systems for planning in their MCS definition as the ex-ante form of control. Figure 2-2 demonstrates the relationships between MCS, MAS and MAPs emerged from the literature.

Figure 2-2: The Relationships between MCS, MAS and MAPs



Source: Adapted from Malmi and Brown (2008).

The current study focuses on the smallest element within the relationships, MAPs, some of which are designed for planning and control purposes while others are used to support decision-making activities. Instead of using a single practice or a few practices, a comprehensive set of MAPs, which is drawn from previous research of Bright et al. (1992), Chenhall and Langfield-Smith (1998a; 1998b), Adler et al. (2000), Joshi (2001), Luther and Longden (2001), and Phadoongsitthi (2003), is considered as the main focus of this research.

2.2 Management Accounting Change

Management accounting (MA) experienced significant change since the beginning of 1980s. The discipline of MA has developed involving the emergence of new practices and the development of new managerial techniques and requirements (Hesford et al., 2007). Interest was triggered by the seminal work, *Relevance Lost*, of Johnson and Kaplan (1987). They claimed that MA was 'in crisis', and urged, given the enhancement in information technology, a thorough 're-think' and 're-design' of MA techniques and accounting systems so that relevance could be achieved once more. The similar concerns were continuously expressed in the work, *Evolution not Revolution*, of Bromwich and Bhimani (1989). They explored the link between changes in the manufacturing environment and MA in order to assist practitioners in adjusting to these changes. Since then, there has been substantial change in the nature of MA, and new accounting practices have been developed by academics, accountants and consultants (Bhimani, 1996; Shields, 1997).

The change in MA was driven by many business changes such as the changes in organizational designs, competitive environments, information technologies, and government regulation and policy (Burns and Vaivio, 2001; Waweru et al., 2004). Specifically, organizations based in new technologies may need to adopt new management techniques, innovation systems, and advanced manufacturing technologies (AMTs) to cope effectively with new environment (Littler and Sweeting, 1989). The adoption of these new management and manufacturing techniques eventually leads to the need for change in the conventional role of MA in order to provide more accurate and timely information, and assist management in strategic decision-making and control (Kellett and Sweeting, 1991).

For example, a new cost accounting model may be required to respond to the adoption of just-in-time manufacturing philosophies (Yazdifar, 2003). Similarly, Tayles and Drury (1994) reported from the accounting practitioner's view that extensive use of flexible manufacturing systems (FMSs) significantly cause changes in firm's accounting system for generating product costs. A framework of comprehensive drivers influencing and shaping MAPs is provided in the study of Granlund and Lukka (1998). These include both economic and institutional perspectives.

Consequently, the change in MA has become a popular focus for research. Some authors investigated the circumstances and forces which drive the development of accounting practices (Innes and Mitchell, 1990; Burns and Scapens, 2000), some explored the forms which MA change has taken based on a typology of MAS change (Sulaiman and Mitchell, 2005), some studied consequences resulting from MA changes (Malmi, 1997; Vaivio, 1999), and others reported the barriers to change in MA techniques (Adler et al., 2000) and offered the means to overcome the barriers (Waldron, 2005).

Due to the effect of MA change, there has been a growth of papers and journals focusing on MA research, and calls for studies examining MA phenomena from multiple perspectives using multi-methods. Hesford et al. (2007) reviewed MA articles in 10 journals over the period of change in MA (1981-2000). Their findings reported a change over time from budgeting and organizational control to performance measurement and evaluation topics. They also disclosed a decrease in the use of experiments over time, and a rise in the use of case and field research methods. Most of MA research are still rooted in economics rather than drawing on sociology discipline.

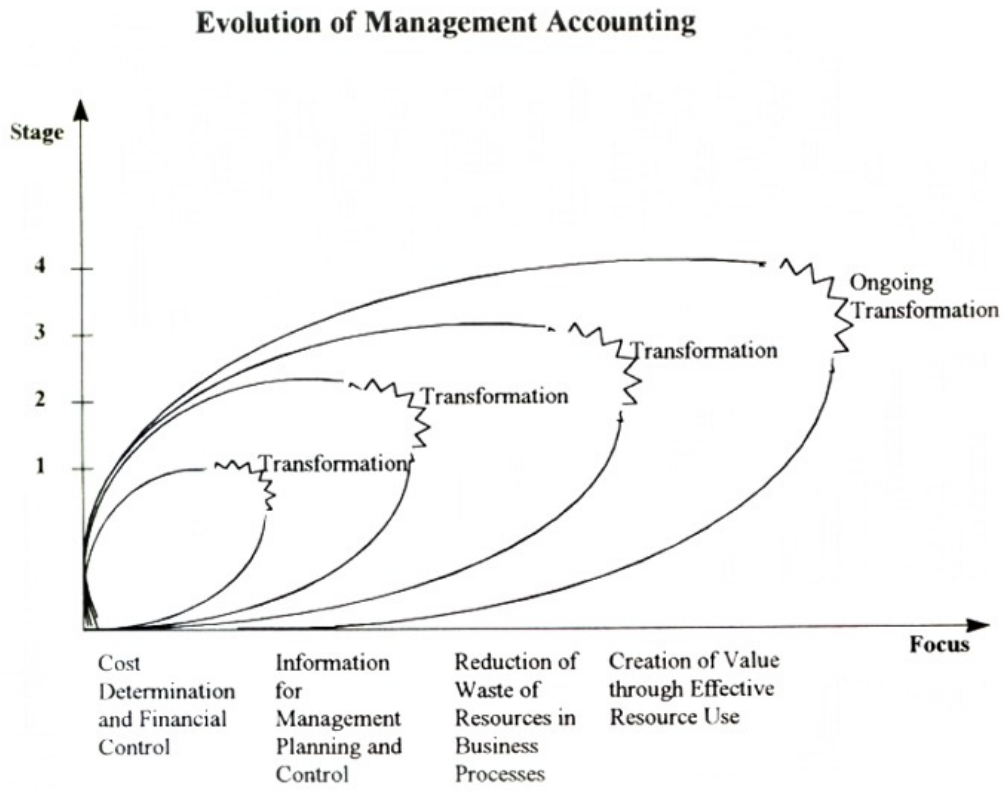
2.2.1 The Evolution of Management Accounting

A statement of the scope, purposes and concepts of management accounting was first issued in 1989 by the International Federation of Accountants (IFAC). This was further revised and developed in 1998. It articulated that the field of organizational activity encompassed by MA has gradually been changed through four stages. These are Stage 1—cost determination and financial control, Stage 2—information for management planning

and control, Stage 3—reduction of waste in resources, and Stage 4—creation of value. The detail of each stage is graphically illustrated in Figure 2-3.

Although these four stages are recognizable, it is claimed that the process of change has been evolutionary from one to another by the absorption, reshaping, and adding to the previous focus a new focus arriving at a new set of conditions of MA. For example, the focus on information provision of State 2 is rebuilt in waste reduction of Stage 3 and value creation of Stage 4 (IFAC, 1998). In other words, it is implied that the stages are not mutually exclusive, and MA has gradually been shifted from a 'simple' role of cost determination and financial control to a 'complicated' role of value creation through effective resource use (Abdel-Kader and Luther, 2006).

Figure 2-3: Four Evolutionary Stages of MA by IFAC



Stage 1: Prior to 1950s, the focus was on cost determination and financial control, through the use of budgeting and cost accounting technologies.
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.
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.
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.

Source: Management Accounting Concepts by IFAC (1998).

2.2.2 Traditional and Contemporary Management Accounting

MA has steadily developed from the conventional concepts of formal, internal and financial information (traditional MA) to the use of broader scope information such as informal, external and non-financial information (contemporary MA) (Chenhall, 2003). It was the traditional MA that was criticized as losing relevance to modern businesses, no longer allowing the company to respond to the current information needs of organizations and the maintenance of competitive advantage (Johnson and Kaplan, 1987). This may be because most of these MAPs appeared in text books and were developed from the early part of the 1900s while over the recent decades the business environment and the nature of organization has been considerably changed (Kaplan, 1984). This is also together with an absence of costing data in the whole range of a product life cycle, and the lack of reliable cost information for strategic decision-making (Innes and Mitchell, 1995).

The shortcoming of traditional MA led to the emergence of more recently developed MA during the 1990s. New and so-called ‘advanced’ or ‘contemporary’ MA were developed by academics, practitioners and consultants in order to respond to the recent information requirements of business managers (Burns and Vaivio, 2001). It is claimed that contemporary MA may provide more relevant, accurate and appropriate information within a proper time period to overcome the deficiency of traditional MA (Chenhall and Langfield-Smith, 1998a).

Bjørnenak and Olson (1999) distinguish contemporary MAPs from traditional MAPs by using the concept of unbundling the innovation of practices, and analyzing their elements. Together with some other studies, the differences between traditional and contemporary

MAPs have been drawn as follows. Traditional MAPs focus mainly on internal and financial information from a financial accounting system. They tend to relate to a short term perspective and are relatively ignorant of strategic focus (Guilding et al., 2000). The time period is fixed and tends to follow a financial accounting period or calendar time. Typical cost objects (e.g. products or responsibility centres/ departments) and causal variability factors based on unit-levels (e.g. production volume, labour hour or machine hour) are fundamental for traditional MAPs (Bjørnenak and Olson, 1999).

On the other hand, contemporary MAPs tend to focus more on non-financial information, have an external approach such as customers and competitors, and a more strategic orientation (Chenhall and Langfield-Smith, 1998a). Time period is more flexible responding to the needs of management. Cost objects have more variety than those in traditional MAPs. They can be products, departments, customers, activities, distribution channels, brands and market segments or even competitors. Therefore, causal variability factors for contemporary MAPs also contain more variety including both volume and non-volume causal factors concerning internal and external causal factors (Bjørnenak and Olson, 1999).

The idea of diffusion of MA innovations, such as strategic management accounting (SMA), activity based costing (ABC) and balanced scorecard (BSC), has been adopted by many authors to understand MA change and the adoption of these new MAPs as well as explore the driving forces behind innovation diffusion. Their findings contain some interesting insights. Bjørnenak (1997) suggests the diffusion of ABC takes an 'expansion' type and 'contagious' form; however, the 'relocation' of ABC experts needs more investigation[4]. Ax and Bjørnenak (2005) suggest that the diffusion of BSC in Sweden has been promoted by adapting the original BSC model to the business culture and integrating other administrative innovations to establish a more attractive MA innovation than a 'standard' BSC. Malmi (1999) proposed that the driving forces behind MA innovation diffusion transform over the stages of diffusion.

[4] There are two major types of diffusion processes; relocation and expansion diffusions. Relocation diffusion focuses on how ideas (or people) enter an area without necessarily increasing the number of adopters (people). Expansion diffusion is described as the innovation is adopted by more and more agents (firms), so that the total number of adopters is growing over time. Expansion diffusion assumes two major forms; contagious and hierarchical. The spread is smooth and continuous in the former form while it is slowed down in the latter form (Bjørnenak, 1997, p.5-6).

Studies of the adoption of both traditional and contemporary MAPs have been undertaken over the past decades. Contrary to the conventional wisdom, it is suggested that the adoption rates of recently developed MAPs are disappointing while those of traditional MAPs remain high across countries such as U.K., U.S., Australia, New Zealand and Asian countries (Bright et al., 1992; Drury et al., 1993; Szendi and Elmore, 1993; Chenhall and Langfield-Smith, 1998a; Adler et al., 2000; Guilding et al., 2000; Joshi, 2001; Luther and Longden, 2001; EI-Ebaishi et al., 2003; Phadoongsitthi, 2003; Sulaiman et al., 2004). These studies have been descriptive and often used contingency approach to explain the adoption of various MAPs. This prompts the pervading question concerning the relevance of traditional MAPs and the benefits gained from contemporary MAPs. Related to this, it is important to identify key MAPs for gaining competitive advantage and better organizational performance.

2.3 Contingency Theory of Management Accounting

2.3.1 Contingency Theory Framework

Contingency theory was developed and appeared in the organization theory literature in the early to mid 1960s. The core paradigm of contingency theory of organizations is that organizations gain their effective outcomes from the fit between the organizational characteristics and contingencies reflecting from the organizational situation (such as environment, organizational size and strategy). In other words, contingency influences the effect of an organizational characteristic on organizational performance. Hence, it is maintained that, in their activities organizations attempt to attain a fit and avoid a misfit between organizational characteristics and contingency factors to ensure high performance. The organizational characteristics such as organizational structure, leadership, HRM, and strategic decision-making processes can be varied. However, much of them are focused on the organizational structure, that is, traditional ‘structural contingency theory’ (Donaldson, 2001).

Contingency theory in accounting literature emerged later around the mid 1970s. There has been a long history of almost three decades in the published work of management accounting literature and the study of management control system (MCS) design. Accounting researchers initially conducted their works based on contingency theory of organizations attempting to examine the effect of environment, technology, structure, strategy, culture and size on the design of MCS (Chenhall, 2003). The premise of the contingency approach to management accounting was proposed by Otley (1980) as

> '*There is no universally appropriate accounting system which applies equally to all organizations in all circumstances. Rather, it is suggested that particular features of an appropriate accounting system will depend upon the specific circumstances in which an organization finds itself*' (Otley, 1980, p.413).

It implies that contingency theory attempts to find specific aspects of an accounting system that are related to certain defined circumstances as well as to demonstrate an appropriate matching. Anderson and Lanen (1999) proposed a basic contingency theory framework in MA based on traditional 'structural contingency theory' of organizations shown in Figure 2-4. It illustrates the strategy-structure-performance paradigm, in which organizational structure and strategy respond to many contingency factors to maximize firms' performance. Management accounting practice is discerned as a part of organizational structure located in a dynamic setting. Thus, management accounting practices are developed and evolved over time subject to the fit to an organizational context in order to enhance organizational performance.

Figure 2-4: Basic Contingency Theory Framework in MA

Source: Anderson and Lanen (1999).

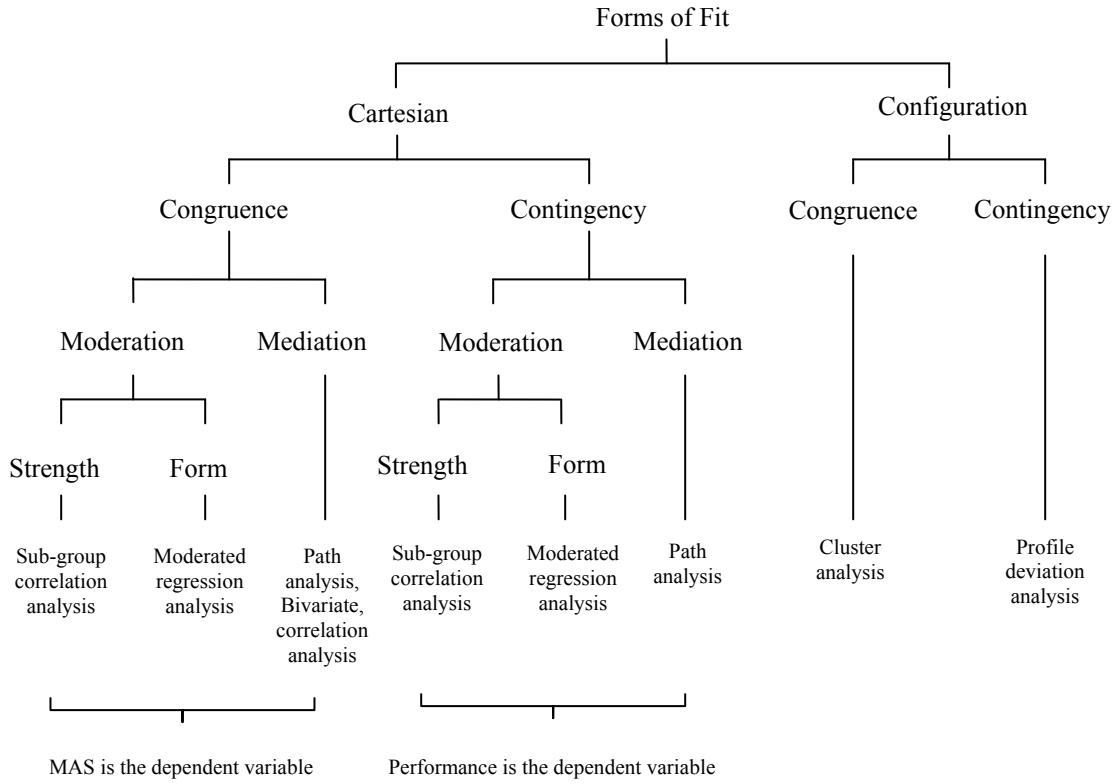
2.3.2 Forms of Contingency Fit

According to contingency theory of organizations, different forms of contingency fit appeared from the work of Van de Ven and Drazin (1985) and Drazin and Van deVen (1985); selection, interaction and systems approaches. These forms of theoretical fit have also been adopted in accounting literature and MCS research. Chenhall (2003; 2007) summarised MCS research based on these forms of fit as follows. Works based on the selection approach aims to investigate the relationship between contextual factors and aspects of MCS without being concerned about their relationship with performance. It assumes that only firms with good performance can survive in the competitive environment. Interaction studies attempt to examine the moderation of contextual factors on the relationship between MCS and firms' performance. System models consider various combinations of multiple aspects of MCS and contextual factors in order to improve organizational performance.

Gerdin and Greve (2004) reviewed the articles in the strategy-MAS area, and revealed that many forms of contingency fit have been used. They proposed a more complicated classificatory framework for mapping different forms of contingency fit shown in Figure

2-5, and encouraged the researchers to be aware of the difficulties of relating these forms to each other. It is noted that the detail of this classificatory framework can be found in the paper of Gerdin and Greve (2004). The current study only provides brief discussion and attempts to compare and trace it back to the prior forms of contingency fit mentioned by Chenhall (2003; 2007).

Figure 2-5: A Classificatory Framework for Mapping Different Forms of Contingency Fit



Source: Gerdin and Greve (2004, p.304).

As can be seem from the Figure 2-5, configuration form of fit can be compared using a systems approach. It is claimed that configuration takes a holistic view, in which the relationships can only be examined and understood when many contextual and structural variables are analyzed simultaneously. In contrast, Cartesian form of fit, which takes a reductionist view focuses on the relationships between single contextual factors and single structural attributes and how these relationships affect performance, can be referred to selection and interaction approaches. Specifically, congruence forms, assuming that only the best-performing companies survive (and hence can be studied), can be linked to a

selection approach. Contingency forms, assuming that companies may have varying degrees of fit; imply a higher degree of fit is related to higher performance, can be referred to as an interaction approach.

Luft and Shields (2003; 2007) offered a commentary and discussion of the theories used in contingency based MCS research. This covers the structural relations and the nature of the causality between variables. Their graphic representations (maps) indicated many causal-model forms involving curvilinear and linear models[5]. These can briefly be summarized as follows. Even though much of theory underpinning empirical MA research expects curvilinear relationships, it is rarely that empirical MA research addresses these relations. They claimed that the studies based on curvilinear relations have the possibility to provide the answers for unresolved questions arising from the linear studies, and called for nonlinear studies if nonlinearities are captured in the study.

Several linear causal-model forms have appeared in MCS literature. Luft and Shields (2003; 2007) identified three linear causal-model forms including additive, interaction, and intervening models. They reported that most of MCS studies use the additive causal-model form, which assumes that each variable performs in separation with no explicit interaction between variables. Using additive models may hamper the understanding of MA by ignoring the conditional effect of one variable on another or other variables on a context. An interaction model indicates the interaction effect between MCS and aspects of context on the outcome variable while an intervening model represents causal paths between MCS, context, and outcome variables. Chenhall (2003) added one more causal-model form—system model, which tests multiple fits simultaneously. It involves a wider variety of aspects of MCS and context affecting performance, and allows equally effective performance to be possible.

The studies of Gerdin and Greve (2004) and Chenhall (2007) imply the link between forms of contingency fit, causal-model forms, and statistical analyses as follows. Additive causal models adopt simple correlations and linear regression as the dominant forms of analysis. Interaction causal models often use moderated regression while intervening causal models

[5] The detail of each causal-model form can be found in the works of Luft and Shields (2003; 2007).

rely on structural equation models (SEM) and partial least square (PLS). System causal models use Euclidean distance and cluster analysis. Regarding forms of fit, selection approach can take additive, interaction, or intervening causal-models with no link to the organizational performance. Interaction approach mainly adopts interaction or intervening causal-models to investigate the effect of interaction. Systems approach relies on system causal models.

2.3.3 Level of Analysis in Contingency Studies

It is noted that level or unit of analysis is vital to theory construction within MA contingency based studies. There should be the consistency between the theory, the unit or level of analysis, and the source of measurement (Chenhall, 2003). 'The level of a variable is defined *at the level at which the variation of interest occurs*' (Luft and Shields, 2003, p.175). Deriving from four-level structures proposed by Hopwood (1976), four levels of analysis, including the individual, subunit, organization, or beyond organization, have been adopted to identify the level of a variable in MA contingency based research.

It has been an issue that variables in different levels of analysis often use the same or very similar names, and there is an ambiguity of the meanings of the same name variables at different levels. For example, an incentive system can be an individual-level variable, if the researcher explores causes and effects from its use for different individuals. However, an incentive system can also be a subunit-level variable, if the researcher examines its use in different subunit. To avoid this problem, the researcher should address the level of analysis in his or her research. Some studies were conducted at a single level of analysis only while others were based on multiple levels of analysis. Concerning single-level studies, researcher should carefully ensure that the causes and effects at the level of analysis are not confused with those at other levels. Researchers using multiple-level studies, involving the effects from different levels, may need to concern themselves with causal model-forms of the effects to identify whether they are multi-level additive relations or cross-level interaction[6]. To insure the valid models for multiple-level studies, the researchers are

[6] If the multi-level effects are additive relations, a variable as theoretically defined at one level does not affect a variable as theoretically defined at another level. In contrast, if the multi-level effects are cross-level

suggested to separate the effects from multiple levels. Otherwise, the use of an interaction causal-model form, with at least one interacting variable measured at the same level as the dependent variable, is recommended (Luft and Shields, 2007).

Luft and Shields (2003; 2007) provided general guidelines for dealing with the issue of level of analysis as the researchers should identify the level of analysis for the variables of interest, and whether they vary across different levels of analysis. To ensure the valid theory-consistent empirical evidence, the level of theory (what is being explained), level of variable measurement (source of evidence), and level of data analysis (unit of data) must be aligned.

Regarding this MA research, it is a single-level study, which focuses on an organization-level as the level of analysis. In other words, the variation of interest in this study is expected to occur at the organizational level. Specifically, it aims to examine the adoption of, and the perceived benefit, from MAPs and MTs as well as strategies and organizational performance of each company in SET, which are expected to be different across organizations. Although the information is collected from individual respondents, particularly senior accounting executives, they were asked to indicate their answers in relation to the organizations of which they have most experience. Consequently, the careful consideration has been made to deal with the issue related to the level of analysis in order to ensure the valid empirical evidence of this study.

2.3.4 Criticism of Contingency Theory

Although the contingency framework has been widely adopted in management accounting research for over 25 years, it is regarded as an imperfect theory (Chenhall, 2007). This section provides criticisms of contingency theory and the remedies to overcome these criticisms for the current study.

It is pointed out that the methodology of contingency theory involves deficiencies. Contingency-based research relies heavily on traditional functionalist theories rather than

---

interaction, the variables as theoretically defined at different levels are interactive (Luft and Shields, 2003, p.197).

interpretive and critical views (Chenhall, 2003). Surveys and questionnaires are predominantly used in empirical contingency-based research. Respondent bias and weaknesses of the survey instrument may cause problems and influence the findings. The use of triangulation may alleviate this limitation (Fisher, 1995). To overcome the problem, this research combines survey and case study methods. It is expected to use qualitative data to gain more understanding of the relationships among constructs.

It has been suggested that application of contingency theory is unclear and inconsistent. Contingency variables are not well-defined, and vary from study to study. Much of contingency research examines the relationship between one contingency factor and one aspect of management accounting. This leads to the fracture or even contradiction of the studies and is difficult to integrate the findings in order to make a coherent body of knowledge (Galunic and Eisenhardt, 1994; Fisher, 1995; Chapman, 1997). It calls for replication by adopting the concepts of variables from previous studies so that the validity and reliability of findings can be enhanced (Chenhall, 2007). Gerdin and Greve (2004) further suggested that careful attention and full acknowledgement should be paid to the concept of contingency fit in order to facilitate the integrating of the findings. To help overcome the problems, the current study employs measurement of variables from previous research, allowing comparison and replication. It also adopts and explicitly acknowledges three forms of contingency fit.

Contingency theory proposes that higher performance derives from the 'fit' between organizational structure and contingency factors. Organizational effectiveness or particularly firm's performance has been used as a dependent variable. Fisher (1995) criticised that the measurement of performance is problematic and poorly defined. He further mentioned that the organizations may have more than one goal to measure their effectiveness such as survivability, growth, or market share; however, firm's performance is mainly adopted as an outcome variable in the literature. To overcome this problem, the current research adopts a number of variables to measure organizational performance (e.g. profitability, market share, etc.).

2.4 Contingency Factors

Many contingency factors both exogenous and endogenous have been used in an attempt to explain the effectiveness of MCS. These include external environment, technology, size, structure, strategy and national culture (Chenhall, 2003; 2007). The current study, however, adopts two contingency factors; strategy and management techniques. It is expected that these factors may affect organizational performance in the context of MCS.

2.4.1 Strategy

It has been argued that strategy is distinct from other contingency factors. 'It is not an element of context, rather it is the means whereby managers can influence the nature of the external environment, the technologies of the organization, the structural arrangements and the control culture and the MCS' (Chenhall, 2003, p.150). The definitions, levels, and classifications of strategy have been explored as follows.

Authors have defined strategy in different ways depending on their background and purpose; hence, there is some ambiguity and contradiction among them (Hofer and Schendel, 1978). Nevertheless, it is argued that they always share a common theme that is 'a deliberate conscious set of guidelines that determines decisions into the future' (Mintzberg, 1978). One of the earliest authors in this field is Chandler (1962) who explicitly defined strategy in his work named 'Strategy and Structure: Chapter in the History of the Industrial Enterprise' as follows.

> *'The determination of the basic long-term goals and objectives of an enterprise, and the adoption of courses of action and the allocation of resources necessary for carrying out these goals'* (Chandler, 1962, p.13)

This definition was criticized that it did not distinguish the concept of strategy from the processes in formulating strategy. However, after Chandler's publication, there was more attention to the concept of strategy in management literature (Hofer and Schendel, 1978). Most of the strategic definitions reveal three main themes, external environment around the

organization, internal resources and capability, and the expectations and objectives of all stakeholders. This exposes the role of strategy in linking the external market requirements, internal organizational and technological resources and capability in order to achieve the organizational goals (Sun and Hong, 2002).

The strategic management process is composed of mission and objective identification, analysis of the business environment, the internal business audit, review of strategic opportunities, comparison of strategic options, and implementation, evaluation and control of strategy (Howe, 1986). Also, Coulter (2005) articulated strategic management as

> *'A process of analyzing the current situation; developing appropriate strategies; putting those strategies into action; and evaluating, modifying, or changing those strategies as needed'* (Coulter, 2005, p.5)

2.4.1.1 Levels of Strategy

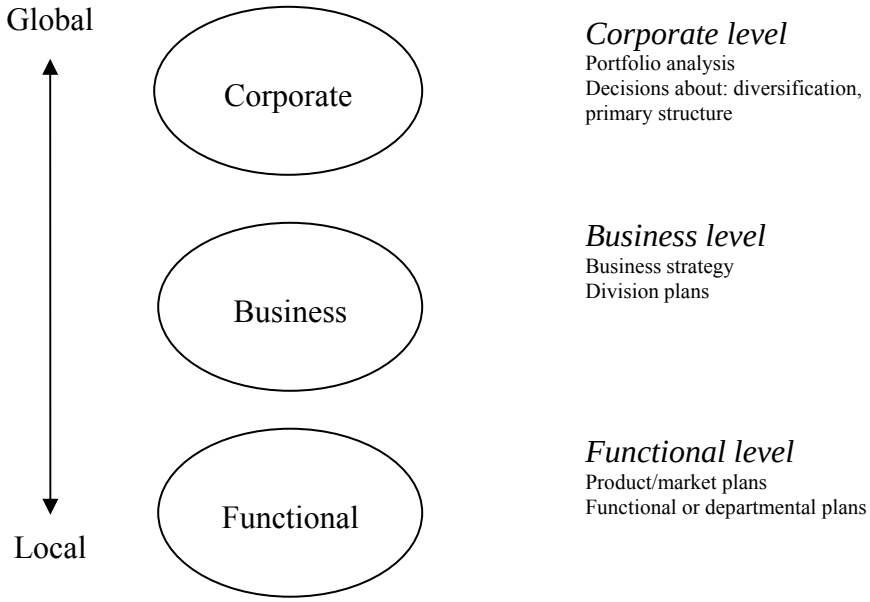
For most large multi-product organizations, strategy can be divided into three levels: corporate strategy, business strategy and functional strategy (Thompson, 2001). They are interrelated and formulated in different levels of organizational structure. However, corporate strategy and business strategy of a small single product line organization may not be separated from each other (Walker et al., 2003).

Corporate strategy: Corporate strategy is concerned with the direction of the entire organization. It deals with strategic perspective or the range, scope and diversification of the organization (Thompson, 2001). The decision on which types of businesses the companies should be in is the main theme of this strategic level including the usage of resources in acquisition and diversity (Langfield-Smith, 1997).

Business strategy: The second level is business strategy or competitive strategy which sustains competitive advantage in each business, product or service in the organization so called strategic business units (SBUs) (Thompson, 2001). It deals with how each SBU competes in its specific industry or organization scope, and its relation to the competitors (Langfield-Smith, 1997).

Functional strategy: Finally, functional strategy or operational strategy is used in each functional area of business such as manufacturing, R&D, marketing and human resources in order to achieve a competitive advantage in each function (Thompson, 2001). It relates to how the different functions of the organization improve the specific business strategy and competitiveness of the organization (Langfield-Smith, 1997). Thus, functional strategies should be consistent with each other, so that business strategy can be implemented efficiently in order to gain competitive advantage (Thompson, 2001). Three levels of strategy are shown in Figure 2-6.

Figure 2-6: Levels of strategy



Source: Bowman and Asch (1987, p.37).

2.4.1.2 Classification of Strategy

Strategy is not static, but changes over time; however, common pattern of strategies or generic types of strategies can be found. Typologies of business strategy were proposed in a variety ways in the strategy literature. Some authors characterized strategy as concerned with a product-market evolution stage or corporate life cycle whereas others categorized strategy based on the money the company should invest in each of its businesses

depending on its position in the industry and on the attractiveness of the industry (Herbert and Deresky, 1987). However, there are four main classifications of the strategic typology used in the MCS research to investigate the relationship between the strategy and the MCS (Langfield-Smith, 1997). This will be discussed in chronological order as follows.

The Strategic Types of Miles and Snow (1978)

Miles and Snow (1978) defined strategic typologies of companies based on the rate of change in products or markets. This can be distinguished into four different types: prospectors, defenders, analyzers and reactors.

Prospectors: Continually searching for market opportunities and generating changes in an industry are main themes of an organization pursuing a prospector strategy (Abernethy and Guthrie, 1994). Prospectors aim to maintain industry leadership in product innovation not necessarily just to achieve efficiency and profit performance. Consequently, R&D, product engineering and marketing are much more important than finance and production. Also, IT capabilities and communication mechanisms are important to them in order to sustain competitiveness (Guilding, 1999). Prospectors tend to use a 'first-to-market' strategy, and normally they are likely to be successful in unsteady and unpredictable environments also in rapidly changing technological industries such as biotechnology, medical care and aerospace industries. The environmental characteristics in favour of a prospector strategy include the industry in the early stage of the product life cycle, unidentified or undeveloped market segments, few established competitors and high industry concentration (DeSarbo et al., 2005).

Defenders: A firm with a narrow product range and involvement in little product or market development can be defined as defender. Its organization structure exploits the specialization of products, markets and technology (Jusoh et al., 2006). It focuses on resource efficiency and process improvements in order to reduce manufacturing costs. The key success functions of defenders are finance, production and engineering whereas R&D and marketing are less important (Cadez and Guilding, 2008). The environmental characteristics suitable for defenders were proposed to be such as an industry in the later

stage of the product life cycle, identified or developed market segments, many established competitors and low industry concentration (Walker et al., 2003).

Analyzers: An organization pursuing an analyzer strategy merges the most powerful features of defenders and prospectors. Analyzers may use different strategies for different industries. For instance, they tend to defend their position in more stable product-market domains while they may become leaders in product and market development or move quickly in more turbulent product-markets (Conant et al., 1990). Nevertheless, analyzers tend to use a 'second-but-better' strategy. Sometimes analyzers act as defenders and sometimes compete as prospectors because pursuing both strategies concurrently requires considerable resources. The environment characteristics in favour of analyzers are also somewhere between those of defenders and prospectors (DeSarbo et al., 2005).

Reactors: A firm with a reactor strategy is regarded as an unsuccessful organization. Reactors are viewed as lacking a consistent strategy and improperly and perhaps belatedly reacting to the environment (Miles and Snow, 1978). They cannot obtain benefits from their capabilities because they always change their strategic orientation in reacting to the competition. Consequently, they will be at a disadvantage compared to those firms who have stable strategic typologies such as defenders, prospectors and analyzers (Walker et al., 2003).

Strategic Priorities of Porter (1980; 1985)

In order to cope with the five competitive forces[7], Porter (1980, 1985) articulated three generic types of competitive strategy: differentiation, cost leadership and focus.

Differentiation: Differentiation strategy aims to differentiate a firm's products or services from its competitors in an industry by providing a unique feature which offers value for the customers. There are many ways to differentiate products or services such as design or brand image, technology, features, customer service and dealer network (Baines and Langfield-Smith, 2003). A firm pursuing differentiation cannot ignore cost control

[7] For a more detailed statement of the five competitive forces: industry competitors, potential entrants, buyers, suppliers and substitutes, see Porter (1980, p.3-33).

even if it is not a key strategy. However, a firm pursuing differentiation strategy sometimes tends to have higher cost than one pursuing cost leadership from activities in creating the unique value such as 'extensive research, product design, high quality materials or intensive customer support' (Porter, 1980, p.38). A differentiation position provides the competitive advantages to deal with the five competitive forces. Unlike cost leadership, a firm may require a perception of exclusivity not a high market share in order to achieve a differentiation strategy (Porter, 1985).

Cost leadership: Cost leadership strategy aims to attain overall cost leadership in an industry and provide a low price product or service to customers. Firms that pursue a cost leadership strategy need 'aggressive construction of efficient-scale facilities, vigorous pursuit of cost reductions from experience, tight cost and overhead control, avoidance of marginal customer accounts, and cost minimization in areas like R&D, service, sales force and advertising' (Porter, 1980, p.35). Although the main focus of this strategy is about cost control to obtain low cost compared to competitors, the organization cannot ignore any other areas such as quality and service. A cost leadership position provides the competitive advantages to an organization over all five competitive forces. Nevertheless, an organization requires some advantages in order to achieve a low cost position such as a high relative market share, favourable accessibility to raw materials, good product design to facilitate manufacturing and intense investment in modern equipment and facilities. When an organization achieves a low cost position, the precondition for sustaining this strategy is reinvestment in those facilities (Auzair and Langfield-Smith, 2005).

Focus: A focus strategy aims to focus on a specific target market such as a particular group of customers, product line or market segment. An organization pursuing a focus strategy with a narrow strategic target can have a competitive advantage over its competitors which may operate with a broader target. Although a firm with focus strategy may not accomplish cost leadership, differentiation or either in its whole industry, it can have a low cost position, high differentiation or either position in its narrow strategic target. Also, an organization may use focus strategy to choose an appropriate target market to compete with the weakest five competitive forces. Nevertheless, the implicit limitations of focus strategy are its difficulty to achieve an overall market share and balance between profitability and sales volume (Porter, 1980; 1985).

The Strategic Types of Miller and Friesen (1982)

Miller and Friesen (1982) categorized strategy into two different typologies: entrepreneurial and conservative based on the extent of product innovation and how executives respond to the innovation depending on environmental, information processing, structural and decision making variables.

Entrepreneurial: Executives of entrepreneurial organizations view a vital element of strategy as a regular and extensive innovation in product lines or services and product designs. They believe that a competitive advantage derives from continuously creating powerful innovations and taking considerable risks. Hence, entrepreneurial firms aggressively pursue innovation. However, entrepreneurial firms may need effective warning systems such as environmental, information processing, structural and decision making devices to make executives slow down or stop the innovation (Chenhall and Morris, 1995).

Conservative: Managers of conservative firms may regard innovation as costly and troublesome to production efficiency. As a result, conservative organizations unwillingly perform innovation or take risks. They only react to significant challenges generated by competitors or customers, or when they are under pressures and it is necessary to do so. Conservative firms may require effective warning systems to make executives aware of the needs for innovation and to encourage them to innovate (Miller and Friesen, 1982).

The Strategic Missions of Gupta and Govindarajan (1984a; 1984b)

Gupta and Govindarajan (1984a; 1984b) classified strategic types based on variations in strategic mission. The alternatives of strategic mission indicate the trade-offs between market share growth and short-term earnings/cash flow maximization. There are four different strategic typologies: build, hold, harvest and divest.

Build: A firm that pursues a build strategy tends to focus on building market share growth and competitive position rather than short-term earnings and cash flow. A build strategy relates to product quality improvement, aggressive marketing and decrease in

prices in order to generate market demand. Consequently, it requires investments in R&D, engineering support and capital investment. Appropriate managerial characteristics of build strategy are high risk-taker, greater tolerance for ambiguity and having R&D, marketing or production backgrounds. Build strategy can be achieved by the superior organizations in an industry (Guilding, 1999).

Hold: Under hold strategy, a firm aims to protect market share and competitive position while earning reasonable short-term profits (Gupta, 1987).

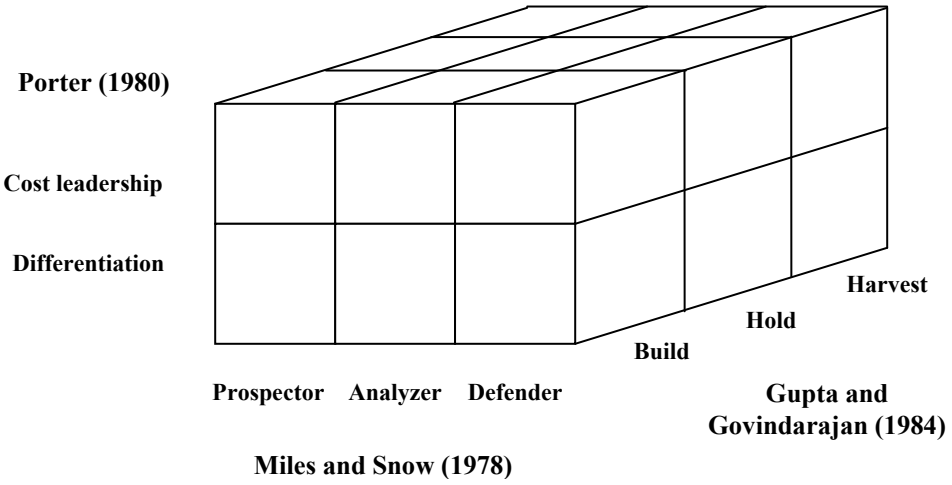
Harvest: Maximizing short-term profit and cash flow is the main theme of a firm pursuing a harvest strategy; increasing market share is ignored and becomes less important. No investments such as R&D, marketing expenditures and capital investment are required for this strategy. A harvest strategy implies a highly risk-averse person, less tolerance for ambiguity and a manager with a finance control background (Guilding, 1999).

Divest: An organization follows divest strategy plans to cease and come out of the business (Gupta and Govindarajan, 1984a; 1984b).

2.4.1.3 The Use of Strategic Types in MA Research

Although all of the four strategic types mentioned above were classified almost three decades ago, they have recently been adopted as variables by researchers in management accounting studies in order to investigate the relationship between particular management accounting aspects and strategy as well as firm's performance such as the studies of Auzair and Langfield-Smith (2005), Jusoh et al. (2006), Abdel-Kader and Luther (2008), and Cadez and Guilding (2008). However, it can be argued that using a wide range of strategic variables in MCS research can generate confusion and may hinder the integration of research findings in order to make a comprehensive body of knowledge. Consequently, the concept of integrating strategy variables is proposed by Langfield-Smith (1997) shown in Figure 2-7.

Figure 2-7: The integration of strategic types



Source: Langfield-Smith (1997, p.212).

Considering the differences and similarities between the various strategy classifications may assist in integrating this research. The viable combined uses of these strategic types for a particular business unit were proposed in Figure 2-8. For example, it may be appropriate when prospector/entrepreneurial firms complete through differentiation and pursue a build mission, but not for prospector/entrepreneurial firms pursuing differentiation and harvest strategies. However, further empirical research is called for to validate the combinations proposed in the diagram (Langfield-Smith, 1997).

Figure 2-8: A Proposed Combination of Strategic Types

	Build	Hold	Harvest
Cost leadership	×	×	?
Differentiation	√	×	×

	Build	Hold	Harvest
Cost leadership	×	√	√
Differentiation	×	?	?

Prospector (entrepreneurial) ⟷ Defender (conservative)

Source: Langfield-Smith (1997, p.213).

This research focuses on a comprehensive set of strategic typologies as contingency factors. It contributes to the body of knowledge by responding to the call for validating proposed combinations of strategies. It incorporates four strategic types to explore the viable combinations of strategies of Thai firms as well as investigating their appropriate MCS. No previous studies have been undertaken integrating these strategic variables.

2.4.2 Management Techniques

Apart from the study of Chenhall and Langfield-Smith (1998b), there has been limited research explicitly using management techniques as contingency factors. Management techniques are important to an organization in order to help managers in problem-solving, to improve work efficiency and effectiveness as well as providing a foundation for improved managerial performance (Armstrong, 1993). The implementation of management techniques, both operational processes and administrative functions, which support a particular of organizational strategy, may assist the organizations in pursuing competitive advantage. Management techniques can be defined as:

> *'The systematic and analytical methods used by managers to assist in decision-making, the improvement of efficiency and effectiveness and, in particular, the conduct of the two key managerial activities of planning and control'* (Armstrong, 1993, p.15).

Organizational performance may be enhanced by a synergistic power from collective uses of complementary management techniques. However, it is claimed that there is a difficulty in defining and researching these management techniques due to the ambiguous nature of their broad philosophies. Consequently, a discrete range of management techniques rather than broader philosophies is often used in the research (Chenhall and Langfield-Smith, 1998b). According to previous studies (De Meyer et al., 1989; Miller et al., 1992; Chenhall and Langfield-Smith, 1998b), management techniques can be separated into six discrete groups including human resource management policies, integrating systems, team-based structures, quality systems, operational systems innovations, and improving existing processes.

2.4.2.1 Human Resource Management

Human resource management (HRM) is defined as 'a strategic and coherent approach to the management of an organization's most valued assets—the people working there who individually and collectively contribute to the achievement of its objectives for sustainable competitive advantage' (Armstrong, 1993, p.371). Also, it can be viewed as one of the principle mechanisms used by managers in incorporating employees' actions in order to keep their behaviour consistent with the firm's interest (Liao, 2005). There are four main

practices of people management. These are employee involvement and communication, the management of reward, training and development, and recruitment and retention (Storey, 2001). Many activities are involved such as recruitment and selection, managing the work flexibly, pay structures and systems, occupational health and safety, training, developing effective managers, coaching and mentoring, and employee communications (Lock, 1998).

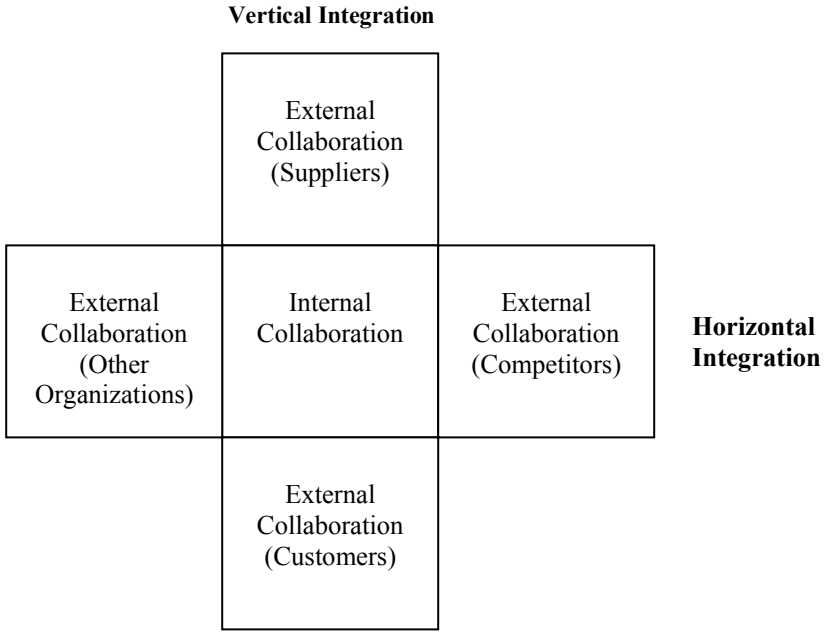
It is argued that there are two distinctive types of human resource based practices; high value added approach and low value added approach. A high value added approach believes that competitiveness can be derived from high levels of employee-employee interdependence and employee delegation. This approach can involve high levels of investment in training and development, high levels of job security and an innovative reward system. A low value added approach attempts to gain competitiveness through cost-cutting methods. This leads to decreases in training investment, the greater use of sub-contracted labour, and reduction in security of tenure. The selection of an appropriate HRM approach may depend on the context of an organization such as the strategic choices the firms pursue, the culture and the socio-political settings (Webster and Wood, 2005). According to contingency theory and control perspective, the study indicates that an appropriate combination of HRM, control system and business strategy can improve organizational performance (Liao, 2005).

2.4.2.2 Integrating Systems

Integrating systems refer to 'linking operational strategies to business strategies, linking business processes, integrating information systems across functions, integrating information systems in operations, and integrating information systems with suppliers and customers' (Chenhall and Langfield-Smith, 1998b, p.263). It is argued that integrating systems are vital to the survival of an organization in globalization. Internal integration alone (both aligning operational functions with business strategy and aligning operations across processes) may not be sufficient to support a firm during intensive competition. A careful link between firm's processes and external organizations such as suppliers and customers becomes a requirement of the most successful organizations in order to gain and sustain competitive advantage. This can be done through efficiently and effectively responding to the customers' needs by relying on a more limited number of qualified or certified suppliers (Zailani and Rajagopal, 2005). The idea of the scope of integration has

been proposed by Barratt (2004) shown in Figure 2-9. Two main potential categories of integration have been suggested being vertical and horizontal. Vertical integration includes collaborations with customers, internally (across functions and value chain such as purchasing, manufacturing, logistics, marketing, and R&D), and with suppliers. Horizontal integration includes collaborations between internal organization members and other companies both competitors and non-competitors such as firms sharing manufacturing capacity.

Figure 2-9: The Scope of Integration



Source: Barratt (2004, p.32).

Processes can be integrated at an operational level alone or both tactical and operational levels. However, it is claimed that the performance benefits from integrating systems can be limited if the integration is employed at only some parts of the organizational structure. Consequently, integration should be implemented throughout three levels of the organizational structure; strategic, tactical and operational levels (Barratt, 2004).

The degree of integration can be distinguished into two different levels; narrow and broad integration. Narrow integration refers to a relatively little integration between an organization and its suppliers or customers. In contrast, broad integration means that an organization extensively integrates with its suppliers or customers. Based on growing

evidence, it is claimed that an organization with a higher degree of integration should have higher potential benefits (Zailani and Rajagopal, 2005). There are many benefits to an organization implementing integrating systems such as reducing cost, creating more value for customers, and detecting and responding quickly to critical demand changes (Horvath, 2001). Furthermore, integration with suppliers and customers eliminates unnecessary processes, speeds up information and material flows, and creates long-term relationships with major suppliers and customers (Heikkila, 2002). These benefits from closer relationships with suppliers and customers provide more opportunities to improve firms' performance (Barratt, 2004).

Although many benefits from integration and collaboration are obvious, information technology infrastructure is required in order to implement integrating systems and increase the level of collaboration and information sharing. The role and the size of collaborative technology infrastructure[8] may vary among different firms depending on their requirements and the resources available for investment (Horvath, 2001). It is also suggested that there is difficulty in implementing integration and collaboration due to an over-reliance on technology, misunderstanding about when and with whom to integrate, and a lack of trust between trading partners. Nevertheless, the success of collaboration can be increased by improving the understanding of what collaboration actually implies (Barratt, 2004).

2.4.2.3 Team Based Structures

Organizational designs vary from traditional or hierarchical organizational structures to non-hierarchical based, flatter or leaner structures. There are a variety of factors which force organizational design changes such as intensive global competition, increased environmental uncertainty, rapid advancements in information technologies, increasing customer expectations, and changes in the nature of work and the attitudes of workers (Cross et al., 2000; Callanan, 2004). Since the mid of 1990s, there has been an accelerating call for power and information sharing through collaborative teams and boundaryless

[8] Collaborative technology infrastructure varies by the role and size. These include open, low-cost connectivity; very large, flexible, multimedia data storage capabilities; systems and channel integration; higher-level self service capabilities; intelligence gathering and analysis; supply chain collaboration exchanges; sophisticated security capabilities; new electronic commerce capabilities. They are discussed in more detail in Horvath (2001, p.206-207).

organizational structures in order to enhance organizational effectiveness. This can be seen in the prevalent implementation of team-based structure as a method for task accomplishment, decision making and problem solving over the past decades (Callanan, 2004). There is emerging evidence of the cross-functional project group or team consisting of members from different functional areas such as manufacturing, marketing and R&D responding successfully to competitive forces (Keller, 2001). As a result, the use of cross-functional, team-based structures is viewed as a preferred organizational structure.

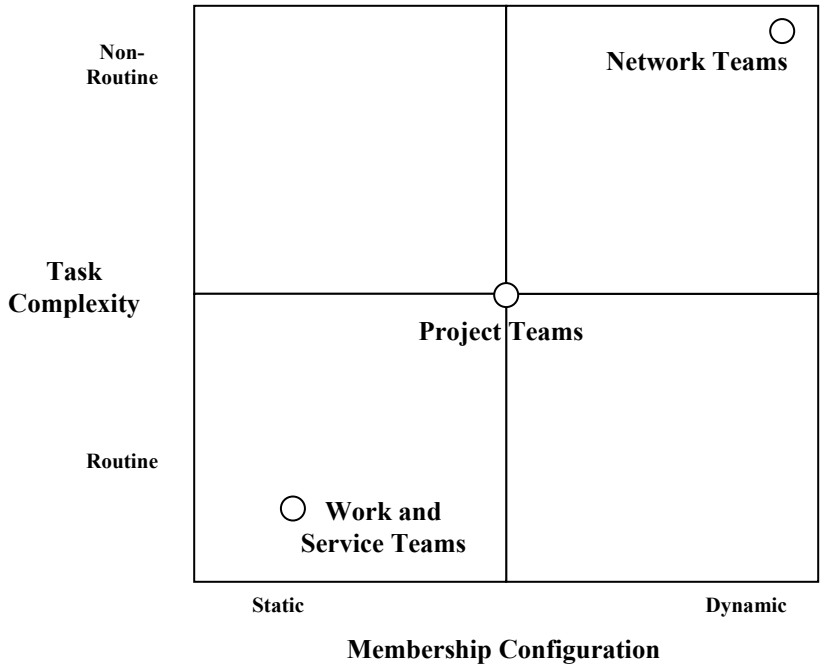
Scott and Einstein (2001) categorize teams into three different types (work teams, project teams, and network teams) based on two dimensions—membership configuration (static or dynamic) and task complexity (routine or non-routine)[9]. First, work teams have a more static membership configuration and engage in routine task complexity. This means that the teams have been established for a long time, and once they exist there is little change in their memberships. The members have expectation for this stability of the teams in the future. The teams' tasks normally involve production or service work, so they are routine and standardized.

Project teams are different from work teams due to anticipated limited future duration. The project teams are formed for a specific reason, and the teams will be terminated when their purposes are achieved. The members also engage in work outside the teams and will return to their functions after the project ends. Task complexity of project teams is more non-routine than that of work teams (Scott and Einstein, 2001).

Network teams have a dynamic membership configuration and extremely non-routine task complexity. The members in network teams are not limited to time or space. They may come from different geographical areas and collaborate via a variety of communications channels and information technologies. Also, the membership can come from anyone who is committed to the goal of the team, such as workers, customers, vendors, consultants, and organizational employees (Scott and Einstein, 2001). Figure 2-10 demonstrates all of the team types on a scale of membership configuration and task complexity.

[9] Membership configuration refers to the expected tenure of a team, the stability of its membership, and the allocation of members' work time, and it varies along a continuum from static to dynamic whereas task complexity refers to the degree of complexity of work in which organizational teams engage varying from the routine to the non-routine (Scott and Einstein, 2001, p. 110).

Figure 2-10: Types of Teams



Source: Scott and Einstein (2001, p.110).

Tasks and activities can be accomplished faster and better by improved collaboration from team members as well as greater competency of workers (Buzacott, 2004). It is maintained that team-based structures can be used to deal with the limitations of vertical information processing and individual decision makers. Team-based structure encourages greater collaboration rather than individual power in decision-making; hence, organizational effectiveness can be established by the sharing of power and information via collaborative teams. It assists an organization to process a greater amount of information for better decision-making. Furthermore, team-based structures provide the flexibility for an organization to adapt itself to changing environments and customers' needs (Callanan, 2004). Cross-functional teams also provide the benefits from multiple sources of communication, information, and perspectives (Keller, 2001). However, some disadvantages of team-based structure exist. They may reduce the clarity and hierarchy of job descriptions, and generate the perception that management use teams to achieve more output by fewer people or lower pay, additionally some workers may not be comfortable with the change of authority from an individual to the team (Buzacott, 2004).

2.4.2.4 Quality Systems

The existence of a global market and high competition leads to demands for higher quality of product and service and the development of global quality standards for quality assurance (Bandyopadhyay, 2005). It is generally accepted that the essence of a company's survival and competitiveness is high-quality products and services (Mjema et al., 2005). There has been an increasing awareness of quality issues in companies over the past ten years (Lindberg and Rosenqvist, 2005). Quality is regarded as an important foundation for every single business in modern industry (Nookabadi and Middle, 2006). To compete with global competitors, a firm attempts to provide the highest possible quality products and services at acceptable prices to meet customers' quality expectations (Mjema et al., 2005). Consequently, an organization may need to attain and maintain quality by establishing specially designed and developed quality systems for efficient quality management and support (Srdoc et al., 2005).

A number of quality standards and quality systems have been developed and adopted by many companies to respond to their customer's requirements for quality assurance activities (Bandyopadhyay, 2005). Srdoc et al. (2005) illustrate four of the most important quality management models that assist an organization in maintaining and improving quality of its processes, products, services, and overall business performance. These are total quality management (TQM), the Malcolm Baldrige Criteria for Performance Excellence, the EFQM Excellence Model, and the quality standard ISO 9001. These can briefly be explained as follows.

Total quality management (TQM) is defined as 'an integrated system of principles, methods, and best practices that provide a framework for organizations to strive for excellence in everything they do' (p.280). The core concepts of TQM are customer focus, leadership, continuous improvement, strategic quality planning, design quality, people participation and partnership, and fact-based management (Srdoc et al., 2005). The implementation of TQM can lead to the improvement in organizational performance mainly in product quality, customer and employee satisfaction, and competitiveness. It is believed that leadership and employee participation are the most important dimensions of TQM in getting their better performance. Nevertheless, implementing TQM may consume more resources, and investment can be costly (Costa and Lorente, 2004).

The Malcolm Baldrige Criteria for Performance Excellence was designed to assist an organization in enhancing its competitiveness by improving value to customers and overall organizational performance and capabilities. Criteria are applied in the Malcolm Baldrige National Quality Award (MBNQA) that aims to promote excellence in US organizations. Baldrige criteria are regarded as a descriptive or diagnostic framework for excellence that have a set of core values and concepts including customer-driven quality, leadership, continuous improvement and learning, valuing employees, fast response, design quality and prevention, long-range view of the future, partnership development, public responsibility and citizenship, and results focus (Srdoc et al., 2005).

The EFQM Excellence Model is viewed as the most popular quality framework and the basic criteria for most of the national and regional quality awards in Europe. It was introduced at the beginning of 1992 to use for assessing applications for the European Quality Award (EQA) (Srdoc et al., 2005). Top management can use the EFQM Model as a management model in support of an organization that pursues TQM (van den Heuvel et al., 2005). The EFQM's fundamental concepts are results orientation, customer focus, leadership and constancy of purpose, management by processes and facts, people development and involvement, continuous learning, innovation and improvement, partnership development, and corporate social responsibility (Srdoc et al., 2005).

It has been shown that organizations both in manufacturing and service industries have successfully implemented and adopted the ISO 9000 series worldwide. The ISO 9000 series were first issued by the International Organization for Standardisation (Geneva Switzerland) in 1987, which were later revised in 1994 and 2000. The ISO 9000 series include the standards that identify requirements and guidelines for quality management systems (van den Heuvel et al., 2005). The ISO series were designed as generic standards in order to harmonize quality assurance activities in global supply chains; hence, they can be applied to any organization regardless of firm's size, the types of products and services, and private or public sector. However, it is argued that due to their generic nature, they fail to mention specific requirement of many industries such as automotive, aerospace, defence, chemical, and electronics. This leads to the emergence of many industry-specific quality standards such as QS 9000 series for US automotive industry (Bandyopadhyay,

2005). Traditionally, it was regarded as a competitive tool for an organization; however, it no longer creates competitive advantage. Instead, it is viewed as a prerequisite to compete in the market (Costa and Lorente, 2004).

The core values and concepts of these models obviously overlap, and each of the quality models has both advantages and disadvantages. As a result, there is an idea of integrating them in order to find out the best suited for an organization. Many approaches suggest different ways of integrating the quality models such as TQM-then-ISO, ISO-then-TQM, and balanced path. Different implementation patterns of quality systems may vary among countries, firms' size, and advancement of the company (Srdoc et al., 2005). However, it was found that high performance may be derived from the combined use of ISO 9000 series and TQM no matter what order of implementation (Costa and Lorente, 2004).

A quality system cannot be isolated from other functional areas. All departments throughout the entire organization may have to take responsibility for the quality of its products and services. As a result, it calls for an effective collaboration from all functional areas to obtain the high quality or 'right first time' for all activities in order to satisfy customer expectations at minimum total quality cost. It requires three dimensions of integration in quality system, intra-system integration, inter-system integration, and supply chain integration. This implies that an organization may demand the integration not only among quality functions within a quality system, but also between the quality system and other departments, and among all partners and users in a supply chain such as suppliers and customers. Integrated quality system (IQS) has been introduced in recent year to deal with this issue. It was defined as 'a system which integrates all quality functions' (Nookabadi and Middle, 2006, p.175). IQS aims to integrate all quality related functions from the beginning to the final phases to satisfy customer quality expectations and achieve maximum effectiveness (Nookabadi and Middle, 2006).

2.4.2.5 Operating Systems Innovations

In the twenty-first century, business environments are fast changing and uncertain. There is an increased demand for shorter lead times, better delivery service, and reduction of product life cycles (Koh et al., 2005). This is together with customers' demands for more variety of products in smaller quantities. Hence, traditional operating methods pursuing

efficiency through batch operations and process orientation may no longer cope with these changes (Sofianopoulou, 2006). It calls for operating innovation and a modern production system to cope with this new environment (Demeester et al., 2004). Enterprises are required to be agile and responsive to this change (Koh et al., 2005). Management techniques related to operating systems innovations involve implementing new operating methods, investing in new physical layout, and outsourcing (Chenhall and Langfield-Smith, 1998b).

It is claimed that existing layout configurations may not satisfy the demands of multi-product organizations in a rapidly changing environment. The existing layouts include functional and cellular layouts. Multi-product companies may require new layouts that have high flexibility, modularity and reconfigurability as well as layouts that allow shorter lead times, lower inventories, and a greater degree of product customization. Consequently, three new generation layouts are proposed as alternative layout configurations to respond to the needs of the flexible factory. They are distributed, modular, and agile layouts[10] (Benjaafar et al., 2002).

Outsourcing manufacturing and services is regarded as a common practice for todays business, and there is a growing trend of the use of outsourcing (Schniederjans and Zuckweiler, 2004). It is defined as an 'act of moving some of a firm's internal activities and decision responsibilities to outside providers' (Chase et al., 2004, p.372). It can be regarded as a form of restructuring to reduce an internal function and replace it with an outside entity (Fisher and White, 2000). The idea and concept of outsourcing is not new. It has been used for many decades such as 'buy or make' production decisions, or outsourcing service activities. However, outsourcing becomes a critical issue due to its new position in the organization's decision-making structure. It involves a shift from a tactical decision to a strategic decision especially with an emphasis on international outsourcing. It allows a firm to focus on core activities (core competencies), focus on key strategic objectives, and share risks. It can be used to reduce or stabilize overhead costs, decrease investments in technology, and transfer fixed cost into variable cost. Outsourcing can benefit operations by increasing accessibility to resources, improving quality,

[10] The detail of each layouts can be found from the study of Benjaafar et al. (2002).

decreasing product/process design and cycle time, and increasing flexibility. It provides an access to suppliers' knowledge, and flexibility to adjust staff levels. However, its disadvantages should be acknowledged such as a loss of control over critical functions, loss of control over suppliers, questions over performance measurement, potential violations of intellectual property rights, and uncertainty over actual benefits (Schniederjans and Zuckweiler, 2004).

2.4.2.6 Improving Existing Processes

Management techniques for improving existing processes are reorganizing existing processes and downsizing the organization (Chenhall and Langfield-Smith, 1998b). Firms may adopt business process improvement (BPI) to reorganize and improve their existing processes. BPI first appeared in the literature in 1991 (Adesola and Baines, 2005). It was defined as 'a systematic methodology developed to help an organization make significant advances in the way its business processes operate' (Harrington, 1991, p.20).

Downsizing is perceived as a specific category of corporate restructuring (Carbery and Garavan, 2005). It is 'an organization's conscious use of permanent personnel reductions in an attempt to improve its efficiency and/or effectiveness' (Budros, 1999, p.70), and is regarded as an intentional form of organizational size reduction, or deliberate strategy designed to reduce the number of the employees. Examples of downsizing strategies are hiring freezes and early retirement programmes (Carbery and Garavan, 2005).

Although downsizing is traditionally used for problematic firms or declining organizations, it has become more popular recently and is regarded as a common strategy (reorganization strategy) to ensure a leaner enterprise for today's business (Carbery and Garavan, 2005; Fisher and White, 2000). Many companies enhance their profitability via successfully downsizing and restructuring, however, some researchers argued that firms should not simply assume that layoffs will quickly result in an increase in financial performance (Cascio and Wynn, 2004). The study of Cascio and Wynn (2004) found that indiscriminate downsizing or layoffs alone without careful judgement may not lead to the improvement of financial performance. Obviously, downsizing may be a popular tactic used even in the best of economic conditions, but it may not eventually increase productivity and long-term gains in shareholder value. Companies may experience a decrease in quality, productivity

and effectiveness, if non-effective downsizing is used such as 'nonprioritized downsizing' (Fisher and White, 2000).

2.5 Previous Management Accounting Research Based on Contingency Theory

Previous MA research based on contingency theory has been explored in relation to contingency factors; strategy and management techniques. They are divided into three different approaches as follows.

2.5.1 Previous MA Research: Selection Approach

Strategy has been used as an important contingency factor, especially strategy at a business level. The alignment between performance measures and business strategy has been explored in the study of McAdam and Bailie (2002). It was found that the linkage to business strategy made performance measures more effective, and the alignment between them should be continually examined and regarded as a dynamic and intricate issue. Some studies explored the adoption of particular MAPs, and found the relationship to firms' strategy. Malmi (2001) found that the adoption of a BSC assist an organization in translating strategy into action. Malina and Selto (2001) found that BSC was designed and implemented as an effective device for controlling corporate strategy. Perera et al. (2003) found that the adoption of transfer pricing, which was regarded as an accounting mechanism, was affected by cultural and strategic change in an organization.

Auzair and Langfield-Smith (2005) examine the impact of many contingency variables including service process type, business strategy and organizational life cycle stage on the design of MCS in service organizations. They found that all contingency variables above have a great impact on the design of MCS. Precisely, more bureaucratic forms of MCS can be found in mass service, mature and cost leader firms compared to professional service, growth and differentiation firms.

Nilsson (2002) analyzed the design and use of MCS suitable for corporate strategy of acquirer and business strategy of acquired company after takeover. It was found that the acquirer firm following a 'portfolio management' corporate strategy (high degree of diversification and limited synergy potential) tends to have tight control and focus on short-term financial performance. In contrast, acquirer firm with an 'activity-sharing' strategy (lower degree of diversification and substantial synergy potential) may be appropriate to loose control and non-monetary long-term perspective (for example in the use of performance measures). Additionally, the cases indicated that acquired companies pursuing differentiation as a business strategy tend to have loose and non-monetary control while acquired firm with cost leadership have tight and monetary control.

Guilding (1999) studied a particular MAP namely competitor-focused accounting (CFA). CFA incorporates five practices including competitor cost assessment; competitive position monitoring; competitor appraisal based on published financial statements; strategic costing; strategic pricing. He appraised CFA adoption rates and assessed its perceived helpfulness as well as investigated its relationship with four contingency factors: company size, industry, competitive strategy and strategic mission. The results indicated that CFA adoption rates are higher than expected. Moreover, three contingency factors (company size, competitive strategy and strategic mission) have been found to have significant relationship with CFA usage and perceived helpfulness. Particularly, prospector/ build/ larger firms tended to make greater use of, and perceived greater helpfulness in, CFA practices.

Abdel-Kader and Luther (2008) examined the impact of a range of possible contingency factors on a broad set of MAPs drawing on the UK's largest industry sector. Ten contingency factors are related to external characteristics, organizational characteristics, and manufacturing or processing characteristics. The results revealed that the variations in MA sophistication are significantly driven by environmental uncertainty, customer power, decentralisation, size, AMT, TQM, and JIT. The data however did not support the expected relationships between competitive strategy, processing system complexity and product perishability, and MA sophistication.

Other research pays attention to functional strategy such as manufacturing strategy and marketing strategy. Tayles and Walley (1997) examined the associations between management accounting practices and functional strategies of marketing and manufacturing. Their findings, summarized from the cases, are that the costing system and performance measures were designed to be congruent with competitive strategy for both marketing strategy and manufacturing strategy in order to ensure a better performance. Hence, the company's ability to compete or survive may depend on consistency between the functional strategies and the accounting system.

Fry et al. (1995) examined the relationship between management accounting system (MAS) and manufacturing strategy as well as firms' manufacturing environment. They found that there is an inconsistency between MAS and the manufacturing environment supporting manufacturing strategy. However, they suggested that MAS should be consistent with manufacturing strategy to ensure better performance. Similarly, Nicolaou (2003) explored the relationship between firms' manufacturing strategy and the perceptions about the effectiveness of cost management systems (CMS) in providing information for strategic and operational decision-making. The findings conclude that CMS provides information required to support decisions in implementing manufacturing strategy, and its design must be consistent with adopted manufacturing strategy.

Bouwens and Abernethy (2000) also examined the relationship between the design of MAS for decision making and manufacturing strategy particularly customization via interdependencies[11] (such as pooled, sequential and reciprocal interdependencies). Firms with customization tend to allow the individual customer to influence the features of their products and services. It is claimed that customization and interdependencies may cause an information gap leading to uncertainty in an organization. However, this uncertainty can be reduced by providing the appropriate information from the MAS. In this study, uncertainty is viewed as an implicit contingency factor. The findings indicated that there is an indirect relationship between MAS dimensions and customization through interdependencies. It implies that an organization may require more sophisticated MAS to cope with interdependencies that result from the pursuit of customization.

[11] Interdependence is defined as the extent to which departments depend upon each other to accomplish their tasks (Bouwens and Abernethy, 2000, p.223).

Agbejule and Burrowes (2007) contributed to the MA literature by adding new purchasing strategies such as supplier development (SUD) as a mediating variable. They aimed to examine the association between perceived environmental uncertainty (PEU), SUD, and the use of broad scope MAS information. The results show that firms are more flexible and proactive by establishing new purchasing strategy (SUD) to cope with increasing level of PEU. Firms eventually use more broad scope MAS information to deal with the diversity of information.

Naranjo-Gil and Hartmann (2006) investigated how top management teams (TMTs) implement strategy by using MAS. The role of MAS has been explored in supporting strategy implementation, and how TMT background affects this role. Consistent with their expectation, they found systematic differences between professional and administrative TMTs in their use of MAS and its impact on the implementation of strategy. TMT background affects the use of MAS, and such use subsequently affects strategy implementation.

2.5.2 Previous MA Research: Interaction Approach

Most of the researchers who studied the relationship between MAS, strategy and organizational performance proposed that the better performance can be generated from a consistency between MAS and strategy. Chenhall and Morris (1995) conducted empirical research to investigate the impact of the combination between MAS and organic processes on the organizational performance under two different strategies—conservative and entrepreneurial. Organic decision and communication processes refer to the possibility for people in an organization to participate in strategy formulation, share ideas and information, and deal with the external environment. In contrast, mechanistic approaches are regarded as less responsive and less supportive for innovative action. The results showed that better performing entrepreneurial firms correlate with the combined use of MAS and organic processes especially the extensive use of MAS. But, this is not the case for conservative firms.

Abernethy and Guthrie (1994) examined the required characteristics of MAS for firms following different strategic postures. The results reveal that business unit's performance is dependent on a fit between the design of MAS and firm's strategy. Specifically, MAS with broad scope were found to be more effective in firms pursuing prospector rather than those pursuing defender.

Chong and Chong (1997) examined the role of MAS design on the relationship between strategic business unit (SBU) strategy and SBU performance as well as that between perceived environmental uncertainty (PEU) and SBU performance. The findings indicate that SBU strategy (prospector vs defender) and PEU are important antecedents of MAS design and broad scope of MAS information is an important antecedent of SBU performance.

The impact of MCS and business strategy on performance has also been studied. Ittner and Larcker (1997) investigated the relationship between organizational performance and the fit between quality-based manufacturing strategy and control systems in two industries (automobile and computer industries) across four countries (Canada, Germany, Japan and U.S.). They examined the influence of strategic control systems and quality strategy on organizational performance. The results showed that, logically, firms pursuing quality strategy tend to utilize more quality-related strategic control practices. However, they found mixed results for the impact of using strategic control practices on firms' performance varying from industry to industry. This implies that firms should adapt their strategic control systems to the organization's competitive environment. Additionally, some practices had a negative relationship with performance. In particular, formal strategic control practices may reduce performance whereas flexible and creative strategic control systems may be more suitable for firms pursuing a quality strategy.

Abernethy and Lillis (1995) examined the implications of manufacturing flexibility[12] (manufacturing strategy) on an organization's MCS as well as their effect to enhance performance. Two dimensions of MCS—structural arrangements and the performance

[12] Manufacturing flexibility is reflected in a firm's ability to respond to market demands by switching from one product to another through co-ordinated policies and actions and a willingness or capacity to offer product variations. It is a strategy which attempts to maximize differentiation (Abernethy and Lillis, 1995, p.242).

measurement systems were studied. Their results demonstrated that organizations tend to adapt the design of MCS to support the implementation of manufacturing strategy. In particular, firms implementing a flexible manufacturing strategy may not be suited by the use of mechanistic organizational structures and traditional performance measures such as accounting or other efficiency-based performance measures, but place greater reliance on the use of integrative liaison devices in the form of teams, task forces, meeting and spontaneous contacts and a broader set of measures. However, the findings relating to performance only provide some supports for their expectations. Particularly, non-flexible firms using efficiency-based measures have significantly higher performance than flexible firms.

Perera et al. (1997) extended the study of Abernethy and Lillis (1995). They investigated the association between a customer-focused manufacturing strategy and an emphasis on non-financial measures as well as the relationship to firms' performance. The findings indicated the association between customer-focus strategy and the extent of use of non-financial performance measures but not for the link with performance.

Abernethy and Brownell (1999) examined the role of MCS in organizations that operate under strategic change. In this study, the budget was regarded as a representative of MCS. Specifically, they investigated the relationship between strategic change (from defender to prospector continuum), style of budget use (diagnostic or interactive) and organizational performance. The results revealed that superior performance will be found when a firm uses budgets interactively under significant strategic change, or when a firm uses budgets in a diagnostic role under little or no strategic change.

Davila (2000) explored the relationship between project uncertainty, product strategy, and MCS as well as their effect on performance. The finding supports a contingency theory of MCS in product development. The alignment between the design and use of MCS and product strategy is significantly related to product development performance. Particularly, firms which use customer information more intensively and follow a customer focused strategy tend to have a positive impact on performance. Similarly, firms which use cost information more intensively and follow a low cost strategy tend to have better

performance. However, there is no relationship between the use of time information and performance when pursuing time-to-market strategy.

Some studies pay attention to quality issues and their relationship with other contingency factors and MCS, specifically performance measurement as well as the impact on performance. Chenhall (1997) explored the effects of the combination between total quality management (TQM) and manufacturing performance measures (MPM) on organizational performance. He found that the higher performance depended on the combined uses of TQM and MPM. Ittner et al. (2003) examined the association, in financial service firms, between measurement system satisfaction, economic performance, and two types of strategic performance measure (SPM)—greater measurement diversity and improved alignment with firm strategy and value drivers. They articulated that financial service firms adopting a broad set of financial and non-financial measures have higher measurement system satisfaction and higher economic performance. However, there was limited evidence supporting the fact that the match between organizational strategy and performance measurement system benefits firms' performance.

The findings of Ittner et al. (2003)'s study are strongly supported by Van der Stede et al. (2006) Their study extends knowledge in this area by separating performance measures into objective and subjective non-financial measures. The research explored the association between quality strategy and the use of various types of performance measures including financial measures and non-financial measure both objective and subjective measures as well as their effect on firms' performance. The findings show that greater use of both objective and subjective non-financial measures can be found in the organizations emphasizing quality manufacturing. It is also reported that firms with greater use of a variety of performance measures have higher performance than firms with less use. However, the results partly support the expectation of the alignment between strategy and performance measurement. The fit between quality-based manufacturing strategy and performance measurement, particularly subjective non-financial measures, positively influences performance, but not for objective non-financial measures.

The effects on current and future performance of including non-financial performance measures in a set of performance metrics are examined by Said et al. (2003). They also

explore the association between non-financial measures and many contingency factors. The results demonstrated that higher performance can be found in the firms employing a combination of financial and non-financial measures. Moreover, the use of non-financial measures is significantly related to several contingencies including an innovation-oriented strategy (prospector-defender strategy), a quality-oriented strategy, the length of the product development cycle, industry regulation and the level of financial distress. Importantly, the relationship between the use of non-financial measures and firm performance is dependent on the match between the use of non-financial measures and the firm's operational and competitive characteristics (particularly, pursuing a prospector strategy, adopting quality strategy, having longer product development and product life cycle, being regulated firms and having low level of financial distress).

Jusoh et al. (2006) investigated the influence of the alignment between Miles and Snow strategic typology and the use of multiple performance measures (MPM) particularly BSC. It was found that superior firms' performance can be found in two combinations—prospectors with customer and learning and growth measures, and defenders with financial measures.

2.5.3 Previous MA Research: Systems Approach

Chenhall and Langfield-Smith (1998b) investigated the effect of management techniques and MAPs on firms' performance under different strategic priorities. The results show that differentiator firms tend to have higher performance when the combinations of management techniques (quality systems, integrating systems, team-based structures, HRM policies, improving existing processes, manufacturing systems innovations) and MAPs (strategic planning techniques, balanced performance measures, benchmarking, employee-based measures, activity-based techniques) are used. Also, cost leadership firms tend to have higher performance when the combinations of management techniques (improving existing processes, manufacturing systems innovations, integrating systems) and MAPs (traditional accounting techniques, activity-based techniques, benchmarking, strategic planning techniques) are adopted.

Van der Stede (2000) investigated the effects of business strategy and business unit past performance on the style of budgetary control. He examined two dysfunctional effects of budgetary controls: budgetary slack and managerial short-term orientation. The results showed that there are spillover effects existing between these two dysfunctional effects. A decrease in one dysfunction may lead to an increase in another dysfunction. Nevertheless, the true dysfunction is dependent on the circumstances, especially business unit competitive strategy and firms' profitability. In particular, differentiation and more profitable firms tend to use less rigid budgetary controls. This will allow managers to think long-term and create more budgetary slack though this could be viewed as a form of inefficiency. However, budgetary slack is argued to be necessary for innovation. In contrast, cost leader and poor performance firms seem to pursue more rigid budgetary controls. This leads to less budgetary slack and more focus on short-term orientation. It is suggested that rigid controls and short-term orientation may be important for the poor performing firms to recover their situation.

Baines and Langfield-Smith (2003) used structural equation modelling (SEM) to investigate the associations between a range of organizational variables and the changing competitive environment as antecedents to the change in MA as well as their influence on performance. The findings show that an increase in competitive environment drives a higher emphasis on differentiation strategy. This change leads to the changes in the design of organizations, advanced manufacturing technology, and advanced MAPs. This in turn results in a greater reliance on non-financial accounting information, which leads to higher organizational performance.

Chenhall (2005) provided research to improve the understanding of how contemporary strategic performance measurement systems (SPMS) such as BSC enhance organizational competitiveness. The paper proposes that the impact of integrative SPMS on strategic outcomes is acting through the mediating effects of the alignment of manufacturing with strategy and organizational learning. The results advocate the idea that integrative SPMS can improve strategic competitiveness for both differentiator and cost leader firms. Particularly, SPMS will improve strategic outcomes of organizations when the connection between goals, strategies and operation is ensured and the understanding of the interdependencies across the value chain is provided.

Further studies explored the association between total quality management strategy (TQM), strategic control systems (SCS) and organizational performance. The findings indicate that the implementation of TQM strategy has a direct influence on firms' performance and SCS. Moreover, an indirect effect of the implementation of TQM strategy on organizational performance was found via SCS (Abas and Yaacob, 2006).

Cadez (2007) applied a configuration contingency form of fit via cluster analysis to examine the fit between MAS and contingency factors, and their effect on performance. The findings support the contingency theory framework. Specifically, superior performance is not automatically supported by the use of sophisticated MAS; rather it derives from an appropriate match between MAS and identified contingency factors.

Cadez and Guilding (2008) explored the simultaneous impact of strategic choices (prospector and defender), deliberate strategy formulation orientation, market orientation, and company size on two dimensions of strategic management accounting (SMA) as well as the mediating effect of SMA on organizational performance. A contingency theory framework has been supported by the data indicating that contingency factors such as company size and strategy significantly affect the successful application of SMA, and that organizational performance depends on the fit between organizational context and structure. Particularly, the application of a prospector strategy and deliberate strategy formulation is positively related to accountant's strategic decision making participation. The use of SMA is positively linked to the adoption of prospector strategy, deliberate strategy formulation, firm size, and accountants' strategic decision making participation. In turn, the use of SMA also positively influences performance.

2.6 Development of Hypotheses

The current research aims to explore the relationships between MAPs, MTs, strategies, and organizational performance. Drawing from the literature and previous research, three forms of contingency fit have been adopted in order to develop the hypotheses. A comprehensive set of strategic typologies is used to picture and capture the relationships between the main

constructs. Hence, hypotheses have been developed in relation to two different extremes of strategic typologies—differentiation/ prospector/ entrepreneurial/ build and cost leadership/ defender/ conservative/ harvest as follow.

2.6.1 Differentiation/ Prospector/ Entrepreneurial/ Build

Based on contingency theory and characteristics of these strategies, there should be specific management techniques (MTs) and management accounting practices (MAPs), which are more appropriate to support and facilitate differentiation/ prospector/ entrepreneurial/ build strategies. Firms pursuing these strategies seek to provide the uniqueness and high quality of products and services. These can be done through extensive research (R&D), product design, product quality improvement, high quality materials, and intensive customer support. Technology and innovation are vital to them (Porter, 1980; 1985; Miles and Snow, 1978; Miller and Friesen, 1982; Gupta and Govindarajan, 1984a; 1984b). Some authors found these strategies linked to more reliance on the use of teams, task forces, meeting and spontaneous contacts as well as advanced manufacturing techniques (AMTs) (Abernethy and Lillis, 1995; Baines and Langfield-Smith, 2003). Hence, the current research proposes that there should be an alignment between differentiation/ prospector/ entrepreneurial/ build strategies and MTs concerning quality, employee empowerment, customization and flexibility. These alignments are also expected to lead to higher organizational performance.

Many researchers indicate that firms pursuing these strategies are linked to new, advanced, sophisticated, contemporary, broader scope of MA. Baines and Langfield-Smith (2003) indicated that differentiation strategy leads to changes in the design of organization, AMTs, and advanced MAPs. Some authors studied functional strategies supporting differentiation such as flexibility, customization, customer-focus, and quality-focus strategies. Abernethy and Lillis (1995) reported that firms implementing a flexible manufacturing strategy place more reliance on the use of a broad set of measures. Bouwens and Abernethy (2000) pointed out that an organization may require more sophisticated MAS to cope with the pursuit of customization. Perera et al (1997) indicated the association between customer-focus strategy and the use of non-financial performance measures. Davila (2000) revealed that firms following a customer focused strategy tend to

use customer information more intensively. Ittner and Larcker (1997) reported that firms pursuing quality strategy tend to utilize more quality-related strategic control practices. Van der Stede et al. (2006) suggested the fit between quality-based manufacturing strategy and performance measurement, particularly subjective non-financial measure, positively influences performance. Chenhall (1997) indicated that the combined uses of total quality management (TQM) and multiple performance measures (MPM) can lead to higher performance. Abas and Yaacob (2006) reported that an indirect effect of the implementation of TQM strategy on performance was found via strategic control systems (SCS).

Guilding (1999) found that prospector/ build firms tend towards greater use of competitor-focused accounting (CFA). Abernethy and Guthrie (1994) reported that firms pursuing prospector strategy found MAS with broad scope more effective. The match between prospector strategy and the use of non-financial measures was found in the studies of Said et al. (2003) and Jusoh et al. (2006) while the fit between prospector strategy and the use of strategic management accounting (SMA) was found in the study of Cadez and Guilding (2008). Chenhall and Morris (1995) revealed that better performing entrepreneurial firms correlate with the combine use of MAS and organic processes especially the extensive use of MAS. In most studies, these fits, in turn, were found to be associated with higher organizational performance. Thus, the current study suggests the alignment between differentiation/ prospector/ entrepreneurial/ build strategies and the benefit obtained from contemporary MAPs. These alignments are also expected to lead to higher organizational performance.

2.6.2 Cost leadership/ Defender/ Conservative/ Harvest

Drawing from contingency theory and attributes of these strategic typologies, there should be specific management techniques (MTs) and management accounting practices (MAPs), which are more appropriate to support and facilitate cost leadership/ defender/ conservative/ harvest strategies. Firms pursuing these strategies aim to provide a low price product and service to customers, which can be achieved through resource efficiency, process improvement, economy of scale, aggressive construction of efficient-scale facilities, and tight cost and overhead control (Porter, 1980; 1985; Miles and Snow, 1978;

Miller and Friesen, 1982; Gupta and Govindarajan, 1984a; 1984b). Hence, the current research proposes that there should be an alignment between cost leadership/ defender/ conservative/ harvest strategies and MTs supporting cost efficient processes.

Davila (2000) revealed that firms following a low cost strategy and using cost information more intensively tend to have a positive impact on performance. Van der Stede (2000) indicated that cost leadership firms seem to pursue more rigid budgetary controls. This is supported by the studies of Auzair and Langfield-Smith (2005) and Nilsson (2002) reported that firms pursuing cost leadership tend to use more bureaucratic forms of MCS/ tight and monetary control. Jusoh et al. (2006) indicated that superior firms' performance can be found in defenders with financial measures. Thus, the current study suggests the alignment between cost leadership/ defender/ conservative/ harvest strategies and the benefit obtained from traditional MAPs. These alignments are also expected to lead to higher organizational performance. Table 2-2 sets out these research hypotheses

Table 2-2: Research Hypotheses

Form of fit	Main theme	Hypotheses
Selection	MAPs and Strategy	Hypothesis 1: There is an alignment between strategic priorities of Porter and management accounting practices (MAPs). H 1.1: There is a positive relationship between differentiation strategy and contemporary MAPs. H 1.2: There is a positive relationship between cost leadership strategy and traditional MAPs. Hypothesis 2: There is a fit between strategic types of Miles and Snow and management accounting practices (MAPs). H 2.1: There is a positive relationship between Prospector strategy and contemporary MAPs. H 2.2: There is a positive relationship between Defender strategy and traditional MAPs. Hypothesis 3: There is a fit between strategic missions and management accounting practices (MAPs). H 3.1: There is a positive relationship between Build strategy and contemporary MAPs. H 3.2: There is a positive relationship between Harvest strategy and traditional MAPs. Hypothesis 4: There is a fit between strategic types of Miller and Friesen and management accounting practices (MAPs). H 4.1: There is a positive relationship between Entrepreneurial firms and contemporary MAPs. H 4.2: There is a positive relationship between Conservative firms and traditional MAPs.
Selection	MTs and Strategy	Hypothesis 5: There is an alignment between strategic priorities of Porter and management techniques (MTs). H 5.1: There is a positive relationship between differentiation strategy and MTs concerning quality, employee empowerment, customization and flexibility. H 5.2: There is a positive relationship between cost leadership strategy and MTs supporting cost efficient processes. Hypothesis 6: There is a fit between strategic types of Miles and Snow and management techniques (MTs). H 6.1: There is a positive relationship between Prospector strategy and MTs concerning quality, employee empowerment, customization and flexibility. H 6.2: There is a positive relationship between Defender strategy and MTs supporting cost efficient processes.

Table 2-2: Research Hypotheses (Continued)

Form of fit	Main theme	Hypotheses
Selection	MTs and Strategy	Hypothesis 7: There is a fit between strategic missions and management techniques (MTs). H 7.1: There is a positive relationship between Build strategy and MTs concerning quality, employee empowerment, customization and flexibility. H 7.2: There is a positive relationship between Harvest strategy and MTs supporting cost efficient processes. Hypothesis 8: There is a fit between strategic types of Miller and Friesen and management techniques (MTs). H 8.1: There is a positive relationship between Entrepreneurial firms and MTs concerning quality, employee empowerment, customization and flexibility. H 8.2: There is a positive relationship between Conservative firms and MTs supporting cost efficient processes.
Interaction	MAPs, Strategy, and OP	Hypothesis 9: There is a positive combined effect of a particular management accounting practice and consistent strategy on organizational performance. H 9.1: The stronger emphasis on differentiation/ prospector/ build/ entrepreneurial strategy, the more positive relationship between contemporary MAPs and organizational performance. H 9.2: The stronger emphasis on cost leadership/ defender/ harvest/ conservative strategy, the more positive relationship between traditional MAPs and organizational performance.
Interaction	MAPs, MTs, and OP	Hypothesis 10: There is a positive combined effect of management accounting practices and management techniques on organizational performance. H 10.1: The higher benefit obtained from MTs concerning quality, employee empowerment, customization and flexibility, the more positive relationship between contemporary MAPs and organizational performance. H 10.2: The higher benefit obtained from MTs supporting cost efficient processes, the more positive relationship between traditional MAPs and organizational performance.

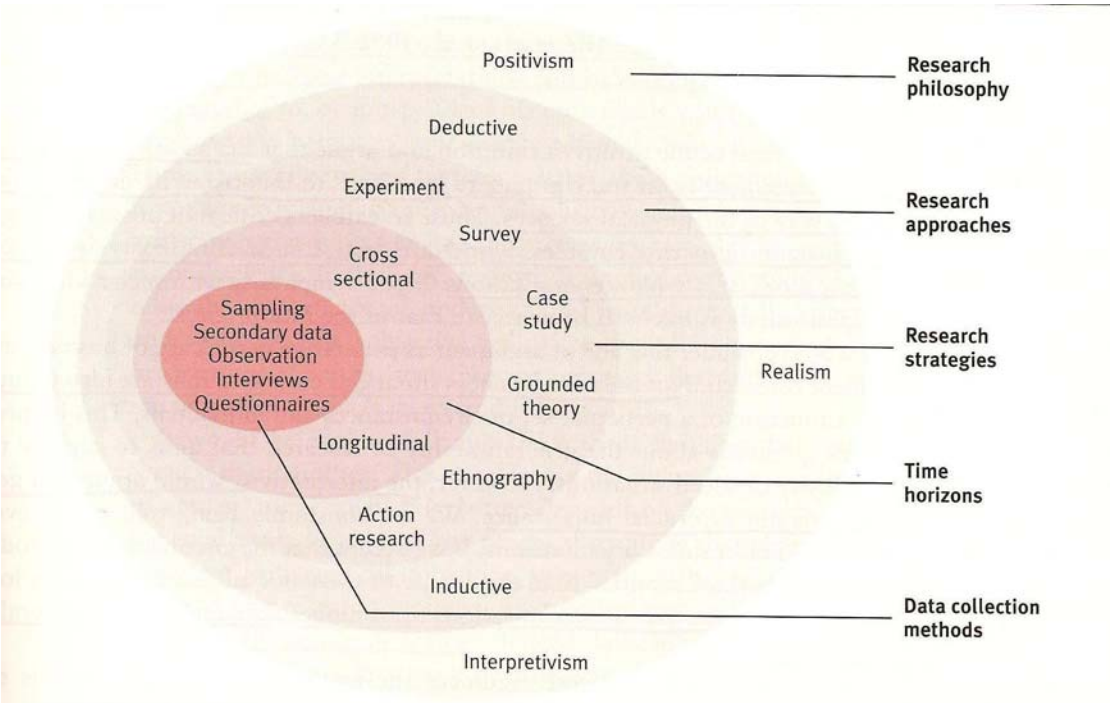
Table 2-2: Research Hypotheses (Continued)

Form of fit	Main theme	Hypotheses
Systems	MAPs, MTs, Strategy, and OP	Hypothesis 11: There is a positive combined effect of management accounting practices and management techniques on organizational performance under different strategic types. H 11.1: Firms under a differentiation/ prospector/ build/ entrepreneurial strategy that use the combination of contemporary MAPs and MTs concerning quality, employee empowerment, customization and flexibility tend to have high performance. H 11.2: Firms under a cost leadership/ defender/ harvest/ conservative strategy that use the combination of traditional MAPs and MTs supporting cost efficient processes tend to have high performance.

Chapter 3
Research Methodology

This chapter explains the methodology used in this research. Research methodology refers to 'the overall approach to the research process, from the theoretical underpinning to the collection and analysis of the data' (Collis and Hussey, 2003, p.55). This implies that research philosophy, research approach, theory and framework, and data collection methods should all be consistent with one another. The organization of this chapter is structured on 'the research process onion' proposed by Saunders et al. (2003) shown in Figure 3-1.

Figure 3-1: The Research Process 'Onion'



Source: Saunders et al. (2003, p.83).

The chapter begins with the research philosophy and research approach. This is followed by the explanation of research strategies and data collection methods as well as the time horizons. Finally, the credibility of the research including reliability and validity are discussed.

3.1 Research Philosophy

An appropriate research methodology cannot be selected without concern for the research philosophy which relies upon epistemological and ontological assumptions. Researchers hold various assumptions based on their views about the nature of reality applied to a phenomenon (ontology). These assumptions will influence the way the researchers acquire the knowledge from that phenomenon (epistemology). Eventually, the acquisition of the knowledge will affect the process through which the research can be conducted (methodology) (Ryan et al., 2002). Likewise, all research methodological approaches are based on assumptions regarding ontology, epistemology and human nature (Morgan and Smircich, 1980).

Hence, it is worth discussing philosophy issues before moving to explain the research methods employed in this study. There are two main research philosophies or paradigms[13], positivism and interpretivism (Walliman, 2006). These two extreme ends on the philosophical continuum will be explained, and then followed by the discussion on research philosophy in accounting. Eventually, the place of philosophy underpinning this study will be located.

3.1.1 Positivism

This research philosophy is also known as quantitative paradigm (Douglas, 1976; de Vaus, 2001; Collis and Hussey, 2003) and scientific approach (Frankfort-Nachmias and Nachmias, 1992; Sekaran, 2000). Positivism has a long tradition in business and management research, and can be traced back to the philosophical stance of the natural scientist (Saunders et al., 2003). Management research based on a positivistic perspective aims to generate causal relationships or laws which manage the ways in which organizations operate. This permits management to become more scientific and allows managers to envisage and control their environments (Johnson and Duberley, 2000).

[13] Research paradigm refers to 'the progress of scientific practice based on people's philosophies and assumptions about the world and the nature of knowledge; in this context, about how research should be conducted' (Collis and Hussey, 2003, p.46).

Positivists prefer 'working with an observable social reality and believe that the end product of such research can be law-like generalizations similar to those produced by the physical and natural scientists' (Remenyi et al., 1998, p.32). It means that positivistic researchers believe they are independent of what they study and are value-free in selecting both what to study and how to study it including collecting and analyzing data.

For purposes of generalization, a sufficient size of sample is required in order to allow the researchers to draw appropriate conclusions and for it to be representative of the wider population. Positivists attempt to identify causal explanations through a process of hypothesizing and deduction (Easterby-Smith et al., 2004). It is believed that the problems should be reduced into the simplest possible elements (reductionism) rather than analyzed as a whole situation (holistic view). They also focus on a highly structured methodology, operationalization and statistical analysis in order to permit replication (Saunders et al., 2003).

3.1.2 Interpretivism

Interpretivism can also be called social constructionism (Easterby-Smith et al., 2004), phenomenology (Remenyi et al., 1998), and qualitative paradigm (Collis and Hussey, 2003). It is 'a theoretical point of view that advocates the study of direct experience taken at face value; and one which sees behaviour as determined by the phenomena of experience rather than by external, objective and physically described reality' (Remenyi et al., 1998, p.34). The researchers in this paradigm believe that reality is subjective and socially constructed within people's minds through sharing their experiences and through sense-making processes. They focus on the different constructions, meanings and interpretations established based on people's thinking and feelings, individually and collectively as well as their communications (Easterby-Smith et al., 2004). This means that the researchers have explicit or implicit values and these values guide them through their interpretation and the sense-making process (Collis and Hussey, 2003).

This paradigm can be used to examine much more complicated situations taking a holistic rather than reductionist view. Hence, it has been argued that it may be difficult and problematic to undertake replication for such a whole complex phenomenon (Remenyi et

al., 1998). It is further pointed out that statistical generalization is less valuable and less important in this paradigm according to the belief that the reality of each phenomenon is unique and ever-changing (Saunders et al., 2003). This implies that interpretivists seek to gain the rich insights into human behaviour and experiences reflected from a specific complex situation rather than attempts to establish replication and generalization.

Positivism and interpretivism are distinguished by many research aspects. The differences between them are summarized in Table 3-1 as follow.

Table 3-1: The Differences between Positivism and Interpretivism

	Positivism	Interpretivism
The observer	must be independent	is part of what is being observed
Human interests	should be irrelevant	are the main drivers of science
Explanations	must demonstrate causality	aim to increase general understanding of the situation
Research progresses through	hypotheses and deductions	gathering rich data from which ideas are induced
Concepts	need to be operationalized so that they can be measured	should incorporate stakeholder perspectives
Units of analysis	should be reduced to simplest terms	may include the complexity of 'whole' situations
Generalization through	statistical probability	theoretical abstraction
Sampling requires	large numbers selected randomly	small numbers of cases chosen for specific reasons

Source: Easterby-Smith et al. (2004, p.30).

3.1.3 Research Philosophy in Accounting

Much of accounting research has its origin in the economics discipline. Positivism has a long tradition in the development of research in finance and accounting. It is also regarded as the dominant philosophy for this research. According to positivists, true belief is based on what researchers observe with value neutrality and being external to the object. 'Positive' accounting research constructs theories and validates them by employing possibly large and unbiased samples emphasising the replicability of method and results (Ryan et al., 2002).

Apart from positivism (scientific methods), alternative ranges of research philosophies in finance and accounting research have been proposed based on different ontological assumptions which are regarded as more 'naturalistic' methods (Ryan et al., 2002). Deciding on which philosophy underpins the research is related to the understanding of two assumptions, epistemology and ontology. Hence, two assumptions are justified as follows.

Epistemology

Epistemology, the acquisition of knowledge, is concerned with how researchers accept knowledge or how the researchers can acquire knowledge (Collis and Hussey, 2003). Philosophers in the ancient time believed that our knowledge of the world can arise from two sources, observing and thinking. Thus, two distinctive forms of epistemology emerged, empiricism and rationalism. Empiricists advocate for acquiring knowledge via 'observing' while rationalists accept the true knowledge via 'thinking' (Johnson and Duberley, 2000).

Empiricists regard that knowledge or belief is rooted within the object. They gather knowledge by observation and categorization, perceive knowledge through their experiences, and analyse the data by using scientific methods. In other words, they believe in the power of observation instead of the power of reason. Belief or knowledge derived from non-experiential grounds is considered meaningless. Empiricists consider the gathering of data which is 'value free' to be of utmost importance. In contrast, rationalists believe that source of knowledge or true belief about the world is within themselves or innate via the contemplative mind. Knowledge is accessed, justified, and understood exclusively through a process of reason. It implies that they believe in the power of reason rather than power of observation (Ryan et al., 2002).

Ontology

Ontology is concerned with the nature of reality (Collis and Hussey, 2003), that is the nature of existence in objects is regarded as reality. Two distinctive forms used to describe

ontology are realism and idealism. Realists believe that reality of something that is existent within the objects, external to the researchers, and independent of researchers' perception about the thing. This implies that even when the researchers describe something, that thing possesses reality and its reality is independent of the researchers' perception. Empirical realists believe in causality and general laws of behaviour which are drawn from the observation of the repeated conjunction of events. They utilise 'correspondence theory' of truth to justify the statement about the world as true or false by comparing that statement with empirical evidence such as repeated observations (Ryan et al., 2002).

Idealists believe that reality exists within the subjects or within the minds of the researchers and depends on the researchers' perceptions (Ryan et al., 2002; Collis and Hussey, 2003). Empirical idealists believe that reality of their experiences is formed by mental representations. Therefore, knowledge and reality can be socially constructed. The statement about the world is justified as true or false by 'coherence' with people's beliefs either at the individual level or the social level or both, rather than 'correspondence' with reality. Nevertheless, these two extremes—realist and idealist—have their own problems. Realists may suffer from problems in connecting between the perception of the appearance of reality and the reality of the thing in itself. Idealist may be trapped in a position that knowledge is purely produced from the mind, and truth is what we or society believe to be true (Ryan et al., 2002).

Between these two extremes of the objective-subjective continuum, six ontological assumptions that are related to particular schools of thought in the social science were proposed by Morgan and Smircich (1980) who argued that the dichotomy between quantitative and qualitative research is too simplistic. They presented six ontological assumptions about reality. Later, Tomkins and Groves (1983) adopted the concept of six ontological assumptions for the research in social science, and applied this to an accounting research context in order to identify a wider variety of research methodology. Consequently, it is important for accounting researchers to be aware of these six ontological assumptions and recognize which one underpins the methodological approaches used in their accounting research (Ryan et al., 2002). Table 3-2 illustrates six ontological assumptions, their epistemology, the examples of finance and accounting research and their methodology.

Table 3-2: Six Ontological Assumptions in Finance and Accounting Research

	Objective ◄					► **Subjective**
Ontology	Reality as concrete structure	Reality as a concrete process	Reality as a contextual field of information	Reality as a symbolic discourse	Reality as a social construction	Reality as a projection of human imagination
Epistemology	To identify the social structure using a positivistic research style with an emphasis on the empirical analysis	To understand system, process and change	To understand and map the contexts in a holistic fashion (cybernetic)	To understand the nature and patterning of the symbols through which individuals negotiate their social reality	To understand how social reality is created	To understand the way in which human beings shape the world from inside themselves
The example of the Finance and Accounting Research	A study trying to establish the truth of the hypothesis that current cost data is more useful than historical cost statements to financial analysts when valuing a company's shares	The impact of changes in the real-world environment in terms of the effects accounting reports have and how they are used	Accounting research that try to provide a large model showing the interconnections between the environment and parts of an organization being examined, in particular accounting practices	The study of the role of accounting in giving meanings to organizational activity, providing norms of behaviour and structuring day-to-day social practices in organizations and society	The accounting research that seek to establish how individual accountants make sense of accounting rules or standards, or how individual make sense of accounting information they receive	Accounting research that explores the depth of individual feelings of actors when they are faced with the complexity of their reactions to accounting information
Methodology	- Precise and highly structured or pre-determined procedures for data collection such as lab experiments and surveys - Mathematical or statistical techniques - Quantitative validation of the hypotheses tested	- Still emphasis on measurement and stable statistical functions - Using quantitative measures or standard qualitative classifications - Historical analysis	- Still be regarded as in mainstream accounting research - Quantitative techniques still remain an important role but only partial role in the analysis and understanding - Contextual analysis	- Scientific method become inappropriate - Naturalistic research methods are required	- Ethno-methodology and other similar approaches	- Pheno-menology

Sources: Morgan and Smircich (1980), Tomkins and Groves (1983), Ryan et al. (2002).

As can be seen in Table 3-2, the first ontology from left hand side, *reality as concrete structure*, is the most objective while the last ontology, *reality as a projection of human imagination*, is the most subjective. The first three ontological assumptions were viewed as 'scientific' methods whereas the last three are more 'naturalistic' methods. Each of these ontological assumptions from left to right along the objective-subjective continuum is slightly different from one another (Morgan and Smircich, 1980; Tomkins and Groves, 1983). They can be discussed briefly as follows.

First, a social world of the first ontology, *reality as concrete structure*, is external, objective, concrete and real. It can be viewed as a network of fixed and definite relationships like the world of physics and chemistry. Its reality can be acquired and identified by observation and the use of variables tied together by general laws; hence, its epistemology is based on positivism and empiricism. Knowledge can be gained by identifying the social structure. The methodology involved with this ontology is rooted in the methods of the natural sciences including the use of large scale empirical surveys, detailed laboratory experiments, and sophisticated quantitative approaches (Morgan and Smircich, 1980; Tomkins and Groves, 1983; Ryan et al., 2002).

The second ontology, *reality as a concrete process*, views the social world as an evolving process that is concrete in nature, but changing over time in detailed form. Everything is interacting with each other; thus, determinate causal relationships may be difficult to find. It moves from machine or closed structure to an organism or open system. Consequently, the assumption about the stable relationships of reality are relaxed and replaced by the assumption that reality is existent within the predictable and contingent relationships between organization and environment, and general laws describing how things change. The acquisition of knowledge is gained by the insight into processes of change. However, this change is assumed to happen in only one way, in particular, the adaptation of the organization to the environment but not the other way around. Its methodology is still based on measurement and stable statistical functions and the use of quantitative measures as well as standard qualitative classifications such as historical analysis to understand the process and change (Morgan and Smircich, 1980; Tomkins and Groves, 1983; Ryan et al., 2002).

Third, this ontology, *reality as a contextual field of information*, regards the social world as a process of information. It is continuously changing in form and activity, based on the exchange of information over time. Human beings are regarded as information processors who are continuously learning and adapting to their environment. Thus, the difference between the subject and the environment is reduced, and the relationships both stable and probabilistic are viewed as a whole or from a cybernetic perspective. Its epistemology values the importance of the mapping and understanding of contexts in a holistic view

based on a cybernetic metaphor. The contextual approach assumes that the organization and its environment are evolving together, not only in one way. This methodology is still regarded as that used in much of mainstream accounting research. Quantitative techniques retain their importance, but only partly in the role of analyzing and understanding. This is often taken together with the use of appropriate qualitative research techniques (Morgan and Smircich, 1980; Tomkins and Groves, 1983; Ryan et al., 2002).

The fourth ontology, *reality as symbolic discourse*, views the social world as a pattern of symbolic relationships and meanings created by the actions and interactions of human actors. The network of subjective meaning is therefore the fundamental character of the social world. Reality is in the system of meaningful action, not in rules or rule-following. In other words, it believes that deterministic relationships cannot represent the social world. Instead, the reality of the social world is made sense by human beings in a way meaningful to them and revealing their inner nature. The meanings and norms, created through individual experiences of events and situations and shared through social interaction, inform the reality. For epistemology, knowledge is gained via the individuals' understanding about the nature and pattern of the symbols that derive from negotiating with their social reality. Scientific methods may not be appropriate due to problems in generalizations when subjective meanings subsist in everything. Thus, naturalistic research methods are required (Morgan and Smircich, 1980; Tomkins and Groves, 1983; Ryan et al., 2002).

Fifth, the social world of this ontology, *reality as a social construction*, is a continuous process, re-created by the human actors with every encounter of everyday life, and therefore has no concrete status. Social reality is derived from individual sense-making and is embedded in the nature and use of symbolic action modes such as the medium of language, labels, actions and routines. Reality exists in the process of creating itself. Social actions are the focus of the research, and the procedures of individual sense-making are in the researchers' concern. For epistemology, knowledge is acquired by analyzing the particular processes or methods of sense-making that create reality. Therefore, ethnomethodology and other similar approaches are viewed as the appropriate methods to characterize the main feature of this approach. Ethnomethodologist aims to gain the insights into individuals' self images and the assumptions underlying individual's

performance of their everyday life (Morgan and Smircich, 1980; Tomkins and Groves, 1983; Ryan et al., 2002).

The last ontology, *reality as a projection of human imagination*, regards the social world as a projection of individual consciousness, an action of creative imagination, and uncertain intersubjective status. Reality subsists only in the consciousness of individual thinkers or in human imagination. According to their epistemological position, knowledge is in subjective experience and gained through the understanding how individuals shape their world. Phenomenology or exploration of pure subjectivity is more suitable for this end of the continuum because phenomenological forms of insight can be used to access the nature of this world through ones own consciousness (Morgan and Smircich, 1980; Tomkins and Groves, 1983; Ryan et al., 2002).

In summary, this research proposes a research model that represents the relationships between management accounting practices and contingency factors, particularly strategies and management techniques to affect organizational performance. It will be conducted by using a large number of companies through the use of a survey and supplemented by the interviews through a few case companies. Data will be analysed using scientific methods such as those in statistical packages, and appropriate qualitative data analysis. Therefore, this research is operated within the second and third elements of the six ontological assumptions of Morgan and Smircich (1980). It seeks for an understanding of the interconnection of all parts of the research model in both reductionist and holistic views. These ontological assumptions believe that organizations are affected by various contingency factors and they attempt to learn and adapt themselves to those factors. For epistemology, the knowledge is acquired through the understanding of the business environment by mapping the contexts. Hence, the philosophy underpinning this research is between two extreme ends of the philosophical paradigms; however, it is located closer to positivism rather than interpretivism. This is still in the mainstream accounting research and is conducted based on scientific method and a quantitative approach supplemented by appropriate qualitative research methods.

3.2 Research Approach

There are two research approaches—deductive approach (testing theory) and inductive approach (building theory).

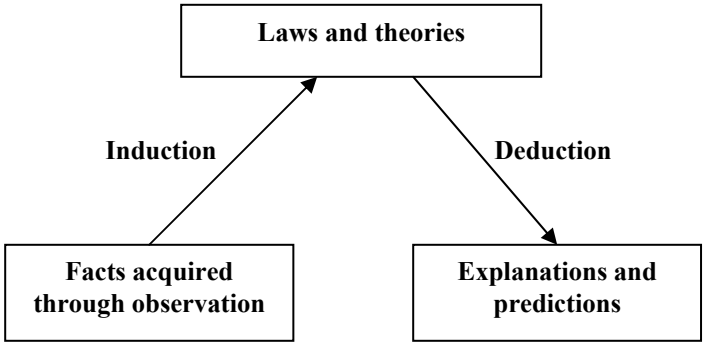
3.2.1 Deductive Approach

Regarding deduction, 'the conclusion must follow from the premises' (Williams and May, 1996, p.25). Thus, the deductive research process starts with developing of hypotheses from theory, collecting data, testing hypotheses, and confirming or modifying the theory if necessary (Creswell, 2003). For this reason, theory testing approaches move from the general to the particular (de Vaus, 2001). The important characteristics of the deductive approach are the search for causal relationships between variables, the collection of quantitative data (also some appropriate qualitative data), controls to allow the testing of hypotheses, a highly structured methodology for replication, operationalization, reductionism and generalization (Saunders et al., 2003).

3.2.2 Inductive Approach

In contrast, induction can be defined as 'the derivation of a general principle or possibly a law in science, which is inferred from specific observations' (Williams and May, 1996, p.22). The inductive research process commence with collecting data, analyzing the data by making sense of it, and forming the theory. The theory building approach moves from individual observation to general patterns or laws (Collis and Hussey, 2003). The inductive approach focuses on obtaining an insight into the meanings of events, the collection of qualitative data, a more flexible structure to allow changes of research emphasis, and less concern with generalization (Saunders et al., 2003). Figure 3-2 illustrates the concepts of deductive and inductive approaches.

Figure 3-2: The Concepts of Deductive and Inductive Approaches



Source: Ghauri and Gronhaug (2002, p.14).

This research is based mostly on the deductive approach because the hypotheses are developed based on the relevant theory. Then the hypotheses are tested relying mainly on quantitative data and statistical packages. However, qualitative data is used in this study through the interviews with the case companies to gain better and deeper understanding about the context. The deductive approach is also consistent with the positivism that underpins this research.

3.3 Research Strategies and Data Collection Methods

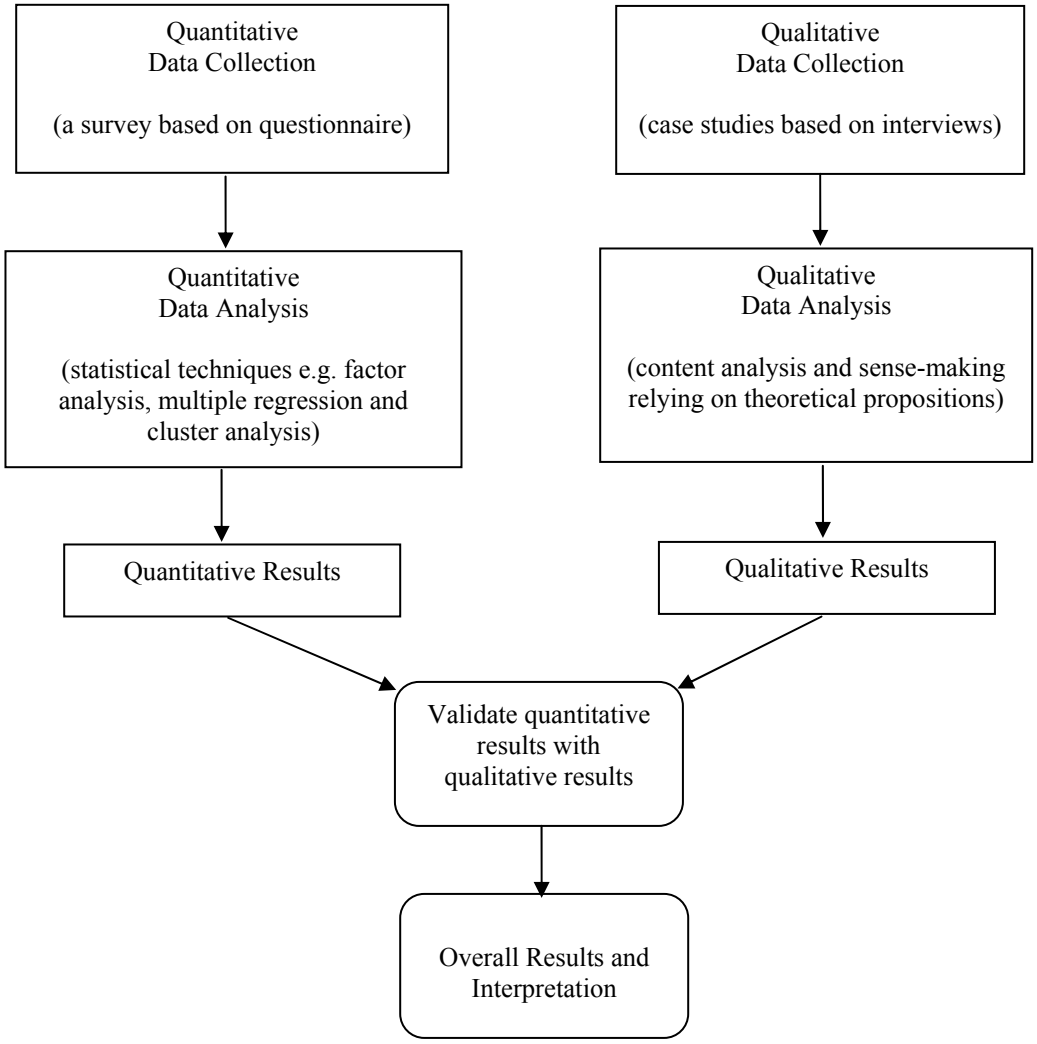
Research strategies must be consistent with the research philosophy and research approach as well as providing a general plan in order to answer the research questions (Saunders et al., 2003). A variety of research strategies have been proposed for business and management research such as experiment, survey, case study, grounded theory, ethnography and action research. Some of these belong completely to a positivistic or deductive approach such as experiment and survey while the other may follow a phenomenological or inductive approach such as grounded theory and ethnography. Nevertheless, some research strategies can be used, to some extent, for both paradigms such as the case study (Remenyi et al., 1998).

Different research strategies have their own advantages and disadvantages; thus, the combination or mixture of research strategies is claimed to provide the best results as well as to strengthen the credibility of the research findings (Douglas, 1976). The mixed

methods research, using both quantitative and qualitative approaches, in management accounting originated in the last three decades, and has recently received growing attention (Modell, 2009). The findings from qualitative methods reinforce those from quantitative methods by providing more insight into the context or setting while the results from quantitative methods support those from qualitative methods by offering generalization to the population (Creswell and Plano Clark, 2007).

The research strategy of this study is the mixed method combining a survey and case studies; thus, a *triangulation approach* is used in this research. A survey method will be used to collect data for testing the hypotheses based on contingency theory whereas case study method will be conducted to find the answers to 'how' and 'why' questions in research questions as well as to validate the research findings from the survey. This research plans to collect both quantitative data and qualitative data in a similar time. It is however noted that the case companies will be chosen from the respondents of the survey who are willing to participate in further interviews. Figure 3-3 demonstrates the triangulation design of data collection in this study. A mixed method of research strategies together with their data collection methods employed in this study can be explained as follows.

Figure 3-3: The Triangulation Design of Data Collections



Source: adapted from Creswell and Plano Clark (2007, p.63).

3.3.1 Survey

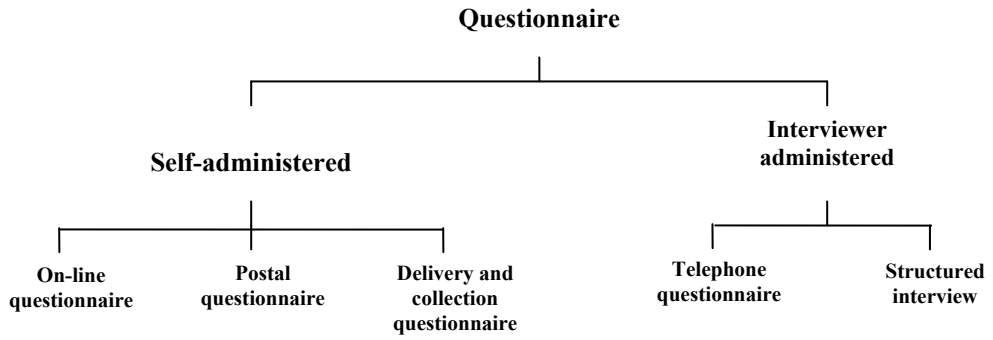
Most empirical research underpinned by positivism develops hypotheses based on theory, collects data through surveys and tests the hypotheses by using statistical packages (Ryan et al., 2002). This implies that a survey strategy is usually related to the deductive approach. Saunders et al. (2003) also indicated that a survey strategy is a popular and common strategy in business and management research. As can be seen from the literature review, much management accounting research based on contingency theory was conducted mainly through surveys by using questionnaires. Various advantages of surveys are also explained such as the ability to conduct the research in a large number of

respondents, reasonable costs, and providing easy comparison. Nevertheless, the survey method also has some issues of concern such as the clarity of questions in the questionnaire and the appropriate number of respondents (Saunders et al., 2003; Collis and Hussey, 2003). These can be dealt with by using considerable care when the questionnaire is developed.

Data Collection Methods for Survey

There are many data collection methods related to a survey strategy such as questionnaire, structured observation and structured interview; however, a questionnaire is widely used as a data collection method in a survey strategy (Saunders et al., 2003). There are many types of questionnaire including self-administered and interviewer administered questionnaire as shown in Figure 3-4.

Figure 3-4: Types of Questionnaire



Source: Saunders et al. (2003, p.282).

A self-administered postal questionnaire is used in this research for the survey which is regarded as the first stage of data collection. This method allows the researcher to conduct a large scale survey with a reasonable cost. It also ensures that the responses are not affected by the interviewer. Although response rates from this type of survey are lower than those from other data collection methods, response rates can be improved by a good covering letter, follow-up letter, stamped return envelopes, and an appropriate length of the questionnaire (Sekaran, 2000).

Questionnaires will be constructed based on the literature review and previous research, and posted to the companies in the Stock Exchange of Thailand (SET) with a covering letter informing the respondent of the importance of the study, its objectives, what it will be used for, and the benefits from the participation. Confidentiality will be guaranteed to the respondents as well as a copy of the final report and a draw prize of £150 being offered as the incentives.

3.3.2 Case Study

Although the use of survey based methods and statistical packages, mentioned above, have dominated contingency based research, there are a number of justifications for using more qualitative and interpretive research (Ryan et al., 2002). There is an increasing use of the case study in recent management accounting research. The advantages of case studies are provision of deeper understanding into the context of the research, ability to generate the answers for 'how' and 'why' questions, and allowing multiple methods (Saunders et al., 2003) whereas the disadvantages are difficulty to gain the access to the case company and the time-consuming nature of the approach (Collis and Hussey, 2003). This research aims to gain access to the companies by contacting the survey responding firms who indicate willingness to have further interviews.

Data Collection Methods for Case Study

Several data collection methods can be used in case study research including questionnaire, interview, observation, and documentary analysis (Saunders et al., 2003). Semi-structure interview and documentary analysis methods are chosen to conduct the case studies in this research in order to learn more about the research context and strengthen the validity of the research findings from the survey.

Interviews are one of the most popular data collection methods for business and management case studies. They provide the interviewee's insight into a certain situation. Personal interview may allow the researcher to feel a degree of intimacy with the interviewee as well as provide the opportunities for the researcher to visit the organizations (Remenyi et al., 1998). Personal interview also provides flexibility in the questioning

process and the control over the situation (Frankfort-Nachmias and Nachmias, 1992). However, it may suffer from the problems of bias and inaccurate articulation and listening. Consequently, interview should be supplemented by other methods (Remenyi et al., 1998).

Documentary analysis is regarded as a useful method which is primarily corroborating other sources of case study evidence. Documents benefit the researchers in verifying spellings and titles, providing specific details supporting the verbal views of interviewees, setting the organizational context for the interview process (Remenyi et al., 1998). This study plans to supplement the interviews with the other sources of documents such as annual reports and companies' websites.

3.4 Time Horizon

The time horizon envisaged for the research has implications for the nature of the analysis either cross-sectional or longitudinal. Cross-sectional study refers to 'a study in which data are gathered just once, perhaps over a period of days or weeks or months, in order to answer a research question' (Sekaran, 2000, p.138). The researcher who conducts cross-sectional study will collect the data just once over a short period, and then analyze the data and report the findings. This means that it takes a snapshot of an on-going situation across a large number of subjects (Collis and Hussey, 2003). Cross-sectional design is usually conducted through the survey methods (Walliman, 2006). It is the most widely adopted time approach in social science research in that provides results relatively quickly and at reasonable cost (de Vaus, 2001).

On the contrary, longitudinal study refers to 'a study that extends over a substantial period of time and involves studying changes over time' (Remenyi et al., 1998, p.47). It aims to investigate the dynamics of the same situation or people many times or continuously over the period of the research problem. A longitudinal study can sometimes be associated with a positivist methodology; however, it is primarily grounded in a qualitative approach (Collis and Hussey, 2003). It can generate useful insights into the dynamic changes of a particular situation, but it may be a time-consuming and expensive approach (de Vaus, 2001).

It is observed that much research in the management accounting literature is based on cross-sectional study, and only a few studies lend themselves to longitudinal study. This research follows the main stream research, and can be regarded as a cross-sectional study because it will be conducted through a survey and interviews over a single period of time.

3.5 The Credibility of the Research

Credibility of the research findings relates to decreasing the risk of gaining wrong answers to the research questions. This includes two main aspects of the research design, reliability and validity (Saunders et al., 2003).

3.5.1 Reliability

Reliability refers to the idea of 'replication', 'replicability', or the ability to repeat the research and gain the same or similar results not only by the same researcher but also by different researchers based on the same or similar data (Collis and Hussey, 2003; Bryman and Bell, 2007). In other words, reliability is primarily concerned with stability of the measures and the research findings (Easterby-Smith et al., 2004; Ghauri and Gronhaug, 2005). Reliability is regarded as an important aspect for positivistic studies, and normally survey research maintains high reliability (Collis and Hussey, 2003). Regarding this research, it is partly quantitative approach using a postal questionnaire survey and scientific methods including statistical packages. The questions in the questionnaire, which are used to measure the variables, are predominantly drawn from previous research. This demonstrates the consistency in measuring concepts. As a result, reliability of this research concerning both measurement and research findings is expected to be high with appropriate care devoted to the research instrument.

3.5.2 Validity

Validity is concerned with the accurateness of the research findings, and their representativeness of the real situation (Collis and Hussey, 2003). Validity can be divided

into two aspects—'internal validity' and 'external validity'. Internal validity is dependent on the degree of the control over irrelevant influences achieved in the research. The greater the control, the higher the internal validity accomplished (Ryan et al., 2002). In other words, internal validity is concerned with the credibility of causal relationships between dependent and independent variables. It implies that the changes in dependent variables should come from the independent variables rather than extraneous variables (Modell, 2005). External validity is concerned with generalizability of the research findings or the ability to draw valid conclusions from the sample (one setting) to the population (another setting) (Ryan et al., 2002). There are two types of generalizations—statistical generalization for a positivistic survey and theoretical generalization for an interpretive case study (Yin, 1994).

A number of different ways is proposed in order to assess the validity of measurements including 'face validity' and 'construct validity'. Face validity, which is the most common way to assess validity, involves 'ensuring that the tests or measures used by the researcher do actually measure or represent what they are supposed to measure or represent' (Collis and Hussey, 2009, p.65). Construct validity is defined as 'the extent to which an operationalization measures the concept which it purports to measure' (Ghauri and Gronhaug, 2005, p.83). It is concerned with a problem related to hypothetical constructs, which are not directly observable phenomena. Hypothetical constructs are presumed to subsist as factors explaining observable phenomena. The researchers must demonstrate that observations and research findings can be explained by the construct (Collis and Hussey, 2003).

Although the reliability in survey based research is usually high due to its ability to support replication, it is claimed that its validity tends to be low because measurement may not reflect the real phenomena the researcher has chosen to examine (Collis and Hussey, 2003). Hence, the focus of positivist research design is to maximize validity, which is related to the ability to provide the accurate reflections of reality from research findings (Easterby-Smith et al., 2008). Concerning the validity of this research, it is expected that the use of triangulation combining quantitative and qualitative methods survey and case study will improve its validity. By doing so, the case study is used to obtain and enable more holistic, deeper, and richer related understanding of the phenomena of the survey

results as well as assisting the researcher in explaining the abnormal or unexpected results from the survey (Modell, 2005).

The measurement validity of variables is also strengthened through many procedures in this study. Apart from providing terminology of MAPs and MTs in the questionnaire, face validity is increased by using qualitative method. The interviewees were asked to reflect their understanding of what have been measured in the questionnaire, for example, the adoption and perceived benefit of some practices and techniques. Construct validity is ensured by the use of multiple indicators and factor analysis. Several variables in this study, such as strategic priorities, are measured by using multiple items to capture a given construct, and then factor analysis is applied to establish valid and reliable constructs with Crohnbach's alpha. It is believed that the measures using multiple indicators and factor analysis are more vigorous and that the measurement error is diminished. For instance, the respondents were asked to respond to many questionnaire items to assess their strategic priorities rather than relying on only a single question, which might not easily capture a firm's strategy. The measurement of variables and the use of factor analysis to form the constructs are presented in chapter 4 and 5, respectively.

Additionally, both internal and external validity should be increased through triangulation. In particular, internal validity may be enhanced and demonstrated if the survey results are consistent with previous hypotheses and qualitative findings from the case study. In other words, causal explanations derived from statistical methods may be enriched and substantiated by qualitative data, resulting in the increasing internal validity. The efforts in establishing internal validity may enhance external validity. Specifically, generalizability can be gained through both statistical generalization used in surveys and theoretical generalization used in the case studies (Modell, 2009).

Chapter 4

Research Questionnaire, Measurement, and Descriptive Analysis

This chapter aims to explain the descriptive statistics of the survey data collected through a questionnaire. The development and administration of the questionnaire instrument will first be mentioned. This is followed by the measurement of variables and descriptive analysis. Finally, the data were examined for missing data, outliers, and univariate assumptions.

4.1 Questionnaire Instrument

The first part of data collection uses the survey method which is based on a postal questionnaire. The important issues related to survey research based on questionnaire will be discussed such as population and sample, questionnaire design, pilot test, questionnaire administration, response rate, and non-response bias analysis.

4.1.1 Population and Sample

The companies listed on Thai Stock Exchange (SET) on 26 November 2007[14] were considered as the population and the sample of this research. In other words, all possible cases in the population were selected as the sample. This means the sample is unlikely to be biased and will represent the entire population. Both manufacturing and non-manufacturing companies listed on SET are regarded as relatively large and have high influence on the Thai economic situation. It has been demonstrated by previous research that size has an influence on the adoption of sophisticated management accounting practices; particularly, the larger firms tend to implement those practices more than smaller firms (Drury and Tayles, 2005; Abdel-Kader and Luther, 2008). Hence, the sample contains those companies with potential uses for contemporary practices which are more appropriate to this research. The interpretation and the generalization of the research findings from this survey should therefore apply to only those companies in SET.

[14] It is the latest version of database provided by SET before the survey was carried out in 2008.

There are 471 companies across different industries and sub-sectors in SET. However, five companies from two industries; mining and professional services were discarded from the survey due to their inappropriateness. It is claimed that primary and extraction businesses are unlikely to have developed management accounting practices; thus, these companies are less relevant to the research. Before the survey was conducted, the phone calls to all the companies were undertaken during December 2007 and January 2008 using telephone numbers from the mailing list deriving from SET database. This step was undertaken for three particular reasons.

First, it aims to verify the names and addresses of the appropriate business units, particularly the financial and accounting departments. It is believed that these phone calls will increase the accuracy of the mailing list. It was found that target business units of some companies are located in places which are different from the addresses of headquarters shown in the mailing list. Consequently, the questionnaire was delivered to the more accurate address of the appropriate business unit.

Second, it was intended to obtain permission to send the questionnaire, and obtain an agreement to fill in the questionnaire. The research objectives were explained through the phone calls in most cases to accounting departments. Most companies allowed the researcher to administer the questionnaires to them. There were only 12 companies[15] which refused to answer to the questionnaire. These organizations were excluded from the sample.

Last, the phone calls were carried out to identify the most suitable person to respond to the questionnaire. It was desirable that the questionnaire was answered by a Senior Accounting Executive, but in every case, given the objectives of the questionnaire, the most suitable respondent was sought. More than half of the companies provided names and positions of the possible respondents. Some companies refused to give out the name; however, they allowed the researcher to deliver the questionnaires by using respondents' positions. They are mainly accounting managers, accountants, financial controllers, and chief executives. The rest of the companies were not willing to reveal both name and exact position, but

[15] No pattern was found when examining these 12 companies.

agreed to answer the questionnaire. Thus, the questionnaire was delivered to those companies by using the position termed 'accounting manager' which has been used in previous Thai research. It has been noted that 'management accountant' is not commonly used in Thailand (Phadoongsitthi, 2003). Chenhall and Langfield-Smith (1998b) claimed that administering the questionnaire to appropriate respondents is important to increase the accuracy of the reply. This step is important in that it solves the problem of inaccurate responses due to inappropriate respondents in previous management accounting research based on surveys. Overall, 17 companies were excluded from the sample due to either the irrelevant industries or refusal to answer the questionnaire. Thus, 454 companies are regarded as the sample for this research.

4.1.2 Questionnaire Design and Pilot Study

The questionnaire was designed to acquire information including management accounting practices, management techniques, strategies, and organizational performance from the companies in Thailand (shown in Appendix A). The questions were constructed and adapted based on previous research of Gupta and Govindarajan (1984a), Miller et al. (1992), Chenhall and Morris (1995), Chenhall and Langfield-Smith (1998b), Guilding (1999), Joshi (2001), Luther and Longden (2001), Phadoongsitthi (2003), and Auzair and Langfield-Smith (2005). This can be argued to strengthen the validity of the findings and comparability of the results across the studies.

The questionnaire consists of five sections within five pages. The first section is related to the adoption and benefit of management accounting practices. Section two is mainly concerned with management techniques, both the adoption, and the benefit. The third section is about strategy which is divided into four strategic typologies within four sub-sections; differentiation and cost leadership of Porter, prospector and defender of Miles and Snow, build and harvest of Gupta and Govindarajan, and entrepreneurial and conservative styles of Miller and Friesen. Section four is related to organizational performance whereas the last section reveals general characteristics of the companies.

The questionnaire was initially prepared in the English language, and subsequently translated into Thai language suitable for the potential respondents. From the phone calls,

it was found that most of the likely respondents are Thai, and they may feel more comfortable to respond to the questionnaire in Thai language. There were only two companies requesting English versions of the questionnaire because the potential respondents are foreigners. The questionnaire was validated using 'reverse translation'. That is the researcher first translated the questionnaire from English to Thai language. Two Thai academics, who have long experience teaching management accounting in the University of the Thai Chamber of Commerce (UTCC), verified the usage of Thai management accounting terminologies in the Thai version questionnaire. Then, another Thai academic, who had a Master degree from Australia and currently pursuing her PhD degree in English system, translated the questionnaire back from Thai to English language. Both of English versions have been compared, and it was concluded that the English and Thai version questionnaires have the same contents, and meanings.

The translation was also applied to the cover letter and the glossary which were included in the survey package. The cover letter was developed by careful consideration, and was used to explain the purposes and the detail of the survey. It is claimed that the response rate can be affected by the messages in the cover letter (Saunders et al., 2003). To decrease any confusion, the important terminologies both in management accounting and management techniques, which were partly drawn from *CIMA Official Terminology* (2005), were provided in the glossary in order to assist the respondents in interpretation.

The pilot tests were conducted for both English and Thai versions in order to refine the questionnaire. Both academics and practitioners in UK and Thailand have been involved in the pilot study. For the English version, the questionnaire has been pilot tested with two academics from the University of Hull, and one practitioner. The Thai version questionnaire has been pilot tested with five academics. Two of them have a doctoral degree in Accounting, one of them is titled 'Assistant Professor', and two of them have working experience relating to professional accounting. It was also pilot tested with 11 Thai practitioners who are currently MBA students in accounting major in UTCC, and working in large organizations as accounting managers. The comments from pilot study were taken into account, and used to adjust the questionnaire in order to improve the clarity and relevance of the research instrument. Consequently, the questionnaire was developed with careful consideration through the design process, translation, and pilot study. It is

expected that the response rate, validity, and reliability of the survey can thus be maximized.

4.1.3 Questionnaire Administration and Response Rate

At the beginning of February 2008, the survey packages were delivered to 454 companies listed on SET by post. However, one blank questionnaire due to invalid address was returned. Two incomplete questionnaires were returned due to ineligibility to respond because the respondents admitted that they had insufficient knowledge to answer some particular questions. Non-responses due to unreachable or ineligible persons were excluded from the total number in the sample (Saunders et al., 2003). This makes possible responses 451 companies. Each survey package contained a cover letter, a questionnaire, a glossary, and a pre-paid return envelope. Research objectives as well as detail of the survey were explained in the cover letter with personal signature. A copy of the executive summary of research findings and a draw prize of £150 were offered as an incentive. The anonymity of the respondents was guaranteed, where no individual identity would be revealed, and all information collected would be treated as strictly confidential. The questionnaires were pre-numbered in order to identify the respondents who returned the questionnaires. The detail of replies was used only in the follow-up processes. There were 43 returned questionnaires from the first mail.

After three weeks of the initial mail, the second survey packages were administered to those who had not yet returned the questionnaires. The reminder letter was included in each package as well as a questionnaire, a glossary, and a pre-paid returned envelope which were provided once again for the convenience of the respondents. There were 45 returned questionnaires from the follow-up mailing. Regarding non response from the two mails, phone call reminders were carried out to those respondents who had not yet replied after three weeks of the second mail. A new copy of the questionnaire was provided via facsimile, email, or post when request. There were 47 replies from the phone call reminders.

This yielded to 135 returned questionnaires; nevertheless, some of these contained missing or unclear information. To minimize the problem from missing data, the respondents

where missing data applied were telephoned to clarify the answers. Subsequently, 135 usable responses, or 29.9 percent response rate was achieved, which is favourable for this kind of research. In comparison, the previous studies demonstrated the response rates as 24.4 percent response rate of Joshi (2001), 11.5 percent response rate of Luther and Longden (2001), 19 percent response rate of Adler et al. (2000), and 22.7 percent response rate of Phadoongsitthi (2003). The summary of survey responses is shown in Table 4-1.

Table 4-1: Summary of Survey Responses

Number of the companies listed in SET on 26 Nov 2007	471
Less: Companies in irrelevant industries	5
Less: Companies refused to answer the questionnaire	12
Delivered questionnaires	454
Less: Returned blank questionnaire regarding invalid address	1
Less: Returned incomplete questionnaires regarding ineligibility	2
Total number in sample or possible responses	451
Returned and usable responses	135
Response rate	29.9%

4.1.4 Response and Non-response Bias Analysis

Response and non-response bias analysis was examined by comparing the responses from the first mail (43 replies) and those from phone call reminders (47 replies). In particular, independent sample *t*-test was conducted to test the significant differences in the mean scores of key variables. Most of the key variables were chosen and tested including MAPs, MTs, strategies, and organizational performance. The results showed that there are no statistically significant differences in the mean scores between the former and latter responses ($P > 0.05$).

Additionally, known characteristics, which are industry sector and turnover, of sample and population were compared. Regarding industry, the chi-square test (χ^2) was used due to the categorical nature of this variable. The result showed that there was no statistical significance, indicating that the patterns of industry in sample and population are not significantly different ($P > 0.05$). Concerning turnover, independent sample *t*-test was applied to test the difference. It was found that there was no statistically significant

difference in the mean score of turnover between sample and population ($P > 0.05$). These provide evidences to support the fact that non-response bias does not present a problem.

4.2 Measurement of Variables

The variables in this research can be divided into four groups; management accounting practices, management techniques, strategies, and organizational performance. Their measurements are shown as follows.

4.2.1 Measurement of Management Accounting Practices (MAPs)

A comprehensive list of management accounting practices have been developed by adapting previous studies of Bright et al. (1992), Chenhall and Langfield-Smith (1998a; 1998b), Adler et al. (2000), Joshi (2001), Luther and Longden (2001), and Phadoongsitthi (2003), resulting in 43 items. The questionnaire related to the adoption of each practice and the benefit gained from those practices adopted by Thai companies. The respondents were asked to indicate the extent of benefit obtained from each practice, which is placed on a seven-point Likert-scale ranging from no benefit (scored one) to high benefit (scored seven). The respondents were asked to leave unused practices blank. The meanings of any likely uncommon terminologies were provided in the glossary to facilitate interpretation by the respondents.

4.2.2 Measurement of Management Techniques (MTs)

The questionnaire items in this section have been adapted from previous survey of Miller et al (1992). It concentrated on the adoption and the benefit of MTs. There are 25 items after modification. The respondents were asked to indicate the extent of benefit obtained from each techniques, which is placed on a seven-point Likert-scale ranging from no benefit (scored one) to high benefit (scored seven). The respondents were asked to leave unused techniques blank. The meanings of any likely uncommon terminologies were provided in the glossary to facilitate interpretation by the respondents.

4.2.3 Measurement of Strategic Variables

There are four strategic typologies arising from the literature. These are differentiation and cost leadership of Porter (1980; 1985), prospector and defender of Miles and Snow (1978), build and harvest of Gupta and Govindarajan (1984a; 1984b; 1987), and entrepreneurial and conservative of Miller and Friesen (1982).

Measurement of Strategic Priorities of Porter (1980; 1985): Differentiation and Cost Leadership

The questionnaire items used to measure differentiation and cost leadership of Porter have been adapted from the prior studies of Chenhall and Langfield-Smith (1998b), Halim (2004), Chenhall (2005), and Auzair and Langfield-Smith (2005). There are 16 items related to differentiation and cost leadership characteristics. The respondents were asked to indicate the degree of emphasis placed on these strategic priorities. A seven-point Likert-type scale was ranged from no emphasis (scored one) to high emphasis (scored seven).

Measurement of Strategic Typologies of Miles and Snow (1978): Prospector and Defender

The concept of prospector and defender of Miles and Snow was measured by adapting from a previous instrument of Guilding (1999). It assesses the overall strategic orientation of an organization. The respondents were presented with a brief description of a 'defender', 'analyzer', and 'prospector' firms which were placed on a continuum of 1-7. Scored one is anchored with a description of a defender-type organization, scored four is anchored with a description of an analyzer-type organization, and scored seven is anchored with a description of a prospector-type organization. The respondents then were asked to select one of the 7 numbers which best represented their organization.

Measurement of Strategic Mission of Gupta and Govindarajan (1984a; 1984b; 1987): Build and Harvest

The measurement of this variable was exactly adopted from previous research of Gupta and Govindarajan (1984a; 1984b; 1987). The respondents were asked to indicate the percentage of firms' current total sales accounted for by activities in pursuit of these missions: (1) increase sales and market share, be willing to accept low returns on

investment in the short-to-medium term if necessary, (2) maintain market share and obtain reasonable return on investment, (3) maximize profitability and cash flow in the short-to-medium term, be willing to sacrifice market share if necessary, (4) prepare for sale or liquidation, and (5) non of the above. The descriptions of several alternative strategies given above represent build, hold, harvest, divest, and others respectively.

There are eleven replies which entered percentage under category (5) representing other strategies. Four of eleven cases indicated the reasons which can be classified as 'hold'. One of eleven replies identified the reason which is not related to strategic mission; hence, this was omitted. Six of eleven cases did not provide the reasons, so the percentage was also excluded from the calculation.

In line with practices in previous research, the scores of +1, 0, -1, and -2 were attached to 'build', 'hold', 'harvest', and 'divest' respectively. The percentage breakdown provided by respondents for each item was used to calculate a weighted average measure of strategic mission, with negative values indicating a harvest mission and positive values indicating a build mission.

Measurement of Strategic Typologies of Miller and Friesen (1982): Entrepreneurial and Conservative

The questionnaire items used to measure this variable are drawn from the study of Miller and Friesen (1982). The respondents were asked to indicate the extent of their agreement with five statements related to innovation and risk taking. A seven-point Likert-scale was used to measure this, ranging from strongly disagree (scored one) to strongly agree (scored seven). All scale items were averaged to obtain the variable score. Low average score represents high emphasis on conservative strategy while high average score represents high emphasis on entrepreneurial strategy.

4.2.4 Measurement of Organizational Performance

The questionnaire items for organizational performance were adapted from previous studies of Govindarajan (1988), Govindarajan and Fisher (1990), and Chenhall and Langfield-Smith (1998b), resulting in 12 dimensions. Performance was measured relying

on multiple dimensions of performance rather than a single dimension. The respondents were asked to assess their performance in various dimensions compared to their competitors on a seven-point Likert-scale ranging from significantly below average (scored one) to significantly above average (scored seven). The respondents were also asked to rate each dimension on a five-point Likert-scale ranging from not important (scored one) to extremely important (scored five) to indicate the degree of importance of each criteria to their business. The calculated overall performance for each firm was obtained by using the degree of importance of each dimension as weights.

4.3 Descriptive Analysis

Prior to any analysis, it is recommended to screen the data (Tabachnick and Fidell, 2007). The accuracy of the data file was ensured by proofreading the original data against the computerized data file in SPSS programme as well as examination of descriptive statistics and graphic examination of the variables such as histogram, stem and leaf diagram, and boxplot. The descriptive results are shown as follows.

4.3.1 Respondents Demographics

Demographic information of the businesses was also obtained and summarized in Table 4-2.

Table 4-2: Summary of Respondent Demographics

Industry	Sector	Possible responses	Usable responses	
			Number	Percentage
Agricultural and food	Agribusiness	20	7	35.0
	Foods and Beverage	25	9	36.0
	Sub total	45	16	35.6
Consumption	Fashion	24	3	12.5
	Home and office products	11	4	36.4
	Personal products and Pharmaceuticals	6	1	16.7
	Sub total	41	8	19.5
Financial	Banking	12	2	16.7
	Financial and securities	33	8	24.2
	Insurance	18	5	27.8
	Sub total	63	15	23.8
Material and manufacturing	Automotive	18	2	11.1
	Industrial materials and Machinery	20	8	40.0
	Packaging	13	5	38.5
	Paper and printing materials	3	1	33.3
	Petrochemicals and chemicals	12	5	41.7
	Sub total	66	21	31.8
Property and construction	Construction materials	31	12	38.7
	Property development	70	20	28.6
	Sub total	101	32	31.7
Resources	Energy and utilities	22	7	31.8
	Sub total	22	7	31.8
Services	Commerce	14	5	35.7
	Health care services	13	4	30.8
	Media and publishing	24	5	20.8
	Tourism and leisure	15	4	26.7
	Transportation and logistics	12	6	50.0
	Sub total	78	24	30.8
Technology	ICT	24	8	33.3
	Electronic components	11	4	36.4
	Sub total	35	12	34.3
Total		451	135	29.9

Type of business	Frequency	Percentage
Manufacturing	64	47.4
Wholesaling or retailing	13	9.6
Services	24	17.8
Financial and commercial	18	13.3
Others	16	11.9
Total	135	100

Table 4-2: Summary of Respondent Demographics (Continued)

Number of employees	Frequency	Percentage
250 or under	34	25.2
251-500	25	18.5
501-1000	32	23.7
1000-2500	22	16.3
Over 2500	22	16.3
Total	135	100

Turnover	Frequency	Percentage
1,000 million baht or under	33	24.4
1,000-5,000 million baht	48	35.6
5,000-10,000 million baht	14	10.4
10,000-35,000 million baht	20	14.8
Over 35,000 million baht	20	14.8
Total	135	100

Nationality	Frequency	Percentage
Thai company	124	91.9
Foreign owned company	11	8.1
Total	135	100

The 135 returned and usable responses are from different industries and sub-sectors. The highest response percentage (35.6 percent) comes from the agricultural and food industry while the lowest response percentage (19.5 percent) comes from consumption industry, arriving at 29.9 percent overall response rate. The majority of respondent firms (47.4 percent) are manufacturing companies. Service firms are 17.8 percent, financial and commercial firms are 13.3 percent, and wholesaling or retailing firms are 9.6 percent. Other types of businesses are 11.9 percent, most of which are property development businesses.

The size of the companies has been measured by using two different criteria; number of employees and turnover. Respondent firms were ranged from 250 employees or under (25.2 percent) to over 2,500 employees (16.3 percent). In term of turnover, firms were ranged from 1,000 million Baht (15 million Pounds) or under (24.4 percent) to over 35,000 million Baht (500 million Pounds) (14.8 percent). Regarding organizational nationality, the majority of respondent firms are Thai companies (91.9 percent) while the rest are foreign owned companies (8.1 percent).

4.3.2 The Adoption and Benefit of Management Accounting Practices (MAPs)

Within 43 management accounting practices, 135 respondents indicated the benefit obtained from the practices they adopted ranging from no benefit (score one) to high benefit (score seven). Unused practices were indicated. The percentage of the adoption of each management accounting practice has been calculated and ranked. To discuss the results, these were separated into three groups; high adoption, moderate adoption, and low adoption based on the ranking[16]. The first group, high adoption, includes twelve practices within top ten ranking. They were used by at least 83.7 percent of the responses. Moderate adoption contains 15 practices, ranking from eleventh to twentieth. They were adopted by at least 75.6 percent of the companies. Low adoption includes 16 practices, ranking from twenty-first to thirty-second. They were applied by at least 64.4 percent of the responses. The detail is shown in Table 4-3.

Similarly, the mean score of the benefit obtained from individual practices was ranked, and classified into three groups; high benefit, moderate benefit, and low benefit. The first group, high benefit, includes 14 practices with the mean scores greater than 5.30. Moderate benefit contains 15 practices with the mean scores above 5.00. Low benefit includes 14 practices with the lowest mean score of 4.36. Table 4-4 demonstrates all the detail.

To discuss the findings, management accounting practices were considered as either traditional management accounting practices (TMAPs) or contemporary management accounting practices (CMAPs). The purposes of the practices such as planning, costing, and performance evaluating, are also taken into account.

[16] The purpose of this classification is to provide a basis for comparison and discussion on the adoption of practices and benefits obtained from practices. It does not imply either high or low adoption and benefit in any absolute sense.

Table 4-3: The Adoption of Management Accounting Practices (MAPs)

Management Accounting Practices (MAPs)	Rank	Percentage	No. of adopters*
High adoption			
Budgeting systems for controlling costs	1	95.6	129
Performance evaluation based on budget variance analysis	2	92.6	125
Capital budgeting techniques (e.g. NPV, IRR, Payback)	2	92.6	125
Performance evaluation based on return (profit) on investment	3	91.9	124
Product profitability analysis	4	91.1	123
Budgeting systems for planning cash flows	5	89.6	121
Cost-volume-profit analysis (CVP)	6	88.1	119
Performance evaluation based on customer satisfaction surveys	7	86.7	117
Standard costing	8	85.2	115
Absorption costing	9	84.4	114
Budgeting systems for coordinating activities across the business units	9	84.4	114
Performance evaluation based on divisional profit	10	83.7	113
Moderate adoption			
Benchmarking of product/service characteristics	11	83.0	112
Performance evaluation based on team performance	11	83.0	112
Customer profitability analysis (CPA)	12	82.2	111
Formal strategic planning	12	82.2	111
Benchmarking of management processes	13	81.5	110
Benchmarking of operational processes	14	80.7	109
Long range forecasting	14	80.7	109
Budgeting systems for planning day to day operations	15	80.0	108
Budgeting systems for compensating managers	16	79.3	107
Performance evaluation based on cash flow return on investment	16	79.3	107
Performance evaluation based on controllable profit	17	77.8	105
Cost modelling	18	77.0	104
Benchmarking of strategic priorities	19	76.3	103
Performance evaluation based on supplier evaluations	20	75.6	102
Variable costing	20	75.6	102
Low adoption			
Performance evaluation based on balanced scorecard	21	74.8	101
Economic (shareholder) value added (EVA/SVA)	22	74.1	100
Performance evaluation based on residual income	22	74.1	100
Backflush costing	23	73.3	99
Product life cycle analysis	24	72.6	98
Target costing	24	72.6	98
Throughput accounting	24	72.6	98
Cost of quality	25	71.9	97
Activity-based costing (ABC)	26	71.1	96
Operations research techniques	27	69.6	94
Activity-based budgeting (ABB)	28	68.9	93
Activity-based management (ABM)	29	68.1	92
Zero-based budgeting	29	68.1	92
Performance evaluation based on employee attitudes	30	67.4	91
Kaizen costing	31	65.2	88
Value chain analysis	32	64.4	87

*The number of all respondents is 135 cases.

Table 4-4: The Benefit of Management Accounting Practices (MAPs)

Management Accounting Practices (MAPs)	Rank	Benefit		No. of adopters*
		Mean	SD	
High Benefit				
Budgeting systems for controlling costs	1	5.94	0.950	129
Product profitability analysis	2	5.85	1.069	123
Cost-volume-profit analysis (CVP)	3	5.83	1.152	119
Budgeting systems for planning cash flows	4	5.73	1.125	121
Performance evaluation based on budget variance analysis	5	5.66	1.232	125
Standard costing	6	5.60	1.138	115
Performance evaluation based on customer satisfaction surveys	7	5.49	1.424	117
Variable costing	8	5.44	1.058	102
Formal strategic planning	9	5.43	1.305	111
Activity-based costing (ABC)	10	5.42	1.319	96
Customer profitability analysis (CPA)	11	5.41	1.404	111
Capital budgeting techniques (e.g. NPV, IRR, Payback)	12	5.40	1.326	125
Performance evaluation based on return (profit) on investment	13	5.39	1.354	124
Benchmarking of product/service characteristics	14	5.37	1.280	112
Moderate Benefit				
Absorption costing	15	5.28	1.392	114
Benchmarking of operational processes	15	5.28	1.216	109
Cost modelling	16	5.26	1.315	104
Performance evaluation based on cash flow return on investment	17	5.23	1.411	107
Activity-based budgeting (ABB)	18	5.22	1.481	93
Benchmarking of management processes	19	5.21	1.134	110
Activity-based management (ABM)	20	5.20	1.416	92
Target costing	21	5.17	1.370	98
Benchmarking of strategic priorities	22	5.16	1.356	103
Performance evaluation based on divisional profit	23	5.12	1.471	113
Throughput accounting	23	5.12	1.364	98
Budgeting systems for compensating managers	24	5.11	1.423	107
Performance evaluation based on controllable profit	24	5.11	1.361	105
Long range forecasting	25	5.04	1.347	109
Performance evaluation based on team performance	26	5.02	1.420	112
Low Benefit				
Cost of quality	27	4.99	1.327	97
Performance evaluation based on balanced scorecard	28	4.96	1.489	101
Backflush costing	29	4.92	1.496	99
Budgeting systems for coordinating activities across the business units	30	4.91	1.386	114
Economic (shareholder) value added (EVA/SVA)	31	4.87	1.509	100
Zero-based budgeting	32	4.82	1.533	92
Kaizen costing	33	4.81	1.492	88
Product life cycle analysis	33	4.81	1.469	98
Performance evaluation based on supplier evaluations	34	4.79	1.478	102
Value chain analysis	35	4.75	1.456	87
Performance evaluation based on residual income	36	4.73	1.448	100
Operations research techniques	37	4.68	1.370	94
Budgeting systems for planning day to day operations	38	4.46	1.620	108
Performance evaluation based on employee attitudes	39	4.36	1.588	91

*The number of all respondents is 135 cases.

Traditional Management Accounting Practices (TMAPs)

Despite the criticism of TMAPs potentially losing relevance, it is found that most of highly adopted practices (ten out of twelve practices) are TMAPs including Budgeting systems for controlling costs (ranked 1), Performance evaluation based on budget variance analysis, and Capital budgeting techniques (both ranked equal 2), Performance evaluation based on return (profit) on investment (ranked 3), Budgeting systems for planning cash flows (ranked 5), Cost-volume-profit analysis (CVP) (ranked 6), Standard costing (ranked 8), Absorption costing, and Budgeting system for coordinating activities across the business units (both ranked equal 9), and Performance evaluation based on divisional profit (ranked 10), respectively.

They are mainly traditional budgeting, traditional planning tools, performance evaluation based on financial measures, and traditional costing. It can be concluded that the most widely adopted practices among the companies in SET (Stock Exchange of Thailand) are TMAPs. The high adoption of these TMAPs may result from the research taking place in an emerging economy. The business environment in developing countries encourages the firms to adopt the practices to deal with cost control rather than the practices to build up firm's value.

The importance of these highly adopted TMAPs is confirmed by examining the perceived benefit. It is found that TMAPs, especially traditional budgeting and costing, and performance evaluation based on financial measures, are likely to have high perceived benefit from the respondents. Two-third of high-benefit practices (nine out of fourteen practices) are TMAPs including Budgeting systems for controlling costs (ranked 1), Cost-volume-profit analysis (CVP) (ranked 3), Budgeting systems for planning cash flows (ranked 4), Performance evaluation based on budget variance analysis (ranked 5), Standard costing (ranked 6), Variable costing (ranked 8), Formal strategic planning (ranked 9), Capital budgeting techniques (ranked 12), and Performance evaluation based on return (profit) on investment (ranked13), respectively.

However, there are a few TMAPs having low benefit, especially Budgeting systems for planning day to day operations (ranked 38). It is indicated that the companies in SET

perceive very little benefit from short-term planning. Instead, they may prefer a long-term perspective for planning as can be seen in high benefit derived from Formal strategic planning (ranked 9) and Capital budgeting techniques (ranked 12). Unexpectedly, Operations research techniques, which has appeared in many textbooks and professional courses, is not widely adopted (ranked 27) and perceived as low benefit (ranked 37). It may be because of its complexity in the practical use.

Contemporary Management Accounting Practices (CMAPs)

Surprisingly, there are only two CMAPs, which are highly adopted by the companies in SET. These are Product profitability analysis (ranked 4), and Performance evaluation based on customer satisfaction surveys (ranked 7). The importance of these two practices is strengthened by their perceived benefit. They are all ranked as high benefit practices, particularly Product profitability analysis (ranked 2), and Performance evaluation based on customer satisfaction surveys (ranked 7). It is implied that the respondents may consider the profitability of the firm as well as customer orientation as their main priorities. To support the above statement, Customer profitability analysis (CPA) is also ranked as high benefit (ranked 11). Unexpectedly, Activity-based costing (ABC) is perceived as high benefit (ranked 10) even though it is not commonly used by the organizations in SET (ranked 26). This may imply that the respondents perceive the benefit from ABC, but they have not yet adopted the practice due to the lack of expertise to implement the concept of ABC, its difficulty in practical use as well as time and money involved in developing it.

It is shown that many of the CMAPs tend to be rarely adopted by the companies in SET. These practices are Performance evaluation based on balanced scorecard (ranked 21), Economic (shareholder) value added (EVA/SVA), and Performance evaluation based on residual income (both ranked equal 22), Backflush costing (ranked 23), Product life cycle analysis, Target costing, and Throughput accounting (all ranked equal 24), Cost of quality (ranked 25), Activity-based costing (ABC) (ranked 26), Activity-based budgeting (ABB) (ranked 28), Activity-based management (ABM), and Zero-based budgeting (both ranked equal 29), Performance evaluation based on employee attitudes (ranked 30), Kaizen costing (ranked 31), and Value chain analysis (ranked 32), respectively.

These low adopted practices are mainly activity-based techniques, performance evaluation based on non-financial measures, contemporary costing and budgeting, and value-based techniques. Apart from activity-based techniques, which are perceived as relatively high and moderate benefit, the rest of low adopted CMAPs are perceived to generate low benefit. In particular, low adopted contemporary performance evaluation practices, which are perceived as low benefit, are performance evaluation based on balanced scorecard (ranked 28), Performance evaluation based on supplier evaluations (ranked 34), Performance evaluation based on residual income (ranked 36), and Performance evaluation based on employee attitudes (ranked 39). The survey confirms the importance of financial measures, and it can be deduced that the large firms in SET still rely mainly on financial measures supplemented with a few non-financial measure, particularly performance evaluation based on customer satisfaction rather than rely mainly on a variety of non-financial measures.

Similarly, most of low adopted contemporary budgeting and costing, and value-based techniques are generally perceived as low benefit. These are Cost of quality (ranked 27), Backflush costing (ranked 29), Economic (shareholder) value added (EVA/SVA) (ranked 31), Zero-based budgeting (ranked 32), Kaizen costing, and Product life cycle analysis (both ranked equal 33), and Value chain analysis (ranked 35). It is apparent that the firms in developing country tend to derive high benefit from and adopt more traditional budgeting and costing to deal with cost concern rather than contemporary budgeting and costing as well as value-based techniques to establish the firm's value.

In sum, the research findings confirm the popularity of the use of traditional management accounting practices whereas the adoption rates of contemporary management accounting practices are disappointing. It is consistent with previous findings respectively in U.K., U.S., Australia, New Zealand, and Asian countries of Drury et al., (1993), Szendi and Elmore, (1993), Chenhall and Langfield-Smith, (1998a), Adler et al., (2000), Guilding et al., (2000), EI-Ebaishi et al., (2003), and Phadoongsitthi (2003).

4.3.3 The Adoption and Benefit of Management Techniques (MTs)

Within 25 management techniques, 135 respondents indicated the benefit obtained from the techniques they adopted ranging from no benefit (score one) to high benefit (score seven). Unused techniques were indicated. Management techniques were ranked based on the calculated percentage of their adoption, and then classified into three groups; high adoption, moderate adoption, and low adoption[17]. There are six management techniques in the first group with the lowest adoption rate being 88.1 percent. Moderate adoption contains eight techniques, which have the adoption rate above 77.8 percent. The rest of the techniques (11 techniques) are categorized as low adoption. They were applied by at least 64.4 percent of the responses. The detail is shown in Table 4-5.

Additionally, the mean of the benefit derived from using each management technique was calculated and ranked. Based on this criterion, all techniques were separated into three groups; high benefit, moderate benefit, and low benefit. There are nine techniques classified as high benefit with the mean score above 5.50. Next eight techniques are categorized as moderate benefit with the mean score greater than 5.20. The rest of the techniques (eight techniques) are regarded as low benefit with the mean score above 4.30. Table 4-6 illustrates the benefit obtained from management techniques.

[17] The purpose of this classification is to provide a basis for comparison and discussion on the adoption of techniques and benefits obtained from techniques. It does not imply either high or low adoption and benefit in any absolute sense.

Table 4-5: The Adoption of Management Techniques (MTs)

Management Techniques (MTs)	Rank	Percentage	No. of adopters*
High adoption			
Worker training	1	99.3	134
Management training	2	97.0	131
Establishing participative culture	3	93.3	126
Outsourcing	4	91.9	124
Integrating information systems in operations	5	88.9	120
Implementing new operating methods	6	88.1	119
Moderate adoption			
Linking operational strategy to business strategy	7	85.9	116
Occupational health and safety	7	85.9	116
Project teams	7	85.9	116
Certification to quality standards (e.g. ISO 9000 series)	8	82.2	111
Integrating information systems across functions	8	82.2	111
Cross-functional teams	9	80.0	108
Linking business processes	9	80.0	108
Quality assurance activities	10	77.8	105
Low adoption			
Total quality management (TQM)	11	74.8	101
Using more sub-contracted labour	12	74.1	100
Downsizing the organization	13	73.3	99
Statistical quality control	13	73.3	99
Reorganizing existing operating processes	14	72.6	98
Integrating information systems with supplier and/or distributors	15	70.4	95
Work-based teams	15	70.4	95
Network teams	15	70.4	95
Flattening of formal organizational structure	16	68.9	93
Investing in new physical layout	17	65.2	88
Integrated quality system (IQS)	18	64.4	87

*The number of all respondents is 135 cases.

Table 4-6: The Benefit of Management Techniques (MTs)

Management Techniques (MTs)	Rank	Benefit		No. of adopters*
		Mean	SD	
High Benefit				
Worker training	1	5.81	1.084	134
Establishing participative culture	2	5.73	1.169	126
Management training	3	5.68	1.248	131
Total quality management (TQM)	4	5.63	1.120	101
Linking operational strategy to business strategy	5	5.61	1.086	116
Quality assurance activities	6	5.57	1.073	105
Integrating information systems in operations	7	5.56	1.067	120
Occupational health and safety	8	5.53	1.295	116
Linking business processes	9	5.52	1.046	108
Moderate Benefit				
Integrated quality system (IQS)	10	5.39	1.185	87
Network teams	11	5.38	1.265	95
Certification to quality standards (e.g. ISO 9000 series)	12	5.34	1.430	111
Integrating information systems across functions	13	5.32	1.198	111
Project teams	14	5.26	1.238	116
Reorganizing existing operating processes	14	5.26	1.169	98
Statistical quality control	15	5.24	1.221	99
Work-based teams	16	5.22	1.213	95
Low Benefit				
Implementing new operating methods	17	5.18	1.262	119
Integrating information systems with supplier and/or distributors	18	5.09	1.392	95
Cross-functional teams	19	4.91	1.322	108
Flattening of formal organizational structure	20	4.90	1.225	93
Outsourcing	21	4.80	1.443	124
Investing in new physical layout	22	4.63	1.325	88
Using more sub-contracted labour	23	4.37	1.447	100
Downsizing the organization	24	4.31	1.345	99

*The number of all respondents is 135 cases.

For further discussion, six groups of management techniques are taken into account, which are Human resource management (HRM), Integrating system, Team-based structure, Quality systems, Operating system innovation, and Improving existing processes.

Human resource management (HRM)

The most highly adopted management techniques among large companies in SET are human resource management (HRM) techniques, particularly Worker training (ranked 1), Management training (ranked 2), Establishing participative culture (ranked 3), and Occupational health and safety (ranked 7). The popular use of these techniques is confirmed by examining the benefit obtained. They are all classified as high benefit techniques; Worker training (ranked 1), Establishing participative culture (ranked 2),

Management training (ranked 3), and Occupational health and safety (ranked 8). It is shown that most of the responding companies invest in HRM activities in their organization including training for different levels, encouraging a high level of employees' participation and involvement, and obtaining high levels of job security. This is supported by low adoption in Using more sub-contracted labour (ranked 12) where the respondents also perceive very low benefit from it (ranked 23). This implies that most of the firms in SET rely on permanent employees rather than sub-contracted labour. It can be concluded that a high value added approach of HRM practices, which involve high levels of training and development, is the preference of the companies in SET.

Integrating systems

Most of the management techniques representing integrating system concepts are highly and moderately adopted by the firms in SET. These techniques are Integrating information systems in operations (ranked 5), Linking operational strategy to business strategy (ranked 7), Integrating information systems across functions (ranked 8), and Linking business processes (ranked 9). Likewise, these techniques provide relatively high benefit to the respondents, specifically Linking operational strategy to business strategy (ranked 5), Integrating information systems in operations (ranked 7), Linking business processes (ranked 9), and Integrating information systems across functions (ranked 13). However, one of the techniques called Integrating information systems with suppliers and distributors is not widely adopted (ranked 15) together with its low perceived benefit (ranked 18). It is revealed that the companies in SET value the information sharing and the alignment between operational and business strategies as well as the alignment among business processes. They tend to invest in internal integrating systems within organizations, but not external integrating systems especially with suppliers, customers, or distributors. As they develop further their supply chain focus thus may develop.

Team-based structure

Surprisingly, none of management techniques corresponding to team-based structures is widely adopted by the organizations in SET. Two of the techniques are moderately adopted; they are Project teams (ranked 7), and Cross-functional teams (ranked 9). The rest

of team-based techniques are regarded as low adopted techniques. These are Work-based teams and Network teams (both ranked equal 15), and Flattening of formal organizational structure (ranked 16). Similarly, they are perceived as moderate and low benefit, particularly Network teams (ranked 11), Project teams (ranked 14), Work-based teams (ranked 16), Cross-functional teams (ranked 19), and Flattening of formal organizational structure (ranked 20). This implies that the organizational structure of most companies in SET may be based mainly on traditional or hierarchical based structures rather than non-hierarchical or team-based structure even though the latter is claimed to provide flexibility, promote employee empowerment, and increase customer satisfaction (Callanan, 2004).

Quality systems

Although the quality of products and services is regarded as an important foundation for all firms in modern industry (Nookabadi and Middle, 2006), it is unexpectedly found that the adoption of quality based techniques among the companies in SET is not high, specifically Quality assurance activities (ranked 10), Total quality management (TQM) (ranked 11), Statistical quality control (ranked 13), and Integrated quality system (IQS) (ranked 18). Even more surprisingly, Certification to quality standards such as ISO 9000 series, which is viewed as a minimum requirement of an effective quality system or a prerequisite to compete in the market (Costa and Lorente, 2004; Srdoc et al., 2005), is only moderately adopted by the respondents (ranked 8). However, these companies perceive relatively high benefit from quality based techniques, particularly Total quality management (TQM) (ranked 4), Quality assurance activities (ranked 6), Integrated quality system (IQS) (ranked 10), Certification to quality standard (ISO 9000 series) (ranked 12), and Statistical quality control (ranked 15). It is possible that they may develop and implement quality systems more in the future due to the perceived benefit obtained from these techniques.

Operating system innovation

Two of management techniques reflecting innovation are widely adopted by the organizations in SET. These are Outsourcing (ranked 4), and Implementing new operating methods (ranked 6). Nevertheless, the technique named Investing in new physical layout is classified as low adoption (ranked 17). It is found that all of them contribute relatively low

benefit to the respondents, particularly Implementing new operating methods (ranked 17), Outsourcing (ranked 21), and Investing in new physical layout (ranked 22). For outsourcing, it is suggested that the respondents may experience disadvantage from this highly adopted management technique. Although it is argued that outsourcing may generate advantages to the firms such as risk sharing, allowing firms to concentrate in core activities, and increasing flexibility, it may negatively affect the control over critical functions and suppliers as well as damage to organizational learning and development (Fisher and White, 2000; Schniederjans and Zuckweiler, 2004). It is anticipated that the use of outsourcing may be reduced or limited to some extent in the future. For Investing in new physical layout, it appears that the companies in SET may not place this technique as the high priority due to the difficulty of perceiving benefit from it.

Improving existing processes

Both of the management techniques representing improving existing processes are identified as low adoption, including Downsizing the organization (ranked 13), and Reorganizing existing operating processes (ranked 14). This is consistent with their low perceived benefit; Reorganizing existing operating processes (ranked 14), and especially Downsizing the organization (ranked 24), which is the lowest benefit in this study. Low adoption and low benefit of downsizing can be explained by previous studies on the outcomes of downsizing of Cascio and Wynn (2004) and Carbery and Garavan (2005). It is argued that downsizing has detrimental effects on firms such as de-motivation, job-insecurity, and reduction in employees' loyalty and organizational commitment. The companies in SET may realize negative effects of downsizing; hence, the use of this technique is kept to a minimum.

4.3.4 Strategic Typologies

This section provides the descriptive analysis of four strategic typologies, including strategic priorities of Porter (1980; 1985), strategic typologies of Miles and Snow (1978), strategic mission of Gupta and Govindarajan (1984a; 1984b), and strategic types of Miller and Friesen (1982).

Strategic Typologies of Porter (1980; 1985): Differentiation and Cost leadership

There are 16 questionnaire items representing strategic priorities based on strategic typologies of Porter (1980; 1985), which are differentiation and cost leadership characteristics. The respondents indicated the degree of emphasis placed on each strategic priority ranging from no emphasis (scored one) to high emphasis (scored seven). The mean score for each item was calculated and ranked. Table 4-7 illustrates the descriptive of these strategic priorities.

Table 4-7: Descriptive Statistics of Strategic Priorities of Porter

Strategic Priorities (N = 135)	Rank	The degree of emphasis		Actual range	
		Mean	SD	Min	Max
Make dependable delivery promises	1	6.15	0.996	2	7
Provide high quality products/services	2	5.98	0.981	3	7
Make products/services more cost efficient	3	5.97	0.962	2	7
Product/service availability	4	5.95	1.024	3	7
Improve the time it takes to provide products/services to customers	5	5.93	1.173	1	7
Customize products/services to customers' needs	6	5.84	1.167	2	7
Provide effective after-sale service and support	7	5.71	1.343	1	7
Obtain cost advantages from all sources	8	5.63	1.314	2	7
Provide products/services that are distinct from that of competitors	9	5.57	1.213	1	7
Improve the utilization of available equipment, services and facilities	10	5.56	1.176	1	7
Achieve lower cost of products/services than competitors	11	5.46	1.439	1	7
Make changes in design and introduce new products/services quickly	12	5.45	1.274	2	7
Offer a broader range of products/services than competitors	13	5.41	1.260	1	7
Improve the cost required for coordination of various activities	14	5.36	1.291	1	7
Make rapid volume and/or product mix changes	15	5.10	1.354	1	7
Compete mainly on the prices of products/services	16	5.08	1.446	1	7

It is observed that most of strategic priorities, on which the companies in SET placed high emphasis, are predominantly related to differentiation concepts concerning with customer satisfaction and quality of products and services. These are Make dependable delivery promises (ranked 1), Provide high quality products/services (ranked 2), Product/service availability (ranked 4), and Improve the time it takes to provide products/services to customers (ranked 5). This implies that the respondents perceived the importance of quality of products and services as well as customer relationships, and positioned these themes as their main strategic priorities.

The strategic priorities with low emphasis are related to two different issues; cost concern and flexibility. Low-emphasis strategic priorities, which are concerned with low cost, are

Achieve lower cost of products/services than competitors (ranked 11), Improve the cost required for coordination of various activities (ranked 14), and Compete mainly on the prices of products/services (ranked 16). Low-emphasis strategic priorities, which are concerned with flexibility, are Make changes in design and introduce new products/services quickly (ranked 12), Offer a broader range of products/services than competitors (ranked 13), and Make rapid volume and/or product mix changes (ranked 15). It is suggested that cost concern and flexibility may be important, but they are not main themes of the firms in SET.

Strategic Typologies of Miles and Snow (1978): Prospector and Defender

The respondents indicated the strategic types they pursued based on the strategic concept of Miles and Snow (1978); prospector, analyzer, and defender. Low score represents an emphasis placed on defender strategy while high score represents an emphasis placed on prospector strategy. It obtained theoretical range and actual range of 1-7. Mean and standard deviation are 4.89 and 1.563, respectively. Descriptive statistics are shown in Table 4-8.

Strategic Mission of Gupta and Govindarajan (1984a; 1984b): Build and Harvest

The scores of +1, 0, -1, and -2 represent build, hold, harvest, and divest respectively. After calculation of weighted average measure of strategic mission, the values vary from -1 to 1, which demonstrate that no company in SET is pursuing a divest strategic mission. Theoretical range is between -2 and 1 while actual range is between -1 and 1. Mean and standard deviation are 0.1421 and 0.344, respectively. Descriptive statistics are shown in Table 4-8.

Strategic Typologies of Miller and Friesen (1982): Entrepreneurial and Conservative

The respondents indicated the strategic types they pursued based on the strategic concept of Miller and Friesen (1982); entrepreneurial and conservative firms. Low score represents an emphasis placed on conservative strategy while high score represents an emphasis placed on entrepreneurial strategy. Theoretical range is between 1 and 7 while actual range is between 1.6 and 7. Mean and standard deviation are 4.4163 and 1.136, respectively. Descriptive statistics are shown in Table 4-8.

Table 4-8: Descriptive Statistics of Three Strategic Types

Strategic types	Mean	Standard deviation	Actual range		Theoretical range	
			Min	Max	Min	Max
Miles and Snow (prospector/ defender)	4.89	1.563	1	7	1	7
Gupta and Govindarajan (build/ harvest)	0.1421	0.344	-1	1	-2	1
Miller and Friesen (entrepreneurial/ conservative)	4.4163	1.136	1.6	7	1	7

4.3.5 Organizational Performance

Organizational performance for each company in SET was measured by using 12 dimensions of performance. The respondents first assessed their performance in each dimension compared to their competitors ranging from significantly below average (scored one) to significantly above average (scored seven). Then, they rated level of the importance for each dimension ranging from not important (scored one) to extremely important (scored five). The degree of importance of each dimension was used as weights in calculating the overall performance for each firm. Theoretical range for each dimension and overall performance is 1-7. The actual range of calculated overall performance is between 2.20 and 7. Table 4-9 indicates the descriptive of organizational performance for each dimension and overall performance.

Table 4-9: Descriptive Statistics of Organizational Performance

Organizational Performance	Mean	Standard deviation	Actual range		Theoretical range	
			Min	Max	Min	Max
1. Capacity utilization	5.00	1.252	1	7	1	7
2. Cash flow from operations	5.40	1.160	2	7	1	7
3. Cost control	5.21	1.218	2	7	1	7
4. Customer satisfaction	5.53	0.913	3	7	1	7
5. Development of new products/services	4.87	1.268	2	7	1	7
6. Employee development	4.99	1.419	1	7	1	7
7. Firm's efficiency	5.17	1.026	2	7	1	7
8. Market share	5.17	1.213	1	7	1	7
9. Market development/ Sale growth rate	5.25	1.176	2	7	1	7
10. Product/ service quality	5.58	1.054	2	7	1	7
11. Return on investment	5.08	1.216	2	7	1	7
12. Supplier relationships	5.10	1.108	1	7	1	7
Overall performance	4.4068[18]	0.97038	2.2	7	1	7

[18] This overall average performance was weighted by the degree of importance of each dimension indicated by respondents. See section 4.3.5 for explanation.

4.4 Examining the Data

Before further analysis is undertaken, the data are examined in more detail. The issues to address include missing data, dealing with outliers, and the tests for the statistical assumptions underlying most multivariate analyses. It is maintained that this step is crucial and ensures more accurate results during the main analysis (Tabachnick and Fidell, 2007).

4.4.1 Missing Data

Missing data are 'valid values on one or more variables which are not available for the analysis' (Hair et al., 2006, p.49). Missing data can generate difficulty in data analysis as well as a considerable impact on the results. Particularly, missing data have implication on sample size and generalizability of the results. Additionally, there is potentially bias result when data are not random and appropriate remedies are not applied (Schafer and Graham, 2002).

As indicated in earlier discussion, for all of the returned responses containing missing values respondents were telephoned to clarify the answers. Consequently, there is no missing data due to the actions from the respondents in the data file. However, the questions about the adoption of management accounting practices and management techniques have generated missing information about the benefit obtained from these practices and techniques because the respondents were asked to leave the benefit questions blank for their unused practices and techniques. These missing data are expected and regarded as part of research design (Hair et al., 2006). In order to select an appropriate remedy, the extent and the patterns of missing data will be examined.

The extent of missing data

The purpose of assessing the extent of missing data is to determine whether any specific remedy can be applied without examining the pattern of missing data. If the extent of the missing data is high, the pattern or the randomness of missing data must be examined before choosing the appropriate remedy. The extent of missing data was assessed by

tabulating, which demonstrates the percentage of variables with missing data for each case, and the number of cases with missing data for each variable (Hair et al., 2006). From the Missing Value Analysis (MVA) provided in SPSS, it is found that the number of cases with missing data is high, in particular 82 cases[19]. Therefore, the number of cases without missing data (53 cases from 135 cases) will not be sufficient for the further analysis including factor analysis, multiple regression analysis, and cluster analysis. The option of deleting individual cases or variables, which contain missing data, is not applied due to the consequent reduction in the sample size and reduction in variables to represent the concepts in the study. Hence, it can be concluded that the extent of missing data is substantial, and the randomness of the missing data must be examined to identify appropriate remedies available.

The pattern of missing data

The pattern or the randomness of the missing data can be separated into three levels; missing completely at random (MCAR), missing at random (MAR), and missing not at random (MNAR) (Tabachnick and Fidell, 2007). To explain the meaning of these three levels of randomness, it is assumed that the information of two variables, X and Y, are collected. X has no missing data while Y contains some missing data. Missing data on Y are classified as MCAR when 'the probability that Y is missing is unrelated to the value of Y itself or any other variable in the data set' (Vriens and Melton, 2002, p.15). In other words, 'the observed values of Y are truly a random sample of all Y values, with no underlying process that lend bias to the observed data' (Hair et al., 2006, p.57). It is assumed that the cases with missing data are the same as those without missing data. The level of randomness in MCAR is viewed as high enough to allow any type of missing data remedy (Hair et al., 2006).

Missing data on Y are regarded as MAR when 'the probability of missing data on Y depends on X but not on Y' (Brown and Kros, 2003, p.613). In other words, 'the observed Y values represent a random sample of the actual Y values for each value of X, but the observed data for Y do not necessarily represent a truly random sample of all Y values'

[19] These cases contain only a few items (variables) with missing data; however, the system indicates them as cases with missing data.

(Hair et al., 2006, p.56). The missing values may be random within subgroup, but not between subgroup, resulting in the difficulty in generalizability from sample to the population. The cases with missing data must be handled differently from cases without missing data. Hence, special methods are required to accommodate a non-random component for MAR such as modelling based approaches (Hair et al., 2006).

In contrast to MCAR and MAR, ignorable missing data, which means the inference does not depend on it, missing data on Y are said to be MNAR or non-ignorable missing data when 'the probability of missing data of Y depends on both X and Y' (Chen and Astebro, 2003, p.310). Consequently, the pattern of MNAR is non-random, and can be explained or predicted by the variable on which the data are missing. It is claimed that dealing with MNAR is the most difficult condition (Brown and Kros, 2003).

Diagnostic tests for levels of randomness were conducted to identify the missing data as MCAR, MAR, or MNAR. The Missing Value Analysis (MVA) result from SPSS provides individual test (*t*-test) for each variable and overall test (Little's MCAR test) of randomness. The test for a single variable (*t*-test) is performed by establishing two groups which are cases with missing data for that variable and those with valid value of that variable, then determining the differences between them on other variables of interest. Significant differences reveal the probability of a non random pattern (Hair et al., 2006). It is shown that most of the individual tests are not statistically significant. Some differences may occur by chance, and that provides the sources of a non random pattern for later investigation, if the overall test indicates a non random pattern such as MAR or MNAR.

The overall test, Little's MCAR test, compares the pattern of missing data on all variables with the pattern of random missing data. If there is no significant difference, MCAR can be assumed. Thus, a statistical non-significant result is preferable (Tabachnick and Fidell, 2007). It is found that a statistical result from Little's MCAR test is non-significant ($p > 0.05$; Chi-Square = 5268.853, df = 5388, $p = 0.875$), indicating that no significant differences are found between the pattern of missing data and that of random missing data. Consequently, the pattern of missing data can be classified as MCAR, and a wide range of potential remedies are available.

Imputation Method

Imputation is 'the process of estimating the missing value based on valid values of other variables and/or cases in the sample' (Hair et al., 2006, p.58). There are a variety of remedies or imputation methods provided to accommodate MCAR. They can be divided into two basic approaches; imputation using only valid data, and imputation by using replacement values. Imputations using only valid data are Complete Case Approach (LISTWISE in SPSS) and Using All-Available Data (PAIRWISE in SPSS). Imputations by using replacement values are Hot or Cold Deck Imputation, Case Substitution, Using Prior Knowledge, Mean Substitution, Regression Imputation, Expectation-Maximization (EM), and Model-Based Multiple Imputation (MI)[20] (Schafer and Graham, 2002; Vriens and Melton, 2002; Brown and Kros, 2003; Chen and Astebro, 2003; Hair et al., 2006; Tabachnick and Fidell, 2007).

Each imputation method possesses its own advantages and disadvantages. Choosing the most appropriate remedy is dependent on the situation of missing data in the study (Hair et al., 2006). As a result of the spread throughout cases and variables of the missing data in this research, using only valid data may arrive at the substantial reduction of sample size. Thus, Complete Case Approach and All Available Data are not the appropriate remedies for the current study.

One of the imputations by using replacement values is more preferable in order to obtain the complete data set and more efficient results (more statistical power) (Schafer and Graham, 2002). However, given the nature of this research, it is almost impossible to acquire additional cases which are exactly similar to the missing value cases in order to replace those missing data by Case Substitution. Furthermore, appropriate external values were not available and this restrictes the use of Cold Deck Imputation while finding similarity between missing values and the values from the actual respondents in the same data set might be problematic and thus it was difficult to use Hot Deck Imputation. It is also claimed that correlations and other measures of association are distorted by using Hot Deck Imputation without refinements (Schafer and Graham, 2002). Mean Substitution

[20] These techniques cannot be elaborated in detail here because of space. For further reading please consult Hair et al. (2006) and Tabachnick and Fidell (2007).

should be avoided or used when the extent of missing data is small due to the reduction in estimated standard deviation and variance, and the distortion in data distribution, covariances and inter-correlations between variables, which would occur (Briggs et al., 2002). Regression Imputation may generate 'out of range' values and decrease generalizability (Hair et al., 2006).

There are two highly recommended approaches: Maximum Likelihood (ML) and Multiple Imputation (MI). These two modern approaches are claimed to perform better than the above older methods such as using only valid data, mean imputation, or regression imputation (Schafer and Graham, 2002). They predict missing values based on a formal statistical model; hence, the statistical integrity of the analysis is retained to allow appropriate inference (Briggs et al., 2002). However, it is more difficult to implement Multiple Imputation (MI) without specialized software (Hair et al., 2006). Consequently, Maximum Likelihood (ML) approach via the Expectation-Maximization (EM) algorithm, which is available in Missing Value Analysis (MVA) option of SPSS programme, was selected to accommodate the missing data for this research.

Maximum Likelihood (ML) approach involves 'formulating a statistical model and basing inference on the likelihood function of the incomplete data' (Briggs et al., 2002, p.381). It is argued that the rule of drawing inferences from a likelihood function is extensively accepted (Schafer and Graham, 2002). EM algorithm is 'a very general iterative algorithm for ML estimation in incomplete-data problems' (Little and Rubin, 1987, p.129). Each iteration of EM engages two steps; expectation (E-step) and maximization (M-step). 'The E-step finds the conditional expectation of the missing data, given the observed values and current estimate of the parameters such as correlations. These expectations are then substituted for the missing data. The M-step performs maximum likelihood estimation as though the missing data had been filled in. After convergence is achieved, the EM variance-covariance matrix may be provided and the filled-in data saved in the data set' (Tabachnick and Fidell, 2007, p.68). The imputed data set is used for all following analyses in this study.

Due to the extent of missing data and small sample size, it is highly recommended to repeat the analyses with and without missing data (Tabachnick and Fidell, 2007). Hence,

sensitivity analysis was performed by repeating all of the analyses for both data sets before and after the imputation method. Most of the results indicate similarity of results from the two data sets, which will be illustrated in more detail for further analyses. Thus, the data from Expectation-Maximization (EM) imputation can be trusted.

4.4.2 Outliers

An outlier is 'a case with such an extreme value on one variable (a univariate outlier) or such a strange combination of scores on two or more variables (multivariate outlier) that it distorts statistics' (Tabachnick and Fidell, 2007, p.72). Also, outliers are defined as 'observations with a unique combination of characteristics identifiable as distinctly different from the other observations' (Hair et al., 2006, p.73). Outliers can have substantial impact on the analysis. They can be beneficial or problematic depending on the context of the analysis. The outliers may be beneficial when they indicate the characteristics of the population while they may be problematic when they do not represent the population, and that distorts the analysis. It is recommended to check the outliers and mitigate their effect prior to the main analysis (Hair et al., 2006).

There are four classes of outliers based on the source of their uniqueness; a procedural error, extraordinary event, extraordinary observations, and unique in combination. The first class of the outliers, a procedural error, is derived from a data entry error or a mistake in coding; thus, it should be removed or recoded as missing values. The second class of the outliers is affected from the extraordinary event which explains the uniqueness of the observation. The choices of retain or delete the outliers depends on whether the extraordinary event matches with the research objectives. The third class of the outliers encompasses extraordinary observations which are unexplainable by the researcher. The alternatives to handle the outliers (retention or deletion) are dependent upon the researcher's judgement. The fourth class of the outliers comprises the ordinary values which vary within normal range of values on all variables. They are not exceptionally high or low values on the variable, but their combinations of values are unique across variables. This type of outliers should be retained in the analysis unless certain evidence degrading their valid membership of the population (Hair et al., 2006).

To identify the outliers in this study, the standard scores, which have a mean of 0 and a standard deviation of 1, are examined for all variables. The cases with standard scores of 2.5 or greater are regarded as the outliers in the small sample size (80 or fewer cases). However, the rule of standard scores can be increased up to 4 for the larger sample size (Hair et al., 2006). Therefore, the standard value of 3.5 is used as the cut-off point to define the outliers due to the sample size of 135 observations in this research. Apart from the use of standard scores, the Boxplot is also used to identify the outliers. The results from both analyses indicate similarity. It is found that there are a few variables containing outliers and extreme values. Particularly, no outliers appear for Strategic Types of Miles and Snow, Strategic Missions of Gupta and Govindarajan, Strategic Types of Miller and Friesen, and Organizational Performance. There are seven items from 43 items of management accounting practices, which contains the outliers. Six items from 25 items of management techniques also reveal the outliers. Last, six items from 16 items of strategic priorities of Porter contain the outliers.

After the outliers have been identified, they are categorized into one of four classes mentioned above in order to make the decision on how to deal with them; retention or deletion. The original values of all the outliers are examined. It is shown that there is no error from data entry or miscoding. The values of the outliers are not affected by extraordinary events, or outstandingly high or low values on the variables. Instead, the observed values are placed within the normal range of values on each of variable, for example values of 1 to 7 for seven Likert-scale questions. Consequently, they are classified as the fourth class of the outliers, which are unique in their combinations of values across variables. All of the outliers will be retained in the analysis due to the belief that they represent a valid element of the population (Hair et al., 2006). Deleting them is to risk the loss of generalizability. It is considered that this step will not interfere with any findings of the research to any major extent.

4.4.3 Testing the Assumptions

Testing for the assumptions underlying the statistical bases for multivariate analysis is the final step in examining data. It is an important process to establish the foundation for multivariate techniques from which statistical inferences and results are drawn. When the

assumptions are violated, the results may be more distorted and biased in multivariate analysis due to the complexity of the relationships. Some techniques are robust and less affected by assumption violation; however, successful analysis may derive from meeting some of the assumptions. Hence, the researcher must be aware of any assumption violations and their implications on the interpretation of the results. The assumptions are tested for two levels; the test for individual variable (univariate), and the collective test for all variables (multivariate) (Hair et al., 2006). The univariate tests for meeting the assumptions are stated in this chapter; the multivariate tests for assumptions will be mentioned when multivariate analysis is performed. The important assumptions in multivariate analysis include normality, homoscedasticity, linearity, and absence of correlated errors. However, only normality assumption is tested for individual variables. Homoscedasticity and linearity assumptions relate mainly to dependent relationships between variables; they are therefore tested in multivariate analysis, particularly multiple regression.

Univariate Normality

Normality refers to 'the shape of the data distribution for an individual metric variable and its correspondence to the normal distribution, the benchmark for statistical methods' (Hair et al., 2006, 79). It is claimed that the departure from normality may lead to invalid statistical results; thus, the normality test must be addressed. Univariate normality for an individual variable can be easily tested by assessing the graphs including histogram and normal probability plot, and statistical tests of normality, particularly the Kolmogorov-Smirnov and Shapiro-Wilk tests (Tabachnick and Fidell, 2007). The tests of normality for all variables are shown in Table 4-10.

Table 4-10: The Univariate Tests of Normality

Variables	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Stat	df	Sig	Stat	df	Sig
Management Accounting Practices (MAPs)						
Absorption costing	0.190	135	0.000	0.902	135	0.000
Activity-based costing (ABC)	0.180	135	0.000	0.919	135	0.000
Activity-based budgeting (ABB)	0.126	135	0.000	0.933	135	0.000
Activity-based management (ABM)	0.124	135	0.000	0.951	135	0.000
Backflush costing	0.124	135	0.000	0.956	135	0.000
Benchmarking of product/service characteristics	0.188	135	0.000	0.880	135	0.000
Benchmarking of operational processes	0.192	135	0.000	0.886	135	0.000
Benchmarking of management processes	0.179	135	0.000	0.915	135	0.000
Benchmarking of strategic priorities	0.157	135	0.000	0.925	135	0.000
Budgeting systems for compensating managers	0.176	135	0.000	0.899	135	0.000
Budgeting systems for controlling costs	0.239	135	0.000	0.837	135	0.000
Budgeting systems for coordinating activities across BUs	0.190	135	0.000	0.917	135	0.000
Budgeting systems for planning day to day operations	0.160	135	0.000	0.944	135	0.000
Budgeting systems for planning cash flows	0.226	135	0.000	0.858	135	0.000
Capital budgeting techniques (e.g. NPV, IRR, Payback)	0.169	135	0.000	0.898	135	0.000
Cost-volume-profit analysis (CVP)	0.235	135	0.000	0.851	135	0.000
Cost modelling	0.158	135	0.000	0.926	135	0.000
Cost of quality	0.111	135	0.000	0.953	135	0.000
Customer profitability analysis (CPA)	0.167	135	0.000	0.892	135	0.000
Economic (shareholder) value added (EVA/SVA)	0.156	135	0.000	0.936	135	0.000
Formal strategic planning	0.180	135	0.000	0.896	135	0.000
Kaizen costing	0.134	135	0.000	0.930	135	0.000
Long range forecasting	0.164	135	0.000	0.933	135	0.000
Operations research techniques	0.126	135	0.000	0.956	135	0.000
Performance evaluation based on budget variance analysis	0.235	135	0.000	0.849	135	0.000
Performance evaluation based on controllable profit	0.182	135	0.000	0.885	135	0.000
Performance evaluation based on divisional profit	0.193	135	0.000	0.918	135	0.000
Performance evaluation based on residual income	0.127	135	0.000	0.952	135	0.000
Performance evaluation based on ROI	0.182	135	0.000	0.898	135	0.000
Performance evaluation based on CFROI	0.157	135	0.000	0.933	135	0.000
Performance evaluation based on team performance	0.171	135	0.000	0.910	135	0.000
Performance evaluation based on employee attitudes	0.126	135	0.000	0.953	135	0.000
Performance evaluation based on balanced scorecard	0.196	135	0.000	0.903	135	0.000
Performance evaluation based on customer satisfaction	0.196	135	0.000	0.864	135	0.000
Performance evaluation based on supplier evaluations	0.156	135	0.000	0.945	135	0.000
Product life cycle analysis	0.137	135	0.000	0.950	135	0.000
Product profitability analysis	0.198	135	0.000	0.885	135	0.000
Standard costing	0.187	135	0.000	0.904	135	0.000
Target costing	0.154	135	0.000	0.923	135	0.000
Throughput accounting	0.161	135	0.000	0.905	135	0.000
Value chain analysis	0.143	135	0.000	0.942	135	0.000
Variable costing	0.166	135	0.000	0.923	135	0.000
Zero-based budgeting	0.158	135	0.000	0.932	135	0.000

Note: *This is a lower bound of the true significance.
[a]Lilliefors Significance Correction.

Table 4-10: The Univariate Tests of Normality (Continued)

Variables	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Stat	df	Sig	Stat	df	Sig
Management Techniques (MTs)						
Certification to quality standards (e.g. ISO 9000 series)	0.168	135	0.000	0.904	135	0.000
Cross-functional teams	0.162	135	0.000	0.933	135	0.000
Downsizing the organization	0.134	135	0.000	0.959	135	0.000
Establishing participative culture	0.238	135	0.000	0.854	135	0.000
Flattening of formal organizational structure	0.129	135	0.000	0.952	135	0.000
Integrated quality system (IQS)	0.138	135	0.000	0.942	135	0.000
Integrating information systems across functions	0.165	135	0.000	0.926	135	0.000
Integrating information systems in operations	0.185	135	0.000	0.889	135	0.000
Integrating information systems with supplier/distributors	0.162	135	0.000	0.939	135	0.000
Investing in new physical layout	0.148	135	0.000	0.933	135	0.000
Implementing new operating methods	0.193	135	0.000	0.875	135	0.000
Linking business processes	0.176	135	0.000	0.902	135	0.000
Linking operational strategy to business strategy	0.166	135	0.000	0.889	135	0.000
Management training	0.246	135	0.000	0.858	135	0.000
Network teams	0.154	135	0.000	0.920	135	0.000
Occupational health and safety	0.170	135	0.000	0.886	135	0.000
Outsourcing	0.226	135	0.000	0.906	135	0.000
Project teams	0.176	135	0.000	0.922	135	0.000
Quality assurance activities	0.150	135	0.000	0.908	135	0.000
Reorganizing existing operating processes	0.182	135	0.000	0.916	135	0.000
Statistical quality control	0.140	135	0.000	0.940	135	0.000
Total quality management (TQM)	0.131	135	0.000	0.925	135	0.000
Using more sub-contracted labour	0.148	135	0.000	0.958	135	0.000
Work-based teams	0.163	135	0.000	0.942	135	0.000
Worker training	0.273	135	0.000	0.837	135	0.000
Strategic Priorities						
Achieve lower cost of products/services than competitors	0.239	135	0.000	0.872	135	0.000
Compete mainly on the prices of products/services	0.196	135	0.000	0.913	135	0.000
Customize products/services to customers' needs	0.252	135	0.000	0.838	135	0.000
Improve the time it takes to provide product/service to customers	0.278	135	0.000	0.797	135	0.000
Improve the cost required for coordination of various activities	0.223	135	0.000	0.886	135	0.000
Improve the utilization of available equipment, services, facilities	0.218	135	0.000	0.864	135	0.000
Make products/services more cost efficient	0.268	135	0.000	0.805	135	0.000
Make change in design and introduce new product/service quickly	0.185	135	0.000	0.900	135	0.000
Make rapid volume and/or product mix changes	0.200	135	0.000	0.910	135	0.000
Make dependable delivery promises	0.248	135	0.000	0.779	135	0.000
Obtain cost advantages from all sources	0.248	135	0.000	0.856	135	0.000
Offer a broader range of products/services than competitors	0.214	135	0.000	0.898	135	0.000
Provide high quality products/services	0.228	135	0.000	0.845	135	0.000
Provide products/services that are distinct from that of competitors	0.238	135	0.000	0.867	135	0.000
Provide effective after-sale service and support	0.274	135	0.000	0.820	135	0.000
Product/service availability	0.268	135	0.000	0.819	135	0.000
Strategic types of Miles and Snow	0.180	135	0.000	0.918	135	0.000
Strategic missions of Gupta and Govindarajan	0.095	135	0.004	0.983	135	0.087
Strategic types of Miller and Friesen	0.090	135	0.009	0.983	135	0.082
Calculated Performance	0.038	135	0.200*	0.991	135	0.577

Note: *This is a lower bound of the true significance.
[a]Lilliefors Significance Correction.

Kolmogorov-Smirnov and Shapiro-Wilk tests compare the values in the sample with a set of values which are normally distributed, and contain the same mean and standard deviation as the sample. A non-significant result (Sig value ≥ 0.05) indicates normality. In other words, the distribution of the sample is not statistically different from a normal distribution. However, a significant result (Sig values < 0.05) indicates that the distribution of sample is probably non-normal (Field, 2005). It was found that only one variable is normally distributed. This is Calculated Performance (Sig value = 0.200). The rest of the variables violate to the assumption of normality (Sig values < 0.05). The shape of the distribution of each variable is also examined, and the results are consistent with the statistical tests of normality. It is shown that most of variables are departure from the normality, predominantly negative skewness (skew to the right).

To remedy non-normality, data transformations were conducted several times by trial and error. The distributions of variables were immediately reassessed after all of the transformations in order to check normality. Squared and cubed transformations were performed for negative skew while logarithm and square root were undertaken to transform positive skew. Inverse were used to transform flat distribution. Unfortunately, none of the data transformations have been successful. Specifically, moderate negative skew is often changed to moderate positive skew after the remedies by squared and cubed transformations. Hence, transformations are not helpful for this study. It is claimed that the negative effects of non-normality are serious in the small sample size (less than 50 cases). However, with the larger sample size of 135 cases in this study the detrimental impacts from non-normality may be negligible, and the data transformation as a remedy may not be required (Hair et al., 2006). Further analyses are thus provided on this basis.

Chapter 5
Preliminary Statistical Analysis

In this research, different variables or questionnaire items in each section are highly correlated, and can be grouped into different dimensions such as those in management accounting practices, management techniques, and strategic priorities. Prior to hypotheses testing, variables from the questionnaire items were summarized and reduced into a smaller set of variables by using Factor Analysis. This seeks to understand the underlying structure of interrelationships or correlations among the variables. A factor is defined as a set of variables which are highly correlated. Each group of variables or factor is assumed to represent each dimension in the data, and a composite measure for each dimension can be calculated and this replaces the original data for further multivariate analysis (Hair et al., 2006).

From the literature, management accounting practices were categorized into two groups, contemporary management accounting practices (CMAPs) and traditional management accounting practices (TMAPs). Two factor analyses were separately performed for CMATs and TMAPs. Management techniques can be divided into six discrete groups which are Human Resource Management, Integrating system, Team-based structure, Quality system, Improving existing processes, and Operating system innovations. However, five factor analyses were separately conducted for these management techniques. Strategic priorities based on strategic typologies of Porter (1980; 1985) were factorial analyzed. New variables emerged from the Factor Analyses, and these were then used in hypotheses testing via multiple regression, moderated regression, and cluster analysis in the next chapters.

5.1 Factor Analysis

Factor Analysis refers to 'an interdependent technique whose primary purpose is to define the underlying structure among the variables in the analysis' (Hair et al., 2006, p.104). It is regarded as a family of techniques rather than a technique alone because there are a variety of different, but related techniques within the family of factor analytic techniques (Pallant,

2001). Two main distinctive techniques are Principle Component Analysis (PCA) and Factor Analysis (FA).

5.1.1 Principle Component Analysis (PCA) versus Factor Analysis (FA)

PCA is the most widely used technique while FA is a recommended and preferred technique. In order to select an appropriate procedure, the similarities and the differences between them should be considered. PCA and FA share one common goal which is to reduce a set of measured variables to a new and smaller set of variables (Velicer and Jackson, 1990). However, they are different in terms of their specific purposes, and the partition of the variance of a variable (Hair et al., 2006). Regarding the purposes, PCA is more appropriate when the main objective is data reduction[21]. In contrast, FA aims to understand the underlying structure of correlation among observed variables, and identify a more parsimonious set of latent constructs which account for the pattern of interrelationships among those observed variables (Fabrigar et al., 1999).

PCA and FA are also diverse in term of their uses of explained and unexplained variance. Before discussing this issue, the variance of a variable should be mentioned. 'Variance is the value representing total amount of dispersion of values for a single variable about its mean' (Hair et al., 2006, p.117). Total variance of a particular variable can be separated into three types; common variance, unique variance, and error variance. 'Common variance is defined as that variance in a variable that is shared with all other variables in the analysis. This variance is accounted for (shared) based on a variable's correlations with all other variables in the analysis. Unique variance is that variance associated with only a specific variable. This variance cannot be explained by the correlations to the other variables but is associated uniquely with a single variable. Error variance is also a variance that cannot be explained by correlations with other variables, but it is due to unreliability in the data-gathering process, measurement error, or a random component in the measured phenomenon' (Hair et al., 2006, p.117).

[21] 'Data reduction involves taking scores on a large set of measured variables and reducing them to scores on a smaller set of composite variables that retain as much information from the original variables as possible' (Fabrigar et al., 1999, p.275).

In PCA, the total variance is considered and used to derive the factors. Particularly, the unities (values of 1.0) representing full variances of variables are inserted in the diagonal of the correlation matrix; hence, the total variance is incorporated in the factor matrix. No distinction among common variance, unique variance, and error variance has been made in PCA. In contrast, only the common or shared variance is considered and used to derive the factors in FA. It is assumed that the unique variance and error variance are not relevant in identifying the structure of variables. Instead of unity, communality which is the proportion of common variance in a variable is placed in the diagonal of the correlation matrix, so that only the common variance is employed in the estimation of the factors (Hair et al., 2006).

In sum, FA is based on a common factor model which differentiates common variance from unique variance and error variance. It intends to understand the structure of correlation among observed variables by assessing the pattern of relationship between common factors and measured variables. On the other hand, PCA does not distinguish common variance from unique variance and error variance. It uses all variances in calculating components or factors without consideration of any underlying structure, and all variances appear in the result. Therefore, PCA should not be regarded as factor analysis at all, but it is only a data reduction method (Fabrigar et al., 1999; Costello and Osborne, 2005).

Despite the differences discussed above, many researchers practically use 'Factor Analysis' as a general term, and refer to both PCA and FA interchangeably (Pallant, 2001). It may be because both techniques tend to arrive at a very similar result in some circumstances. In particular, when the number of variables are more than 30 or most variables have communalities more than 0.60, similar results or almost identical results usually derive from both procedures (Hair et al., 2006). However, the results can vary in some situations, specifically when the communalities are low (less than 0.4) and there are few measured variables (less than three) per factor (Fabrigar et al., 1999). Thus, it is essential to distinguish PCA from FA, and the term 'Factor Analysis' should not be used when PCA is performed.

There has been a lot of debate on which technique is superior to the other. The advocates of PCA have argued that PCA is computationally less complex than FA, and it requires less computer memory and is less time consuming. Nevertheless, proponents of FA have claimed that computational complexity should no longer be a question due to the advances in computer capabilities. Moreover, FA can produce accurate results from the data corresponding to assumptions of either FA or PCA whereas PCA produces less accurate results when the data are consistent with the assumptions of FA (Fabrigar et al., 1999).

After reviewing their differences, advantages and disadvantages, Factor Analysis (FA) is selected for this research. It aims not only to reduce the data, but also to understand the underlying structure of the interrelationship among measured variables, and identify the latent dimensions or constructs which are accounted for in the pattern of the structure of the original variables.

5.1.2 Exploratory Factor Analysis (EFA) versus Confirmatory Factor Analysis (CFA)

The researcher can use Factor Analysis for two perspectives either exploratory or confirmatory viewpoint. Although Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) are based on a common factor model which aims to search for the structure of interrelationship among a set of variables, and represent that structure by a smaller set of latent variables or factors, both analyses are different to some extent. EFA is based on a data-driven approach in which there is no a priori constraints on how many factors or components should be extracted, and few restrictions are set for factor loadings. On the contrary, CFA is a more sophisticated technique, and is used to examine the hypothesis regarding the underlying structure of the data. It requires the researcher to determine a precise number of factors, and specify the pattern of factor loadings for CFA (Fabrigar et al., 1999). Thus, EFA is useful when the researcher is searching for underlying structure or pursuing a data reduction method while CFA is useful when the researcher desires to assess the fit between the data and the expected structure (Hair et al., 2006).

Exploratory Factor Analysis (EFA) is selected to use in this research due to the exploratory nature of it. Especially given there is relatively little empirical evidence for the number of common factors, and specific measured variables or items which should be influenced by

each factor. There are major design and analytical decisions which need to be made while conducting EFA including study design, the extraction procedure, determining the number of factors, and the rotation techniques (Fabrigar et al., 1999; Costello and Osborne, 2005).

5.1.3 Study Design of EFA

Two important issues regarding the study design of EFA involve measured variables and sample size. EFA demands the rigorous selection of the appropriate measured variables as well as the suitable number of measured variables included in the analysis. It is claimed that measured variables should be relevant to the domain of interest, and several measured variables (five or more; or at least three to five) per expected factor should be included in the analysis. If inadequate or irrelevant measured variables have been analyzed, the true underlying structure may not appear or a spurious structure may be obtained. Types of variables are also of concern. Metric variables are preferable while non-metric variables are more problematic (Fabrigar et al., 1999; Hair et al., 2006). Therefore, measured variables or questionnaire items used in this research have been selected with careful consideration. Five or more measured variables per proposed factor have been incorporated in the analysis, and all of them are metric variables. It is believed that all measured variables are sound, appropriate, and adequate for EFA.

To examine the adequacy of sample size, many rules of thumb have been explored. The recommendations have been made in terms of both overall sample size and the sample size based on the number of cases per variable. Hair et al. (2006) propose the minimum absolute sample size of 50 cases, and a more preferable sample size of 100 cases or larger. The minimum number of cases per variable should be 5:1, and more preferable should be 10:1. Furthermore, there are two more issues which have an influence on the adequacy of sample size. These are the number of measured variables per factor and the level of communalities. It is proposed that with three or four measured variables per factor and the level of communalities of 0.70 or higher, the sample of 100 should be enough (Fabrigar et al., 1999). Field (2000) recommended a less rigorous rule such as samples between 100 and 200 should be good enough with communalities in the 0.5 range. This research contains an overall sample size of 135 cases. The maximum measured variables included in one analysis are 25 variables. This arrives at 5.4 cases per variable. The number of

measured variables per factor and the level of communalities are maintained to be as high as possible. The details are discussed in each analysis. Hence, it is concluded that this research obtains an adequate sample size for EFA.

5.1.4 Extraction Method

Factor Analysis (FA) is chosen as the extraction procedure rather than Principle Component Analysis (PCA) in this research. After excluding principle component extraction method, there are six factor analysis extraction procedures provided in SPSS; unweighted least squares, generalized least squares, maximum likelihood, principal axis factoring, alpha factoring, and image factoring. There is very limited information about the strengths and weaknesses of these factor analysis extractions, and in most statistical software packages including SPSS, principle component extraction method is set as the default. This may be the reason why principle component extraction retains its popularity (Costello and Osborne, 2005).

Choosing one of factor analysis extractions for this research is dependent on the normal distribution of measured variables. The Kolmogorov-Smirmov and Shapiro-Wilk tests (sig values ≤ 0.05) indicated the violation to multivariate normality for all variables including Management Accounting Practices, Management Techniques, and Strategic Priorities. Fabrigar et al. (1999) recommended the factor extraction method named 'principal factors method' for this situation. They claimed that principal factor method can well cope with the data that violate the multivariate normality assumption. In SPSS, 'principal axis factoring' represents this method (Costello and Osborne, 2005). Thus, principal axis factoring is applied to all EFA in this research as the extraction method.

5.1.5 The Selection of the Number of Factors

Factor analysis methods strive for the best linear combination of variables. In other words, they seek for a particular linear combination of original variables which can best explain the variance in the data as a whole. The first extracted factor represents the best linear combination of the variables which explains most variance in the data set. The second factor is the second best linear combination of variables which accounts for most variance

remaining after the first factor has been extracted. The process of factor extraction is continued until all of the variance is explained. The number of factors is equal to the number of variables; however, the first few factors account for a considerable portion of total variance in the data set while the latter factors explain a smaller and smaller variance. The researcher needs to make the decision on how many factors to retain. Factor analysis aims to extract only a small number of the factors which can adequately represent the whole set of variables (Hair et al., 2006). It requires the researcher to trade off between the need for relatively few factors (parsimonious model), and the need for enough factors to explain the interrelationship among variables. Only major factors should be retained to represent the underlying structure of the measured variables (Fabrigar et al., 1999).

The decision on the number of factors to extract is vital and affects the accuracy of factor analysis results. Both overextraction (too many factors) and underextraction (too few factors) of factors retained can cause serious problems, and adversely affect the outcome (Costello and Osborne, 2005). Specifically, too few factors may conceal the correct structure or important dimensions while too many factors may cause difficulty in result interpretation (Hair et al., 2006). There are several different criteria for the number of factors to extract in the literature including Latent Root Criterion (the Kaiser Criterion), A Priori Criterion, Percentage of Variance Criterion, Scree Test criterion, Parallel Analysis, RMSEA, ECVI, and Velicer's MAP Criterion (Fabrigar et al., 1999; Field, 2000; Costello and Osborne, 2005; Hair et al., 2006). Each of these techniques has its own advantages and disadvantages. Fabrigar et al. (1999) suggested the researcher to employ multiple criteria to determine the number of factors to extract.

Three criteria were selected for this research. They are Latent Root Criterion (the Kaiser Criterion), Scree Test Criterion, and Percentage of Variance Criterion. Latent Root or Kaiser Criterion is the most common used technique. This technique can simply be applied to both PCA and FA. It aims to retain any factor that accounts for at least one variable which contributes a value of 1 to the total eigenvalue. Thus, the factors having eigenvalues greater than one are regarded as significant and should be retained in the analysis while those having eigenvalues less than one are insignificant and should be eliminated from the analysis (Hair et al., 2006). Latent Root or Kaiser Criterion lends itself to the simplicity and objectivity; however, it has been criticized for less accurate method for selecting the

number of factors (over-factoring or under-factoring) (Fabrigar et al., 1999). Eigenvalues for each factor are available in the result produced by SPSS.

Scree Test Criterion requires the researcher to examine the graph which is produced by plotting the latent roots or eigenvalues against the number of factors in their order of extraction. The shape of the graph is used to evaluate the cut-off point for identifying the number of factors to retain. In particular, the maximum number of factors to extract is the point at which the curve first begins to straighten out (Hair et al., 2006). In other words, it considers the last substantial drop in the magnitude of the eigenvalues. It is claimed that this technique perform relatively well when strong common factors exist in the data. However, it suffers from subjectivity or no clear objective rule of where is exactly the cut-off point before the graph straightens out (Fabrigar et al., 1999). Eigenvalue Plot for Scree Test is available in many statistical software packages including SPSS.

Percentage of Variance Criterion is based on achieving the level of cumulative percentage of the total variance explained by extracted factors. It attempts to certify practical significance that the remaining factors can explain the specified level of total variance. No absolute guideline has been proposed for the required total variance. Nevertheless, at least 95 percent of total variance should be achieved in natural sciences, and 60 percent of total variance or less is regarded as satisfactory in social sciences due to less precise information (Hair et al., 2006).

It is not unusual for the researcher to combine several criteria. This research utilizes these three criteria to determine the appropriate number of factor to extract. Latent Root or Kaiser Criterion was initially used as a guideline for the first extraction. Then, the result from Scree Test and Percentage of Variance Criterion were taken into account. Many results were produced as trial error solutions before an appropriate number of factors had been extracted.

5.1.6 Rotation of Factors

Factor rotation is the most important tool in interpreting the result of factor analysis. It simplifies the factor structure, and provides theoretically more meaningful factor solutions.

In most cases of factor rotation, the ambiguities from the initial unrotated factor solutions have been reduced, and the factor pattern has been improved (Hair et al., 2006). In factor rotation, the axes of factors are rotated into the new and better position in which the variables can be loaded maximally (Field, 2000). The rationale of factor rotation can be explained as follows. The factors have initially been extracted in unrotated factor solution in order of their variance extracted. The first factor accounts for the largest variance while the second factor explains the highest remaining variance after the first factor has been extracted. The later factors explain consecutively smaller portion of variance. Hence, most variables tend to load significantly on the first factor, and few variables are loading on the later factors. To simplify the factor solution, factor rotation redistributes the variance from former factors to latter factors to obtain the simpler and more meaningful structure (Hair et al., 2006).

There are two types of factor rotation; orthogonal and oblique rotation. Orthogonal rotation is the simplest case of rotation. The term 'orthogonal' means unrelated; hence, correlations among the factors are not permitted. Orthogonal rotation maintains the independence among the factors while rotating the factors. The axes are turned by maintaining perpendicular or 90 degrees among one another (Field, 2000). To facilitate interpretation, orthogonal rotation aims to simplify the rows and columns of the factor matrix. In factor matrix, rows represent variables whereas columns represent factors. Simplifying the rows is the attempt to make as many factor loading values in each row close to zero as possible while simplifying the columns mean making as many factor loading values in each column close to zero as possible. Consequently, each variable tends to load strongly onto only one factor. Many orthogonal rotational approaches are widely used, and provided in all software programmes including SPSS. These are QUARTIMAX, VARIMAX, and EQUIMAX[22] (Hair et al., 2006).

Oblique rotation, in contrast, allows the factors to be related rather than remaining independent. It is more flexible because the axes do not need to remain perpendicular or 90-degree angle among one another (Field, 2000). It is also more realistic because the constructs in social science research are likely to be correlated. The common rules in

[22] The detail of each orthogonal rotational method is provided in Hair et al. (2006).

simplifying rows and columns of oblique rotation are similar to those of orthogonal rotation. However, the feature of correlated factors needs to be considered, and additional attention is required to validate obliquely rotated factors. In spite of many choices for orthogonal rotation, limited alternatives for oblique rotations are provided in most statistical packages. DIRECT OBLIMIN and PROMAX are provided in SPSS programmes (Hair et al., 2006).

Although orthogonal rotation may be preferable due to its simplicity and conceptual clarity, oblique rotation is claimed to be superior. When the factors are related, oblique rotation provides more accurate and realistic representation of how factors are related to one another than orthogonal rotation does. When the factors are actually unrelated, oblique rotation still produces the result as accurate as the result from orthogonal rotation by providing estimates of the correlations among factors close to zero. Also, more information is provided in oblique rotation such as estimates of the correlations among factors (Fabrigar et al., 1999).

Choosing one of these methods is dependent on theoretical reasoning underpinning the research questions and hypotheses. Oblique rotation, DIRECT OBLIMIN in particular, was selected and used to rotate the factor solutions because this research aims to examine the combined power of management accounting practices, management techniques, and strategic typologies on organizational performance. It is more appropriate to allow the factors to be correlated in order to explore the effect of these combinations.

5.1.7 The Significance of Factor Loadings

After a rotated factor solution is derived, it is important to consider and assess the significance of factor loadings in the Pattern Matrix in order to interpret the result. Factor loading actually is the correlation between a measured variable and its factor. It is used as a measurement to decide which variables should be incorporated into which factors (Field, 2000). To decide which levels of factor loadings are significant, practical and statistical significance should be assessed. Concerning practical significance, the higher the factor loadings (in absolute size), the more important the factor loadings are in interpreting the result. Factor loadings of ±0.30 to ±0.40 are regarded as minimally acceptable level, the

loadings ±0.50 or greater are generally considered as practically significant, and the loadings greater than ±0.70 are a well-defined structure (Hair et al., 2006).

Assessing statistical significance, the important of factor loadings is dependent on the sample size. Hair et al. (2006) provide the guidelines for identifying significant factor loadings based on sample size in the Table 5-1.

Table 5-1: Guidelines for Identifying Significant Factor Loadings based on Sample Size

Factor Loading	Sample Size Needed for Significance[a]
0.30	350
0.35	250
0.40	200
0.45	150
0.50	120
0.55	100
0.60	85
0.65	70
0.70	60
0.75	50

[a]Significance is based on a 0.05 significance level (α), a power level of 80 percent, and standard errors assumed to be twice those of conventional correlation coefficients.

Source: Hair et al. (2006).

Both practical and statistical significance are taken into account in order to decide the significant level of factor loadings for this research. Due to the sample size of 135 responses, it is appropriate to regard the factor loadings ±0.50 or greater as significant in interpreting the results for this research.

5.2 EFA for Management Accounting Practices (MAPs)

From the literature, management accounting practices can be separated into contemporary and traditional management accounting practices. There are 43 items of management accounting practices in the questionnaire. 25 items are contemporary practices while 18 remaining items are traditional practices. Table 5-2 demonstrates all of the management accounting practices used in this research. Factor Analyses were separately performed for the perceived benefit obtained from both groups of practices. The results and interpretation are discussed.

Table 5-2: List of Contemporary and Traditional Management Accounting Practices (MAPs)

Contemporary Management Accounting Practices (CMAPs)	Traditional Management Accounting Practices (TMAPs)
Activity based costing (ABC)	Absorption costing
Activity based budgeting (ABB)	Budgeting systems for compensating managers
Activity based management (ABM)	Budgeting systems for controlling costs
Backflush costing	Budgeting systems for coordinating activities across the business units
Benchmarking of product characteristics	Budgeting systems for planning day to day operations
Benchmarking of operational processes	Budgeting systems for planning cash flows
Benchmarking of management processes	Capital budgeting techniques
Benchmarking of strategic priorities	Cost-volume-profit analysis (CVP)
Cost modelling	Formal strategic planning
Cost of quality	Long range forecasting
Customer profitability analysis (CPA)	Operations research techniques
Economic (shareholder) value added (EVA/SVA)	Performance evaluation based on budget variance analysis
Kaizen costing	Performance evaluation based on controllable profit
Performance evaluation based on residual income	Performance evaluation based on divisional profit
Performance evaluation based on team performance	Performance evaluation based on return (profit) on investment
Performance evaluation based on employee attitude	Performance evaluation based on cash flow return on investment (CFROI)
Performance evaluation based on BSC	Standard costing
Performance evaluation based on customer satisfaction surveys	Variable costing
Performance evaluation based on supplier evaluations	
Product life cycle analysis	
Product profitability analysis	
Target costing	
Throughput accounting	
Value chain analysis	
Zero based budgeting	

5.2.1 EFA for Contemporary Management Accounting Practices (CMAPs)

Exploratory Factor Analysis (EFA) was performed for 25 items of the contemporary management accounting practices (CMAPs) by using SPSS programme. Principal axis factoring was applied as factor extraction due to the violation to the normality assumption of the data, and direct oblimin was used as factor rotation due to expected correlations among factors. The factor loadings ± 0.50 or above are regarded as significant due to the sample size of 135 responses.

Prior to conducting factor analysis, the suitability of data was assessed. The correlations among variables were expected to be fairly, but not perfectly related (the problem of extreme multicollinearity or singularity). In other words, it is expected to have correlation coefficients above 0.30, but not greater than 0.90. This can be examined by exploring the

Correlation Matrix (Field, 2000; Pallant, 2001). It was found that many correlation coefficients exceed 0.30, which means there are interrelationships among variables needed for factor analysis. However, the correlation coefficient between "Activity Based Budgeting (ABB)" and "Activity Based Management (ABM)" exceeds 0.90, which shows the problem of singularity. Consequently, ABB was removed from the analysis due to its lower individual measure of sampling adequacy (MSA).

Furthermore, the variables which are not sufficiently explained by the factor solution were removed. These variables can be identified by assessing their communalities which represent the amount of variance accounted for by the factor solution for each variable (Hair et al., 2006). Three more items were deleted from the analysis due to low communalities. These are "Backflush costing", "Customer profitability analysis", and "Zero based budgeting", resulting in 21 remaining items with the average communality of 0.65. None of remaining variables have communality less than 0.40.

The measure of sampling adequacy (MSA), also called the Kaiser-Meyer-Olkin (KMO) measure, was assessed in terms of overall and individual variable. The guidelines for both overall and individual MSA are provided as 0.80 or above are meritorious; 0.70 or above are middling; 0.60 or above are mediocre; 0.50 or above are miserable; and below 0.50 are unacceptable (Hair et al., 2006). The overall MSA was 0.869 which is regarded as excellent. There are no individual MSA[23] lower than 0.783 which is considered as a good range. Additionally, the Bartlett test of sphericity, a statistical test for the presence of correlations among the variables, indicated statistical significance (sig value ≤ 0.001). This means that enough correlations exist among the variables to proceed (Hair et al., 2006). All the results supported the factorability of the correlation matrix, and that factor analysis is appropriate for the data. KMO and Bartlett's test are provided in Table 5-3.

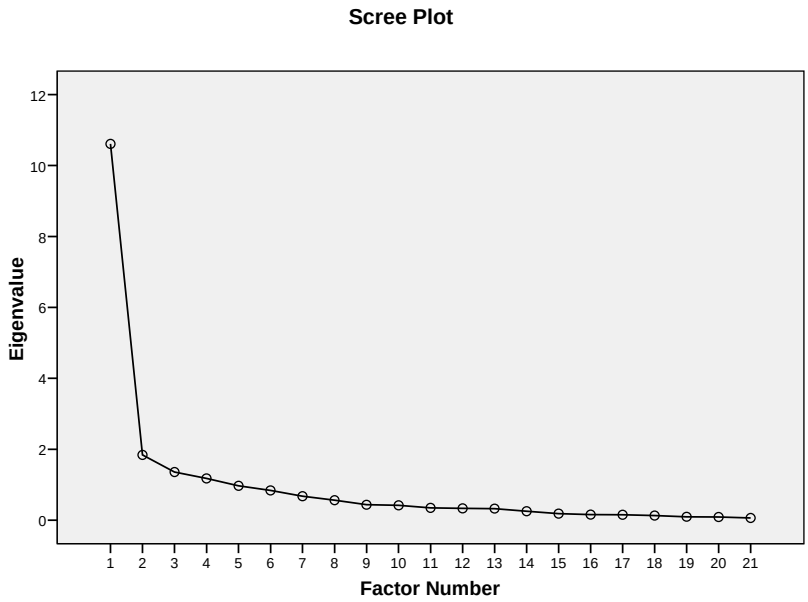
[23] The measure of sampling adequacy (MSA) for individual variable is provided on the diagonal of the anti-image correlation matrix (Field, 2000).

Table 5-3: KMO and Bartlett's Test of Factor Analysis on CMAPs

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.869
Bartlett's Test of Sphericity	Approx. Chi-Square	2419.351
	df	210
	Sig	0.000

Latent Root or Kaiser Criterion revealed four factors which have eigenvalues greater than one, and that four factors should be retained. Scree Test was examined; three factors can be recommended due to the line beginning to straighten out. Figure 5-1 illustrates the Scree Test for 21 items of CMAPs. Cumulative percentage of the total variance was also examined. Three or more factors are acceptable due to the level of cumulative percentage of the total variance in the range of 60 which is regarded as satisfactory in social sciences (Hair et al., 2006). To identify the appropriate number of factors, Hair et al. (2006) suggests the researcher examines a number of different factor structures derived from several trial solutions. The results from the numbers of factors of 3, 4, and 5 were explored. The results were compared and contrasted. The best representation was found with four factors accounted for 65.46 percent of the variance. Factor 1 explains 48.94 percent of the pooled variance.

Figure 5-1: Scree Test for CMAPs



The pattern matrix or rotated solution revealed the presence of a simple structure presented in Table 5-4. More than half of the variables are loading substantially onto only one factor. There is no cross loadings in the rotated solution. However, six items of CMAPs have no significant loadings due to the need to achieve significance of factor loadings of ± 0.50 or above. They do not belong to any factor because all of their factor loadings are less than ± 0.50. These six items are "Performance evaluation based on residual income", "Cost modelling", "EVA/SVA", "Cost of quality", "Kaizen costing", and "Performance evaluation based on team performance".

Table 5-4: Pattern Matrix of Factor Analysis on CMAPs

	Factor			
	1	**2**	**3**	**4**
Throughput accounting	0.800			
Target costing	0.729			
Value chain analysis	0.545			
Product life cycle analysis	0.511			
Performance evaluation based on residual income				
Cost modelling				
EVA/SVA				
Benchmarking of management processes		-0.930		
Benchmarking of operational processes		-0.886		
Benchmarking of strategic priorities		-0.847		
Benchmarking of product/service characteristics		-0.739		
Cost of quality				
Kaizen costing				
Activity based costing (ABC)			0.835	
Activity based management (ABM)			0.740	
Product profitability analysis			0.525	
Performance evaluation based on employee attitudes				-0.857
Performance evaluation based on customer satisfaction surveys				-0.810
Performance evaluation based on balanced scorecard				-0.689
Performance evaluation based on supplier evaluations				-0.643
Performance evaluation based on team performance				
Percentage of variance	48.943	7.469	5.034	4.009
Cumulative percentage	48.943	56.412	61.446	65.455
Cronbach's Alpha	0.864	0.939	0.838	0.876

Notes: The extraction method used was Principal Axis Factoring; the rotation method was Oblimin with Kaiser Normalization.

The reliability of each factor, which concerns with the degree of consistency between multiple measurements of variables, was tested. The reliability coefficient called Cronback's alpha was used to assess the reliability of the factors. Cronbach's alpha of each factor are 0.864, 0.939, 0.838, and 0.876 respectively which are greater than the minimum limit of 0.70 (Hair et al., 2006). Factor one contains four measured variables including "Throughput accounting", "Target costing", "Value chain analysis", and "Product life

cycle analysis" with factor loading of 0.800, 0.729, 0.545, and 0.511 respectively. Factor two consists of four measured variables which are "Benchmarking of management processes", "Benchmarking of operational processes", "Benchmarking of strategic priorities", and "Benchmarking of product/service characteristics" with factor loading of -0.930, -0.886, -0.847, and -0.739 respectively. Factor three incorporates three measured variables which are "Activity based costing (ABC)", "Activity based management (ABM)", and "Product profitability analysis" with factor loading of 0.835, 0.740, and 0.525 respectively. Factor four contains four measured variables which are "Performance evaluation based on employee attitudes", "Performance evaluation based on customer satisfaction surveys", "Performance evaluation based on balanced scorecard", and "Performance evaluation based on supplier evaluations" with factor loading of -0.857, -0.810, -0.689 and -0.643 respectively.

Four factors were given the name based on the nature of the constituent items. Factor one contains all advanced management accounting practices which are related to strategy, so it was named as ***Strategic management accounting***. Factor two consists of all benchmarking techniques; thus, it was called ***Benchmarking***. Most of the items in factor three are concerned with activity based analysis; hence, factor three was named as ***Activity based practices***. Factor four involves the relatively new concept of performance evaluation which is related to more non-financial measure. Consequently, it was named as ***Contemporary performance measure***.

The interrelationships among these four factors were also examined. The Factor Correlation Matrix, which is shown in Table 5-5, contains the correlation coefficients among factors (Field, 2000). It is revealed that all of the factors are interrelated to one another. The correlation coefficients of at least 0.306 have been found. Hence, it is reasonable to use oblique rotation due to the correlation among factors. This confirms the right decision in using oblique rotation, and expected correlation. The result provided by oblique rotation is more meaningful than that provided by orthogonal rotation for this data.

Table 5-5: Factor Correlation Matrix of Factor Analysis on CMAPs

Factor	1	2	3	4
1	1.000	-0.423	0.306	-0.543
2	-0.423	1.000	-0.449	0.598
3	0.306	-0.449	1.000	-0.397
4	-0.543	0.598	-0.397	1.000

Notes: The extraction method used was Principal Axis Factoring; the rotation method was Oblimin with Kaiser Normalization.

The logical combination of CMAP items and their interrelationship have been identified at this point. However, it is necessary to create summated scales for each factor in order to replace the original variables in subsequent analysis. A composite measure for each factor was simply calculated by averaging the scores of variables which have high loadings on a factor, and then used as a variable in further analysis, particularly multiple regression analysis and cluster analysis. Descriptive statistics for these new variables are shown in Table 5-6.

Table 5-6: Descriptive Statistics for CMAPs

Variables (N = 135)	Mean	S.D.
Strategic Management Accounting (SMA)	5.0895	1.10191
Benchmarking (BM)	5.2712	1.11283
Activity Based Practices (ABP)	5.5431	1.07075
Contemporary Performance Measures (CPM)	4.9312	1.23857

5.2.2 EFA for Traditional Management Accounting Practices (TMAPs)

Exploratory Factor Analysis (EFA) was performed for 18 items of the traditional management accounting practices (TMAPs) by using SPSS programme. Principal axis factoring was applied as the factor extraction method due to the violation to the normality assumption of the data, and direct oblimin was used as factor rotation due to expected correlations among factors. The factor loadings ± 0.50 or above are regarded as significant according to the sample size.

Prior to conducting factor analysis, the suitability of the data was assessed. The correlations among variables presented in the correlation matrix were examined. It was found that many correlation coefficients exceeded 0.30, but were not higher than 0.90. This means that there are some interrelationships among variables required for factor analysis,

but no extreme multicollinearity or singularity (Field, 2000). None of the items has communality less than 0.40; hence, all the items were remained in the analysis with the average communality of 0.58.

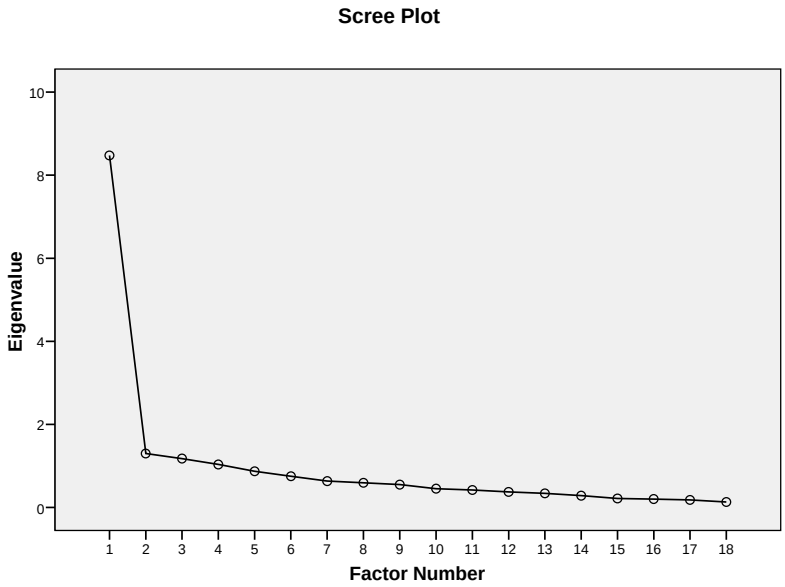
The measure of sampling adequacy (MSA), also called the Kaiser-Meyer-Olkin (KMO) measure, was assessed in terms of overall and individual variable. The overall MSA was 0.890 which is regarded as excellent. There are no individual MSA lower than 0.845 which is considered as a good range. Additionally, the Bartlett test of sphericity indicated statistical significance (sig value $\leq$ 0.001). This means that enough correlations exist among the variables to proceed with the analysis (Hair et al., 2006). All the results supported the factorability of the correlation matrix, and that factor analysis is appropriate for the data. KMO and Bartlett's test are provided in Table 5-7.

Table 5-7: KMO and Bartlett's Test of Factor Analysis on TMAPs

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.890
Bartlett's Test of Sphericity	Approx. Chi-Square	1426.872
	df	153
	Sig	0.000

Latent Root or Kaiser Criterion revealed four factors which have an eigenvalue greater than one, and that four factors should be retained. Scree Test was examined; however, no clear cut-off point was shown. Figure 5-2 illustrates the Scree Test for 18 items of TMAPs. Cumulative percentage of the total variance was also examined. At least five factors should be extracted to meet the acceptable level of 60 cumulative percentage of the total variance. The results from the numbers of factors of 3, 4, 5, 6, and 7 were explored. The results were compared and contrasted. The best representation was found with four factors accounted for 57.73 percent of the variance. Factor 1 explains 44.79 percent of the pooled variance.

Figure 5-2: Scree Test for TMAPs



The pattern matrix or rotated solution revealed the presence of a simple structure presented in Table 5-8. More than two-third of variables were loading substantially on only one factor. There is no cross loadings in the rotated solution. However, four items of TMAPs have no significant loadings due to the requirement to achieve significance of factor loadings of ± 0.50 or above. They do not belong to any factor because all of their factor loadings are less than ± 0.50. These four items are "Operation research techniques", "Long range forecasting", "Performance evaluation based on controllable profit", and "Formal strategic planning". Although four factors were extracted, only three factors, which are factor one, two, and three, were named and remained in the analysis. Factor four was dropped from the analysis because there was only one item loading onto the factor.

Table 5-8: Pattern Matrix of Factor Analysis on TMAPs

	Factor			
	1	2	3	4
Budgeting systems for compensating managers	0.733			
Budgeting systems for planning cash flows	0.692			
CVP analysis	0.662			
Capital budgeting techniques	0.610			
Performance evaluation based on budget variance analysis	0.586			
Budgeting systems for controlling costs	0.580			
Budgeting systems for coordinating activities across BUs	0.523			
Operation research techniques				
Long range forecasting				
Standard costing		0.869		
Absorption costing		0.500		
Variable costing		0.500		
Performance evaluation based on return (profit) on investment			-0.771	
Performance evaluation based on CFROI			-0.746	
Performance evaluation based on divisional profit			-0.547	
Performance evaluation based on controllable profit				
Formal strategic planning				
Budgeting systems for planning day to day operation				0.621
Percentage of variance	44.794	5.110	4.438	3.386
Cumulative percentage	44.794	49.903	54.342	57.727
Cronbach's Alpha	0.867	0.744	0.848	n.a.

Notes: The extraction method used was Principal Axis Factoring; the rotation method was Oblimin with Kaiser Normalization.

The reliability of each factor was tested. Cronbach's alpha of factor one, two, and three are 0.867, 0.744, and 0.848 respectively which met acceptable reliability levels of 0.70 (Hair et al., 2006). Factor one contains seven measured variables including "Budgeting systems for compensating managers", "Budgeting systems for planning cash flows", "CVP analysis", "Capital budgeting techniques", "Performance evaluation based on budget variance analysis", "Budgeting systems for controlling costs", and "Budgeting systems for coordinating activities across the business units" with the factor loading of 0.733, 0.692, 0.662, 0.610, 0.586, 0.580 and 0.523 respectively. Factor two consists of three measured variables which are "Standard costing", "Absorption costing", and "Variable costing" with the factor loadings of 0.869, 0.500, and 0.500 respectively. Factor three incorporates three measured variables including "Performance evaluation based on return on investment", "Performance evaluation based on cash flow return on investment", and "Performance evaluation based on divisional profit" with the factor loading of -0.771, -0.746, and -0.547 respectively.

The three factors were given the names based on the nature of the constituent items. Factor one contains all the practices related to budgeting, so it was named as ***Traditional Budgeting***. Factor two consists of all costing practices; thus, it was called ***Traditional Costing***. Factor three comprises of all performance evaluation which is related to mainly financial measures. Consequently, it was named as ***Traditional Performance Measure***.

The interrelationships among these factors were also examined. The Factor Correlation Matrix, which is shown in Table 5-9, contains the correlation coefficients among factors (Field, 2000). It is revealed that all of the factors are interrelated to one another. Hence, it is reasonable to use oblique rotation due to the correlation among factors. This confirms the right decision in using oblique rotation, and expected correlation. The result provided by oblique rotation is more meaningful than that provided by orthogonal rotation for this data.

Table 5-9: Factor Correlation Matrix of Factor Analysis on TMAPs

Factor	1	2	3	4
1	1.000	0.460	-0.570	0.340
2	0.460	1.000	-0.390	0.219
3	-0.570	-0.390	1.000	-0.285
4	0.340	0.219	-0.285	1.000

Notes: The extraction method used was Principal Axis Factoring; the rotation method was Oblimin with Kaiser Normalization.

The logical combination of TMAPs items and their interrelationship have been identified at this point. However, it is necessary to create summated scales for each factor in order to replace the original variables in subsequent analysis. A composite measure for each factor was simply calculated by averaging the scores of variables which have high loadings on a factor, and then used as a variable in further analysis, particularly multiple regression analysis and cluster analysis. Descriptive statistics for these new variables are shown in Table 5-10.

Table 5-10: Descriptive Statistics for TMAPs

Variables (N = 135)	Mean	S.D.
Traditional Budgeting (TB)	5.4932	0.90692
Traditional Costing (TC)	5.4682	0.94133
Traditional Performance Measures (TPM)	5.2627	1.19224

5.3 EFA for Management Techniques (MTs)

Management Techniques (MTs) in this research can initially be divided into six discrete groups; Human Resource Management (HRM) Policies, Integrating Systems, Team-based Structures, Quality systems, Improving existing processes, and Operating system innovations. Factor Analyses were separately performed for these groups except the last two groups, which are combined together in one analysis due to the number of questionnaire items. Consequently, five analyses were performed. There are 5 items per group which are shown in Table 5-11.

Table 5-11: List of Management Techniques (MTs)

Human Resource Management (HRM) Policies
Establishing a participative culture
Management training
Worker training
Occupational health and safety
Using more sub-contracted labour
Integrating Systems
Linking operational strategy to business strategy
Linking business processes
Integrating information systems across functions
Integrating information systems in operation
Integrating information systems with suppliers and/or distributors
Team-based Structure
Flattening of formal organizational structure
Cross-functional teams
Work-based teams
Project teams
Network teams
Quality Systems
Certification to quality standards
Total quality management (TQM)
Statistical quality control
Quality assurance activities
Integrated quality systems (IQS)
Improving existing processes and operating system innovations
Implementing new operating methods
Investing in new physical layout
Outsourcing
Downsizing the organization
Reorganizing existing operating processes

Exploratory Factor Analyses were performed for each group of Management Techniques (MTs) by using the SPSS programme. Principal axis factoring was applied as factor extraction due to the violation to the normality assumption of the data, and direct oblimin

was used as factor rotation due to expected correlations among factors. The factor loadings ± 0.50 or above are regarded as significant according to the sample size. Prior to conducting factor analysis, the suitability of data was assessed. The correlations among variables presented in the correlation matrix were examined. It was found from five analyses that many correlation coefficients exceed 0.30, but not higher than 0.90. This means that there are some interrelationships among variables, but no extreme multicollinearity or singularity (Field, 2000).

Due to low communalities, only one variable, which is "Using more sub-contracted labour", was removed from the analysis in the first group of MTs (HRM policies). Four items remained with the average communality of 0.63. None of the items was discarded from the analyses for the second group of MTs (Integrating systems) due to low communality with the average communality of 0.66. Regarding the third group of MTs (Team based structure), two variables with low communalities were found and eliminated from the analysis. These are "Flattening of formal organizational structure", and "Work based teams"; thus, three items remain in the analysis with the average communality of 0.57. For the fourth group of MTs (Quality systems), only one variable with low communality, which is "Certification to quality standards", was identified and removed from the analysis. Hence, there are four variables remaining in the analysis with the average communality of 0.57. Two variables, which are "Outsourcing" and "Downsizing the organization", have been discarded from the analysis in the fifth group of MTs (Improving existing processes and operating system innovation) due to their low communality, resulting in 3 remaining items with the average communality of 0.59.

The measure of sampling adequacy (MSA), also called the Kaiser-Meyer-Olkin (KMO) measure, was assessed in term of overall and individual variable for five groups of MTs. The overall MSA were 0.820, 0.825, 0.704, 0.795, and 0.700 respectively. It was noticed that all groups of MTs have the overall MSA greater than 0.70 which is regarded as in a good range. There are no individual MSA lower than 0.659 which is considered as mediocre. Additionally, the Bartlett test of sphericity indicated statistical significance (sig value $\leq$ 0.001). This means that enough correlations exist among the variables to proceed (Hair et al., 2006). All the results supported the factorability of the correlation matrix, and

that factor analysis is appropriate for the data. KMO and Bartlett's test for five analyses are provided in Table 5-12.

Table 5-12: KMO and Bartlett's Test of Factor Analyses on MTs

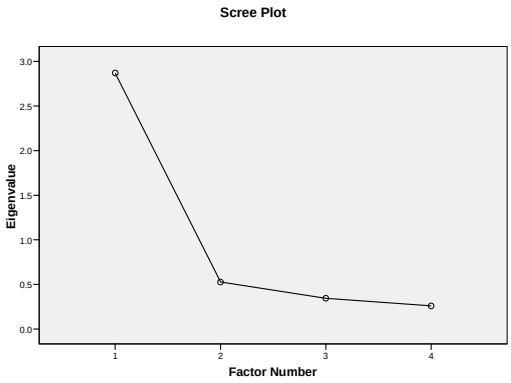
HRM Policies		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.820
Bartlett's Test of Sphericity	Approx. Chi-Square	264.156
	df	6
	Sig	0.000
Integrating Systems		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.825
Bartlett's Test of Sphericity	Approx. Chi-Square	477.563
	df	10
	Sig	0.000
Team-based Structure		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.704
Bartlett's Test of Sphericity	Approx. Chi-Square	124.743
	df	3
	Sig	0.000
Quality Systems		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.795
Bartlett's Test of Sphericity	Approx. Chi-Square	210.628
	df	6
	Sig	0.000
Improving existing processes and operating system innovations		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.700
Bartlett's Test of Sphericity	Approx. Chi-Square	133.824
	df	3
	Sig	0.000

Latent Root or Kaiser Criterion revealed one factor which has an eigenvalue greater than one, and that the only one factor should remain for each of the five groups of MTs. Scree Test was examined, and two factors should be retained due to the line beginning to straighten out in five analyses. Figure 5-3 illustrates the Scree Test for five groups of MTs. Cumulative percentage of the total variance was also examined indicating one or two factors should be extracted to meet the acceptable level of 0.60 cumulative percentage of the total variance. The results from the numbers of factors of one and two were explored. The results were compared and contrasted. The best representation was found with one

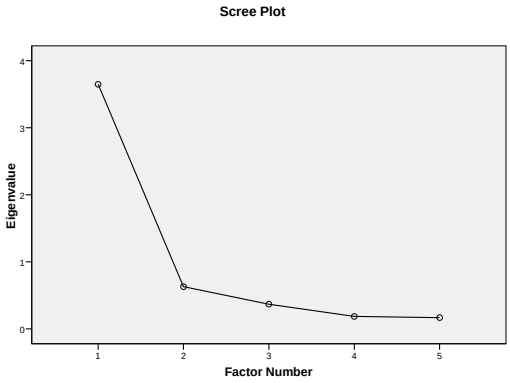
factor accounting for 63.01, 66.48, 57.35, 57.08, and 59.08 percent of the variance for all groups of MTs respectively.

Figure 5-3: Scree Test for MTs

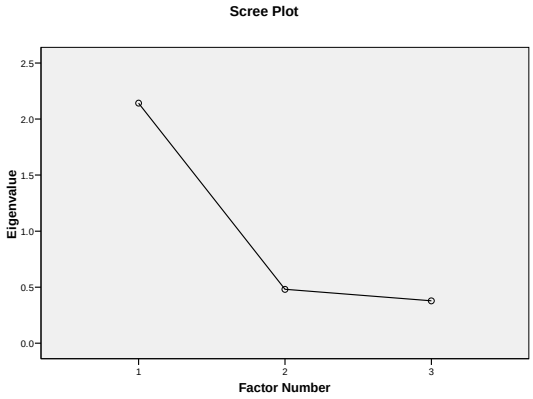
Scree test for HRM Policies



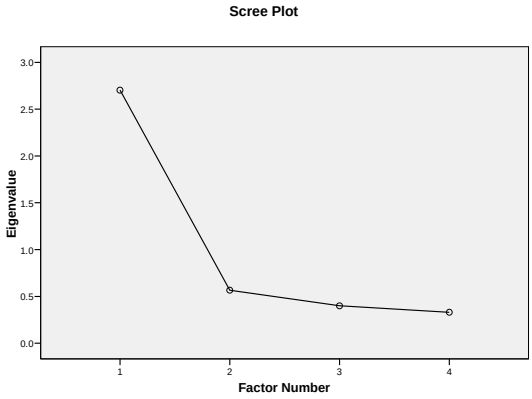
Scree test for Integrating Systems



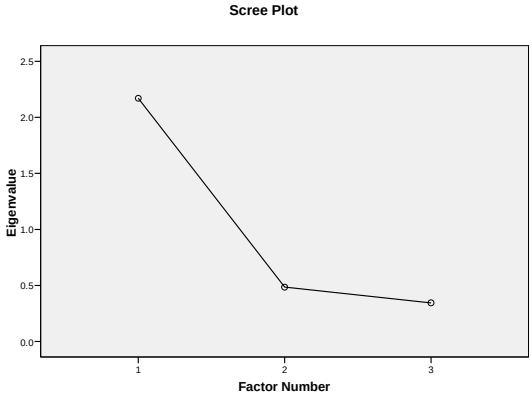
Scree test for Team-based Structure



Scree test for Quality Systems



Scree test for Improving existing processes and operating system innovations



Due to the only one factor extracted for all groups of MTs, factor matrix or unrotated solutions have been examined instead of the pattern matrix or rotated solution. Factor solutions are shown in Table 5-13. Simple structures have been found for all analyses of MTs. All variables are loading substantially on only one factor. There is no cross loadings in the solution. The one factor of each group was named following the name of the MT group. The reliability of each factor was tested. Cronbach's alpha are 0.864, 0.902, 0.799, 0.838, and 0.808 respectively, which met acceptable reliability levels of 0.70 (Hair et al., 2006).

Table 5-13: Factor Matrix of Factor Analysis on MTs

Human Resource Management (HRM) Policies	**Factor 1**
Worker training	0.873
Establishing participative culture	0.835
Occupational health and safety	0.798
Management training	0.651
Percentage of variance	63.006
Cronbach's Alpha	0.864
Integrating Systems	**Factor 1**
Linking business processes	0.880
Linking operational strategy to business strategy	0.863
Integrating information systems in operations	0.824
Integrating information systems across functions	0.791
Integrating information systems with suppliers/distributors	0.706
Percentage of variance	66.483
Cronbach's Alpha	0.902
Team-based Structure	**Factor 1**
Network teams	0.810
Cross functional teams	0.762
Project teams	0.695
Percentage of variance	57.351
Cronbach's Alpha	0.799
Quality Systems	**Factor 1**
TQM	0.814
Integrated quality system	0.791
Quality assurance activities	0.739
Statistical quality control	0.669
Percentage of variance	57.079
Cronbach's Alpha	0.838
Improving existing processes and operating system innovations	**Factor 1**
Implementing new operating methods	0.858
Investing in new physical layout	0.737
Reorganizing existing operating processes	0.702
Percentage of variance	59.083
Cronbach's Alpha	0.808

Notes: The extraction method used was Principal Axis Factoring; the rotation method was Oblimin with Kaiser Normalization.

A composite measure for each factor was simply calculated by averaging the scores of variables which have high loadings on a factor, and then used as a variable in further analysis, particularly multiple regression analysis and cluster analysis. Descriptive statistics for these new variables are shown in Table 5-14.

Table 5-14: Descriptive statistics for MTs

Variables (N = 135)	Mean	S.D.
Human Resource Management (HRM)	5.6644	0.99779
Integrating Systems (IS)	5.3660	0.95574
Team Based Structure (TBS)	5.1593	1.02118
Quality Systems (QS)	5.4193	0.87815
Innovation and Reorganization (INRE)	5.0196	0.98522

5.4 EFA for Strategic Priorities

There are 16 questionnaire items used to measure strategic priorities based on the strategic typologies of Porter (1980; 1985). They are related to the concepts of differentiation and cost leadership. These are shown in Table 5-15.

Table 5-15: List of Strategic Priorities

Achieve lower cost of products/services than competitors
Compete mainly on the prices of products/services
Customize products/services to customers' needs
Improve the time it takes to provide products/services to customers
Improve the cost required for coordination of various activities
Improve the utilization of available equipment, services and facilities
Make products/services more cost efficient
Make changes in design and introduce new products/services quickly
Make rapid volume and/or product mix changes
Make dependable delivery promises
Obtain cost advantages from all sources
Offer a broader range of products/services than competitors
Provide high quality products/services
Provide products/services that are distinct from that of competitors
Provide effective after-sale service and support
Product/service availability

Exploratory Factor Analysis (EFA) was performed for the 16 items of strategic priorities by using SPSS programme. Principal axis factoring was applied as factor extraction due to the violation to the normality assumption of the data, and direct oblimin was used as factor

rotation due to expected correlations among factors. The factor loadings ± 0.50 or above are regarded as significant. Prior to conducting factor analysis, the suitability of data was assessed. The correlations among variables presented in the correlation matrix are examined. It was found that many correlation coefficients exceed 0.30, but not higher than 0.90. This means that there are some interrelationships among variables, but no extreme multicollinearity or singularity (Field, 2000).

Six items were removed from the analysis due to low communalities. These are "Compete mainly on the prices of products/services", "Achieve lower cost of products/services than competitors", "Make rapid volume and/or product mix changes", "Customize products/services to customers' needs", "Obtain cost advantages from all sources", and "Provide effective after-sale service and support", resulting in 10 remaining items with the average communality of 0.57. None of remaining variables have the communality less than 0.40.

The measure of sampling adequacy (MSA), also called the Kaiser-Meyer-Olkin (KMO) measure, was assessed in term of overall and individual variables. The overall MSA was 0.831 which is regarded as excellent. There are no individual MSA lower than 0.726 which is considered as a good range. Additionally, the Bartlett test of sphericity indicated statistical significance (sig value ≤ 0.001). It means that enough correlations exist among the variables to proceed (Hair et al., 2006). All the results supported the factorability of the correlation matrix, and that factor analysis is appropriate for the data. KMO and Bartlett's test are provided in Table 5-16.

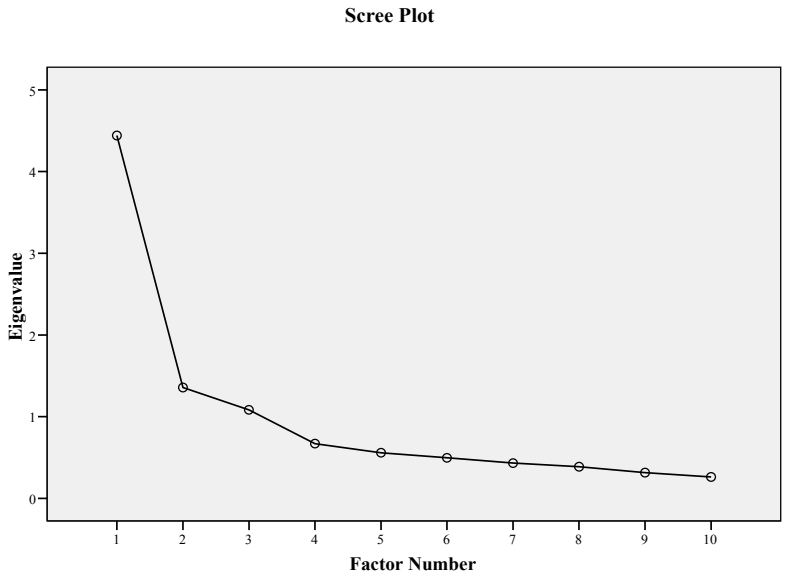
Table 5-16: KMO and Bartlett's Test of Factor Analysis on Strategic Priorities

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.831
Bartlett's Test of Sphericity	Approx. Chi-Square	531.893
	df	45
	Sig	0.000

Latent Root or Kaiser Criterion revealed three factors which have an eigenvalue greater than one, and that three factors should be retained. Scree Test was examined, and four factors should be retained due to the line beginning to straighten out. Figure 5-4 illustrates

the Scree Test for 10 items of strategic priorities. Cumulative percentage of the total variance was also examined. At least three factors should be extracted to meet the acceptable level of cumulative percentage of the total variance. The results from the numbers of factors of 2, 3, and 4 were explored. The results were compared and contrasted. The best representation was found with three factors accounted for 56.76 percent of the variance. Factor 1 explains 40.09 percent of the pooled variance.

Figure 5-4: Scree Test for Strategic Priorities



Pattern Matrix or the rotated solution revealed the presence of a simple structure presented in Table 5-17. Most of variables are loading substantially on only one factor. There is no cross loadings in the rotated solution. However, one item of strategic priorities, which is "Make changes in design and introduce new products/services quickly", has no significant loadings due to requiring at least the significance of factor loadings of ± 0.50 or above. It does not belong to any factor because all of its factor loadings are less than ± 0.50; hence, it was ignored.

Three factors were named based on the nature of the constituent items. Factor one contains four measured variables including "Improve the time it takes to provide products/services to customers", "Make dependable delivery promises", "Make products/services more cost efficient", and "Product/services availability" with the factor loading of 0.793, 0.630, 0.560, and 0.547 respectively. The first factor was named as ***Customer Orientation***. Factor

two consists of two measured variables which are "Improve the utilization of available equipment, services, and facilities", and "Improve the cost required for coordination of various activities" with the factor loading of 0.956 and 0.630 respectively. The second factor was called ***Cost Efficiency***. Factor three incorporates three measured variables including "Provide products/services that are distinct from that of competitors", "Offer a broader range of products/services than competitors", and "Provide high quality products/services" with the factor loading of 0.787, 0.746, and 0.613 respectively. The third factor was named as ***Differentiation***. The reliability of each factor was tested. Cronbach's alpha are 0.795, 0.770, and 0.775 respectively which met acceptable reliability levels of 0.70 (Hair et al., 2006).

Table 5-17: Pattern matrix of Factor Analysis on Strategic Priorities

	Factor		
	1	**2**	**3**
Improve the time it takes to provide products/services to customers	0.793		
Make dependable delivery promises	0.630		
Make products/service more cost efficient	0.560		
Product/service availability	0.547		
Make changes in design and introduce new product/services quickly			
Improve the utilization of available equipment, services and facility		0.956	
Improve the cost required for coordination of various activities		0.630	
Provide products/services that are distinct from that of competitors			0.787
Offer a broader range of products/services than competitors			0.746
Provide high quality products/services			0.613
Percentage of variance	40.093	9.927	6.743
Cumulative percentage	40.093	50.020	56.763
Cronbach's Alpha	0.795	0.770	0.775

Notes: The extraction method used was Principal Axis Factoring; the rotation method was Oblimin with Kaiser Normalization.

The interrelationships among these three factors were also examined. The Factor Correlation Matrix, which is shown in Table 5-18, contains the correlation coefficients among factors (Field, 2000). It is revealed that all of the factors are interrelated. Hence, it is reasonable to use oblique rotation due to the correlation among factors. This confirms the decision in using oblique rotation, and expected correlation. The result provided by oblique rotation is more meaningful than that provided by orthogonal rotation for this data.

Table 5-18: Factor Correlation Matrix of Factor Analysis on Strategic Priorities

Factor	1	2	3
1	1.000	0.470	0.479
2	0.470	1.000	0.352
3	0.479	0.352	1.000

Notes: The extraction method used was Principal Axis Factoring; the rotation method was Oblimin with Kaiser Normalization.

The logical combination of Strategic Priorities and their interrelationship have been identified at this point. However, it is necessary to create summated scales for each factor in order to replace the original variables in subsequent analysis. A composite measure for each factor was simply calculated by averaging the scores of variables which have high loadings on a factor, and then used as a variable in further analysis, particularly multiple regression analysis and cluster analysis. Descriptive statistics for these new variables are shown in Table 5-19.

Table 5-19: Descriptive Statistics for Strategic Priorities

Variables (N = 135)	Mean	S.D.
Customer Orientation (CO)	6.0000	0.82011
Cost Efficiency (CE)	5.4593	1.11310
Differentiation (D)	5.6519	0.96099

5.5 Examining New Variables from FA

New variables, which are derived from factor analyses, are used in the main analysis particularly Multiple Regression, Moderated Regression, and Cluster Analysis for hypotheses testing in the next chapters. It is important to examine the new variables before the main analyses to gain more accurate results (Tabachnick and Fidell, 2007). The issues include sensitivity analysis, outliers, and the tests for the statistical assumptions underlying most multivariate analyses.

5.5.1 Sensitivity Analysis

It is recommended that the analyses should be repeated with and without missing data in order to gain the confidence in the data set after imputation (Tabachnick and Fidell, 2007). Sensitivity analysis was conducted to test the reliability of the data after estimating missing values with EM imputation method. According to missing data on the benefit obtained

from management accounting practices (MAPs) and management techniques (MTs), factor analyses for both groups of variables were performed twice with the data sets before and after imputation. It is noted that using only valid data or complete cases was applied to the data set before EM imputation. The results from both cases indicated similarity; hence, it can be concluded that the analyses were not significantly interfered with by imputation method, and the result can be trusted. The underlying structures emerging from both factor analyses are almost identical shown in Table 5-20.

Table 5-20: Sensitivity Analysis

Valid data analysis	EM imputation
FA on CMAPs	**FA on CMAPs**
1. Strategic management accounting (α = 0.836)	1. Strategic management accounting (α = 0.864)
Throughput accounting	Throughput accounting
Target costing	Target costing
Value chain analysis	Value chain analysis
2. Benchmarking (α = 0.944)	Product life cycle analysis
Of management processes	2. Benchmarking (α = 0.939)
Of operational processes	Of management processes
Of strategic priorities	Of operational processes
Of product/service characteristics	Of strategic priorities
3. Activity based practices (α = 0.922)	Of product/service characteristics
ABB	3. Activity based practices (α = 0.838)
ABM	ABC
ABC	ABM
4. Contemporary performance measure (α = 0.854)	Product profitability analysis
Based on employee attitudes	4. Contemporary performance measure (α = 0.876)
Based on customer satisfaction	Based on employee attitudes
Based on supplier evaluation	Based on customer satisfaction
	Based on BSC
	Based on supplier evaluation
FA on TMAPs	**FA on TMAPs**
1. Traditional budgeting (α = 0.797)	1. Traditional budgeting (α = 0.867)
For compensating managers	For compensating managers
For planning cash flows	For planning cash flows
Budget variance analysis	CVP analysis
For controlling costs	Capital budgeting techniques
For coordinating activities	Budget variance analysis
2. Traditional costing (α = 0.736)	For controlling costs
Standard costing	For coordinating activities
Variable costing	2. Traditional costing (α = 0.744)
3. Traditional performance measure (α = 0.840)	Standard costing
Based on ROI	Absorption costing
Based on CFROI	Variable costing
Based on divisional profit	3. Traditional performance measure (α = 0.848)
	Based on ROI
	Based on CFROI
	Based on divisional profit

Table 5-20: Sensitivity Analysis (Continued)

Valid data analysis	EM imputation
FA on MTs	**FA on MTs**
1. HRM (α = 0.865)	1. HRM (α = 0.864)
Worker training	Worker training
Establishing participative culture	Establishing participative culture
Occupational health and safety	Occupational health and safety
2. Integrating systems (α = 0.892)	Management training
Linking business processes	2. Integrating systems (α = 0.902)
Linking strategies	Linking business processes
Integrating IS in operations	Linking strategies
Integrating IS across functions	Integrating IS in operations
Integrating IS with suppliers	Integrating IS across functions
3. Team based structure (α = 0.769)	Integrating IS with suppliers
Network teams	3. Team based structure (α = 0.799)
Cross functional teams	Network teams
Project teams	Cross functional teams
4. Quality systems (α = 0.809)	Project teams
TQM	4. Quality systems (α = 0.838)
Integrated quality system	TQM
Quality assurance activities	Integrated quality system
5. Innovation and Reorganization (α = 0.774)	Quality assurance activities
Implementing new operating methods	Statistical quality control
Investing in new physical layout	5. Innovation and Reorganization (α = 0.808)
Reorganizing operating processes	Implementing new operating methods
	Investing in new physical layout
	Reorganizing operating processes

5.5.2 Outliers

The standard scores and the Boxplot are examined to identify the outliers for new variables. The results from both criteria indicate similarity. It is found that there are only three variables containing outliers and extreme values, particularly activity based practices, traditional budgeting, and customer orientation. It is noticed that these outliers in the factors may be affected by the outliers included in individual items.

In order to deal with the outliers (retention or deletion), the values of the outliers were examined. It was found that the values are placed within the normal range of values on each of variable, in particular values of 1 to 7 for seven Likert-scale questions. It is shown that there is no evidence of error from data entry, miscoding, or miscalculating. The values of the outliers are not affected by extraordinary events, or outstandingly high or low values on the variables. They are classified as the fourth class of the outliers, which are unique in their combination of values across variables. It is concluded that all of the outliers must be

retained in the analysis due to the belief that they represent a valid element of the population (Hair et al., 2006). Deleting them is a risk to the loss of generalizability.

5.5.3 Testing the Assumptions

Prior to main analysis, it is crucial to test the statistical assumptions underlying multivariate analysis. Violation to the assumption may generate the distorted or biased results. These assumptions are normality, linearity, and homoscedasticity.

Univariate Normality

Univariate normality for an individual variable can be easily tested by assessing the graphs including histogram and normal probability plot, and statistical tests of normality, particularly the Kolmogorov-Smirnov and Shapiro-Wilk tests (Tabachnick and Fidell, 2007). The tests of normality for new variables are shown in Table 5-21.

Table 5-21: The Tests of Normality for New Variables

New Variables	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Stat	df	Sig	Stat	df	Sig
Strategic management accounting	0.120	135	0.000	0.948	135	0.000
Benchmarking	0.104	135	0.001	0.934	135	0.000
Activity based practices	0.092	135	0.007	0.953	135	0.000
Contemporary performance measure	0.093	135	0.007	0.950	135	0.000
Traditional budgeting	0.161	135	0.000	0.901	135	0.000
Traditional costing	0.095	135	0.005	0.962	135	0.001
Traditional performance measure	0.102	135	0.001	0.960	135	0.001
Human resource management	0.097	135	0.003	0.940	135	0.000
Integrating system	0.092	135	0.007	0.961	135	0.001
Team based structure	0.125	135	0.000	0.964	135	0.001
Quality system	0.057	135	0.200*	0.983	135	0.081
Innovation & Reorganization	0.112	135	0.000	0.938	135	0.000
Customer Orientation	0.189	135	0.000	0.899	135	0.000
Cost Efficiency	0.175	135	0.000	0.920	135	0.000
Differentiation	0.138	135	0.000	0.948	135	0.000

Note: *This is a lower bound of the true significance.
[a]Lilliefors Significance Correction.

Kolmogorov-Smirnov and Shapiro-Wilk tests compare the values in the sample with a set of values which are normally distributed, and contain the same mean and standard deviation as the sample. A non-significant result (Sig value ≥ 0.05) indicates normality. In

other words, the distribution of the sample is not statistically different from a normal distribution. However, a significant result (Sig values < 0.05) indicates that the distribution of sample is probably non-normal (Field, 2005). It is found that only one variable, which is Quality system, is normally distributed (Sig value = 0.200). The rest of the new variables violate to the assumption of normality (Sig values < 0.05). The shape of the distribution of each variable is also examined, and the results are consistent with the statistical tests of normality. It is shown that most of variables are a departure from normality, predominantly negative skewness (skew to the right).

To remedy non-normality, the data transformations were conducted many times by trial and error. Unfortunately, none of the data transformations have been successful. It is claimed that the negative effects of non-normality are serious in the small sample size (less than 50 cases). However, with the larger sample size of 135 cases in this study the detrimental impacts from non-normality may be negligible, and the data transformation as a remedy may not be required (Hair et al., 2006).

Linearity

Linearity is an implicit assumption of all multivariate techniques based on correlation such as multiple regression and factor analysis. 'The linearity of the relationship between dependent and independent variables represents the degree to which the change in the dependent variable is associated with the independent variable' (Hair et al., 2006, 205). It is important to examine the relationships between two variables in order to identify any non-linear patterns, which may affect the correlation. Linearity can be assessed by examining scatterplots of the variables, or by running a simple regression to examine the residuals. The straight line from the scatterplot represents the linear relationship while random and equal dispersion about zero of the residuals reveals the linear pattern (Hair et al., 2006). Both scatterplots of any two variables and the residual plots from simple regressions are examined. It is noted that organizational performance is used as a dependent variable while the benefit obtained from management accounting practices and management techniques, and the emphasis on strategic priorities are used as independent variables. The results indicate that most of the relationships between two variables appear to be linear, and no nonlinear relationship was identified.

Homoscedasticity

'Homoscedasticity refers to the assumption that the dependent variable exhibits equal levels of variance across the range of predictor variables' (Hair et al., 2006, p.83). It is important because the variance of the dependent variable being accounted for in the dependent relationship should be equally dispersed across the range of the independent values to allow a fair test of the relationship across all values. The problem that the variance of dependent variable is not relatively equal at each value of the independent variable is called heteroscedasticity. It can result in the better prediction at some levels of the independent variable than the others. To assess heteroscedasticity, scatterplots of any two variables are examined. Unequal dispersions indicate the violation to homoscedasticity such as cones or diamonds shapes. In plotting the graphs, organizational performance is used as a dependent variable while management accounting practices, management techniques and strategic priorities are used as independent variables. It was found that a few scatterplots exhibit slightly unequal dispersions indicating a small degree of heteroscedasticity in the data. This may be due to the skewed distribution or non-normality in most of the independent variables while a dependent variable is normal distributed (Hair et al., 2006).

The data transformation for non-normality can remedy the unequal dispersion of variance in heteroscedastic variables; however, all of the transformations have failed. The violation to homoscedasticity assumption should be acknowledged as limitation of this study. However, this is not unusual in social research of the type being carried out here, and slight heteroscedasticity may have only little impact on significance test, which will not restrict further analysis of the data (Berry and Feldman, 1985; Tabachnick and Fidell, 2007).

Chapter 6

Hypotheses Testing Based on Selection Approach

This chapter focuses on testing the hypotheses developed based on selection approach, which takes a reductionist view to examine the relationship between single contingency factors and organizational structure. Selection approach investigates how contingency factors affect the aspects of management control system (MCS) whilst ignoring their relationships to the organizational performance. It assumes that only firms with good performance can survive within a competitive environment (Chenhall, 2003). There are eight hypotheses developed based on selection approach shown in Table 6-1.

Table 6-1: Research Hypotheses based on Selection Approach

Main theme	Hypotheses
MAPs and Strategy	Hypothesis 1: There is an alignment between strategic priorities of Porter and management accounting practices (MAPs). H 1.1: There is a positive relationship between differentiation strategy and contemporary MAPs. H 1.2: There is a positive relationship between cost leadership strategy and traditional MAPs. Hypothesis 2: There is a fit between strategic types of Miles and Snow and management accounting practices (MAPs). H 2.1: There is a positive relationship between Prospector strategy and contemporary MAPs. H 2.2: There is a positive relationship between Defender strategy and traditional MAPs. Hypothesis 3: There is a fit between strategic missions and management accounting practices (MAPs). H 3.1: There is a positive relationship between Build strategy and contemporary MAPs. H 3.2: There is a positive relationship between Harvest strategy and traditional MAPs. Hypothesis 4: There is a fit between strategic types of Miller and Friesen and management accounting practices (MAPs). H 4.1: There is a positive relationship between Entrepreneurial firms and contemporary MAPs. H 4.2: There is a positive relationship between Conservative firms and traditional MAPs.

Table 6-1: Research Hypotheses based on Selection Approach (Continued)

Main theme	Hypotheses
MTs and Strategy	Hypothesis 5: There is an alignment between strategic priorities of Porter and management techniques (MTs). H 5.1: There is a positive relationship between differentiation strategy and MTs concerning quality, employee empowerment, customization and flexibility. H 5.2: There is a positive relationship between cost leadership strategy and MTs supporting cost efficient processes. Hypothesis 6: There is a fit between strategic types of Miles and Snow and management techniques (MTs). H 6.1: There is a positive relationship between Prospector strategy and MTs concerning quality, employee empowerment, customization and flexibility. H 6.2: There is a positive relationship between Defender strategy and MTs supporting cost efficient processes. Hypothesis 7: There is a fit between strategic missions and management techniques (MTs). H 7.1: There is a positive relationship between Build strategy and MTs concerning quality, employee empowerment, customization and flexibility. H 7.2: There is a positive relationship between Harvest strategy and MTs supporting cost efficient processes. Hypothesis 8: There is a fit between strategic types of Miller and Friesen and management techniques (MTs). H 8.1: There is a positive relationship between Entrepreneurial firms and MTs concerning quality, employee empowerment, customization and flexibility. H 8.2: There is a positive relationship between Conservative firms and MTs supporting cost efficient processes.

6.1 Correlation Analysis

Prior to hypotheses testing, correlation analysis has been conducted to gain some insights into the relationships among all the variables used in the analysis. A correlation is 'the rate of change (linear) in one variable per unit change in the other variable (and vice versa) which best fits the data in the sense of minimizing the squared discrepancies between the estimated and actual scores' (Cohen and Cohen, 1983, p.50). In other words, it is 'a measure of the linear relationship between variables' (Field, 2005, p.107). The value of a correlation coefficient is placed between +1 and -1. If the correlation coefficient is +1, there is a perfect positive relationship between two variables, which means when one

variable changes the other variable changes in the same direction with a proportionate amount. In contrast, if correlation coefficient is -1, there is a perfect negative relationship between two variables, which means when one variable changes the other variable changes in the opposite direction in a proportionate amount. Hence, when a value of correlation coefficient equals 0, no linear relationship exists between those two variables, which means when one variable changes the other variable is stable (Field, 2005).

The magnitude of the correlation coefficient is also important. Coefficient of ±.1 is regarded as a small effect, ±.3 represents a medium effect, and ±.5 indicates a large effect (Field, 2005). Due to the departure from normality of the data, bivariate correlation named Spearman's correlation coefficient which is a non-parametric statistic test has been used for the correlation analysis in this research. One-tailed test is selected according to directional hypotheses (Field, 2005). A correlation matrix reports the correlation coefficients among the variables in Table 6-2.

Table 6-2: Correlation Matrix: Spearman Correlation Coefficient

	Strategic Priorities of Porter			Miles and Snow	Gupta and Govindarajan	Miller and Friesen
(N = 135)	Differen-tiation	Customer Orientation	Cost Efficiency			
CMAPs:						
SMA	.280**	.264**	.190*	.086	-.139	.312***
BM	.317***	.350***	.268**	.249**	-.009	.335***
ABP	.338***	.414***	.379***	.054	-.059	.225**
CPM	.365***	.392***	.368***	.228**	-.141	.461***
TMAPs:						
TB	.346***	.459***	.360***	.126	-.079	.440***
TC	.264**	.373***	.270**	.027	-.127	.143*
TPM	.369***	.461***	.369***	.083	-.086	.266**
MTs:						
HRM	.400***	.534***	.429***	.268**	-.022	.350***
IS	.438***	.418***	.414***	.281***	-.057	.491***
TBS	.366***	.347***	.412***	.265**	-.045	.434***
QS	.438***	.482***	.451***	.177*	-.080	.398***
INRE	.341***	.298***	.434***	.244**	-.028	.416***

*** Correlation is significant at the 0.001 level (1-tailed).
**Correlation is significant at the 0.01 level (1-tailed).
*Correlation is significant at the 0.05 level (1-tailed).

Variable definitions
CMAPs = Contemporary management accounting practices
SMA = Strategic management accounting
BM = Benchmarking
ABP = Activity based practice
CPM = Contemporary performance measures

TMAPs = Traditional management accounting practices
TB = Traditional budgeting
TC = Traditional costing
TPM = Traditional performance measures
MTs = Management techniques
HRM = Human resource management
IS = Integrating system
TBS = Team based structure
QS = Quality system
INRE = Innovation and Reorganization

The interpretation of correlation analysis is described around strategic typologies. It is found that correlation coefficients indicate significantly positive relationships between most pairs of variables. However, there is no significant relationship found between strategic mission of Gupta and Govindarajan (build, hold, and harvest) and all practices and techniques. This implies that the strategic mission the firm pursues has no linear relationship with the benefit obtained from all practices and techniques. Whilst the analysis will proceed further with greater rigor and sophistication this will be borne in mind in subsequent interpretation.

Strategic priorities of Porter: Differentiation and Cost Leadership

Three strategic priorities are statistically correlated with all of the contemporary management accounting practices (CMAPs). Particularly, differentiation is significantly correlated with strategic management accounting ($r = .280$, $p < 0.01$), benchmarking ($r = .317$, $p < 0.001$), activity based practice ($r = .338$, $p < 0.001$), and contemporary performance measure ($r = .365$, $p < 0.001$). Customer orientation is significantly correlated with strategic management accounting ($r = .264$, $p < 0.01$), benchmarking ($r = .350$, $p < 0.001$), activity based practice ($r = .414$, $p < 0.001$), and contemporary performance measure ($r = .392$, $p < 0.001$). Cost efficiency is significantly correlated with strategic management accounting ($r = .190$, $p < 0.05$), benchmarking ($r = .268$, $p < 0.01$), activity based practice ($r = .379$, $p < 0.001$), and contemporary performance measure ($r = .368$, $p < 0.001$).

In line with expectations, all of the CMAPs have a stronger positive relationship with customer orientation which represents differentiation strategy, compared to cost efficiency which characterizes cost leadership strategy. Most of the CMAPs have positive correlation

coefficients greater than .30 with all *p*s < 0.001, which is regarded as a medium association with both customer orientation and differentiation. Particularly, three contemporary practices, which are benchmarking, activity based practices and contemporary performance measure, have the largest correlation with customer orientation while strategic management accounting has the largest relationship with differentiation. It implies that the more the emphasis placed on differentiation strategy, the more benefit gained from all CMAPs. However, cost efficiency also has positive correlation with all of CMAPs, but in different degrees varying from small to medium effects, particularly activity based practices and performance measure (both r > .30, $p < 0.001$). It implies that the firms pursuing a cost efficiency strategic priority may obtain benefit from these two particular practices.

Regarding traditional management accounting practices (TMAPs), there are statistically significant relationships between three strategic priorities and all TMAPs. Particularly, differentiation is significantly correlated with traditional budgeting (r = .346, $p < 0.001$), traditional costing (r = .264, $p < 0.01$), and traditional performance measure (r = .369, $p < 0.001$). Customer orientation is significantly correlated with traditional budgeting (r = .459), traditional costing (r = .373), and traditional performance measure (r = .461) with all *p*s < 0.001. Cost efficiency is significantly correlated with traditional budgeting (r = .360, $p < 0.001$), traditional costing (r = .270, $p < 0.01$), and traditional performance measure (r = .369, $p < 0.001$).

Surprisingly, positive relationships between all of the TMAPs and cost efficiency representing cost leadership strategy are found to be less strong than those with customer orientation strategic priorities characterizing differentiation strategy. However, cost efficiency is positively correlated with all of the TMAPs, and no correlation coefficients less than .270 has been found. This provides an early and superficial indication of a prevalence of TMAPs throughout Thai MA, and this will be examined further in the analysis which follows.

All of the management techniques (MTs) are significantly correlated with three of strategic priorities. Particularly, differentiation is significantly correlated with human resource management (r = .400), integrating system (r = .438), team based structure (r = .366),

quality system (r = .438), and innovation and reorganization (r = .341) with all *p*s < 0.001. Customer orientation is significantly correlated with human resource management (r = .534), integrating system (r = .418), team based structure (r = .347), quality system (r = .482), and innovation and reorganization (r = .298) with all *p*s < 0.001. Cost efficiency is significantly correlated with human resource management (r = .429), integrating system (r = .414), team based structure (r = .412), quality system (r = .451), and innovation and reorganization (r = .434) with all *p*s < 0.001.

It is noticed that human resource management and quality system tend to have relatively large positive relationships with all strategic priorities (r > .40); particularly, both techniques have the largest correlation with customer orientation comparing to any other strategic priorities. It demonstrates the importance of human resource management and quality system to most Thai organizations especially the firms pursuing customer orientation. Similarly, no correlation coefficient less than .40 has been found between integrating system and three strategic priorities. It is noted that integrating system is positively correlated with all strategic priorities in a similar magnitude. As expected, innovation and reorganization are more highly correlated with cost efficiency, rather than with differentiation and customer orientation. Surprisingly, team-based structure has larger correlation with cost efficiency than differentiation or customer orientation.

Strategic type of Miles and Snow: Prospector and Defender

The strategic types of Miles and Snow have been measured using a single question and 7-Likert scale, in which lower scores indicate defender and higher scores indicate prospector. It is revealed that only two contemporary MAPs positively correlated with this strategic type, and it is noticed that only small correlation (r < .30) has been detected. In particular, the strategic type of Miles and Snow is significantly correlated with benchmarking (r = .249), and contemporary performance measures (r = .228) with all *p*s < 0.01. In line with the expectations, it implies that the greater the emphasis placed on prospector orientation, the more benefit obtained from benchmarking and contemporary performance measures. However, there is no significant linear relationship between the strategic types of Miles and Snow and traditional MAPs. It means that whichever strategic type the firms pursue, there is no effect on the benefit obtained from traditional practices.

The strategic type of Miles and Snow is found to be significantly correlated with all MTs, and only small effects (r < .30) have been perceived. Particularly, it is positively correlated with human resource management (r = .268, $p < 0.01$), integrating system (r = .281, $p < 0.001$), team based structure (r = .265, $p < 0.01$), quality system (r = .177, $p < 0.05$), and innovation and reorganization (r = .244, $p < 0.01$). It implies that the more prospector the firms are, the more benefit obtained from all MTs. Specifically, integrating system has the largest correlation while quality system has the smallest correlation.

Strategic type of Miller and Friesen: Entrepreneurial and Conservatives

The strategic type of Miller and Friesen has been measured using multiple items and a 7-Likert scale, in which lower scores indicate conservative attribute and higher scores indicate entrepreneurial characteristic. It is found that the strategic type of Miller and Friesen is significantly correlated with all MAPs both contemporary and traditional in different degrees. Particularly, it is positively correlated with strategic management accounting (r = .312, $p < 0.001$), benchmarking (r = .335, $p < 0.001$), activity based practice (r = .225, $p < 0.01$), contemporary performance measures (r = .461, $p < 0.001$), traditional budgeting (r = .440, $p < 0.001$), traditional costing (r = .143, $p < 0.05$), and traditional performance measure (r = .266, $p < 0.01$).

Expectedly, it is noticed that all contemporary MAPs have a positive relationship with the strategic type of Miller and Friesen. It implies that the more entrepreneurial characteristics the firms possess, the more benefit obtained from all contemporary practices. Specifically, contemporary performance measures has the largest positive correlation (r = .461) while activity based practices has the smallest positive relationship (r = .225). However, all traditional MAPs also have positive relationship with the strategic type of Miller and Friesen, which means the more entrepreneurial attributes the firms pursue, the more benefit obtained from all traditional practices. Particularly, traditional budgeting has the largest positive relationship (r = .440) while traditional costing has the smallest association (r = .143).

Regarding MTs, the strategic type of Miller and Friesen has been found to be significantly correlated with all MTs. Specifically, it is positively correlated with human resource management (r = .350), integrating system (r = .491), team based structure (r = .434), quality system (r = .398), and innovation and reorganization (r = .416) with all *p*s < 0.001. It implies that the more entrepreneurial characteristics the firms posses, the more benefit obtained from all MTs. In particular, integrating system has the largest correlation while human resource management has the smallest relationship.

After addressing linear relationships among variables in correlation analysis, the general understanding about the existing interrelationships between variables as well as the direction of each correlation has been drawn. However, the interpretation of these correlations and their directions cannot be expressed in any causal meaning (Field, 2005). Hypotheses based on selection approach are tested by multiple regression analysis in the next section.

6.2 Multiple Regression Analysis

Multiple regression analysis is 'a statistical technique that can be used to analyze the relationship between a single dependent (criterion or outcome) variable and several independent (predictor) variables' (Hair et al., 2006, p.176). It has been predominantly used in quantitative management accounting research for decades (Smith and Langfield-Smith, 2004) due to its flexibility and adaptability to apply to almost any dependence relationships appearing in research problems. The wide uses of multiple regression analysis can be related to two main objectives; prediction and explanation. For prediction, it aims to predict the single dependent variable by using known values from a set of independent variables. For explanation, it considers the individual contribution of each independent variable in explaining the variation in the dependent variable. This can be done by examining the regression coefficients, including their magnitude, direction (positive or negative), and statistical significance for each independent variable as well as developing substantive and theoretical grounds to explain the impacts of the independent variables (Hair et al., 2006). This study predominantly uses multiple regression analysis for the purpose of explanation rather than prediction. It aims to explain the relationships

between contingency factors and organizational structure, in particular the nature of the MAPs adopted in the firms.

It is claimed that multiple regression analysis is appropriate when the researcher is looking for statistical, not functional relationship[24] (Hair et al., 2006). The relationships among independent variables and dependent variable in this study are based on statistical relationships. This is because the sample data represents human perceptions and opinions, and the measurements of variables involve approximation and contain some levels of measurement error. That is, there is not perfect accuracy in the survey data, such as the benefit from the practices and techniques, the degree of emphasis placed on the strategic priorities, and the perceived performance.

Multiple regression analysis is based on the method of least squares which is the method of identifying the line that best represents the data (the line of best fit) or the regression line. It results in minimizing the total sum of the squared residuals or the squared differences between predicted values of a dependent variable by the line and observed values of dependent variable (Field, 2005). Regression model or regression equation is shown as equation 1.

$$Y_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_n X_n + \varepsilon_i \qquad \ldots\ldots\ldots(1)$$

Y is an outcome variable or a dependent variable, β_0 is the intercept of the regression line or the constant term, β_1 is the regression coefficient of the first predictor or the first independent variable (X_1), β_2 is the regression coefficient of the second predictor or the second independent variable (X_2), β_n is the regression coefficient of the *n*th predictor (X_n), ε_i is the error term or the difference between the predicted and observed value of Y for the *i*th observation (Field, 2005).

A constant term or the intercept represents 'the value of the dependent variable when all the independent variables equal zero' (Berry and Feldman, 1985, p.9). However, the

[24] Functional relationship assumes that there is no error in the prediction; hence, an exact value can be calculated. On the other hand, statistical relationship contains some random component; hence, it estimates an average value (Hair et al., 2006).

interpretation of the intercept depends on the characteristics of the independent variables. Particularly, the intercept may have no explanatory value and should be used only in the prediction process, if the independent variables have no true value of zero (Hair et al., 2006).

A regression coefficient represents 'the slope of the relationship between the independent variable and dependent variable holding all other independent variables constant' (Berry and Feldman, 1985, p.9). In other words, it represents 'the amount of change in the dependent variable due to the independent variable' (Hair et al., 2006, p.180). The type and the strength of the relationship between independent and dependent variables can be assessed through the regression coefficient. The sign of the coefficient represents a positive or negative relationship while the magnitude of the coefficient indicates the amount of change in the dependent variable when the independent variable changes by one unit. When there is no effect of the independent variables on the dependent variable, the coefficient of independent variables are all zero (Schroeder et al., 1986).

6.2.1 Research Design of Multiple Regression Analysis

The research design of multiple regression analysis is concerned with sample size, and the selection of dependent and independent variables.

Sample size

The sample size used in multiple regression analysis can affect both the statistical power[25] of the significance testing and the generalizability of the result. Regarding statistical power, it may not be appropriate to use multiple regression analysis with either too small or too large a sample. Particularly, small sample size (fewer than 30 cases) may only be suitable for simple regression with a single independent variable, and only robust relationships can be identified. In contrast, large sample size (1,000 cases or greater) causes the statistical significant tests to be exceedingly sensitive. In other words, almost all relationships can be statistically significant; hence, the practical significance should also be

[25] The power of the statistical inference test is the probability of correctly rejecting the null hypothesis when it should be rejected. See the detail discussion in Hair et al. (2006, p.10).

ensured in the large sample. In sum, the minimum sample size for multiple regression analysis is 50 cases while 100 cases are more preferable for most research situations (Hair et al., 2006). Thus, the sample size of 135 cases in this study seems appropriate to use multiple regression analysis.

The statistical tests in multiple regression analysis refer to both the coefficient of determination (R^2), 'which is a single measure of overall predictive accuracy' (Hair et al., 2006, 185), and regression coefficient for each independent variable. The interaction among the sample size, the significance level (α), and the number of independent variables in detecting a significant R^2 is shown in Table 6-3.

Table 6-3: The Interaction among R^2, Sample Size, Significance Level (α), and the Numbers of Independent Variables

	Significance Level (α) = .01 No. of Independent Variables				Significance Level (α) = .05 No. of Independent Variables			
Sample Size	**2**	**5**	**10**	**20**	**2**	**5**	**10**	**20**
20	45	56	71	NA	39	48	64	NA
50	23	29	36	49	19	23	29	42
100	13	16	20	26	10	12	15	21
250	5	7	8	11	4	5	6	8
500	3	3	4	6	3	4	5	9
1000	1	2	2	3	1	1	2	2

NA = not applicable.
Source: Hair et al. (2006, p.195).

According to the interplay among sample size, the significant level (α), and the number of independent variables, the possible levels of significant R^2 which can be detected are identified. With the sample size of 135 cases, the significant level (α) at .05, and the number of independent variables varying from 3, 4, and 5 variables, the relationships with R^2 values of approximately 10 to 12 can be detected reliably in this study.

Regarding the effect of the sample size on generalizability of the results, the ratio of cases to independent variables is important. The minimum rule is five cases for each independent variable (5:1). If the ratio is lower than the minimum rule of 5 cases per each independent variable, it may be over-fitting the regression model to the sample. A more desirable level is 15-20 cases to 1 independent variable (15:1 or 20:1). It is believed that the result should be generalizable when this level of the ratio is met and the sample represents well the

population (Hair et al., 2006). With the sample size of 135 cases and the maximum numbers of the independent variables used in this study as five variables, the desirable level of the ratio of cases to independent variables is met with an actual ratio of 27:1. Consequently, the results from the current study should not be a case of over-fitting the sample, and should be generalizable.

The selection of variables

Due to a dependent relationship in multiple regression analysis, variables must be specified as a dependent variable and independent variables. The selection of both dependent and independent variables is based on previous research and theoretical rationale, which aims to investigate the relationships between the emphasis on the strategic priorities and the benefits obtained from the uses of management accounting practices and management techniques. All of the variables, both dependent and independent variables, are 7-Likert scale variables, which are assumed to be metric variables; hence, they are appropriate for multiple regression analysis.

Even though the research problem dictates the selection of a dependent variable, the researcher must be aware of measurement error especially in the dependent variable. It is claimed that acceptable levels of predictive accuracy cannot be achieved even with the best set of independent variables, if there is substantial measurement error in the dependent variable. Measurement error refers to 'the degree to which the variable is an accurate and consistent measure of the concept being studied' (Hair et al., 2006, p.193). There are many possible sources of measurement error such as data entry errors, the imprecision of the measurement, and the inability of respondents to provide accurate information. Some degree of measurement error must be expected in all variables used in multivariate techniques. However, measurement error can be reduced by using multivariate measurements, also called summated scales, which is the use of several variables in a composite measure as a representative of a concept. Different facets of the concept and a more well-rounded perspective can be obtained from using several variables instead of relying solely on a single variable (Hair et al., 2006). Consequently, in this research most of the variables both dependent and independent variables are summated scales deriving from factor analysis; the measurement error is therefore kept as minimum.

The selection of the independent variables involves a problematic issue, specification error, 'which concerns the inclusion of irrelevant variables or the omission of relevant variables from the set of independent variables' (Hair et al., 2006, p.193). Adding irrelevant independent variables may not bias the result for other independent variables, but it affects the regression equation or regression model such as a deteriorated impact on model parsimony, and the reduction of the statistical and practical significance of the analysis. On the other hand, exclusion of relevant independent variables can cause a serious bias of the results and problems in model interpretation. The degree of the bias depends on the magnitude of the correlation between omitted and included variables (Schroeder et al., 1986). To avoid both types of specification error, the independent variables have been selected with careful consideration based on theoretical and practical support.

6.2.2 Assumptions in Multiple Regression Analysis

There are five main areas of assumptions in the multiple regression analysis; linearity of the phenomenon measured, constant variance of the error terms (heteroscedasticity), independence of the error terms, normality of the error term distribution, and multicollinearity.

Importance of assumptions

The linearity assumption is important to regression analysis, and must be examined because the concept of correlation is based on a linear relationship. The presence of unequal dispersion of the variance in the dependent variable across the range of the independent variable or heteroscedasticity affects standard errors, and causes unfair hypothesis tests; thus, it is crucial to examine any violation to the equality of variance. The assumption of independence of the error terms is also important to regression analysis, and must be examined because all predicted values are assumed to be independent in the regression. The normality assumption must be examined in regression analysis. It is noted that the use of F and *t* statistical tests in regression analysis requires the data to be normal. Finally, multicollinearity, which is the correlation among three or more independent variables, should also be examined due to the considerable impact on the regression model

such as the reduction in predictive power of an individual predictor, and the reversed sign of regression coefficients. There is expected to be high correlation between the outcome variable and individual predictors, but not among independent variables. However, some degree of multicollinearity cannot be avoided, especially in the data involving questionnaire responses (Hair et al., 2006).

Examination of assumptions

All of the assumptions must be applied to both the individual variables and the overall relationship in the regression model also called the variate, which is 'the linear combination of variables formed in the multivariate technique by deriving empirical weights applied to a set of variables specified by the researcher' (Hair et al., 2006, p.40). The assumptions for each variable were already tested in the previous chapter; hence, only the assumptions for the overall relationship or the variate will be examined in this chapter.

The residual, which is 'the difference between the observed and predicted values for the dependent variable' (Hair et al., 2006, p.205), is used as the principal measure of prediction error for the variate. Studentized residual, which is the standardized form of residual, is the most widely used due to its correspondence to *t* values. Assumption violations for the relationship as a whole can be identified by examining the residual plots, plotting the residuals (studentized) against the predicted dependent values. Specific patterns of the residuals represent the violations of each assumption such as triangle-shaped and diamond-shaped patterns representing heteroscedasticity while curvilinear patterns represent non-linearity. The null plot or no pattern, which illustrates the random and equal dispersion of the residuals about zero, is expected when all the assumptions are met (de Vaus, 2001). It was found that most of the scatterplots of residuals seem to be null plots. No signal of non-linearity appears from the plots. However, some of the scatterplots exhibit slightly unequal dispersion representing small degrees of heteroscedasticity and a few outliers. Ignoring these imperfections, it can be assumed that all the assumptions are met.

Apart from residual plots, there are some useful other plots in examining regression assumptions such as partial regression plots, histogram of residuals, and normal probability

plots. Partial regression plots, which are scatterplots of the residuals of the dependent variable and each of the independent variables when the effects of all other independent variables are controlled, can also be used to detect non-linear relationships, heteroscedasticity, and the outliers or influential observations. These partial plots are expected to demonstrate the linear relationship either positive or negative depending on the relationship between the outcome variable and each predictor, and the residual dots are expected to scatter equally around that straight line to exhibit homoscedasticity (Field, 2005). It was found that most of these partial regression plots demonstrate relatively linear relationships between variables, and the residuals tend to space out evenly around the line. Thus, some degrees of linearity and homoscedasticity are assured. It also confirms what we found from previous plots.

Histogram of residuals and normal probability plots are useful to test the normality of residuals. A bell-shaped curve or symmetric distribution is expected from the histogram while a straight line along the diagonal is expected from the normal probability plot in order to indicate normality (Field, 2005). It was found that most of the histograms reveal a roughly normal distribution curve while normal probability plots of residuals exhibit a relatively straight diagonal line, indicating the normality of the residuals.

Three methods are used to assess multicollinearity including an examination of the correlation matrix for the predictors, Tolerance, and Variance Inflation Factor (VIF). In examining any correlation matrix, high correlations (above 0.90) between any two independent variables reveal the present of multicollinearity (Field, 2005). It was found that there is no high correlation among independent variables in the correlation matrix. Tolerance is 'the amount of variability of the selected independent variable not explained by the other independent variables' (Hair et al., 2006, p.227). Hence, it is expected to be high to indicate a small degree of multicollinearity. The cut-off point of tolerance value is the value of 0.10, which means the tolerance value less than 0.10 may cause concern. 'Variance Inflation Factor (VIF) is simply the inverse of the tolerance value' (Hair et al., 2006, p.227). In contrast to tolerance value, VIF is expected to be low to indicate a small degree of multicollinearity. The cut-off point of VIF is a value of 10, which means VIF value greater than 10 is problematic (Field, 2005; Hair et al., 2006). It was found that the tolerance values are all substantially greater than 0.1, and VIF values are all well below 10.

The results from all measures are consistent, and it can be concluded that there is no sign of multicollinearity in the data.

In sum, all the assumptions in multiple regression analysis were tested through the plots and tests. These include linearity, heteroscedasticity, independence of the error terms, normality, and multicollinearity. It was found that disregarding small violations it can be assumed that all the assumptions are met.

6.3 Testing Hypotheses with Multiple Regression Analysis

Multiple regression analyses are conducted in order to test the hypotheses developed based on selection approach, particularly the investigation of the relationships between the emphasis placed on different strategic types, and the benefit obtained from management accounting practices and management techniques. The precise set of independent variables is once entered into the regression model and specified by the researcher based on theoretical justification rather than selected by the SPSS programme such as stepwise estimation or forward addition and backward elimination. This confirmatory specification approach allows the researcher to have total control over the variable selection. In this regard, the trade-offs, between using more independent variables and thus more predictive accuracy versus model parsimony and concise explanation of the relationship, must be made. The problems from specification errors due to either omission or inclusion of independent variables are minimized because the selection of variables is relied upon from the literature and theoretical support (Field, 2005; Hair et al., 2006). The results from multiple regression analysis, the interpretation of the results, and the discussion for each hypothesis are shown below.

6.3.1 Hypothesis 1

There is an alignment between strategic priorities of Porter and management accounting practices (MAPs).

H 1.1: There is a positive alignment between differentiation strategy and contemporary management accounting practices (CMAPs).

H 1.2: There is a positive alignment between cost leadership strategy and traditional management accounting practices (TMAPs).

To test the hypothesis, three strategic priorities of Porter are used as dependent variables while contemporary and traditional MAPs are used as independent variables. It is noted that all variables are derived from factor analysis. After estimation of the regression model, the researcher must test the regression assumptions via examination of the residual plots, and identify the outliers and influential observations via standardized residual values, Cook's distance, Mahalanobis distances, and Leverage[26]. Corrective actions and re-estimation of the regression model are required, if substantial violations to the assumptions are found or influential observations are determined (Hair et al., 2006). It was found that there is no serious assumption violation; however, four cases were identified as influential observations and outliers. They may have excessive influence on the result; hence, they were deleted from the analysis.

The regression model is re-estimated after the deletion of the influential cases. It is noted that the sample size is slightly reduced; however, it is large enough to meet the minimum ratio of cases to independent variables (5:1). The results are shown in Table 6-4. It contains three panels in which each of the three strategic priorities is used as a dependent variable. Specifically, panel A represents the results when differentiation strategic priority is used as a dependent variable. Panel B reveals the results when customer orientation strategic priority is used as a dependent variable. Panel C demonstrates the results when cost efficiency strategic priority is used as a dependent variable. Each panel contain two regression equations. Contemporary MAPs are used as independent variables in equation 1 while traditional MAPs are used as independent variables in equation 2.

[26] The detail of these tests can be found in Field (2005).

Table 6-4: The Result from Multiple Regression Analysis for Hypothesis 1

Panel A: Strategic priority named Differentiation (D) is the dependent variable

Multiple regression equation 1: $D = \beta_0 + \beta_1 SMA + \beta_2 BM + \beta_3 ABP + \beta_4 CPM + \varepsilon$

Coefficient of Determination (R^2)	0.141
Adjusted R^2	0.114
Std. Error of the estimate	0.89772
F-value	5.174
Significance	0.001***

	Unstandardised Coefficients		Standardised Coefficients			Collinearity Statistics	
Variable	B	Std. Error	Beta	t-value	Sig	Tolerance	VIF
Constant	3.693	0.495		7.461	0.000		
SMA	-0.017	0.098	-0.018	-0.170	0.865	0.583	1.714
BM	0.082	0.106	0.089	0.776	0.439	0.523	1.912
ABP	0.104	0.105	0.112	0.991	0.324	0.533	1.876
CPM	0.208	0.101	0.244	2.050	0.042**	0.481	2.079

Multiple regression equation 2: $D = \beta_0 + \beta_1 TB + \beta_2 TC + \beta_3 TPM + \varepsilon$

Coefficient of Determination (R^2)	0.161
Adjusted R^2	0.141
Std. Error of the estimate	0.88686
F-value	8.141
Significance	0.000***

	Unstandardised Coefficients		Standardised Coefficients			Collinearity Statistics	
Variable	B	Std. Error	Beta	t-value	Sig	Tolerance	VIF
Constant	3.376	0.613		5.506	0.000		
TB	0.101	0.135	0.084	0.752	0.453	0.525	1.903
TC	0.065	0.110	0.058	0.587	0.558	0.686	1.459
TPM	0.256	0.094	0.306	2.725	0.007***	0.523	1.912

***Significant at the 0.01 level (1-tailed).
**Significant at the 0.05 level (1-tailed).
*Significant at the 0.10 level (1-tailed).

Variable definitions
SMA = Strategic management accounting
BM = Benchmarking
ABP = Activity based practice
CPM = Contemporary performance measures
TB = Traditional budgeting
TC = Traditional costing
TPM = Traditional performance measures

Table 6-4: The Result from Multiple Regression Analysis for Hypothesis 1 (Continued)

Panel B: Strategic priority named Customer Orientation (CO) is the dependent variable

Multiple regression equation 1: $CO = \beta_0 + \beta_1 SMA + \beta_2 BM + \beta_3 ABP + \beta_4 CPM + \varepsilon$

Coefficient of Determination (R^2)	0.202
Adjusted R^2	0.177
Std. Error of the estimate	0.70823
F-value	8.151
Significance	0.000***

	Unstandardised Coefficients		Standardised Coefficients			Collinearity Statistics	
Variable	B	Std. Error	Beta	t-value	Sig	Tolerance	VIF
Constant	4.013	0.368		10.898	0.000		
SMA	0.034	0.076	0.047	0.448	0.655	0.563	1.775
BM	0.136	0.081	0.187	1.685	0.094*	0.502	1.993
ABP	0.188	0.081	0.258	2.327	0.022**	0.505	1.982
CPM	0.015	0.072	0.024	0.210	0.834	0.492	2.034

Multiple regression equation 2: $CO = \beta_0 + \beta_1 TB + \beta_2 TC + \beta_3 TPM + \varepsilon$

Coefficient of Determination (R^2)	0.250
Adjusted R^2	0.232
Std. Error of the estimate	0.71883
F-value	14.113
Significance	0.000***

	Unstandardised Coefficients		Standardised Coefficients			Collinearity Statistics	
Variable	B	Std. Error	Beta	t-value	Sig	Tolerance	VIF
Constant	3.284	0.497		6.607	0.000		
TB	0.142	0.109	0.138	1.301	0.195	0.525	1.903
TC	0.144	0.089	0.150	1.614	0.109	0.686	1.459
TPM	0.212	0.076	0.297	2.791	0.006***	0.523	1.912

***Significant at the 0.01 level (1-tailed).
**Significant at the 0.05 level (1-tailed).
*Significant at the 0.10 level (1-tailed).

Variable definitions
SMA = Strategic management accounting
BM = Benchmarking
ABP = Activity based practice
CPM = Contemporary performance measures
TB = Traditional budgeting
TC = Traditional costing
TPM = Traditional performance measures

Table 6-4: The Result from Multiple Regression Analysis for Hypothesis 1 (Continued)

Panel C: Strategic priority named Cost Efficiency (CE) is the dependent variable

Multiple regression equation 1: $CE = \beta_0 + \beta_1 SMA + \beta_2 BM + \beta_3 ABP + \beta_4 CPM + \varepsilon$

Coefficient of Determination (R^2)	0.153
Adjusted R^2	0.126
Std. Error of the estimate	1.04448
F-value	5.698
Significance	0.000***

	Unstandardised Coefficients		Standardised Coefficients			Collinearity Statistics	
Variable	B	Std. Error	Beta	t-value	Sig	Tolerance	VIF
Constant	3.250	0.576		5.644	0.000		
SMA	-0.087	0.114	-0.081	-0.758	0.450	0.583	1.714
BM	-0.022	0.123	-0.021	-0.183	0.855	0.523	1.912
ABP	0.231	0.122	0.212	1.889	0.061*	0.533	1.876
CPM	0.293	0.118	0.294	2.486	0.014**	0.481	2.079

Multiple regression equation 2: $CE = \beta_0 + \beta_1 TB + \beta_2 TC + \beta_3 TPM + \varepsilon$

Coefficient of Determination (R^2)	0.162
Adjusted R^2	0.142
Std. Error of the estimate	0.90616
F-value	8.082
Significance	0.000***

	Unstandardised Coefficients		Standardised Coefficients			Collinearity Statistics	
Variable	B	Std. Error	Beta	t-value	Sig	Tolerance	VIF
Constant	3.107	0.617		5.032	0.000		
TB	0.128	0.133	0.104	0.963	0.338	0.570	1.755
TC	0.109	0.106	0.100	1.030	0.305	0.706	1.416
TPM	0.221	0.091	0.265	2.419	0.017**	0.558	1.793

***Significant at the 0.01 level (1-tailed).
**Significant at the 0.05 level (1-tailed).
*Significant at the 0.10 level (1-tailed).

Variable definitions
SMA = Strategic management accounting
BM = Benchmarking
ABP = Activity based practice
CPM = Contemporary performance measures
TB = Traditional budgeting
TC = Traditional costing
TPM = Traditional performance measures

Interpretation of the Results

The overall model fit can be assessed through the coefficient of determination (R^2), adjusted coefficient of determination (adjusted R^2), and *F* statistical test. The R^2 reveals the amount of variance in the dependent variable explained by the model. The R^2 value of 1 indicates that the regression model perfectly predicts the dependent variable while the R^2 value of 0 indicates that there is no improvement in predictive power when using regression model instead of baseline prediction (mean value). The adjusted R^2 can be interpreted as the same meaning as R^2, but it is adjusted for the number of predictors relative to the sample size. Consequently, the adjusted R^2 is useful in comparison across regression models with different numbers of independent variables and different sample sizes. The significance of the overall model is measured by *F* ratio, which tests whether the amount of variation explained by the regression model is better than the base line prediction ($R^2 > 0$) (Hair et al., 2006).

The significance of regression coefficients can be tested as to whether the estimated coefficients across different samples of a specific size will definitely be different from zero. The confidence interval must be established around the estimated coefficient. If there is no zero included in the confidence interval, it can be stated that the regression coefficient is significantly different from zero. The statistical test for the regression coefficients is the *t* test, which is calculated by dividing the coefficient by the standard error. Thus, the *t* value corresponds to the number of standard errors that the coefficient differs from zero (Hair et al., 2006). SPSS provides both the *t* test and the significant value of the *t* test for the constant and individual regression coefficient.

Interpretation of the regression equation (Panel A equation 1)

The adjusted R^2 is 0.114, which means 11.4 percent of the possible variation in the emphasis placed on differentiation strategic priority is associated with a set of contemporary management accounting practices (CMAPs). It is found that the regression model is statistically significant with an *F* value of 5.174 ($P < 0.01$). The regression model or estimated equation is shown as follows.

$$\text{Differentiation} = 3.693 + (-0.017)\,\text{SMA} + 0.082\,\text{BM} + 0.104\,\text{ABP} + 0.208\,\text{CPM}$$

The regression coefficients of Strategic management accounting (SMA), Benchmarking (BM), and Activity based practice (ABP) are not statistically significant. It implies that these three practices have no generalizable effect on the emphasis placed on differentiation strategic priority beyond this sample; hence, they should not be used in prediction or explanation purposes. However, the regression coefficient of Contemporary performance measures (CPM) of 0.208 is found to be significantly different from zero with the *t* value of 2.050 ($P < 0.05$). It can be confidently concluded that CPM has a statistically significant effect in the regression model with a high degree of certainty (95%); thus, it should be included in the regression equation. The regression coefficient of CPM is 0.208, which represents the positive relationship between differentiation and CPM. It implies that if the firms obtain the benefit from CPM for one more unit, they are expected to place more emphasis on differentiation strategic priority for 0.208 units.

Interpretation of the regression equation (Panel A equation 2)

The adjusted R^2 is 0.141, which means 14.1 percent of the possible variation in the emphasis placed on differentiation strategic priority is associated with a set of traditional management accounting practices (TMAPs). It is found that the regression model is statistically significant with an *F* value of 8.141 ($P < 0.001$). The regression model or estimated equation is shown as follows.

$$\text{Differentiation} = 3.376 + 0.101\,\text{TB} + 0.065\,\text{TC} + 0.256\,\text{TPM}$$

The regression coefficients of Traditional budgeting (TB) and Traditional costing (TC) are not statistically significant; hence, they should not be used in prediction or explanation purposes. However, the regression coefficient of Traditional performance measure (TPM) of 0.256 is found to be significantly different from zero with the *t* value of 2.725 ($P < 0.01$). It can be confidently concluded that TPM has a statistically significant effect in the regression model with a high degree of certainty (99%); thus, it should be included in the

regression equation. The regression coefficient of TPM is 0.256, which represents the positive relationship between differentiation and TPM. It implies that if the firms obtain the benefit from TPM for one more unit, they are expected to place more emphasis on differentiation strategic priority for 0.256 units.

Interpretation of the regression equation (Panel B equation 1)

The adjusted R^2 is 0.177, which means 17.7 percent of the possible variation in the emphasis placed on customer orientation strategic priority is associated with a set of contemporary management accounting practices (CMAPs). It is found that the regression model is statistically significant with an *F* value of 8.151 ($P < 0.001$). The regression model or estimated equation is shown as follows.

$$\text{Customer Orientation} = 4.013 + 0.034\ \text{SMA} + 0.136\ \text{BM} + 0.188\ \text{ABP} + 0.015\ \text{CPM}$$

The regression coefficients of Benchmarking (BM) and Activity based practice (ABP) are found to be significantly different from zero with the *t* value of 1.685 ($P < 0.10$), and the *t* value of 2.327 ($P < 0.05$), respectively. It can be confidently concluded that BM and ABP have a statistically significant effect in the regression model with a high degree of certainty (90% and 95%); thus, they should be included in the regression equation. However, the regression coefficients of Strategic management accounting (SMA) and Contemporary performance measure (CPM) are not statistically significant; hence, they should not be used in prediction or explanation purposes.

The regression coefficient of BM is 0.136, which represents the positive relationship between customer orientation and BM. It implies that if the firms obtain the benefit from BM for one more unit, they are expected to place more emphasis on customer orientation strategic priority for 0.136 units. Likewise, the regression coefficient of ABP is 0.188, which represents the positive relationship between customer orientation and ABP. It implies that if the firms obtain the benefit from ABP for one more unit, they are expected to place more emphasis on customer orientation strategic priority for 0.188 units. In order to assess the importance of significant predictors, standardized regression coefficients or

beta coefficients are used (Hair et al., 2006). The beta coefficients of Benchmarking (BM) and Accounting based practice (ABP) are 0.187 and 0.258 respectively. Hence, ABP has the highest impact on the model, and is moderately more important than BM.

Interpretation of the regression equation (Panel B equation 2)

The adjusted R^2 is 0.232, which means 23.2 percent of the possible variation in the emphasis placed on customer orientation strategic priority is associated with a set of traditional management accounting practices (TMAPs). It is found that the regression model is statistically significant with an *F* value of 14.113 ($P < 0.001$). The regression model or estimated equation is shown as follows.

$$\text{Customer Orientation} = 3.284 + 0.142\ \text{TB} + 0.144\ \text{TC} + 0.212\ \text{TPM}$$

The regression coefficients of Traditional budgeting (TB) and Traditional costing (TC) are not statistically significant. However, the regression coefficient of Traditional performance measure (TPM) of 0.212 is found to be significantly different from zero with the *t* value of 2.791 ($P < 0.01$). It can be confidently concluded that TPM has a statistically significant effect in the regression model with a high degree of certainty (99%); thus, it should be included in the regression equation. The regression coefficient of TPM is 0.212, which represents the positive relationship between customer orientation and TPM. It implies that if the firms obtain the benefit from TPM for one more unit, they are expected to place more emphasis on customer orientation strategic priority for 0.212 units.

Interpretation of the regression equation (Panel C equation 1)

The adjusted R^2 is 0.126, which means 12.6 percent of the possible variation in the emphasis placed on cost efficiency strategic priority is associated with a set of contemporary management accounting practices (CMAPs). It is found that the regression model is statistically significant with an *F* value of 5.698 ($P < 0.001$). The regression model or estimated equation is shown as follows.

$$\text{Cost Efficiency} = 3.250 + (-0.087)\,\text{SMA} + (-0.022)\,\text{BM} + 0.231\,\text{ABP} + 0.293\,\text{CPM}$$

The regression coefficients of Activity based practice (ABP) and Contemporary performance measure (CPM) are found to be significantly different from zero with the *t* value of 1.889 ($P < 0.10$), and the *t* value of 2.486 ($P < 0.05$), respectively. It can be confidently concluded that ABP and CPM have a statistically significant effect in the regression model with a high degree of certainty (90% and 95%); thus, they should be included in the regression equation. However, the regression coefficients of Strategic management accounting (SMA) and Benchmarking (BM) are not statistically significant; hence, they should not be used in prediction or explanation purposes.

The regression coefficient of ABP is 0.231, which represents the positive relationship between cost efficiency and ABP. It implies that if the firms obtain the benefit from ABP for one more unit, they are expected to place more emphasis on cost efficiency strategic priority for 0.231 units. Likewise, the regression coefficient of CPM is 0.293, which represents the positive relationship between cost efficiency and CPM. It implies that if the firms obtain the benefit from CPM for one more unit, they are expected to place more emphasis on cost efficiency strategic priority for 0.293 units. The beta coefficients of ABP and CPM are 0.212 and 0.294 respectively. Hence, CPM has the highest impact on the model, and is moderately more important than ABP.

Interpretation of the regression equation (Panel C equation 2)

The adjusted R^2 is 0.142, which means 14.2 percent of the possible variation in the emphasis placed on cost efficiency strategic priority is associated with a set of traditional management accounting practices (TMAPs). It is found that the regression model is statistically significant with an *F* value of 8.082 ($P < 0.001$). The regression model or estimated equation is shown as follows.

$$\text{Cost Efficiency} = 3.107 + 0.128\,\text{TB} + 0.109\,\text{TC} + 0.221\,\text{TPM}$$

The regression coefficients of Traditional budgeting (TB) and Traditional costing (TC) are not statistically significant; hence, they should not be used in prediction or explanation purposes. However, the regression coefficient of Traditional performance measure (TPM) of 0.221 is found to be significantly different from zero with the *t* value of 2.419 ($P < 0.05$). It can be confidently concluded that TPM has a statistically significant effect in the regression model with a high degree of certainty (95%); thus, it should be included in the regression equation. The regression coefficient of TPM is 0.221, which represents the positive relationship between cost efficiency and TPM. It implies that if the firms obtain the benefit from TPM for one more unit, they are expected to place more emphasis on cost efficiency strategic priority for 0.221 units.

Summary of the Results

It is found that there are some alignments between strategic priorities of Porter and management accounting practices (MAPs). In line with expectations, there are positive relationships between differentiation strategy (through two strategic priorities; differentiation and customer orientation) and three of contemporary management accounting practices (CMAPs) including contemporary performance measure, benchmarking, and activity based practices. A positive relationship is also found to be statistically significant between cost leadership strategy (through cost efficiency strategic priority) and one of the traditional management accounting practices (TMAPs) named traditional performance measures, but not for any other traditional practices. The findings indicate that the higher emphasis the firms placed on differentiation strategy, the more benefit obtained from most of the CMAPs. Similarly, the higher emphasis the firms placed on cost leadership strategy, the more benefit obtained from a particular TMAP. Consequently, this part of the findings supports the alignment between strategic priorities of Porter and MAPs in both Hypothesis 1.1 and 1.2.

However, contrary to expectations both strategic priorities representing differentiation strategy are unpredictably found to be aligned with traditional performance measure while cost efficiency is surprisingly related to two of CMAPs, particularly activity based practice and contemporary performance measure. Table 6-5 illustrates the result summary for hypothesis 1.

Table 6-5: Summary of the Result for Hypothesis 1

Management Accounting Practices (MAPs)	Differentiation Strategy		Cost Leadership (Cost efficiency)
	Differentiation	Customer Orientation	
Contemporary practices:			
Strategic management accounting			
Benchmarking		0.136*	
Activity based practices		0.188**	0.231*
Contemporary performance measure	0.208**		0.293**
Adjusted R^2	11.4	17.7	12.6
F-value	5.174***	8.151***	5.698***
Traditional practices:			
Traditional budgeting			
Traditional costing			
Traditional performance measure	0.256***	0.212***	0.221**
Adjusted R^2	14.1	23.2	14.2
F-value	8.141***	14.113***	8.082***

***Significant at the 0.01 level (1-tailed).
**Significant at the 0.05 level (1-tailed).
*Significant at the 0.10 level (1-tailed).

6.3.2 Hypothesis 2

There is a fit between strategic types of Miles and Snow and management accounting practices (MAPs).

H 2.1: There is a positive relationship between Prospector strategy and contemporary MAPs.

H 2.2: There is a positive relationship between Defender strategy and traditional MAPs.

To test the hypothesis, a variable named Strategic types of Miles and Snow is used as a dependent variable. The values of the outcome variable vary along the continuum, in which the characteristic of defender is presented at one end and the characteristic of prospector is presented at the other end. The high values demonstrate high degree of prospector while low values illustrate high degree of defender. Contemporary and traditional MAPs, which are derived from factor analysis, are used as independent variables. It was found that there is no serious assumption violation; however, four cases were identified as influential observations and outliers. They may have excessive influence on the result; hence, they were deleted from the analysis. The regression model is re-estimated after the deletion of the influential cases. The results are shown in Table 6-6,

which contains two equations. Contemporary MAPs are used as independent variables in equation 1 whereas traditional MAPs are used as predictors in equation 2.

Table 6-6: The Result from Multiple Regression Analysis for Hypothesis 2

Multiple regression equation 1: $ST_{M\&S} = \beta_0 + \beta_1 SMA + \beta_2 BM + \beta_3 ABP + \beta_4 CPM + \varepsilon$

Coefficient of Determination (R^2)	0.139
Adjusted R^2	0.111
Std. Error of the estimate	1.477
F-value	5.071
Significance	0.001***

	Unstandardised Coefficients		Standardised Coefficients			Collinearity Statistics	
Variable	B	Std. Error	Beta	t-value	Sig	Tolerance	VIF
Constant	3.199	0.815		3.928	0.000		
SMA	-0.134	0.162	-0.090	-0.828	0.409	0.583	1.714
BM	0.428	0.174	0.282	2.465	0.015**	0.523	1.912
ABP	-0.379	0.173	-0.248	-2.192	0.030**	0.533	1.876
CPM	0.439	0.167	0.314	2.632	0.010**	0.481	2.079

Multiple regression equation 2: $ST_{M\&S} = \beta_0 + \beta_1 TB + \beta_2 TC + \beta_3 TPM + \varepsilon$

Coefficient of Determination (R^2)	0.025
Adjusted R^2	0.002
Std. Error of the estimate	1.543
F-value	1.080
Significance	0.360

	Unstandardised Coefficients		Standardised Coefficients			Collinearity Statistics	
Variable	B	Std. Error	Beta	t-value	Sig	Tolerance	VIF
Constant	3.696	1.067		3.464	0.001		
TB	0.327	0.234	0.168	1.393	0.166	0.525	1.903
TC	-0.136	0.192	-0.075	-0.707	0.481	0.686	1.459
TPM	0.030	0.163	0.022	0.183	0.855	0.523	1.912

***Significant at the 0.01 level (1-tailed).
**Significant at the 0.05 level (1-tailed).
*Significant at the 0.10 level (1-tailed).

Variable definitions
$ST_{M\&S}$ = Strategic types of Miles and Snow
SMA = Strategic management accounting
BM = Benchmarking
ABP = Activity based practice
CPM = Contemporary performance measures
TB = Traditional budgeting
TC = Traditional costing
TPM = Traditional performance measures

Interpretation of the Results

Interpretation of the regression equation 1

The adjusted R^2 is 0.111, which means 11.1 percent of the possible variation in the strategic type of Miles and Snow is associated with a set of contemporary management accounting practices (CMAPs). It is found that the regression model is statistically significant with an *F* value of 5.071 ($P < 0.01$). The regression model or estimated equation is shown as follows.

$$SP_{M\&S} = 3.199 + (-0.134)\ SMA + 0.428\ BM + (-0.379)\ ABP + 0.439\ CPM$$

Most of the CMAPs are found to be statistically significant except Strategic management accounting (SMA). The regression coefficients of Benchmarking (BM), Activity based practice (ABP), and Contemporary performance measure (CPM) are found to be significantly different from zero with the *t* value of 2.465, -2.192, and 2.632 (all *P*s < 0.05). It can be confidently concluded that BM, ABP, and CPM have a statistically significant effect in the regression model with a high degree of certainty (all 95%); thus, they should be included in the regression equation.

The regression coefficients of BM and CPM are 0.428 and 0.439, which represent the positive relationships between the strategic type of Miles and Snow and both of CMAPs. It implies that if the firms obtain the benefit from BM and CPM for one more unit, they are expected to pursue the characteristic of prospector more for 0.428 and 0.439 units respectively. In contrast, the regression coefficient of ABP is -0.379, which represents the negative relationship between the strategic type of Miles and Snow and ABP. It implies that if the firms obtain the benefit from ABP for one more unit, they are expected to pursue the characteristic of defender more for 0.379 units. The beta coefficients of BM, ABP, and CPM are 0.282, -0.248 and 0.314 respectively. Hence, CPM has the highest impact on the model, and the second important predictor is BM.

Interpretation of the regression equation 2

The adjusted R^2 is 0.002, which means only 0.2 percent of the possible variation in the strategic type of Miles and Snow is associated with a set of traditional management accounting practices (TMAPs). It is found that the regression model is not statistically significant. It means that the amount of variation explained by this model is not better than baseline prediction. It is also found that none of the regression coefficients are statistically significant. It implies that there is no relationship between the strategic type of Miles and Snow and all of the TMAPs.

Summary of the Results

The results reveal a fit between strategic types of Miles and Snow and management accounting practices (MAPs). It is found that there are positive relationships between this strategic type and two of contemporary practices; benchmarking and contemporary performance measure. It implies that the more prospector the firms are, the higher benefit obtained from benchmarking and contemporary performance measure. This finding supports the positive relationship proposed in Hypothesis 2.1. However, the negative relationship between this strategic type and one of the contemporary practices (activity based practice) has unexpectedly been found. It means that the more defender the firms are, the higher benefit obtained from activity based practices. Thus, defender firms, in attempt, to maintain their competitive advantages, may tend to be very 'cost orientated' and focus on activity based practices to obtain greater insight into their cost position, just to 'defend' their situation.

Regarding traditional practices, no relationship has been found. It implies that whether prospector or defender strategy the firm pursue more, it is no influence on the benefit obtain from traditional practices. Hence, no empirical evidence supports the relationship proposed in Hypothesis 2.2. Table 6-7 demonstrates the result summary for hypothesis 2. There is no discernable difference between the emphasis of prospectors and defenders on traditional MAPs.

Table 6-7: Summary of the Result for Hypothesis 2

Management Accounting Practices (MAPs)	Strategic Type of Miles and Snow
Contemporary practices:	
Strategic management accounting	
Benchmarking	0.428**
Activity based practices	-0.379**
Performance measure	0.439**
Adjusted R^2	11.1
F-value	5.071***
Traditional practices:	
Budgeting	
Costing	
Performance measure	
Adjusted R^2	0.2
F-value	1.080

***Significant at the 0.01 level (1-tailed).
**Significant at the 0.05 level (1-tailed).
*Significant at the 0.10 level (1-tailed).

6.3.3 Hypothesis 3

There is a fit between strategic missions and management accounting practices (MAPs).

H 3.1: There is a positive relationship between Build strategy and contemporary MAPs.

H 3.2: There is a positive relationship between Harvest strategy and traditional MAPs.

To test the hypothesis, a variable named Strategic mission of Gupta and Govindarajan is used as a dependent variable. The values of the outcome variable vary along the continuum, in which the characteristic of Build is presented in one end and the characteristic of Harvest is presented in the other end. The high values demonstrate high degree of Build strategy while low values illustrate high degree of Harvest strategy. Management accounting practices (MAPs) both contemporary and traditional are used as independent variables.

It is found that R^2 and the adjusted R^2 are very low, which means there are little variation in strategic mission associated with a set of contemporary management accounting practices (CMAPs) and traditional management accounting practices (TMAPs). Moreover, *F* ratio, which is used to test the significance of the overall model, indicates that regression model is not statistically significant. It means that the amount of variation explained by this

model is no better than baseline prediction. It is also found that none of the regression coefficients are statistically significant. It implies that there is no relationship between the strategic mission and all of the CMAPs as well as all of the TMAPs.

In sum, the results indicate that there is no statistically significant relationship between strategic mission of Gupta and Govindarajan and all management accounting practices (MAPs) both contemporary and traditional. It implies that whichever strategic mission the firms emphasise more, no additional benefit is obtained from MAPs. In other words, no fit between strategic mission and MAPs is identified. Hence, there is no empirical evidence to support the relationships proposed in Hypothesis 3. These findings are in line with the correlation analysis shown earlier in this chapter. It may be that a more robust item needs to be used to detect this variable or that Thai managers identify least with this strategic mission.

6.3.4 Hypothesis 4

There is a fit between strategic types of Miller and Friesen and management accounting practices (MAPs).

H 4.1: There is a positive relationship between Entrepreneurial firms and contemporary MAPs.

H 4.2: There is a positive relationship between Conservative firms and traditional MAPs.

To test the hypothesis, a variable named Strategic types of Miller and Friesen is used as a dependent variable. The values of the outcome variable vary along the continuum, in which the characteristic of Entrepreneurial firms is presented in one end and the characteristic of Conservative firms is presented in the other end. The high values demonstrate high degree of Entrepreneurial attributes while low values illustrate high degree of Conservative attributes. Contemporary and traditional MAPs, which are derived from factor analysis, are used as independent variables. It was found that there is no serious assumption violation; however, four cases are identified as influential observations and outliers. They may have excessive influence on the result; hence, they are deleted from the analysis. The regression model is re-estimated after the deletion of the influential cases.

The results are shown in Table 6-8, which contains two equations. Contemporary MAPs are used as independent variables in equation 1 whereas traditional MAPs are used as predictors in equation 2.

Table 6-8: The Result from Multiple Regression Analysis for Hypothesis 4

Multiple regression equation 1: $ST_{M\&F} = \beta_0 + \beta_1 SMA + \beta_2 BM + \beta_3 ABP + \beta_4 CPM + \varepsilon$

Coefficient of Determination (R^2)	0.182
Adjusted R^2	0.156
Std. Error of the estimate	1.04766
F-value	6.986
Significance	0.000***

	Unstandardised Coefficients		Standardised Coefficients			Collinearity Statistics	
Variable	B	Std. Error	Beta	t-value	Sig	Tolerance	VIF
Constant	2.250	0.578		3.894	0.000		
SMA	0.124	0.115	0.115	1.085	0.280	0.583	1.714
BM	0.029	0.123	0.026	0.234	0.815	0.523	1.912
ABP	-0.101	0.123	-0.091	-0.824	0.412	0.533	1.876
CPM	0.387	0.118	0.381	3.275	0.001***	0.481	2.079

Multiple regression equation 2: $ST_{M\&F} = \beta_0 + \beta_1 TB + \beta_2 TC + \beta_3 TPM + \varepsilon$

Coefficient of Determination (R^2)	0.180
Adjusted R^2	0.160
Std. Error of the estimate	1.05351
F-value	9.270
Significance	0.000***

	Unstandardised Coefficients		Standardised Coefficients			Collinearity Statistics	
Variable	B	Std. Error	Beta	t-value	Sig	Tolerance	VIF
Constant	1.505	0.728		2.066	0.041		
TB	0.610	0.160	0.423	3.811	0.000***	0.525	1.903
TC	-0.153	0.131	-0.113	-1.165	0.246	0.686	1.459
TPM	0.072	0.111	0.072	0.648	0.518	0.523	1.912

***Significant at the 0.01 level (1-tailed).
**Significant at the 0.05 level (1-tailed).
*Significant at the 0.10 level (1-tailed).

Variable definitions
$ST_{M\&F}$ = Strategic type of Miller and Friesen
SMA = Strategic management accounting
BM = Benchmarking
ABP = Activity based practice
CPM = Contemporary performance measures
TB = Traditional budgeting
TC = Traditional costing
TPM = Traditional performance measures

Interpretation of the Results

Interpretation of the regression equation 1

The adjusted R^2 is 0.156, which means 15.6 percent of the possible variation in the strategic type of Miller and Friesen is associated with a set of contemporary management accounting practices (CMAPs). It is found that the regression model is statistically significant with an *F* value of 6.986 ($P < 0.001$). The regression model or estimated equation is shown as follows.

$$ST_{M\&F} = 2.250 + 0.124\ SMA + 0.029\ BM + (-0.101)\ ABP + 0.387\ CPM$$

Three of the CMAPs, which are Strategic management accounting (SMA), Benchmarking (BM), and Activity based practices (ABP), are found to be not statistically significant. However, the regression coefficient of Contemporary performance measure (CPM) is found to be significantly different from zero with the *t* value of 3.275 ($P < 0.01$). It can be confidently concluded that CPM has a statistically significant effect in the regression model with a high degree of certainty (all 99%); thus, it should be included in the regression equation. The regression coefficient of CPM is 0.387, which represents the positive relationships between the strategic type of Miller and Friesen and CPM. It implies that if the firms obtain the benefit from CPM for one more unit, they are expected to pursue the characteristic of Entrepreneurial firm more for 0.387 units.

Interpretation of the regression equation 2

The adjusted R^2 is 0.160, which means 16 percent of the possible variation in the strategic type of Miller and Friesen is associated with a set of traditional management accounting practices (TMAPs). It is found that the regression model is statistically significant with an *F* value of 9.270 ($P < 0.001$). The regression model or estimated equation is shown as follows.

$$ST_{M\&F} = 1.505 + 0.610\ TB + (-0.153)\ TC + 0.072\ TPM$$

The regression coefficients of Traditional costing (TC) and Traditional performance measure (TPM) are not statistically significant. However, the regression coefficient of Traditional budgeting (TB) of 0.610 is found to be significantly different from zero with the *t* value of 3.811 ($P < 0.001$). It can be confidently concluded that TB has a statistically significant effect in the regression model with a high degree of certainty (99.9%); thus, it should be included in the regression equation. The regression coefficient of TB is 0.610, which represents the positive relationship between the strategic type of Miller and Friesen and TB. It implies that if the firms obtain the benefit from TB for one more unit, they are expected to pursue the characteristics of Entrepreneurial firms for 0.610 units.

Summary of the Results

It is found that there is a fit between the strategic type of Miller and Friesen and contemporary practices, but not traditional practices. The result reveals the positive relationship between the strategic type of Miller and Friesen and contemporary performance measure. It implies that the more Entrepreneurial characteristic the firms pursue, the higher benefit obtained from contemporary performance measure. This fact supports positive relationship between Entrepreneurial firms and contemporary practices proposed in Hypothesis 4.1.

However, there is no evidence supporting the relationship proposed in Hypothesis 4.2, which is expected to find the alignment between Conservative attributes and traditional practices. Instead, it is found that the strategic type of Miller and Friesen is positively related to traditional budgeting. It implies that the more Entrepreneurial characteristic the firms pursue, the higher benefit obtained from traditional budgeting. This may be because Entrepreneurial firms may need traditional budgeting as part of their tight control process and to restrain excessive innovation. The result summary is shown in Table 6-9.

Table 6-9: Result Summary for Hypothesis 4

Management Accounting Practices (MAPs)	Strategic Type of Miller and Friesen
Contemporary practices:	
Strategic management accounting	
Benchmarking	
Activity based practices	
Performance measure	0.387***
Adjusted R^2	15.6
F-value	6.986***
Traditional practices:	
Budgeting	0.610***
Costing	
Performance measure	
Adjusted R^2	16.0
F-value	9.270***

***Significant at the 0.01 level (1-tailed).
**Significant at the 0.05 level (1-tailed).
*Significant at the 0.10 level (1-tailed).

6.3.5 Hypothesis 5

There is an alignment between strategic priorities of Porter and management techniques (MTs).

H 5.1: There is a positive relationship between differentiation strategy and MTs concerning quality, employee empowerment, customization and flexibility.

H 5.2: There is a positive relationship between cost leadership strategy and MTs supporting cost efficient processes.

To test the hypothesis, three strategic priorities of Porter are used as dependent variables while management techniques (MTs) are used as independent variables. It is noted that all variables are derived from factor analysis. It was found that there is no serious assumption violation; however, nine cases are identified as influential observations and outliers. They may have excessive influence on the result; hence, they are deleted from the analysis. The regression model is re-estimated after the deletion of the influential cases. The results are shown in Table 6-10. It contains three panels in which each of the three strategic priorities is used as a dependent variable. Specifically, panel A represents the results when differentiation strategic priority is used as a dependent variable. Panel B reveals the results when customer orientation strategic priority is used as a dependent variable. Panel C demonstrates the results when cost efficiency strategic priority is used as a dependent variable.

Table 6-10: The Result from Multiple Regression Analysis for Hypothesis 5

Panel A: Strategic priority named Differentiation (D) is the dependent variable

Multiple regression equation: $D = \beta_0 + \beta_1 HRM + \beta_2 IS + \beta_3 TBS + \beta_4 QS + \beta_5 INRE + \varepsilon$

Coefficient of Determination (R^2)	0.283
Adjusted R^2	0.253
Std. Error of the estimate	0.79327
F-value	9.473
Significance	0.000***

	Unstandardised Coefficients		Standardised Coefficients			Collinearity Statistics	
Variable	B	Std. Error	Beta	t-value	Sig	Tolerance	VIF
Constant	2.470	0.490		5.044	0.000		
HRM	0.200	0.152	0.197	1.320	0.189	0.268	3.736
IS	0.325	0.146	0.322	2.223	0.028**	0.285	3.505
TBS	-0.234	0.166	-0.227	-1.413	0.160	0.231	4.327
QS	0.273	0.163	0.255	1.676	0.096*	0.258	3.879
INRE	0.006	0.152	0.006	0.042	0.967	0.289	3.458

Panel B: Strategic priority named Customer Orientation (CO) is the dependent variable

Multiple regression equation: $CO = \beta_0 + \beta_1 HRM + \beta_2 IS + \beta_3 TBS + \beta_4 QS + \beta_5 INRE + \varepsilon$

Coefficient of Determination (R^2)	0.340
Adjusted R^2	0.312
Std. Error of the estimate	0.62234
F-value	12.346
Significance	0.000***

	Unstandardised Coefficients		Standardised Coefficients			Collinearity Statistics	
Variable	B	Std. Error	Beta	t-value	Sig	Tolerance	VIF
Constant	3.353	0.385		8.715	0.000		
HRM	0.401	0.119	0.484	3.373	0.001***	0.268	3.736
IS	0.074	0.115	0.089	0.645	0.520	0.287	3.487
TBS	-0.211	0.127	-0.252	-1.659	0.100	0.239	4.188
QS	0.370	0.128	0.423	2.901	0.004***	0.258	3.870
INRE	-0.182	0.120	-0.210	-1.525	0.130	0.289	3.460

***Significant at the 0.01 level (1-tailed).
**Significant at the 0.05 level (1-tailed).
*Significant at the 0.10 level (1-tailed).

Variable definitions
HRM = Human resource management
IS = Integrating system
TBS = Team based structure
QS = Quality system
INRE = Innovation and Reorganization

Table 6-10: The Result from Multiple Regression Analysis for Hypothesis 5 (Continued)

Panel C: Strategic priority named Cost Efficiency (CE) is the dependent variable

Multiple regression equation: $CE = \beta_0 + \beta_1 HRM + \beta_2 IS + \beta_3 TBS + \beta_4 QS + \beta_5 INRE + \varepsilon$

Coefficient of Determination (R^2)	0.246
Adjusted R^2	0.214
Std. Error of the estimate	0.93908
F-value	7.819
Significance	0.000***

	Unstandardised Coefficients		Standardised Coefficients			Collinearity Statistics	
Variable	B	Std. Error	Beta	t-value	Sig	Tolerance	VIF
Constant	2.082	0.584		3.564	0.001		
HRM	-0.037	0.180	-0.031	-0.204	0.839	0.269	3.719
IS	-0.060	0.173	-0.051	-0.350	0.727	0.293	3.414
TBS	-0.002	0.191	-0.001	-0.009	0.993	0.245	4.090
QS	0.469	0.193	0.376	2.430	0.017**	0.263	3.809
INRE	0.283	0.180	0.230	1.573	0.118	0.295	3.393

***Significant at the 0.01 level (1-tailed).
**Significant at the 0.05 level (1-tailed).
*Significant at the 0.10 level (1-tailed).

Variable definitions
HRM = Human resource management
IS = Integrating system
TBS = Team based structure
QS = Quality system
INRE = Innovation and Reorganization

Interpretation of the Results

Interpretation of the regression equation (Panel A)

The adjusted R^2 is 0.253, which means 25.3 percent of the possible variation in the emphasis placed on differentiation strategic priority is associated with a set of management techniques (MTs). It is found that the regression model is statistically significant with an *F* value of 9.473 ($P < 0.001$). The regression model or estimated equation is shown as follows.

$$\text{Differentiation} = 2.470 + 0.200\ HRM + 0.325\ IS + (-0.234)\ TBS + 0.273\ QS + 0.006\ INRE$$

The regression coefficients of Integrating system (IS) and Quality system (QS) are found to be significantly different from zero with the *t* value of 2.223 ($P < 0.05$), and the *t* value of 1.676 ($P < 0.10$) respectively. It can be confidently concluded that IS and QS have a statistically significant effect in the regression model with a high degree of certainty (95% and 90%); thus, they should be included in the regression equation. However, the regression coefficients of the rest of MTs are not statistically significant. It implies that these techniques have no generalizable effect on the emphasis placed on differentiation strategic priority beyond this sample; hence, they should not be used in prediction or explanation purposes.

The regression coefficients of IS and QS are 0.325 and 0.273 respectively, both of which represent the positive relationship between differentiation and the two techniques. It implies that if the firms obtain the benefit from IS and QS for one more unit, they are expected to place more emphasis on differentiation strategic priority for 0.325 and 0.273 units respectively. The beta coefficients of IS and QS are 0.322 and 0.255 respectively. Hence, IS has the higher impact on the model than QS.

Interpretation of the regression equation (Panel B)

The adjusted R^2 is 0.312, which means 31.2 percent of the possible variation in the emphasis placed on customer orientation strategic priority is associated with a set of management techniques (MTs). It is found that the regression model is statistically significant with an *F* value of 12.346 ($P < 0.001$). The regression model or estimated equation is shown as follows.

$$\begin{aligned}\text{Customer orientation} = {} & 3.353 + 0.401\ \text{HRM} + 0.074\ \text{IS} + (-0.211)\ \text{TBS} \\ & + 0.370\ \text{QS} + (-0.182)\ \text{INRE}\end{aligned}$$

The regression coefficients of Human resource management (HRM) and Quality system (QS) are found to be significantly different from zero with the *t* value of 3.373, and 2.901 (all *P*s < 0.01). It can be confidently concluded that HRM and QS have a statistically significant effect in the regression model with a high degree of certainty (99%); thus, they

should be included in the regression equation. However, the regression coefficients of the rest of MTs are not statistically significant.

The regression coefficients of HRM and QS are 0.401 and 0.370 respectively, both of which represent the positive relationship between customer orientation and the two techniques. It implies that if the firms obtain the benefit from HRM and QS for one more unit, they are expected to place more emphasis on customer orientation strategic priority for 0.401 and 0.370 units respectively. The beta coefficients of HRM and QS are 0.484 and 0.423 respectively. Hence, HRM has the higher impact on the model than QS.

Interpretation of the regression equation (Panel C)

The adjusted R^2 is 0.214, which means 21.4 percent of the possible variation in the emphasis placed on cost efficiency strategic priority is associated with a set of management techniques (MTs). It is found that the regression model is statistically significant with an F value of 7.819 ($P < 0.001$). The regression model or estimated equation is shown as follows.

$$\begin{aligned}\text{Cost efficiency} = {} & 2.082 + (-0.037)\,\text{HRM} + (-0.060)\,\text{IS} + (-0.002)\,\text{TBS} \\ & + 0.469\,\text{QS} + 0.283\,\text{INRE}\end{aligned}$$

The regression coefficient of Quality system (QS) is found to be significantly different from zero with the t value of 2.430 ($P < 0.05$). It can be confidently concluded that QS has a statistically significant effect in the regression model with a high degree of certainty (95%); thus, it should be included in the regression equation. The regression coefficient of QS is 0.469, which represents the positive relationship between cost efficiency and QS. It implies that if the firms obtain the benefit from QS for one more unit, they are expected to place more emphasis on cost efficiency strategic priority for 0.469 units. The regression coefficients of the rest of MTs are not statistically significant.

Summary of the Results

It is found that there are some alignments between strategic priorities of Porter and management techniques (MTs). Expectedly, there are positive relationships between differentiation strategy (through two strategic priorities; differentiation and customer orientation) and three of MTs including human resource management (HRM), Integrating system (IS), and Quality system (QS). It implies that the higher emphasis placed on differentiation, the higher benefit obtained from HRM, IS, and QS. The findings support the positive relationship between differentiation strategy and MTs concerning quality, employee empowerment, and flexibility proposed in Hypothesis 5.1.

However, there is no evidence supporting the relationship between cost leadership and MTs relating to cost reduction processes such as innovation and reorganization proposed in Hypothesis 5.2. Instead, cost efficiency strategic priority is unexpectedly found to be positively associated with quality systems. It implies that the higher emphasis placed on cost leadership, the higher benefit obtained from QS. Table 6-11 illustrates the result summary for hypothesis 5.

Table 6-11: Summary of the Result for Hypothesis 5

Management Techniques (MTs)	Differentiation Strategy		Cost Leadership (Cost efficiency)
	Differentiation	Customer Orientation	
Human resource management		0.401***	
Integrating system	0.325**		
Team based structure			
Quality system	0.273*	0.370***	0.469**
Innovation and reorganization			
Adjusted R^2	25.3	31.2	21.4
F-value	9.473***	12.346***	7.819***

***Significant at the 0.01 level (1-tailed).
**Significant at the 0.05 level (1-tailed).
*Significant at the 0.10 level (1-tailed).

6.3.6 Hypothesis 6

There is a fit between strategic types of Miles and Snow and management techniques (MTs).

H 6.1: There is a positive relationship between Prospector strategy and MTs concerning quality, employee empowerment, customization and flexibility.

H 6.2: There is a positive relationship between Defender strategy and MTs supporting cost efficient processes.

To test the hypothesis, a variable named Strategic types of Miles and Snow is used as a dependent variable. The values of the outcome variable vary along the continuum, in which the characteristic of defender is presented at one end and the characteristic of prospector is presented at the other end. The high values demonstrate high degree of prospector while low values illustrate high degree of defender. Management techniques (MTs) are used as independent variables. It was found that there is no serious assumption violation; however, nine cases are identified as influential observations and outliers. They may have excessive influence on the result; hence, they are deleted from the analysis. The regression model is re-estimated after the deletion of the influential cases. The results are shown in Table 6-12.

Table 6-12: The Result from Multiple Regression Analysis for Hypothesis 6

Multiple regression equation: $ST_{M\&S} = \beta_0 + \beta_1 HRM + \beta_2 IS + \beta_3 TBS + \beta_4 QS + \beta_5 INRE + \varepsilon$							
Coefficient of Determination (R^2)						0.154	
Adjusted R^2						0.118	
Std. Error of the estimate						1.421	
F-value						4.358	
Significance						0.001***	
	Unstandardised Coefficients		Standardised Coefficients			Collinearity Statistics	
Variable	B	Std. Error	Beta	t-value	Sig	Tolerance	VIF
Constant	1.786	0.878		2.034	0.044		
HRM	0.108	0.272	0.065	0.398	0.691	0.267	3.741
IS	0.443	0.261	0.266	1.697	0.092*	0.288	3.474
TBS	0.231	0.289	0.136	0.798	0.426	0.242	4.139
QS	-0.514	0.292	-0.291	-1.762	0.081*	0.259	3.861
INRE	0.332	0.273	0.190	1.219	0.225	0.290	3.444

***Significant at the 0.01 level (1-tailed).
**Significant at the 0.05 level (1-tailed).
*Significant at the 0.10 level (1-tailed).

Variable definitions
$ST_{M\&S}$ = Strategic types of Miles and Snow
HRM = Human resource management
IS = Integrating system
TBS = Team based structure
QS = Quality system
INRE = Innovation and Reorganization

Interpretation of the Results

The adjusted R^2 is 0.118, which means 11.8 percent of the possible variation in the strategic type of Miles and Snow is associated with a set of management techniques (MTs). It is found that the regression model is statistically significant with an *F* value of 4.358 ($P < 0.01$). The regression model or estimated equation is shown as follows.

$$ST_{M\&S} = 1.786 + 0.108\ HRM + 0.443\ IS + 0.231\ TBS + (-0.514)\ QS + 0.332\ INRE$$

The regression coefficients of Integrating system (IS) and Quality system (QS) are found to be significantly different from zero with the *t* value of 1.697, -1.762 (all *P*s < 0.10). It can be confidently concluded that IS and QS have a statistically significant effect in the regression model with a high degree of certainty (90%); thus, they should be included in the regression equation. However, the regression coefficients of the rest of MTs are not statistically significant.

The regression coefficient of IS is 0.443, which represents the positive relationship between the strategic type of Miles and Snow and IS. It implies that if the firms obtain the benefit from IS for one more unit, they are expected to pursue the characteristic of prospector more for 0.443 units. In contrast, the regression coefficient of QS is -0.514, which represents the negative relationship between the strategic type of Miles and Snow and QS. It implies that if the firms obtain the benefit from QS for one more unit, they are expected to pursue the characteristic of defender more for 0.514 units. The beta coefficients of IS and QS are 0.266 and -0.291 respectively. Hence, QS has the higher impact on the model than IS.

Summary of the Results

The result confirms some fits between the strategic type of Miles and Snow and management techniques (MTs). Particularly, it is found that there is a positive relationship between the strategic type of Miles and Snow and integrating system (IS) which is useful to increase flexibility. It implies that the more prospector strategy the firms pursue, the higher benefit obtained from IS. This fact supports the relationship proposed in Hypothesis 6.1. There is no evidence to support the relationship between defender strategy and MTs concerning cost efficiency processes such as innovation and reorganization proposed in Hypothesis 6.2. Surprisingly, the strategic type of Miles and Snow is found to be negatively associated with quality system (QS), which means the more defender strategy the firms pursue, the higher benefit obtained from QS, which is counter to the thrust of hypothesis in 6.2. Table 6-13 illustrates the result summary for hypothesis 6.

Table 6-13: Summary of the Result for Hypothesis 6

Management Techniques (MTs)	Strategic Type of Miles and Snow
Human resource management	
Integrating system	0.443*
Team based structure	
Quality system	-0.514*
Innovation and reorganization	
Adjusted R^2	11.8
F-value	4.358***

6.3.7 Hypothesis 7

There is a fit between strategic missions and management techniques (MTs).

H 7.1: There is a positive relationship between Build strategy and MTs concerning quality, employee empowerment, customization and flexibility.

H 7.2: There is a positive relationship between Harvest strategy and MTs supporting cost efficient processes.

To test the hypothesis, a variable named Strategic mission of Gupta and Govindarajan is used as a dependent variable. The values of the outcome variable vary along the continuum, in which the characteristic of Build is presented in one end and the characteristic of Harvest is presented in the other end. The high values demonstrate high

degree of Build strategy while low values illustrate high degree of Harvest strategy. Management techniques (MTs) are used as independent variables.

It is found that R^2 and the adjusted R^2 are very low, which means there are little variation in strategic mission associated with a set of management techniques (MTs). Moreover, *F* ratio, which is used to test the significance of overall model, indicates that regression model is not statistically significant. It means that the amount of variation explained by this model is not better than baseline prediction. It is also found that none of the regression coefficients are statistically significant. It implies that there is no relationship between the strategic mission and all of the MTs.

In sum, the results indicate that there is no statistically significant relationship between strategic mission of Gupta and Govindarajan and all management techniques (MTs). It implies that whichever strategic mission the firms emphasise more, no additional benefit is obtained from MTs. In other words, no fit between strategic mission and MTs is identified. Hence, there is no empirical evidence supporting the relationships proposed in Hypothesis 7. These results seem to bear out the conclusion established earlier that the item used to detect the 'build, hold, harvest' style of Gupta and Govindarajan is not successful in detecting this strategic style.

6.3.8 Hypothesis 8

There is a fit between strategic types of Miller and Friesen and management techniques (MTs).

H 8.1: There is a positive relationship between Entrepreneurial firms and MTs concerning quality, employee empowerment, customization and flexibility.

H 8.2: There is a positive relationship between Conservative firms and MTs supporting cost efficient processes.

To test the hypothesis, a variable named Strategic types of Miller and Friesen is used as a dependent variable. The values of the outcome variable vary along the continuum, in which the characteristic of Entrepreneurial firms is presented in one end and the characteristic of Conservative firms is presented in the other end. The high values

demonstrate high degree of Entrepreneurial attributes while low values illustrate high degree of Conservative attributes. Management techniques (MTs) are used as independent variables. It was found that there is no serious assumption violation; however, nine cases are identified as influential observations and outliers. They may have excessive influence on the result; hence, they are deleted from the analysis. The regression model is re-estimated after the deletion of the influential cases. The results are shown in Table 6-14.

Table 6-14: The Result from Multiple Regression Analysis for Hypothesis 8

Multiple regression equation: $ST_{M\&F} = \beta_0 + \beta_1 HRM + \beta_2 IS + \beta_3 TBS + \beta_4 QS + \beta_5 INRE + \varepsilon$

Coefficient of Determination (R^2)	0.239
Adjusted R^2	0.207
Std. Error of the estimate	0.96715
F-value	7.536
Significance	0.000***

	Unstandardised Coefficients		Standardised Coefficients			Collinearity Statistics	
Variable	B	Std. Error	Beta	t-value	Sig	Tolerance	VIF
Constant	1.323	0.602		2.198	0.030		
HRM	-0.098	0.185	-0.081	-0.527	0.599	0.269	3.719
IS	0.530	0.178	0.438	2.976	0.004***	0.293	3.414
TBS	-0.006	0.197	-0.005	-0.029	0.977	0.245	4.090
QS	0.010	0.199	0.008	0.050	0.960	0.263	3.809
INRE	0.165	0.185	0.131	0.894	0.373	0.295	3.393

***Significant at the 0.01 level (1-tailed).
**Significant at the 0.05 level (1-tailed).
*Significant at the 0.10 level (1-tailed).

Variable definitions
$ST_{M\&F}$ = Strategic types of Miller and Friesen
HRM = Human resource management
IS = Integrating system
TBS = Team based structure
QS = Quality system
INRE = Innovation and Reorganization

Interpretation of the Results

The adjusted R^2 is 0.207, which means 20.7 percent of the possible variation in the strategic type of Miller and Friesen is associated with a set of management techniques (MTs). It is found that the regression model is statistically significant with an *F* value of 7.536 ($P < 0.001$). The regression model or estimated equation is shown as follows.

$$ST_{M\&F} = 1.323 + (-0.098)\,HRM + 0.530\,IS + (-0.006)\,TBS + 0.010\,QS + 0.165\,INRE$$

The regression coefficient of Integrating system (IS) is found to be significantly different from zero with the *t* value of 2.976 ($P < 0.01$). It can be confidently concluded that IS has a statistically significant effect in the regression model with a high degree of certainty (99%); thus, it should be included in the regression equation. The regression coefficient of IS is 0.530, which represents a positive relationship between the strategic type of Miller and Friesen and IS. It implies that if the firms obtain the benefit from IS for one more unit, they are expected to pursue the characteristic of Entrepreneurial firm more for 0.530 units. The regression coefficients of the rest of MTs are not statistically significant. It implies that these techniques have no generalizable effect on the strategic type of Miller and Friesen beyond this sample; hence, they should not be used in prediction or explanation purposes.

Summary of the Results

The result confirms a fit between the strategic type of Miller and Friesen and management techniques (MTs). Particularly, it is found that there is a positive relationship between the strategic type of Miller and Friesen and integrating system (IS) which is useful to increase flexibility. It implies that the more characteristics of Entrepreneurial firms that the companies pursue, the higher benefit obtained from IS. This fact supports the relationship proposed in Hypothesis 8.1. However, there is no evidence to support the relationship between conservative firms and MTs concerning cost efficiency processes such as innovation and reorganization proposed in Hypothesis 8.2. Table 6-15 illustrates the result summary for hypothesis 8.

Table 6-15: Summary of the Result for Hypothesis 8

Management Techniques (MTs)	Strategic Type of Miller and Friesen
Human resource management	
Integrating system	0.530*
Team based structure	
Quality system	
Innovation and reorganization	
Adjusted R^2	20.7
F-value	7.536***

Chapter 7

Hypotheses Testing Based on Interaction Approaches

This chapter will focus on testing the hypotheses based on an interaction approach, which examines the moderating role of organizational context on the relationship between MCS and organizational performance. There are two hypotheses developed based on interaction approach shown in Table 7-1.

Table 7-1: Research Hypotheses based on Interaction Approach

Main theme	Hypotheses
MAPs, Strategy, and OP	Hypothesis 9: There is a positive combined effect of a particular management accounting practice and consistent strategy on organizational performance. H 9.1: The stronger emphasis on differentiation/ prospector/ build/ entrepreneurial strategy, the more positive relationship between contemporary MAPs and organizational performance. H 9.2: The stronger emphasis on cost leadership/ defender/ harvest/ conservative strategy, the more positive relationship between traditional MAPs and organizational performance.
MAPs, MTs, and OP	Hypothesis 10: There is a positive combined effect of management accounting practices and management techniques on organizational performance. H 10.1: The higher benefit obtained from MTs concerning quality, employee empowerment, customization and flexibility, the more positive relationship between contemporary MAPs and organizational performance. H 10.2: The higher benefit obtained from MTs supporting cost efficient processes, the more positive relationship between traditional MAPs and organizational performance.

Moderated regression analysis is used to test the presence of interaction effect. Prior to the interpretation of the results, moderated regression is described.

7.1 Moderated Regression Analysis

Moderated regression analysis, which is the extension of the linear regression model, is used to demonstrate the interaction or moderator effects (Schroeder et al., 1986). Moderator effect happens when the form and/or strength of the relationship between independent and dependent variables has been changed by another independent variable or

moderator (Hair et al., 2006). The interaction effect between two predictors is not equal to the sum of their separate effects. It is above and beyond the simple sum of additive effect (Cohen et al., 2003). 'Moderator variables can be viewed as a subset of specification variables, which specifies the form and/or magnitude of the relationship between a predictor and a criterion variable' (Sharma et al., 1981, p.292). There are four types of specification variables depending on two criteria; the relationship with the dependent and/or independent variable and the interaction with the independent variable (Sharma et al., 1981). The typology of specification variables is illustrated in Figure 7-1.

Figure 7-1: Typology of Specification Variables

	Related to Criterion and/or Predictor	Not Related to Criterion and Predictor
No Interaction With Predictor Variable	1 Intervening, Exogenous, Antecedent, Suppressor, Predictor	2 Moderator (Homologizer)
Interaction With Predictor Variable	3 Moderator ('Quasi' Moderator)	4 Moderator ('Pure' Moderator)

Source: Sharma et al. (1981, p.292).

The variable in quadrant 1 is related to dependent and/or independent variables, but does not interact with the independent variable. It refers to an intervening, exogenous, antecedent, suppressor, or additional predictor variable rather than moderator. However, the variables in quadrant 2, 3 and 4 are considered as moderator variables. A moderator variable can be defined as 'one which systematically modifies either the form and/or strength of the relationship between a predictor and a criterion variable' (Sharma et al., 1981, p.291). A moderator variable identified as homologizer in quadrant 2 affects the strength of the relationship while quasi moderator in quadrant 3 and pure moderator in quadrant 4 influence the form of the relationship between the dependent and independent variables[27]. This study will focus on quasi moderator as it is used to test hypotheses.

Quasi or bilinear moderator, in which the regression coefficient of one independent variable changes across values of the moderator variable (another independent variable), is the most common moderator effect employed in multiple regression analysis. The moderator term is entered into the regression equation as a compound variable established

[27] Type of moderator variables are discussed in more detail in Sharma et al. (1981).

by multiplying the independent variable (X_1) by the moderator (X_2) (Hair et al., 2006). Equation 2 represents the moderated relationship.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_1 X_2 + \varepsilon_i \quad \text{…….(2)}$$

Where

β_0 = intercept
$\beta_1 X_1$ = linear effect of X_1
$\beta_2 X_2$ = linear effect of X_2
$\beta_3 X_1 X_2$= moderator effect of X_2 on X_1

The moderator effect is not clear and contains some ambiguity in a quasi relationship. A moderator variable is not only interacting with the independent variable, but also related to the dependent variable. In other words, the moderator is an independent variable itself. Each of these two independent variables can in turn be a moderator variable as shown in equation 3 and 4. Equation 2 can be rewritten as equation 3 to illustrate the relationships between the dependent variable (Y) and the independent variable (X_1) for different values of the moderator (X_2) (Sharma et al., 1981).

$$Y = (\beta_0 + \beta_2 X_2) + (\beta_1 + \beta_3 X_2) X_1 + \varepsilon_i \quad \text{…….(3)}$$

Similarly, equation 2 can be rewritten as equation 4 to demonstrate the relationships between the dependent variable (Y) and the independent variable (X_2) for different values of the moderator (X_1) (Sharma et al., 1981).

$$Y = (\beta_0 + \beta_1 X_1) + (\beta_2 + \beta_3 X_1) X_2 + \varepsilon_i \quad \text{…….(4)}$$

However, specifying which independent variable being a moderator variable based on theoretical ground can mitigate the ambiguity in quasi moderator (Sharma et al., 1981). The main focus or substantive interest of the study should be used as the independent variable rather than moderator (Jaccard and Turrisi, 2003). In this study, identification of a moderator and hypotheses are based on literature and theoretical bases. Particularly, different strategic types and management techniques (MTs) are used as a moderator variable to moderate the relationship between benefit obtained from management accounting practices (MAPs) and organizational performance.

Hair et al. (2006) proposed three steps to determine whether the moderator effect is significant. The original or unmoderated equation is initially estimated. Then, the original equation plus moderator variable or the moderated relationship is estimated. Next, the significance of the change in R^2 is measured, which means only the incremental effect (X_1X_2) is assessed rather than the significance of individual variables. This is because of the high multicollinearity among old (X_1 and X_2) and new (X_1X_2) variables. A significant moderator effect is present when the change in R^2 is statistically significant. Another alternative suggested by Jaccard and Turrisi (2003) is the examination of the significance of β_3. It is noted that the significant value of the change in R^2 is identical to that of β_3. Hence, the statistical significance of β_3 also reveals the presence of the moderator effect.

Regression coefficients can be separated into first-order effects and higher order effects. 'First-order effects refer to the effects of the individual predictors on the criterion (β_1 and β_2) while higher order effects refer to the partialed effects of multiplicative function of the individual predictors (β_3)' (Cohen et al., 2003, p.259-260). The information about the characteristics of the interaction is represented by higher order effect or β_3 coefficient. The magnitude of β_3 coefficient represents the strength of the interaction effect. Particularly, the more β_3 coefficient deviates from zero, the stronger the interaction effect (Jaccard and Turrisi, 2003). 'The β_3 coefficient, the moderator effect, indicates the unit change in the effect of X_1 as X_2 changes' (Hair et al., 2006, p.202). It can also be interpreted as 'the number of units that the slope of criterion on predictor changes given a one unit increase in moderator' (Jaccard and Turrisi, 2003, p.22).

In an unmoderated relationship, the β_1 and β_2 coefficients represent the overall effects of X_1 and X_2 on Y, respectively, constant across all values of the other predictor. In moderated regression, the interpretation of the first-order coefficients is slightly different from an unmoderated relationship. 'The β_1 and β_2 coefficients now represent the effects of X_1 and X_2, respectively, when the other independent variable is zero' (Hair et al., 2006, p.202). In other words, the first-order effect of a predictor is now separated from the other predictor. The overall effect of a predictor can be assessed by calculation. Particularly, the total effect of X_1 on Y for any value of X_2 can be calculated as $\beta_1 + \beta_3X_2$ (see equation 3) while the total effect of X_2 on Y for any value of X_1 can be calculated as $\beta_2 + \beta_3X_1$ (see

equation 4) (Hair et al., 2006). It is noticed that the interpretation of β_1 and β_2 coefficients in moderated regression can be quite problematic, especially in social science data when zero is rarely a meaningful point on a scale (Cohen et al., 2003).

Due to the high multicollinearity and the problematic interpretation of first-order coefficients, it is highly recommended to center all continuous independent variables entered into a moderated regression model, but not for the dependent variable (Tabachnick and Fidell, 2007). The only one exception of this recommendation is when an independent variable has a meaningful zero value on the scale. Centering is regarded as one of the linear transformations[28]. Any independent variable can be centered by subtracting each score on that variable by its mean (Cohen et al., 2003).

Mean centering provides two main advantages, it facilitates the interpretation of first-order coefficients and it reduces multicollinearity. First, the interpretation of first-order coefficients is more meaningful. Each first-order coefficient represents 'the average regression of the criterion on the predictor across the range of the other predictors' (Cohen et al., 2003, p.261). In particular, with centered predictors, β_1 coefficient refers to the effect of X_1 on Y at the mean of X_2 while β_2 coefficient refers to the effect of X_2 on Y at the mean of X_1. Equation 5 indicates the calculation of centered β_1 and β_2.

$$\beta_{1,\text{centered}} = \beta_{1,\text{uncentered}} + \beta_{3,\text{uncentered}} * \text{Mean of } X_{2,\text{uncentered}}$$
$$\beta_{2,\text{centered}} = \beta_{2,\text{uncentered}} + \beta_{3,\text{uncentered}} * \text{Mean of } X_{1,\text{uncentered}} \quad \text{…….(5)}$$

However, centering affects first-order coefficients only when the interaction term is included into the regression equation. If the predictors are centered and entered into the regression equation with no interaction term, first-order coefficients are numerically identical to those produced from uncentered predictors. This fact is demonstrated in equation 5 when there is no interaction term in the regression equation, β_3 is zero; hence, centered first-order coefficient is equal to uncentered first-order coefficient (Tabachnick and Fidell, 2007).

[28] 'Linear transformations include adding or subtracting constants, and multiplying and dividing by constants' (Cohen et al., 2003, p.262).

It is noted that centering independent variables has no influence on the higher order coefficient or β_3 coefficient. Hence, centered β_3 coefficient is equal to uncentered β_3 coefficient. It implies that the interpretation of the interaction effect remains the same for centered and uncentered form of a regression equation (Cohen et al., 2003). Equation 6 demonstrates this fact.

$$\beta_{3,centered} = \beta_{3,uncentered} \quad \text{…….(6)}$$

Second, nonessential multicollinearity, which is the amount of correlation between each predictor and interaction term produced by the nonzero means of variables, can be eliminated by centering. This is because centered variables have zero mean, which generates zero values for the covariance and correlation between centered variables and interaction term. Consequently, nonessential multicollinearity is removed from the analysis leaving only essential multicollinearity, which cannot be eliminated by centering[29] (Cohen et al., 2003).

In conclusion, all of the continuous predictors entered into moderated regression are centered to gain interpretational advantages and eliminate nonessential multicollinearity. However, there is no benefit to center the dependent variable. In contrast, keeping the criterion variable in uncentered form maintains the predicted scores in the units of the original scale (Cohen et al., 2003). Hence, the dependent variable is kept as its original scale. The results from hypotheses testing are shown in the next section.

7.2 Testing Hypotheses with Moderated Regression Analysis

There are two main themes for the interaction approach; strategic types and management techniques (MTs) as moderator. Different strategic types are used as moderator variables to explore the interaction effect on organizational performance in hypothesis 9 while MTs are used as moderator variable to test the combined effect proposed in hypothesis 10 as follows.

[29] Essential versus nonessential multicollinearity is presented in more detail in Marquardt (1980).

7.2.1 Hypothesis 9

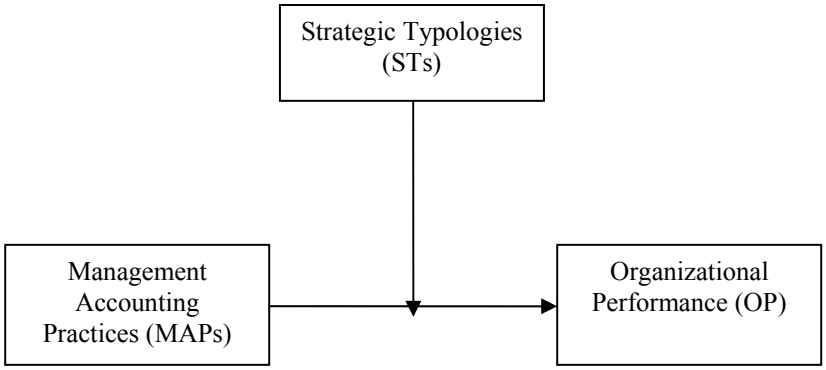
There is a positive combined effect of a particular management accounting practice and consistent strategy on organizational performance.

H 9.1: The stronger emphasis on differentiation/ prospector/ build/ entrepreneurial strategy, the more positive relationship between contemporary MAPs and organizational performance.

H 9.2: The stronger emphasis on cost leadership/ defender/ harvest/ conservative strategy, the more positive relationship between traditional MAPs and organizational performance.

In order to test this hypothesis, moderated regression was performed to test the combined effect of MAPs and different strategic types on organizational performance. Figure 7-2 illustrates the moderated relationship proposed in hypothesis 9. Organizational performace, which is the dependent variable, is kept as its original scale. Management accounting practices (MAPs) are the independent variables while strategic types are moderators. Both MAPs and strategic types are centered before calculating the interaction term between them; hence, all predictors in a moderated regression equation are centered.

Figure 7-2: Moderated Relationship Proposed in Hypothesis 9



Hierarchical or blockwise entry is used in order to assess the interaction effect through the significance of R^2 change. Unmoderated regression which contains only two predictors was first entered as model 1 while moderated regression which includes two predictors and the interaction term was entered as model 2. Equation 7 illustrates unmoderated regression and equation 8 indicates the moderated model.

$$OP = \beta_0 + \beta_1 MAPs_i + \beta_2 STs_i + \varepsilon_i \quad \text{…….(7)}$$

$$OP = \beta_0 + \beta_1 MAPs_i + \beta_2 STs_i + \beta_3 MAPs_i STs_i + \varepsilon_i \quad \text{…….(8)}$$

Where

OP	=	Organizational performance
MAPs*i*	=	Management accounting practices (*i* = 1-7, 1 = SMA, 2 = BM, 3 = ABP, 4 = CPM, 5 = TB, 6 = TC, and 7 = TPM)
STs*i*	=	Strategic types (*i* = 1-6, 1 = D, 2 = CO, 3 = CE, 4 = $ST_{M\&S}$, 5 = $SM_{G\&G}$, and 6 = $ST_{M\&F}$)
MAPs*i*STs*i*	=	interaction term between MAPs and strategic types

Due to 7 groups of MAPs and 6 groups of strategies, 42 moderated regression equations are estimated. After all regression equations have been estimated, the regression assumptions are tested via examination of the residual plots, the outliers and influential observations are identified via standardized residual values, Cook's distance, Mahalanobis distances, and Leverage[30]. Corrective actions and re-estimation of the regression model are required if substantial violations to the assumptions are found or influential observations are determined (Hair et al., 2006). It was found that there is no serious assumption violation and no sign of influential observations and outliers. Consequently, all of the observations remain in the analysis. There are only 3 of 42 equations, in which the change in R^2 is statistically significant indicating the presence of interaction effect. Table 7-2 demonstrates the significant findings.

[30] The detail of these tests can be found in Field (2005).

Table 7-2: The Result from Moderated Regression Analysis for Hypothesis 9

Panel A: TC as management accounting practice versus CO as strategic type

Model 1: $OP = \beta_0 + \beta_1 TC + \beta_2 CO + \varepsilon_i$

Model 2: $OP = \beta_0 + \beta_1 TC + \beta_2 CO + \beta_3 TC*CO + \varepsilon_i$

				Change Statistics			
	R^2	Adj R^2	SE	R^2 Change	Sig F Change	F-value	Sig value
Model 1	0.217	0.206	0.865	0.217	0.000	18.337	0.000
Model 2	0.236	0.219	0.858	0.019	0.074*	13.517	0.000

		Unstandardised Coefficients		Standardised Coefficients			Collinearity Statistics	
	Variable	B	SE	Beta	t-value	Sig	Tolerance	VIF
Model 1	Constant	4.407	0.074		59.200	0.000		
	TC	0.280	0.084	0.271	3.312	0.001***	0.882	1.133
	CO	0.352	0.097	0.297	3.627	0.000***	0.882	1.133
Model 2	Constant	4.365	0.077		56.395	0.000		
	TC	0.294	0.084	0.286	3.498	0.001***	0.874	1.144
	CO	0.382	0.098	0.323	3.914	0.000***	0.856	1.168
	TC*CO	0.160	0.089	0.142	1.803	0.074*	0.845	1.058

Panel B: SMA as management accounting practice versus D as strategic type

Model 1: $OP = \beta_0 + \beta_1 SMA + \beta_2 D + \varepsilon_i$

Model 2: $OP = \beta_0 + \beta_1 SMA + \beta_2 D + \beta_3 SMA*D + \varepsilon_i$

				Change Statistics			
	R^2	Adj R^2	SE	R^2 Change	Sig F Change	F-value	Sig value
Model 1	0.186	0.174	0.882	0.186	0.000	15.103	0.000
Model 2	0.214	0.196	0.870	0.028	0.033**	11.897	0.000

		Unstandardised Coefficients		Standardised Coefficients			Collinearity Statistics	
	Variable	B	SE	Beta	t-value	Sig	Tolerance	VIF
Model 1	Constant	4.407	0.076		58.054	0.000		
	SMA	0.233	0.071	0.264	3.261	0.001***	0.940	1.064
	D	0.285	0.082	0.283	3.490	0.001***	0.940	1.064
Model 2	Constant	4.444	0.077		57.848	0.000		
	SMA	0.236	0.070	0.268	3.355	0.001***	0.939	1.064
	D	0.270	0.081	0.267	3.327	0.001***	0.932	1.073
	SMA*D	-0.144	0.067	-0.168	-2.156	0.033**	0.992	1.008

***Significant at the 0.01 level (1-tailed).

**Significant at the 0.05 level (1-tailed).

*Significant at the 0.10 level (1-tailed).

Variable definitions

OP = Operational performance

TC = Traditional costing

SMA = Strategic management accounting

CO = Customer orientation

D = Differentiation

ST_{GG} = Strategic type of Gupta and Govindarajan

Table 7-2: The Result from Moderated Regression Analysis for Hypothesis 9 (Continued)

Panel C: SMA as management accounting practice versus ST_{GG} as strategic type

Model 1: $OP = \beta_0 + \beta_1 SMA + \beta_2 ST_{GG} + \varepsilon_i$

Model 2: $OP = \beta_0 + \beta_1 SMA + \beta_2 ST_{GG} + \beta_3 SMA*ST_{GG} + \varepsilon_i$

				Change Statistics			
	R^2	Adj R^2	SE	R^2 Change	Sig F Change	F-value	Sig value
Model 1	0.112	0.098	0.921	0.112	0.000	8.298	0.000
Model 2	0.135	0.115	0.913	0.023	0.062*	6.824	0.000

		Unstandardised Coefficients		Standardised Coefficients			Collinearity Statistics	
	Variable	B	SE	Beta	t-value	Sig	Tolerance	VIF
Model 1	Constant	4.407	0.079		55.565	0.000		
	SMA	0.292	0.073	0.331	4.024	0.000***	0.993	1.007
	ST_{GG}	-0.067	0.232	-0.024	-0.290	0.772	0.993	1.007
Model 2	Constant	4.418	0.079		56.076	0.000		
	SMA	0.295	0.072	0.336	4.113	0.000***	0.992	1.008
	ST_{GG}	0.021	0.235	0.007	0.089	0.929	0.953	1.049
	$SMA*ST_{GG}$	0.362	0.192	0.156	1.886	0.062*	0.960	1.042

***Significant at the 0.01 level (1-tailed).
**Significant at the 0.05 level (1-tailed).
*Significant at the 0.10 level (1-tailed).

Variable definitions
OP = Operational performance
TC = Traditional costing
SMA = Strategic management accounting
CO = Customer orientation
D = Differentiation
ST_{GG} = Strategic type of Gupta and Govindarajan

Interpretation of the Results

Interpretation of the regression equation (Panel A)

The change in R^2 is used to assess the interaction between traditional costing and customer orientation. It is found that the R^2 without interaction term is 0.217 (model 1) while R^2 with interaction term is 0.236 (model 2), resulting in 0.019 change in R^2 which is statistically significant at the level of 0.10 (sig *F* change = 0.074). It means the interaction accounts for 1.9% of the variance in the organizational performance. It is noted that the significance of the change in R^2 is the same as that of β_3, indicating the presence of a significant moderator effect. The moderated relationship (model 2) is shown as follow.

$$OP = 4.365 + 0.294TC + 0.382CO + 0.160TC*CO \quad \text{…….(9)}$$

It is found that the intercept and all regression coefficients are statistically significant. Regression coefficients of traditional costing and customer orientation (β_1 and β_2) are 0.294 ($P < 0.01$) and 0.382 ($P < 0.001$) respectively. It implies that organizational performance is predicted to increase by 0.294 units when the firm obtains the benefit from traditional costing for one more unit, and pursues customer orientation as strategic priority at the mean level. Similarly, organizational performance is predicted to increase by 0.382 units when the firm pursues customer orientation as strategic priority for one more unit, and obtains the benefit from traditional costing at the mean level.

Higher order coefficient (β_3) is 0.160, which is positive and significant at the level of 0.10 ($P < 0.10$), indicating the presence of an interaction effect. It implies that the slope of organizational performance on the benefit obtained from traditional costing is predicted to increase by 0.160 units when the firm emphasize one more unit on customer orientation. It means that the effect of traditional costing on organizational performance depends on strategic priority of customer orientation which the firm pursues. In other words, there is an interactive effect between traditional costing and customer orientation on organizational performance.

It is suggested that plotting the significant interaction is useful for interpretation. To describe interactions, regression lines of dependent variable on independent variable at meaningful values of moderator are plotted (Tabachnick and Fidell, 2007). Thus, the relationships between traditional costing and organizational performance are plotted at chosen levels of the emphasis on customer orientation, particularly high, medium, and low levels. A convenient set is suggested as the mean value for medium level and one standard deviation below and above the mean of the moderator for low and high levels respectively (Cohen et al., 2003). As standard deviation of customer orientation (CO) is 0.82011, three levels of CO are -0.82011, 0, and 0.82011 respectively. This set of CO is substituted into equation 9 to generate simple regression equations. Additionally, the analysis of simple regression equations is conducted by creating confidence intervals around simple slopes, and testing the significance of simple slopes. The result is presented in Table 7-3.

Table 7-3: Analysis of Simple Regression Equations for Regression of Organizational Performance on Centered Traditional Costing at Three Values of Centered Customer Orientation

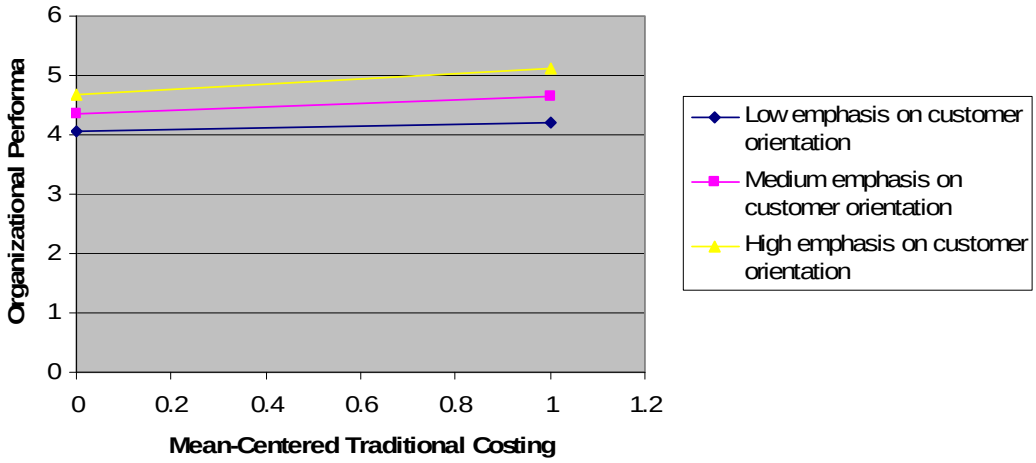
Value of CO	Simple regression equation	SE	95% confidence intervals	*t* test	Sig value
Low	OP = 4.052 + 0.163 TC	0.106	-0.046 to 0.373	1.545	0.125
Medium	OP = 4.365 + 0.294 TC	0.084	0.128 to 0.461	3.498	0.001***
High	OP = 4.678 + 0.425 TC	0.116	0.195 to 0.656	3.656	0.000***

***Significant at the 0.01 level (1-tailed).
**Significant at the 0.05 level (1-tailed).
*Significant at the 0.10 level (1-tailed).

It is found that when low level of customer orientation is pursued, the effect of traditional costing on organizational performance is not statistically significant. However, when the firms increase the level of the emphasis placed on customer orientation strategic priority, the positive effect of traditional costing on firm's performance is significant and stronger.

It is noticed that the slopes of the simple regression lines increase from 0.163 to 0.294 to 0.425, and the intercepts increase from 4.052 to 4.365 to 4.678 as the emphasis on customer orientation is increased. Three regression lines are plotted to demonstrate the interaction effect in Figure 7-3. It is found that these regression lines are not parallel, which confirms the occurrence of interaction power. It implies that the higher emphasis placed on customer orientation, the higher positive relationship between traditional costing and organizational performance. In other words, strategic priority of customer orientation strengthens the effect of benefit obtained from traditional costing on organizational performance.

Figure 7-3: Regression Lines Predicting Organizational Performance from Traditional Costing at Three Levels of Customer Orientation



Interpretation of the regression equation (Panel B)

The change in R^2 is used to assess the interaction between strategic management accounting and differentiation. It is found that the R^2 without interaction term is 0.186 (model 1) while R^2 with interaction term is 0.214 (model 2), resulting in 0.028 change in R^2 which is statistically significant at the level of 0.05 (sig *F* change = 0.033). It means the interaction accounts for 2.8% of the variance in the organizational performance. It is noted that the significance of the change in R^2 is the same as that of β_3, indicating the presence of a significant moderator effect. The moderated relationship (model 2) is shown as follow.

$$OP = 4.444 + 0.236SMA + 0.270D + (-0.144)SMA*D \qquad \text{…….(10)}$$

It is found that the intercept and all regression coefficients are statistically significant. Regression coefficients of strategic management accounting and differentiation (β_1 and β_2) are 0.236 and 0.270 (all *P*s < 0.01). It implies that organizational performance is predicted to increase by 0.236 units when the firm obtains the benefit from strategic management accounting for one more unit, and pursues differentiation as strategic priority at the mean level. Similarly, organizational performance is predicted to increase by 0.270 units when the firm pursues differentiation as strategic priority for one more unit, and obtains the benefit from strategic management accounting at the mean level.

Higher order coefficient (β_3) is -0.144, which is negative and significant at the level of 0.05 ($P < 0.05$), indicating the presence of an interaction effect. It implies that the slope of organizational performance on the benefit obtained from strategic management accounting is predicted to decrease by 0.144 units when the firm emphasises one more unit on differentiation. It means that the effect of strategic management accounting on organizational performance depends on strategic priority of differentiation the firm pursues. In other words, there is an interactive effect between strategic management accounting and differentiation on organizational performance.

To characterize the nature of interaction, the regressions of organizational performance on strategic management accounting at three different levels (low, medium, and high levels) of differentiation strategic priority are plotted as well as the analysis of simple regression equations presented in Table 7-4.

Table 7-4: Analysis of Simple Regression Equations for Regression of Organizational Performance on Centered Strategic Management Aaccounting at Three Values of Centered Differentiation

Value of D	Simple regression equation	SE	95% confidence intervals	*t* test	Sig value
Low	OP = 4.185 + 0.374 SMA	0.096	0.184 to 0.564	3.888	0.000***
Medium	OP = 4.444 + 0.236 SMA	0.070	0.097 to 0.375	3.355	0.001***
High	OP = 4.703 + 0.098 SMA	0.094	-0.088 to 0.284	1.044	0.298

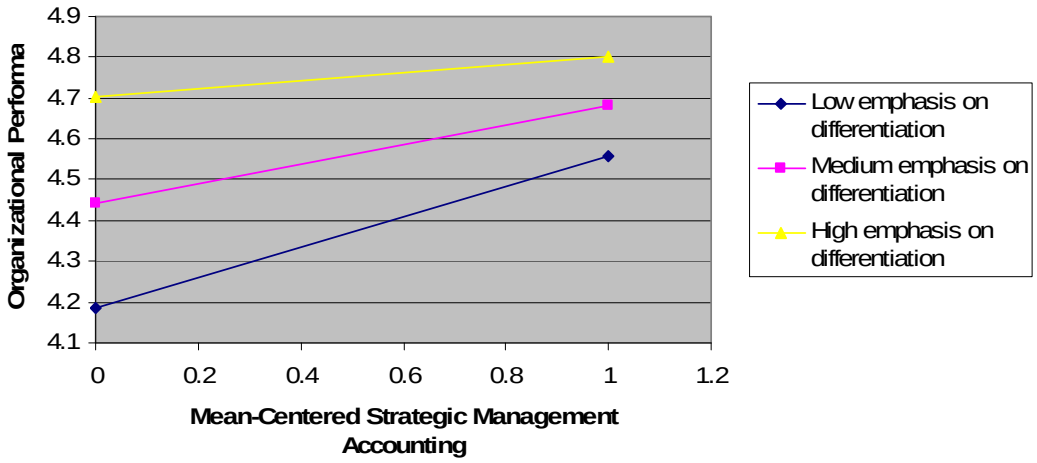
***Significant at the 0.01 level (1-tailed).
**Significant at the 0.05 level (1-tailed).
*Significant at the 0.10 level (1-tailed).

It is found that when high level of differentiation is pursued, the effect of strategic management accounting on organizational performance is not statistically significant. However, when the firms decrease the level of emphasis placed on differentiation strategic priority, the positive effect of strategic management accounting on firm's performance is significant and stronger.

It is noticed that the slopes of the simple regression lines decrease from 0.374 to 0.236 to 0.098, and the intercepts increase from 4.185 to 4.444 to 4.703 as the emphasis on differentiation is increased. Three regression lines are plotted to demonstrate the interaction effect in Figure 7-4. It is found that these regression lines are not parallel,

which confirms the occurrence of interaction power. It implies that the higher emphasis on differentiation, the weaker positive relationship between the benefit obtained from strategic management accounting and organizational performance. In other words, strategic priority named differentiation buffers the effect of benefit obtained from strategic management accounting on organizational performance.

Figure 7-4: Regression Lines Predicting Organizational Performance from Strategic Management Accounting at Three Levels of Differentiation



Interpretation of the regression equation (Panel C)

The change in R^2 is used to assess the interaction between strategic management accounting and strategic mission of Gupta and Govindarajan. It is found that the R^2 without interaction term is 0.112 (model 1) while R^2 with interaction term is 0.135 (model 2), resulting in 0.023 change in R^2 which is statistically significant at the level of 0.10 (sig *F* change = 0.062). It means the interaction accounts for 2.3% of the variance in the organizational performance. It is noted that the significance of the change in R^2 is the same as that of β_3, indicating the presence of a significant moderator effect. The moderated relationship (model 2) is shown as follow.

$$OP = 4.418 + 0.295SMA + 0.021ST_{GG} + 0.362SMA* ST_{GG} \quad \text{…….(11)}$$

It is found that the intercept and regression coefficients are statistically significant except that of strategic mission of Gupta and Govindarajan. Regression coefficients of strategic

management accounting (β_1) are 0.295, which is statistically significant at level of 0.001 ($P < 0.001$). It implies that organizational performance is predicted to increase by 0.295 units when the firm obtains the benefit from strategic management accounting for one more unit, and pursues strategic mission of Gupta and Govindarajan at the mean level.

Higher order coefficient (β_3) is 0.362, which is positive and significant at the level of 0.10 ($P < 0.10$), indicating the presence of an interaction effect. It implies that the slope of organizational performance on the benefit obtained from strategic management accounting is predicted to increase by 0.362 units when the firm emphasize one more unit on strategic mission of Gupta and Govindarajan (one more unit toward build strategy). It means that the effect of strategic management accounting on organizational performance depends on strategic mission of Gupta and Govindarajan the firm pursues.

To characterize the nature of interaction, the regressions of organizational performance on strategic management accounting at three different levels (low, medium, and high levels) of strategic mission of Gupta and Govindarajan are plotted as well as the analysis of simple regression equations presented in Table 7-5.

Table 7-5: Analysis of Simple Regression Equations for Regression of Organizational Performance on Centered Strategic Management Accounting at Three Values of Centered Strategic Mission of Gupta and Govindarajan

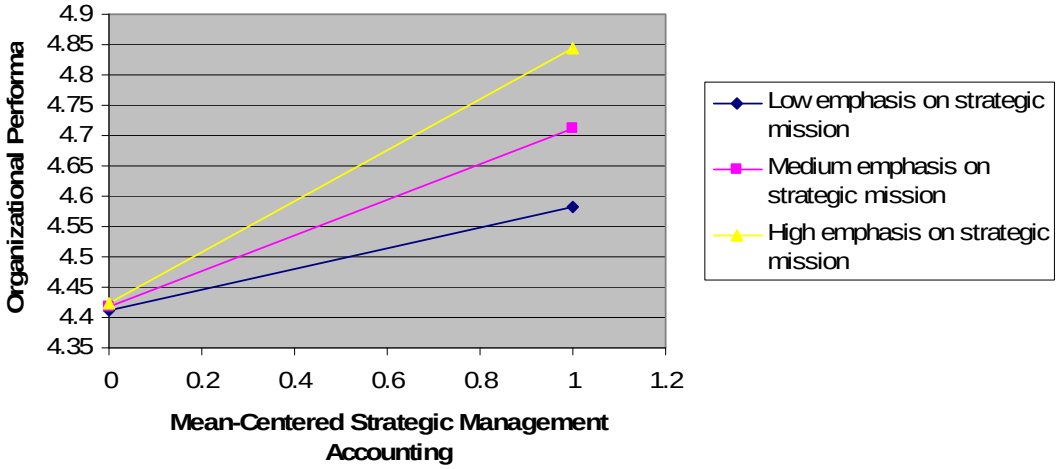
Value of ST_{GG}	Simple regression equation	SE	95% confidence intervals	*t* test	Sig value
Low	OP = 4.411 + 0.171 SMA	0.096	-0.020 to 0.361	1.775	0.078*
Medium	OP = 4.418 + 0.295 SMA	0.072	0.153 to 0.438	4.113	0.000***
High	OP = 4.425 + 0.420 SMA	0.099	0.224 to 0.616	4.246	0.000***

***Significant at the 0.01 level (1-tailed).
**Significant at the 0.05 level (1-tailed).
*Significant at the 0.10 level (1-tailed).

It is found that for all levels of strategic mission, the effect of strategic management accounting on organizational performance is statistically significant. When the firms increase the level of strategic mission (moving from 'harvest' to 'build'), the positive effect of strategic management accounting on firm's performance is stronger.

It is noticed that the slopes of the simple regression lines increase from 0.171 to 0.295 to 0.420, and the intercepts increase from 4.411 to 4.418 to 4.425 as the level of strategic mission increases (moving toward 'build'). Three regression lines are plotted to demonstrate the interaction effect in Figure 7-5. It is found that these regression lines are not parallel, which confirms the occurrence of interaction power. It implies that the higher level of strategic mission (moving toward 'build'), the stronger relationship between the benefit obtained from strategic management accounting and organizational performance. In other words, the level of strategic mission strengthens the effect of benefit obtained from strategic management accounting on organizational performance.

Figure 7-5: Regression Lines Predicting Organizational Performance from Strategic Management Accounting at Three Levels of Strategic Mission



Summary of the Results

It is found that strategic types of Porter and strategic mission of Gupta and Govindarajan moderate the relationship between some management accounting practices and organizational performance. The interaction effect found from strategic mission of Gupta and Govindarajan is expected. Particularly, the higher score of strategic mission that the firm pursues (moving toward 'build' strategy), the more positive relationship between benefit obtained from strategic management accounting and organizational performance. This part of the finding supports the interaction effect proposed in hypothesis 9.1.

However, the interaction effects found from strategic types of Porter are unexpected. Specifically, the higher emphasis on customer orientation, the more positive relationship between benefit obtained from traditional costing and organizational performance. Similarly, the higher emphasis on differentiation, the less positive relationship between benefit obtained from strategic management accounting and organizational performance. These findings do not support the proposed hypothesis.

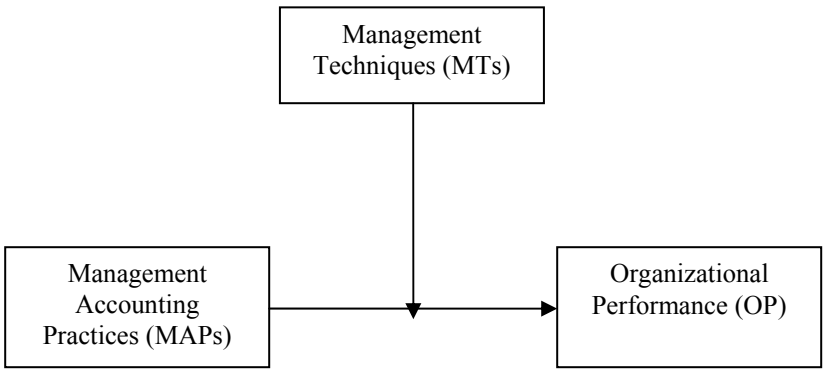
7.2.2 Hypothesis 10

There is a positive combined effect of management accounting practices (MAPs) and management techniques (MTs) on organizational performance.

> H 10.1: The higher benefit obtained from MTs concerning quality, employee empowerment, customization and flexibility, the more positive relationship between contemporary MAPs and organizational performance.
>
> H 10.2: The higher benefit obtained from MTs supporting cost efficient processes, the more positive relationship between traditional MAPs and organizational performance.

In order to test this hypothesis, moderated regression was performed to test the combined effect of management accounting practices and management techniques on organizational performance. Figure 7-6 illustrates moderated relationship proposed in hypothesis 10. Organizational performance, which is the dependent variable, is kept as its original scale. Management accounting practices (MAPs) are the independent variables while management techniques (MTs) are moderators. Both MAPs and MTs are centered before calculating the interaction term between them; hence, all predictors in a moderated regression equation are centered.

Figure 7-6: Moderated Relationship Proposed in Hypothesis 10



Hierarchical or blockwise entry is used in order to assess the interaction effect through the significance of R^2 change. Unmoderated regression which contains only two predictors was first entered as model 1 shown in equation 12 while moderated regression which includes two predictors and the interaction term was entered as model 2 shown in equation 13.

$$OP = \beta_0 + \beta_1 MAPs_i + \beta_2 MTs_i + \varepsilon_i \quad \text{…….(12)}$$

$$OP = \beta_0 + \beta_1 MAPs_i + \beta_2 MTs_i + \beta_3 MAPs_i MTs_i + \varepsilon_i \quad \text{…….(13)}$$

Where

OP	=	Organizational performance
MAPs*i*	=	Management accounting practices (*i* = 1-7, 1 = SMA, 2 = BM, 3 = ABP, 4 = CPM, 5 = TB, 6 = TC, and 7 = TPM)
MTs*i*	=	Management techniques (*i* = 1-5, 1 = HRM, 2 = IS, 3 = TBS, 4 = QS, and 5 = INRE)
MAPs*i*MTs*i*	=	interaction term between MAPs and MTs

Due to 7 groups of MAPs and 5 groups of MTs, 35 moderated regression equations are estimated. After all regression equations have been estimated, the regression assumptions are tested via examination of the residual plots, the outliers and influential observations are identified via standardized residual values, Cook's distance, Mahalanobis distances, and Leverage[31]. Corrective actions and re-estimation of the regression model are required, if substantial violations to the assumptions are found or influential observations are

[31] The detail of these tests can be found in Field (2005).

determined (Hair et al., 2006). It was found that there is no serious assumption violation, and no sign of influential observations and outliers. Consequently, all of the observations remain in the analysis. There is only 1 of 35 equations, in which the change in R^2 is statistically significant indicating the presence of interaction effect. Table 7-6 demonstrates the findings.

Table 7-6: The result from moderated regression analysis for hypothesis 10

Model 1: $OP = \beta_0 + \beta_1 SMA + \beta_2 TBS + \varepsilon_i$
Model 2: $OP = \beta_0 + \beta_1 SMA + \beta_2 TBS + \beta_3 SMA*TBS + \varepsilon_i$

				Change Statistics				
	R^2	Adj R^2	SE	R^2 Change	Sig F Change	F-value	Sig value	
Model 1	0.184	0.172	0.883	0.184	0.000	14.924	0.000	
Model 2	0.210	0.192	0.872	0.025	0.042**	11.593	0.000	

		Unstandardised Coefficients		Standardised Coefficients			Collinearity Statistics	
Model 1	Variable	B	SE	Beta	t-value	Sig	Tolerance	VIF
	Constant	4.407	0.076		57.990	0.000		
	SMA	0.166	0.079	0.188	2.111	0.037**	0.777	1.287
	TBS	0.292	0.085	0.307	3.444	0.001***	0.777	1.287
Model 2	Constant	4.468	0.081		55.351	0.000		
	SMA	0.148	0.078	0.169	1.901	0.059*	0.768	1.302
	TBS	0.291	0.084	0.306	3.475	0.001***	0.777	1.287
	SMA*TBS	-0.115	0.056	-0.161	-2.051	0.042**	0.984	1.016

***Significant at the 0.01 level (1-tailed).
**Significant at the 0.05 level (1-tailed).
*Significant at the 0.10 level (1-tailed).

Variable definitions
OP = Operational performance
SMA = Strategic management accounting
TBS = Team based structure

Interpretation of the Results

The change in R^2 is used to assess the interaction between strategic management accounting and team based structure. It is found that the R^2 without interaction term is 0.184 (model 1) while R^2 with interaction term is 0.210 (model 2), resulting in 0.025 change in R^2 which is statistically significant at the level of 0.05 (sig *F* change = 0.042). It means the interaction accounts for 2.5% of the variance in the organizational performance. It is noted that the significance of the change in R^2 is the same as that of β_3, indicating the

presence of a significant moderator effect. The moderated relationship (model 2) is shown as follow.

$$OP = 4.468 + 0.148SMA + 0.291TBS + (-0.115)SMA*TBS \quad \text{…….(14)}$$

It is found that the intercept and all regression coefficients are statistically significant. Regression coefficients of strategic management accounting and team based structure (β_1 and β_2) are 0.148 ($P < 0.10$) and 0.291 ($P < 0.01$) respectively. It implies that organizational performance is predicted to increase by 0.148 units when the firm obtains the benefit from strategic management accounting for one more unit, and obtains the benefit from team based structure at the mean level. Similarly, organizational performance is predicted to increase by 0.291 units when the firm obtains the benefit from team based structure for one more unit, and obtains the benefit from strategic management accounting at the mean level.

Higher order coefficient (β_3) is -0.115, which is negative and significant at the level of 0.05 ($P < 0.05$), indicating the presence of an interaction effect. It implies that the slope of organizational performance on the benefit obtained from strategic management accounting is predicted to decrease by 0.115 units when the firm obtain the benefit from team based structure for one more unit. It means that the effect of strategic management accounting on organizational performance depends on the benefit obtained from team based structure. In other words, there is an interactive effect between strategic management accounting and team based structure on organizational performance.

To characterize the nature of interaction, the regressions of organizational performance on strategic management accounting at three different levels (low, medium, and high levels) of benefit obtained from team based structure are plotted as well as the analysis of simple regression equations presented in Table 7-7.

Table 7-7: Analysis of Simple Regression Equations for Regression of Organizational Performance on Centered Strategic Management Accounting at Three Values of Centered Team Based Structure

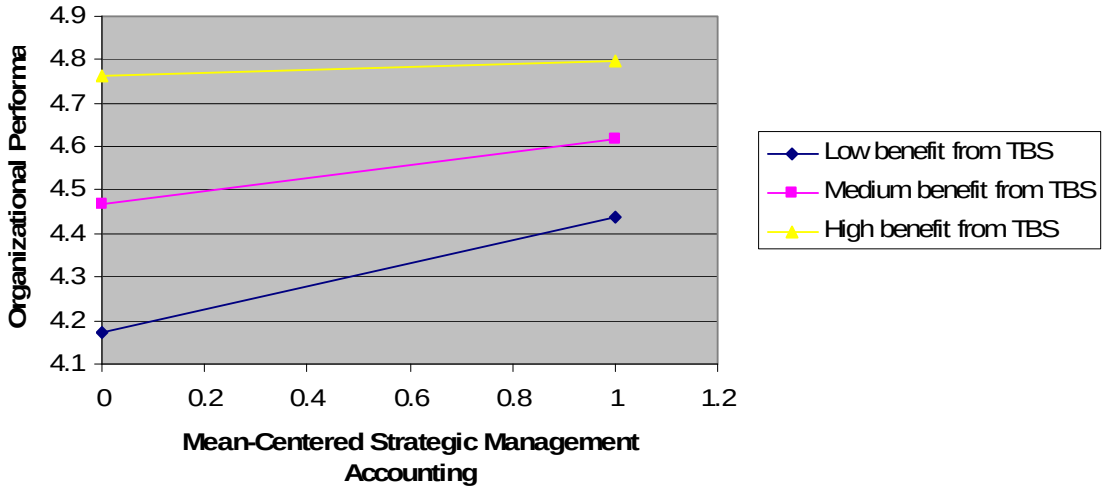
Value of TBS	Simple regression equation	SE	95% confidence intervals	*t* test	Sig value
Low	OP = 4.171 + 0.266 SMA	0.092	0.085 to 0.447	2.901	0.004***
Medium	OP = 4.468 + 0.148 SMA	0.078	-0.006 to 0.303	1.901	0.059*
High	OP = 4.765 + 0.031 SMA	0.102	-0.170 to 0.232	0.303	0.762

***Significant at the 0.01 level (1-tailed).
**Significant at the 0.05 level (1-tailed).
*Significant at the 0.10 level (1-tailed).

It is found that when high benefit obtained from team based structure, the effect of strategic management accounting on organizational performance is not statistically significant. However, when the firms obtain less benefit from team based structure, the positive effect of strategic management accounting on firm's performance is significant and stronger.

It is noticed that the slopes of the simple regression lines decrease from 0.266 to 0.148 to 0.031, and the intercepts increase from 4.171 to 4.468 to 4.765 as the benefit obtained from team based structure is increased. Three regression lines are plotted to demonstrate the interaction effect in Figure 7-7. It is found that these regression lines are not parallel, which confirms the occurrence of interaction power. It implies that the higher benefit obtained from team based structure, the weaker positive relationship between the benefit obtained from strategic management accounting and organizational performance. In other words, team based structure buffers the effect of benefit obtained from strategic management accounting on organizational performance.

Figure 7-7: Regression Lines Predicting Organizational Performance from Strategic Management Accounting at Three Levels of Team Based Structure



Summary of the Result

It is found that there is no positive combined effect between management accounting practices and management techniques on organizational performance as proposed in the hypothesis. Instead, a negative combined effect has been found. Particularly, team based structure is found to be the moderator weakening the positive relationship between strategic management accounting practices and organizational performance. Hence, there is no evidence supporting the moderated relationship proposed in hypothesis 10.

The results of the examination of the interaction effect of strategy and MTs on the relationship between MAPs and performance are disappointing. However, it must be borne in mind that this research is undertaken in an emerging economy where management may still be coming to terms with the use of management accounting information. Additionally, there is no evidence that any other researchers have attempted to demonstrate this interaction effect for an emerging economy.

Chapter 8

Hypotheses Testing Based on Systems Approach

This chapter will focus on testing the hypothesis based on the systems approach, which takes a holistic view of fit or a configuration form of contingency theory. A systems approach concerns a variety of ways of combining multiple aspects of MCS and contextual factors in order to improve organizational performance (Chenhall, 2003). Unlike selection and interaction approaches, which provide an incomplete view of the relationship, it aims to investigate all of the relationships among many contextual and contingency variables as a whole. Cluster analysis is adopted to test this hypothesis in line with its ability to incorporate and consider a variety of the variables simultaneously. Therefore, the complexity of organizational reality can meaningfully be captured (Ketchen and Shook, 1996).

8.1 Cluster Analysis

Cluster analysis is a group of 'numerical techniques for deriving classifications originated largely in the natural sciences such as biology and zoology in an effort to rid taxonomy of its traditionally subjective nature' (Everitt et al., 2001, p.4). Cluster analysis is used as a generic term for classification methods; however, it is given a number of names varying from discipline to discipline such as *Q* analysis, numerical taxonomy, segmentation, typology construction, and classification analysis (Everitt et al., 2001; Hair et al., 2006). Despite different names across disciplines, all clustering approaches share the same purpose, which is to classify the objects, respondents, companies, products, or other entities based on the similarity of the objects for a set of chosen characteristics (cluster variate or clustering variables[32]). As a result, the objects in the same cluster are expected to be similar (high internal homogeneity) while the objects from different clusters are expected to be dissimilar (high external heterogeneity) (Hair et al., 2006).

[32] 'Cluster variate is a set of variables or characteristics representing the objects to be clustered and used to calculate the similarity between objects' (Hair et al., 2006, p.556).

Cluster analysis can be used to deal with any combination of three basic research questions, including taxonomy description, data simplification, and relationship identification. The most traditional use of cluster analysis, taxonomy description, is used to form a classification of objects for both exploratory and confirmatory purposes. Second, cluster analysis can be used to simplify the data by defining the underlying structure among the observations, and then using derived groups of observations or the clusters to develop a simplified view or insight into their general characteristics as well as the basis for further analysis. Last, cluster analysis can be used to reveal meaningful relationships among the observations, which are not previously identified with the individual observations. This can be done by examining the simplified structure either with quantitative methods such as discriminant analysis or more qualitative methods (Hair et al., 2006).

The objectives of cluster analysis are also related to the selection of clustering variables used to describe the observations being clustered. The researcher needs to be concerned with conceptual and practical considerations in selecting clustering variables, and avoid the inclusion of irrelevant variables (Hair et al., 2006). Three fundamental approaches have been suggested to identify the appropriate clustering variables; inductive, deductive, and cognitive. In an inductive approach, the selection of clustering variables is concerned with the inclusion of as many variables as possible due to the lack of theoretical grounding. It is considered as exploratory in nature. In contrast, a deductive approach identifies clustering variables based on theory and prior research. This is more appropriate to deal with a study attempting to explain or predict relationships between constructs because a theoretical foundation is needed. Regarding a cognitive approach, the selection of clustering variables is more reliant on the perceptions of expert informants than those of the researchers. Selecting one of these approaches is dependent on the purposes of the study (Ketchen and Shook, 1996).

The current study employs cluster analysis to address a combination of the three basic research questions; taxonomy description, data simplification, and relationship identification. The selection of a clustering variable is based on theoretical grounding and previous research, the deductive approach. It includes only relevant variables proposed in the hypothesis. The study intends to classify the respondents into different groups based on

the emphasis of strategic types the firms pursue, and the degree of benefit obtained from management accounting practices and management techniques, which are regarded as clustering variables. Consequently, organizational configurations or groups of organizations sharing the similar profiles emerge. The proposed relationships between these configurations and organizational performance in the hypothesis are thus investigated. It is expected that the cluster analysis will provide rich and meaningful descriptions of configurations (Ketchen and Shook, 1996).

8.1.1 Research Design in Cluster Analysis

Research design in cluster analysis is influenced by four main issues, particularly the adequacy of sample size, the outliers, the measurement of similarity, and the standardization of data (Hair et al., 2006).

The adequacy of sample size

Regarding the sample size, there is no statistical inference or statistical power involved in cluster analysis. However, a major concern is about the adequacy of sample size in order to identify practical and useful groups or clusters. The sample size must be adequate to characterize the data structure and enough to generate representative groups within the population (Hair et al., 2006). With a sample size of over 100 cases, it is anticipated to be large enough to represent the small groups within the population of 451 observations. The number of cases per cluster is expected to be five observations or more. This is consistent with prior research, in which the minimum cases per cluster are four observations for example Chenhall and Langfield-Smith (1998b).

The outliers

The outliers can be detected before and after the partitioning process commences. The researchers must make a decision whether the detected outliers are truly unusual observations or representative of relevant but small groups within the population. This issue is also related to the adequacy of the sample size. The true outliers should be removed from the analysis because cluster analysis is susceptible to the outliers. The

failure to do so may result in a distorted structure or results which are unrepresentative of the population (Hair et al., 2006). For this research, detecting outliers has been undertaken before and after the partitioning process. There is no evidence of problematic outliers from univariate procedures presented in chapter 4 and 5; however, it is necessary to detect the outliers for the multivariate procedure due to the nature of cluster analysis, which involves many clustering variables.

The Mahalanobis distance (D^2), the distance of each case from the sample mean across all clustering variables, was calculated for each observation. Although there is no specific cut-off point, the extremely high value of Mahalanobis distance indicates that the cases are different from the other cases across the set of clustering variables (Hair et al., 2006). It is found that there are 27 cases with higher value of Mahalanobis distance (greater than the value of 25) than the remaining observations. However, they are not discarded before the analysis, but they may become candidates for deletion later if they tend to form single-member clusters or extremely small clusters. The detection of the outliers after the partitioning process will be discussed when cluster analysis is performed.

The measurement of similarity

Similarity is the fundamental concept in cluster analysis. Inter-object similarity represents 'the degree of correspondence among objects across all of the characteristics used in the analysis' (Hair et al., 2006, p.563). The similarity between each pair of objects is calculated based on the characteristics (clustering variables) specified by the researcher, and it is used to group the similar objects into the same cluster. In spite of many procedures in measuring inter-object similarity, the applications of cluster analysis have been dominated by three main methods; correlational measures, distance measures, and association measures[33] (Hair et al., 2006).

In short, they are different in their specific perspectives on similarity depending on both the objectives (emphasis on the patterns or the magnitudes of values) and types of data (metric or nonmetric data). Correlational measures indicate the patterns across the

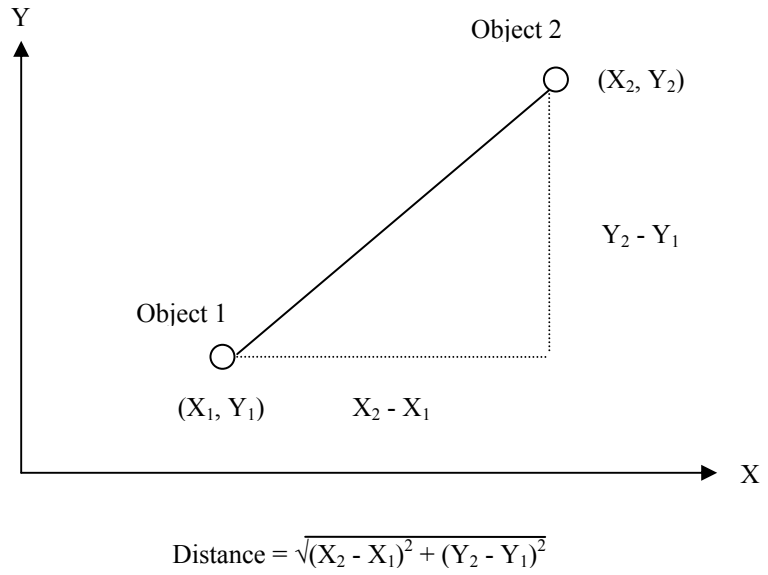
[33] Each method 'measuring similarity' is discussed in more detail in Hair et al., (2006).

variables while distance measures represent the magnitudes of the objects. Metric data are required for correlational and distance measures while nonmetric data are accommodated by association measures (Hair et al., 2006). The selected similarity measure should be consistent with the research design, which is determined by the theoretical, practical, and philosophical context of the research problem (Aldenderfer and Blashfield, 1984).

The current study employs distance measures as the measurement of similarity due to its popular use in cluster analysis and suitability with the objective (emphasis on magnitudes of the value) and the type of data (all clustering variables are metric variables). Distance measures are the most commonly used measures of similarity in cluster analysis. Similarity is measured as the distance of observations to one another across the clustering variables. High value represents less similarity, and low value represents high similarity. Hence, distance measures can be referred to as a measure of dissimilarity. There are many types of distance measures including Euclidean distance, Squared Euclidean distance, City-block (Manhattan) distance, Chebychev distance, and Mahalanobis distance (Hair et al., 2006). Due to limited space, the details of each type of distance measures are not provided here, but can be found in many materials such as Aldenderfer and Blashfield (1984), Everitt et al., (2001), and Hair et al., (2006).

Squared Euclidean distance is selected for this study due to its consistency with specific linkage method (Ward's method) used in the analysis. Euclidean distance refers to straight-line distance between two points or the length of the hypotenuse of a right triangle. Figure 8-1 illustrates Euclidean distance between two objects measured on two variables and the formula to calculate it. This concept can be easily applied when there are more than two clustering variables. Squared Euclidean distance is 'the sum of squared differences without taking the square root' (Hair et al., 2006, p.575). It is noted that Squared Euclidean distance is suggested as the distance measure for the centroid and Ward's methods of clustering (Hair et al., 2006).

Figure 8-1: Euclidean Distance between Two Objects Measured on Two Variables



Source: Hair et al. (2006, p.575).

The standardization of data

According to the emphasis on magnitudes of the values, cluster analysis based on distance measures is responsive to different measurement scales among clustering variables. The dispersion of variables affects the final solution. Particularly, variables with larger standard deviations and larger ranges are given more weight in identifying a cluster solution. In other words, they have more influence on the final similarity value. Consequently, it is recommended to standardize all of the clustering variables before the analysis. Standardization transforms the distribution of variables into a mean of zero and a standard deviation of one. Hence, clustering variables are equally contributing to the clustering process, and the bias from different scaling is eliminated (Hair et al., 2006).

It has been argued however that meaningful differences among observations in original data may be lost when standardization is applied. This is because standardization can diminish the variation between clusters on clustering variables, which may be the best discriminators (Aldenderfer and Blashfield, 1984). There is no specific guidance, so that the decision about standardization should be made case by case. It is suggested that the analyses should be done with and without standardization. If the cluster solutions from

both approaches are inconsistent, the solution with higher validity should be selected (Ketchen and Shook, 1996).

In the current study, most of the clustering variables are measured on a seven-point Likert-scale except strategic mission of Gupta and Govindarajan. Cluster analyses are performed with and without standardization. Regarding standardization, all of the clustering variables are standardized by converting the variables to standard scores also known as Z scores. It is found that cluster solutions from both approaches are not substantially different. Thus, standardization is adopted to ensure that the effects from differences in measurement scales across clustering variables are eliminated.

8.1.2 Assumptions in Cluster Analysis

Due to its properties as a non-statistical inference technique, the requirements of normality, linearity and homoscedasticity are less important in cluster analysis. Instead, cluster analysis is more concerned with the representativeness of the sample and multicollinearity among clustering variables (Hair et al., 2006).

Regarding the representativeness of the sample, it is important to ensure that the sample is truly representative of the population in order that the derived clusters can represent the underlying structure of the population (Hair et al., 2006). The sample used in the current study is reasonably representative of the companies in the Stock Exchange of Thailand (SET). The sample of 135 observations is about 30 percent of the whole population. When dividing the sample into small groups based on their industries, the sample is accounted for about 30 percent for almost all industries. However, there are two exceptional cases; consumption and financial industries are under represented in the sample (approximately 20 percent each) while agricultural & food and technology are relatively over represented (approximately 35 percent each). Thus, it is believed that the sample is a relatively good representative sample of the population, and the findings from cluster analysis can be generalized to the population of interest. The detail of this is shown in Table 4-2: Summary of respondent demographics in Chapter 4.

The impact of multicollinearity in cluster analysis is quite different from that in other multivariate techniques. Multicollinearity may disguise the true effect of variables on the findings in other techniques such as multiple regression analysis. Instead, in cluster analysis multicollinearity affects the weighting process. For example, if some of the clustering variables have substantially high multicollinearity, this group of variables will have more chance to affect the similarity measure than those single variables or smaller groups of variables. In other words, multicollinearity variables will dominate the partitioning process. Hence, it is necessary to examine the degree of multicollinearity among clustering variables (Hair et al., 2006). It is found that there is no evidence of extremely high multicollinearity among clustering variables (all collinearity less than 0.80). Thus, it is assumed that clustering variables are weighted and affect the similarity measure equally in order to arrive at the best representative picture of the underlying structure.

8.1.3 Partitioning Procedure

Despite a variety of partitioning procedures developed across disciplines, the most commonly used procedures can be categorized as hierarchical and nonhierarchical cluster procedures (Ketchen and Shook, 1996).

Hierarchical Cluster Procedures

'Hierarchical procedures involve a series of $n - 1$ clustering decisions (where n equals the number of observations) that combine observations into a hierarchy or a treelike structure' (Hair et al., 2006, p.584). Agglomerative and divisive methods are two basic types of hierarchical clustering procedures. In agglomerative methods, an individual case or observation starts as a single-member cluster, and then the two most similar clusters are combined into a new cluster, and so on. The repetitive process continues until all observations are included into one cluster, which is $n - 1$ times. On the other hand, divisive methods are the methods in reverse. All observations start in one cluster, and are then divided into two clusters, and so on until each observation is a single-member cluster (Kuo et al., 2002). It is noted that agglomerative methods are used in most popular computer packages including SPSS (Hair et al., 2006).

After selecting the method to measure the similarity from amongst correlational measures, distance measures and associational measures (distance measures are selected for the current study), the researcher needs to decide how to define similarity between two clusters when there are multiple members in the clusters (also called clustering algorithm). Many clustering algorithms have been proposed; however, the five most popular algorithms in a hierarchical procedure are single-linkage, complete-linkage, average linkage, centroid method, and Ward's method (Hair et al., 2006).

In the single-linkage method (also called the nearest-neighbor method), the similarity between clusters are defined as the shortest or smallest distance between any objects in different clusters. There is no requirement to calculate new distance measures. Instead, the original distance matrix between observations can be used. It is the most flexible agglomerative algorithm due to the ability to define a wide range of clustering patterns. However, it can create the problems called 'snakelike chains' which represent dissimilar objects at the two opposite ends of the chain in the same cluster (Aldenderfer and Blashfield, 1984).

The complete-linkage method (also called farthest-neighbor or diameter method) defines the similarity between clusters based on the longest or furthest distance between objects in each cluster. This method is claimed to produce the most compact clustering solutions and reduce the chaining problem found with single-linkage method. Nonetheless, it still presents the only one aspect of the data (farthest distance) (Hair et al., 2006).

In contrast to the methods above, the average linkage defines similarity based on all members in the clusters rather than a single pair of the extreme values (smallest or farthest distances). It measures similarity between clusters as the average similarity of all objects in one cluster with that of all objects in another cluster. Hence, it is less affected by the outliers. It tends to generate the clusters with small and relatively equal within-cluster variation (Hair et al., 2006).

Regarding the centroid method, the similarity between clusters is defined as the distance between cluster centroids of the clusters. 'Cluster centroids are the mean values of the

observations on the variables in the cluster variate (or clustering variables)' (Hair et al., 2006, p.588). A cluster centroid is adjusted every time when a new individual object or cluster is combined with an existing cluster. Like the average method, the centroid method is less sensitive to the outliers. It is commonly used in the physical sciences such as biology even though it may generate confusing results (Hair et al., 2006). The centroid method is limited to the use of interval or ratio scales, and may produce irregular shaped clusters (Ketchen and Shook, 1996).

Ward's method is commonly used in the social sciences, but not in the pure sciences such as biology (Aldenderfer and Blashfield, 1984). The similarity between clusters is the sum of squares within the clusters summed over all variables rather than a single measure of similarity as in the previous methods. Two clusters are combined when their combination of clusters minimizes the increase in the total sum of squares across all variables in all clusters (Hair et al., 2006). In other words, 'Ward's method is designed to optimize the minimum variance within clusters' (Aldenderfer and Blashfield, 1984, p.43). It tends to produce equal size clusters (relatively the same number of observations); however, this method is susceptible to the outliers (Ketchen and Shook, 1996).

According to the process of creating clusters in hierarchical procedure and a clustering algorithm selected, the complete range of cluster solutions is generated by nesting each stage of the solutions together. The later stage of the solutions is formed by combining two existing clusters in the earlier stage. The membership of each observation can be traced back in an unbroken path of a treelike diagram also called dendrogram (Everitt et al., 2001).

The critical decision for hierarchical methods is then to determine the number of clusters, which best represents the structure of the data. The researcher must select the most appropriate cluster solution from the complete set of cluster solutions by applying 'stopping rule' (Hair et al., 2006). Although there is no standard objective selection procedure due to the deficiency of internal statistical criterion in cluster analysis, many criteria or stopping rules for determining the number of clusters have been developed such as the measures of heterogeneity change (the agglomeration coefficient in SPSS), the inspection of graphs (dendrogram and the graph of the number of clusters against the

agglomeration coefficient), and a priori theory. Each criterion has its own limitations; therefore, it is recommended to use multiple techniques to determine the number of clusters (Ketchen and Shook, 1996).

Advantages and disadvantages of hierarchical methods should be discussed. Hierarchical methods provide an excellent framework representing any set of cluster solutions. They offer a simple and comprehensive description of the entire range of clustering solutions (Hair et al., 2006). Nevertheless, the result from hierarchical procedure can be misleading due to the inability to separate undesirable combinations from the early stage, and the considerable impact of the outliers. Choosing the right clustering algorithm may be difficult because the underlying structure normally is unknown before the analysis is performed (Ketchen and Shook, 1996). It is also difficult to deal with a large sample size due to the requirements of data storage of similarities (Hair et al., 2006).

Nonhierarchical Clustering Procedures

Unlike hierarchical methods involving a treelike structure, nonhierarchical clustering procedures assign observations into clusters after the number of clusters is specified. It involves two essential steps; the specification of cluster seeds, and assignment. First, the starting points or cluster seeds are identified. This can be done by different approaches, which can be categorized into two basic groups; researcher specified and sample generated. Cluster seeds can be specified by the researcher based on previous research or result from another multivariate analysis. The alternative is to identify cluster seeds from the observations of the sample such as random selection (Hair et al., 2006). However, only the use of nonrandom seed points can make nonhierarchical methods more preferable while nonhierarchical methods with random seeds are not superior to hierarchical techniques (Kuo et al., 2002).

After the selection of cluster seeds, each observation is then assigned to one of the cluster seeds based on similarity. It aims to allocate each object to the most similar seed point (Ketchen and Shook, 1996). There are three nonhierarchical clustering algorithms also referred to as K-means clustering or iterative methods. These are sequential threshold, parallel threshold, and optimization. In sequential threshold method, one cluster seed is

specified at the time, and all observations within a threshold distance are included. Then, the next cluster seed is selected and all observations within a pre-specified distance are assigned, and so on. The drawback of this method is that each object cannot be reassigned even though it is more similar to another cluster seed than the original one (Hair et al., 2006).

In parallel threshold method, all cluster seeds are simultaneously considered, and observations are assigned within the threshold distance to the closest or the most similar seed. Regarding the optimizing procedure, it is comparable to the other two clustering algorithms, but the observations are allowed to reassign to the more similar or nearer cluster seed (Hair et al., 2006).

Nonhierarchical clustering procedures have become more popular and increasingly acceptable. There are several advantages of these procedures. The findings from nonhierarchical procedures are less sensitive to the outliers because it allows the observations to switch cluster membership (Ketchen and Shook, 1996). Nonhierarchical procedures produce more than one pass through the data. The cluster solutions are not nested, and not part of a hierarchy. Hence, the major drawback of hierarchical procedures can be avoided (Aldenderfer and Blashfield, 1984). The inclusion of irrelevant or inappropriate clustering variables affects the findings to a lesser extent. Moreover, extremely large data sets may be analysed because there is no requirement of similarity matrices among all observations (Hair et al., 2006).

However, nonhierarchical procedures require the number of clusters and initial starting points to be pre-specified (Kuo et al., 2002). Thus, it may be problematic to identify the number of clusters and cluster seeds prior to the analysis when the study is exploratory research (Ketchen and Shook, 1996). The use of nonhierarchical methods much depends on the researcher's ability to select the appropriate seed points. In fact, different sets of specified seed points tend to generate different final solutions; hence, validation is required to guarantee the optimum result. Compared to hierarchical methods which provide all possible solutions in one analysis, nonhierarchical procedures can only produce one solution in a single analysis; thus, it is inefficient to use nonhierarchical procedures to examine a large number of potential solutions (Hair et al., 2006).

A Combination of Hierarchical and Nonhierarchical Methods

Both hierarchical and nonhierarchical procedures have their own advantages and disadvantages. In order to gain the benefit from each method, the combined use of hierarchical and nonhierarchical clustering procedures is proposed. It is noted that the strengths of each method can compensate for the weaknesses of the other counterpart. There is evidence showing that the validity of the results can be increased when hierarchical and nonhierarchical procedures are jointly applied. However, it requires extra time and effort from the researcher (Ketchen and Shook, 1996). This can be achieved in two stages. First, a complete set of cluster solutions is generated by using hierarchical clustering procedures. The number of applicable solutions is selected, and cluster centers are profiled to act as cluster seeds. Any obvious outliers (those single-member clusters or extremely small clusters) are identified and eliminated at this stage. Reanalysis is required after any deletion. Second, nonhierarchical clustering procedures are used to produce the final solution based on the number of clusters and the initial cluster seeds from hierarchical methods (Hair et al., 2006).

The current study employs the combination of hierarchical and nonhierarchical clustering procedures rather than relying on only one method. The hierarchical agglomerative method with Ward's linkage algorithm is selected to generate the number of clusters and cluster seed points. Then, the final solution is produced by a nonhierarchical method, particularly optimizing procedure, which allows for reassignment of observations. It is believed that the cluster solution from these combined methods provides more accurate cluster memberships to represent the data's structure.

8.1.4 Limitations of Cluster Analysis

Despite its popularity and advantages, the limitations of cluster analysis should be addressed when cluster analysis is employed. The most common criticism is the absence of statistical inferences. Cluster analysis is descriptive and non-inferential, which means there is no statistical basis such as an *F*-statistic for drawing inferences from a sample to a population (Hair et al., 2006). Without a statistical test, cluster analysis relies extensively on researcher judgment throughout the process. No clear answer regarding the support or

lack of support for a hypothesis is provided. Instead, the results are arbitrarily interpreted in order to gain meaningful explanation (Ketchen and Shook, 1996).

According to the reliance on researcher judgment, it is difficult to generalize the cluster solution when the selection of clustering variables is completely specified by the researcher. This is because the cluster solution is totally dependent on clustering variables as the basis for the similarity measure (Hair et al., 2006). There is also concern about generalizability of the findings because different clustering methods tend to generate different solutions (Aldenderfer and Blashfield, 1984). It is also noted that clusters will always be created by cluster analysis even though there may be no actual existence of any structure in the data. The researcher must be aware that once clusters have been formed; their existence is not guaranteed (Ketchen and Shook, 1996). In order to overcome these criticisms, the strong conceptual support and validation are required to ensure meaningful and relevant clusters. Each of the specific decisions involved in performing a cluster analysis must be mentioned (Hair et al., 2006).

8.2 Hypothesis Testing with Cluster Analysis

Hypothesis 11: There is a positive combined effect of management accounting practices and management techniques on organizational performance under different strategic types.

H 11.1: Firms under a differentiation/ prospector/ build/ entrepreneurial strategy that obtain high benefit from contemporary MAPs and MTs concerning quality, employee empowerment, customization and flexibility tend to have high performance.

H 11.2: Firms under a cost leadership/ defender/ harvest/ conservative strategy that obtain high benefit from traditional MAPs and MTs supporting cost efficient processes tend to have high performance.

In order to test this hypothesis, an ‘organizational configuration’, which represents ‘a set of firms that share a common profile along conceptually distinct variables’, is identified (Ketchen and Shook, 1996, p.441). Then, the meaningful interpretation of these configurations or clusters is sought to support the proposed relationships among the constructs in the hypothesis. Cluster analysis was performed based on a combination of hierarchical and nonhierarchical procedures.

Hierarchical cluster analysis

First, the hierarchical clustering method was conducted to identify the appropriate number of clusters and cluster seeds. Squared Euclidean distance was used as the similarity measures because it is an appropriate measure for Ward's method. Ward's method, which is the most popular approach used in social sciences, was selected as clustering algorithm in order to optimize the minimum variance within clusters (Hair et al., 2006). A set of variables describing the characteristics of firms proposed in the hypothesis were used as clustering variables. These include the different strategic typologies the firms pursue, and the benefit obtained from the use of management accounting practices and management techniques. Eighteen items of the clustering variables are shown in Table 8-1. All clustering variables are standardized to mitigate the effect of the differences in measurement scales.

Table 8-1: Clustering Variables

Strategic Typologies	***Clustering Variables***
Strategic Types of Porter (1980; 1985)	D (Differentiation)
	CO (Customer Orientation)
	CE (Cost Efficiency)
Strategic Types of Miles and Snow (1978)	$ST_{M\&S}$
Strategic Mission of Gupta and Govindarajan (1984a)	$SM_{G\&G}$
Strategic Types of Miller and Friesen (1982)	$ST_{M\&F}$
Management Accounting Practices	***Clustering Variables***
Contemporary Management Accounting Practices	SMA (Strategic Management Accounting)
	BM (Benchmarking)
	ABP (Activity Based Practices)
	CPM (Contemporary Performance Measures)
Traditional Management Accounting Practices	TB (Traditional Budgeting)
	TC (Traditional Costing)
	TPM (Traditional Performance Measures)
Management Techniques	***Clustering Variables***
	HRM (Human Resource Management)
	IS (Integrating System)
	TBS (Team Based Structure)
	QS (Quality System)
	INRE (Innovation and Reorganization)

With the similarity measure, clustering algorithm, and clustering variables selected, the hierarchical clustering procedure generates the initial cluster result, which is a complete range of cluster solutions. Single-member clusters or small clusters should now be detected as the candidates for the outliers. The cluster solutions ranging from 2 to 10 clusters are

examined because 6 to 8 clusters have been observed in various previous studies. The sizes and cluster members of initial 10 clusters are shown in Table 8-2.

Table 8-2: Cluster Sizes for the Initial Hierarchical Cluster Analysis

	Initial 10 clusters	Cluster Solutions[a]								
ID	**Members**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**
1	1,9,48,50,70,89,121	7	7							
2	2,3,21,23,25,27,34,42,46,49,57,66,84,88, 95,98,104,105,107,126,130,134	22	22	22	22	22	36	36	36	
3	4,8,13,16,17,18,20,22,24,32,36,37,38,40, 51,60,64,67,72,74,77,91,92,99,111,113, 115,116,118,132,133	31	31	31	51	51	51	51	51	87
4	5,10,55,68,81,93,97,100,114,129,131	11	23	30	30	30	30	41	48	48
5	6,7,11,19,30,31,33,43,58,75,76,79,82,87, 108,112,117,120,124,128	20	20	20						
6	12,53,59,62,78	5	5	5	5					
7	14,28,69,85,109,119,123	7	7	7	7	7	7	7		
8	15,26,29,39,41,56,63,65,94,96,101,106, 125,135	14	14	14	14	14				
9	35,45,52,73,83,102	6	6	6	6	11	11			
10	44,47,54,61,71,80,86,90,103,110,122,127	12								

[a]Values in cells are number of observations in clusters for each cluster solution.

It was found that there is no single-member cluster or small cluster which falls below the pre-specified cluster size of five members defined earlier. Hence, the outliers are of less concern. Four small clusters (cluster 1, 6, 7, and 9), which contain 5, 6, and 7 members per cluster, are investigated in more detail. It is noticed that 27 observations with relatively high Mahalanobis distance values (previously detected in the examination of the outliers) scatter across all clusters (as shown in red colour). Only some of the observations in four small clusters have high Mahalanobis distance. It is believed that these small clusters are the representatives of small but relevant groups within the population. Deleting them may lead to the distortion of data structure. Consequently, all of these observations in small clusters are retained in the analysis, resulting in 135 observations.

Even though a complete range of cluster solutions is generated from the hierarchical cluster analysis, only a set of preliminary cluster solutions is selected to establish the basis for nonhierarchical cluster analysis. Multiple methods are used to determine the optimum numbers of clusters. These are the measures of heterogeneity change, the examination of dendrogram and the graph of the number of clusters against the agglomeration coefficient.

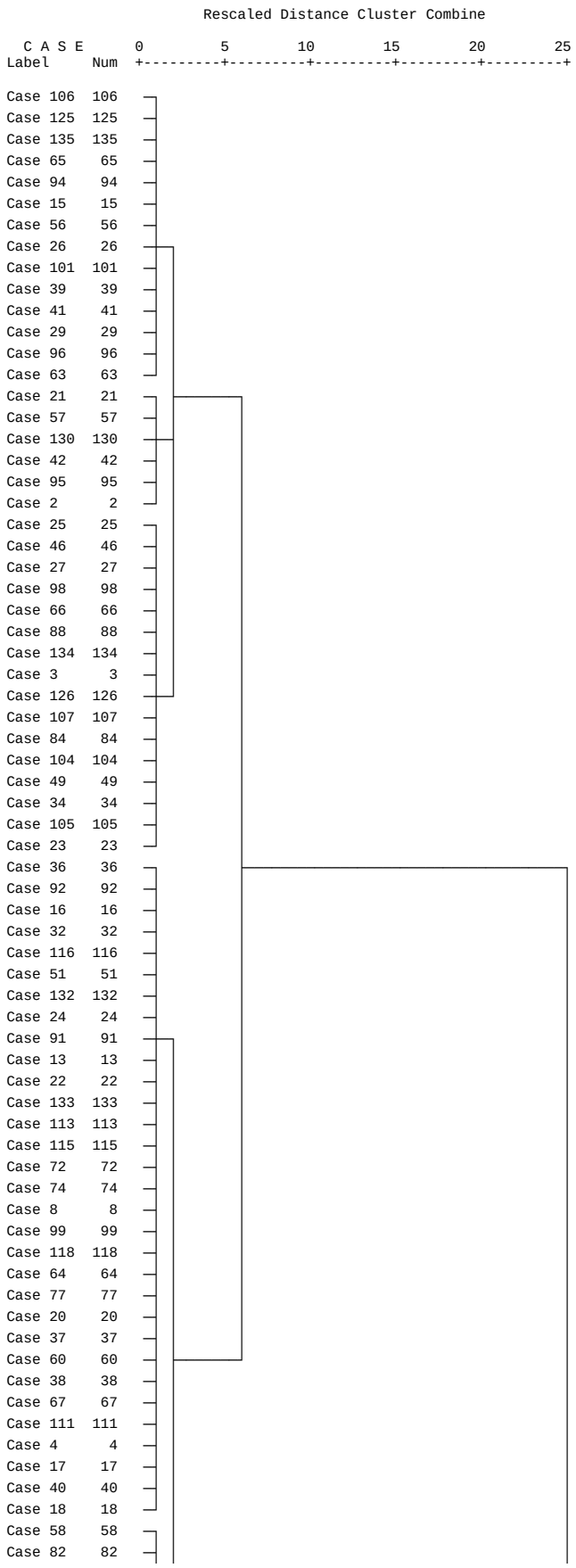
The measures of heterogeneity change are shown in Table 8-3. The percentage changes in heterogeneity are calculated based on the agglomeration coefficient provided in the agglomeration schedule by SPSS. Large increases in the percentage represents a substantial increase in heterogeneity indicating that two different clusters have been merged at this stage. Hence, the prior cluster solution should be selected (Hair et al., 2006). The result revealed that four largest increases in percentage are stages 133 to 134 (43.42 percent), stages 132 to 133 (10.82 percent), stages 131 to 132 (8.44 percent), and stages 130 to 131 (6.22 percent), respectively. However, it should be noticed that the final stage will always generate the most marked increase. This generally makes two-cluster solution as a preferred solution even though it may not provide the meaningful interpretation to meet the research objectives (Hair et al., 2006). Hence, three-, four- and five-cluster solutions are identified as the candidates for the set of preliminary cluster solutions.

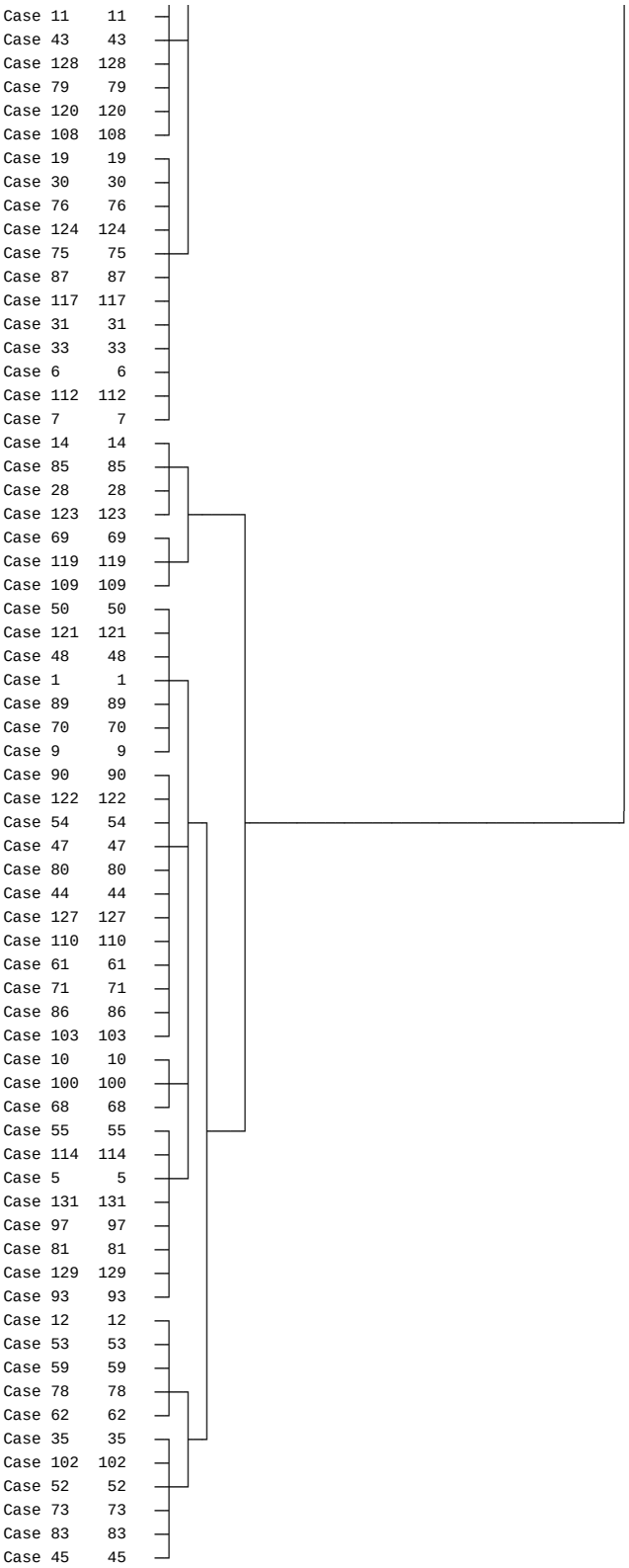
Table 8-3: Percentage Changes in Agglomeration Coefficient

	Number of Clusters		Agglomeration Coefficient	
Stage	Before Joining	After Joining	Value	Percentage Increase to Next Stage
125	11	10	1097.582	3.39
126	10	9	1134.839	3.51
127	9	8	1174.665	3.80
128	8	7	1219.319	3.95
129	7	6	1267.477	3.95
130	6	5	1317.527	6.22
131	5	4	1399.479	8.44
132	4	3	1517.554	10.82
133	3	2	1681.754	43.42
134	2	1	2412.000	-

The clustering process is mathematically and graphically represented in the treelike structure or dendrogram shown in Figure 8-2. The dendrogram is scaled, so the distances within the graph are the same ratio as original distances. The vertical lines indicate joined clusters. Closer distances between the vertical lines represent greater homogeneity among the clusters (Hair et al., 2006). To determine the appropriate number of clusters, the research seeks for large breaks through the dendrogram indicating large heterogeneity where dissimilar clusters are combined (Ketchen and Shook, 1996). It is visually revealed that the large distances between the vertical lines suggest two-, three-, and four-cluster solutions as the set of preliminary solutions. However, it has been observed that this method is informal, subjective, and heavily reliant on researcher judgment (Everitt et al., 2001).

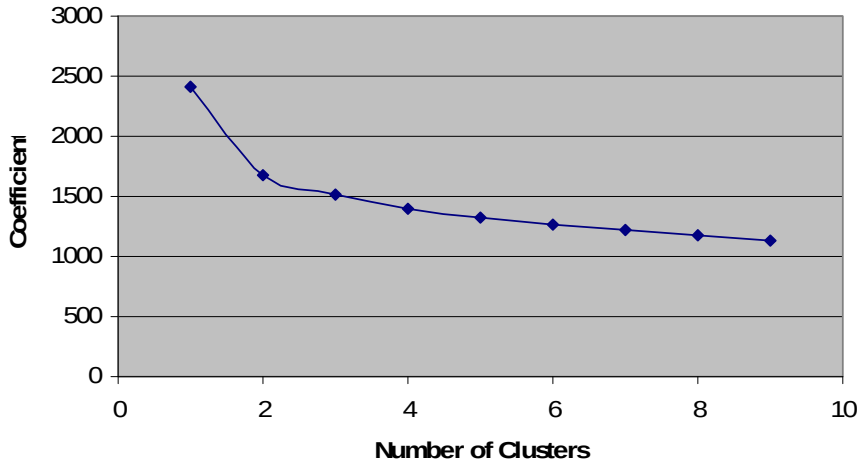
Figure 8-2: Dendrogram Using Ward's Method




Case 11 11
Case 43 43
Case 128 128
Case 79 79
Case 120 120
Case 108 108
Case 19 19
Case 30 30
Case 76 76
Case 124 124
Case 75 75
Case 87 87
Case 117 117
Case 31 31
Case 33 33
Case 6 6
Case 112 112
Case 7 7
Case 14 14
Case 85 85
Case 28 28
Case 123 123
Case 69 69
Case 119 119
Case 109 109
Case 50 50
Case 121 121
Case 48 48
Case 1 1
Case 89 89
Case 70 70
Case 9 9
Case 90 90
Case 122 122
Case 54 54
Case 47 47
Case 80 80
Case 44 44
Case 127 127
Case 110 110
Case 61 61
Case 71 71
Case 86 86
Case 103 103
Case 10 10
Case 100 100
Case 68 68
Case 55 55
Case 114 114
Case 5 5
Case 131 131
Case 97 97
Case 81 81
Case 129 129
Case 93 93
Case 12 12
Case 53 53
Case 59 59
Case 78 78
Case 62 62
Case 35 35
Case 102 102
Case 52 52
Case 73 73
Case 83 83
Case 45 45

A more formal and objective method is to plot the number of clusters against the agglomeration coefficient shown in Figure 8-3. This graph is comparable to the scree plot of factor analysis (Aldenderfer and Blashfield, 1984). The point at which the graph markedly flattens represents two very dissimilar clusters being joined. Thus, the 'elbow' of the graph indicates the appropriate number of clusters (Ketchen and Shook, 1996). It is found that the obvious 'elbow' indicates a two-cluster solution. However, three- and four-cluster solutions are also identified as preliminary solutions due to relatively small 'elbow'.

Figure 8-3: Plotting Number of Clusters against Agglomeration Coefficient



In sum, the results from all stopping rules are consistent, indicating two-, three-, four-, and five-cluster solutions as the set of preliminary cluster solutions. Prior to proceeding to nonhierarchical clustering method, profiling analyses have been conducted. However, the set of preliminary cluster solutions does not provide meaningful insight into the research question. Then, cluster solutions ranging from 2-10 clusters are profiled based on clustering variables to ensure a meaningful interpretation. Finally, an eight-cluster solution makes most sense and offers most meaningful explanation in terms of research matter; hence, it is selected as the appropriate number of clusters for further analysis in nonhierarchical cluster procedure.

Nonhierarchical cluster analysis

Nonhierarchical cluster analysis was performed to optimize the final cluster solution. Derived from the hierarchical result, eight-cluster solution appeared to be the appropriate

number of clusters. The cluster centroid of each cluster from hierarchical analysis is used as the initial starting seed point in nonhierarchical cluster analysis. The optimizing algorithm in SPSS is chosen due to its ability to reassign the observations among clusters until heterogeneity levels within clusters are smallest. The mean scores of variables within each cluster are presented in Table 8-4.

Table 8-4: Mean Scores of Variables within Clusters

	Clusters in group 1			Clusters in group 2					
	C1	C2	C3	C4	C5	C6	C7	C8	
No. of firms	**17**	**24**	**28**	**18**	**28**	**8**	**7**	**5**	***F*-test**
Strategies:									
D	6.69(1)	6.00(2)	5.61(4)	5.76(3)	5.42(6)	4.13(8)	5.52(5)	4.27(7)	12.834***
CO	6.82(1)	6.03(4)	5.63(7)	6.17(2)	6.08(3)	5.94(5)	5.82(6)	4.45(8)	8.364***
CE	6.65(1)	5.31(4)	5.02(5)	5.58(3)	5.82(2)	4.69(6)	4.57(8)	4.60(7)	7.353***
$ST_{M\&S}$	5.82(2)	6.38(1)	5.57(3)	3.72(5)	4.79(4)	2.00(8)	2.43(7)	3.60(6)	38.855***
$SM_{G\&G}$	.161(6)	.246(2)	.209(4)	.011(7)	.001(8)	.207(5)	.221(3)	.254(1)	1.749
$ST_{M\&F}$	5.60(1)	5.10(2)	4.06(5)	4.62(3)	4.26(4)	2.93(8)	2.94(7)	3.64(6)	14.182***
MAPs:									
SMA	6.30(1)	5.30(3)	4.26(7)	5.86(2)	5.21(4)	4.80(5)	4.27(6)	2.76(8)	21.755***
BM	6.23(1)	5.86(3)	4.77(6)	5.91(2)	5.15(4)	4.98(5)	4.34(7)	2.15(8)	23.785***
ABP	6.52(1)	5.62(3)	4.78(7)	6.51(2)	5.57(4)	5.26(5)	5.15(6)	3.48(8)	16.198***
CPM	6.40(1)	5.45(3)	4.08(6)	5.67(2)	4.91(4)	4.54(5)	3.82(7)	1.89(8)	30.810***
TB	6.40(1)	5.85(3)	4.83(6)	6.16(2)	5.56(4)	5.29(5)	4.59(7)	3.27(8)	29.283***
TC	6.42(1)	5.41(4)	4.80(7)	6.24(2)	5.45(3)	5.39(5)	5.07(6)	4.28(8)	11.935***
TPM	6.51(1)	5.62(3)	4.17(7)	6.02(2)	5.43(5)	4.26(6)	5.48(4)	3.07(8)	23.181***
MTs:									
HRM	6.86(1)	6.05(3)	4.99(6)	6.17(2)	5.79(4)	5.29(5)	4.16(7)	3.74(8)	28.220***
IS	6.60(1)	5.74(3)	4.82(6)	5.97(2)	5.39(4)	4.97(5)	3.33(8)	3.61(7)	49.732***
TBS	6.44(1)	5.50(3)	4.49(5)	5.74(2)	5.34(4)	4.44(6)	3.46(7)	3.36(8)	33.550***
QS	6.60(1)	5.67(3)	4.61(6)	6.08(2)	5.48(4)	5.08(5)	4.50(7)	3.81(8)	40.143***
INRE	6.06(1)	5.44(3)	4.52(6)	5.58(2)	5.14(4)	4.63(5)	3.07(7)	2.94(8)	34.587***
OP	5.34(1)	4.66(3)	4.28(5)	4.67(2)	4.31(4)	3.56(6)	3.55(7)	2.89(8)	8.664***

Note: Values in cells are mean scores of variables within clusters while the values in parenthesis are ranking of variables across clusters

Clusters in group 1 exhibit differentiation/ prospector/ entrepreneurial/ build strategies
Clusters in group 2 exhibit cost leadership/ defender/ conservative/ harvest strategies

***Significant at the 0.01 level (P < 0.01).
**Significant at the 0.05 level (P < 0.05).
*Significant at the 0.10 level (P < 0.10).

Variable definitions
D = Differentiation
CO = Customer orientation
CE = Cost efficiency
$ST_{M\&S}$ = Strategic types of Miles and Snow
$SM_{G\&G}$ = Strategic missions of Gupta and Govindarajan
$ST_{M\&F}$ = Strategic types of Miller and Friesen
MAPs = Management accounting practices
SMA = Strategic management accounting

BM = Benchmarking
ABP = Activity based practice
CPM = Contemporary performance measure
TB = Traditional budgeting
TC = Traditional costing
TPM = Traditional performance measure
MTs = Management techniques
HRM = Human resource management
IS = Integrating system
TBS = Team based structure
QS = Quality system
INRE = Innovation and reorganization
OP = Organizational performance

The interpretation of the results

In the final solution shown in Table 8-4, eight clusters were formed by the nonhierarchical procedure based on a set of the initial seed points from the hierarchical result. In order to test the hypothesis about higher performing firms in two different strategic types, the clusters were ranked according to the mean scores of organizational performance, and then separated into two groups based on two distinct sets of strategies. The clusters in group 1 (cluster 1 to cluster 3) exhibit differentiation/ prospector/ entrepreneurial/ build characteristics while those in group 2 (cluster 4 to cluster 8) demonstrate cost leadership/ defender/ conservative/ harvest attributes. Regarding the first group, the companies in C1 have highest average performance while those in C3 have lowest average performance within that group. Similarly, the companies in C4 have highest average performance while those in C8 have lowest average performance within group 2. It is noted that organizational performance was not used as a clustering variable; rather, it can be used to assess criterion validity, which will be mentioned later.

The significance or *F*-test for each clustering variable indicates that there is a significant difference for individual variables across clusters; however, it does not indicate any significant difference between clusters. In other words, the significant *F*-tests are purely descriptive and cannot be used to test the hypothesis that the cluster means are equal. It was found that all clustering variables except strategic mission[34] have significant differences ($P < 0.001$) across clusters, indicating that these clustering variables equally contribute to the cluster formation process while strategic mission has less influence in

[34] It will be recalled that the variable 'strategic mission' was problematic throughout the research in revealing any meaningful data.

forming the clusters. Despite the difficulty in determining the differences between clusters, *t*-tests were used to detect the significant differences in the mean scores of each variable between clusters while the result is interpreted.

Differentiation/ Prospector/ Entrepreneurial/ Build Strategies

The clusters that exhibit the characteristics of differentiation/ prospector/ entrepreneurial/ build strategies are C1, C2, and C3. The companies in C1 have the highest performance while C2 and C3 have lower performance ranked third and fifth respectively. The differences in organizational performance between C1 and C2 and between C1 and C3 were examined by *t*-tests and found to be significant at $P \leq 0.01$ and $P \leq 0.001$ respectively[35]. The strategies of the companies in C1 and C2 are almost identical except the higher ranks of C1 placing on customer orientation (ranked first) compared to C2 (ranked fourth). Both C1 and C2 have high emphasis on differentiation strategy ranked first and second respectively, following a prospector strategy is ranked second and first respectively, pursuit of entrepreneurial strategy ranked first and second respectively, and build strategy ranked sixth and second respectively. It is noted that although C1 have strategic mission ranked sixth, but the value of mean score indicates build strategy (positive value indicating build while negative value indicating harvest). The companies in C3 have less strong emphasis on differentiation strategy ranked fourth, following a prospector strategy ranked third, pursuit of build strategy ranked fourth; however, they are in the grey area between entrepreneurial and conservative attributes ranked fifth. Consequently, it is assumed that the companies in C1, C2 and C3 are the representatives of firms pursuing differentiation/ prospector/ entrepreneurial/ build strategies.

It is shown that the companies in C1 have significantly higher organizational performance than C2 and C3 respectively. The higher performance of C1 compared to C2 and C3 may derive from higher benefit obtained from the combination of all contemporary MAPs and MTs concerning human resource management, integrating system, team based structure, and quality system. It implies that the companies under differentiation/ prospector/

[35] It is noted that the differences between C1 and C2 in benefit obtained from all MAPs and MTs are significantly different at $P \leq 0.01$ except benchmarking while those between C1 and C3 are all significant difference at $P \leq 0.001$.

entrepreneurial/ build strategies tend to have higher organizational performance when they obtain higher benefit from contemporary MAPs and MTs concerning quality, employee empowerment, customization and flexibility. This finding supports the relationship proposed in hypothesis 11.1.

However, the companies in C1 unexpectedly obtain higher benefit from all traditional MAPs and MTs concerning innovation and reorganization than those in C2 and C3. This unpredicted result suggests that the companies pursuing differentiation/ prospector/ entrepreneurial/ build strategies may also require the benefit from traditional MAPs and MTs concerning cost efficiency in order to support their operations to be highly efficient and innovative. This finding also confirms that the companies emphasizing differentiation strategic types cannot ignore their costs. Another reason may be because the companies in C1 also place highest emphasis on cost efficiency which may require the benefit obtained from traditional MAPs and MTs concerning cost efficiency to be successful. There is still an element of financial accounting mentality and strong cost awareness in these companies.

Cost leadership/ Defender/ Conservative/ Harvest Strategies

Although there is no a single cluster exhibiting all the combined characteristics of cost leadership/ defender/ conservative/ harvest strategies, five clusters particularly C4, C5, C6, C7, and C8 provide information to examine the relationship proposed in hypothesis 11.2. The comparisons are made between C4 and C5 and between C6, C7, and C8. Specifically, the characteristics of cost leadership and harvest strategies can be found from the companies in C4 and C5 while the attributes of defender and conservative strategies have emerged from those in C6, C7, and C8.

The companies in C4 and C5 place high emphasis on cost efficiency as their important strategic priority ranked third and second respectively, and pursuit of strategic mission ranked seventh and eighth indicating one end of the continuum toward harvest strategy. It is noted that firms in both clusters (C4 and C5) also focus on customer orientation as their main strategic priority ranked second and third respectively. The firms in C4 have higher organizational performance (ranked second) than those in C5 (ranked fourth); however, the

difference in their performance is not significantly different with *t*-test[36]. The higher performance of C4 compared to C5 may arise from the higher benefit obtained from the combination of traditional MAPs and MTs concerning innovation and reorganization. It implies that the companies pursuing both cost leadership and harvest strategies tend to have higher performance when they obtain higher benefit from traditional MAPs and MTs supporting cost efficiency. This finding provides some evidence to confirm part of the relationship proposed in hypothesis 11.2.

Nevertheless, the companies in C4 also obtain higher benefit from contemporary MAPs and MTs concerning quality, employee empowerment, customization and flexibility compared to C5. This unexpected finding points to the demand to differentiate their products and services even though the firms focus on cost efficiency. This may be because firms in C4 also place higher emphasis on differentiation strategy (ranked third) than those in C5 (ranked sixth); hence, they may require the benefit from contemporary MAPs and MTs concerning quality, employee empowerment, customization and flexibility to support their operations.

Regarding defender and conservative strategies, the companies in C6, C7, and C8 exhibit these characteristics. They pursue the strategic type of Miles and Snow and strategic type of Miller and Friesen with the last three ranks indicating one end of the continuum toward defender and conservative strategies. The companies in C6 possess the strongest emphasis on both defender and conservative attributes (ranked eighth) while those in C7 and C8 place relatively less emphasis on these strategies ranked seventh and eighth respectively. Firms in C6 are highly performing compared to C7 and C8; however, the differences in organizational performance scores between C6 and C7 and between C6 and C8 are not significant with *t*-tests[37]. The higher organizational performance of the companies in C6 compared to those in C7 and C8 may derive from higher benefit obtained from the combination of all traditional MAPs and MTs concerning innovation and reorganization. It means that the companies displaying defender and conservative characteristics tend to have

[36] It is noted that the differences between C4 and C5 in the scores of benefit obtained from all MAPs and MTs are significantly different at $P \leq 0.05$.

[37] It is noted that the differences between C6 and C7 in the scores of benefit obtained from all traditional MAPs and MTs are significantly different at $P \leq 0.10$ except traditional costing while the differences between C6 and C8 in the scores of benefit obtained from all traditional MAPs and MTs are significantly different at $P \leq 0.10$ except traditional performance measure and team based structure.

higher performance when they obtain higher benefit from traditional MAPs and MTs concerning cost efficiency. This finding supports part of the relationship proposed in hypothesis 11.2.

8.3 Validating Cluster Solution

As mentioned in the limitations of cluster analysis, validation is required to guarantee the practical significance of the final cluster solution. Validating the cluster solution can be done by cross validation and establishing criterion validity (Hair et al., 2006). Cross validity is carried out to assure that the sample is representative of the general population of interest. It involves the degree of replicability of a cluster solution across different data sets (Aldenderfer and Blashfield, 1984).

However, obtaining the second sample from the same population is impossible for this research due to time and cost constraints as well as unavailability of the research objects. Alternatively, the sample can be split into two groups. Hierarchical clustering procedure was conducted using half of the sample in order to obtain the number of clusters and cluster seeds, and use them to define the final cluster solution with the other half of the sample and non-hierarchical analysis (Ketchen and Shook, 1996). The result, shown in Table 8-5, was compared with the cluster solution derived from the whole sample. Although some clusters are small according to split sample, it was found that the cluster solutions are consistent indicating the validity of the solution.

Table 8-5: Cluster Solution from Split Sample for Cross Validation

	Clusters in group 1			Clusters in group 2					
	C1	C2	C3	C4	C5	C6	C7	C8	
No. of firms	**15**	**3**	**21**	**1**	**2**	**11**	**8**	**7**	***F*-test**
Strategies:									
D	6.51(1)	6.00(3)	5.62(5)	6.00(3)	6.33(2)	4.97(7)	5.46(6)	4.19(8)	7.129***
CO	6.68(2)	4.83(7)	6.12(4)	6.75(1)	6.25(3)	5.59(6)	6.09(5)	4.64(8)	7.102***
CE	6.47(2)	4.67(7)	5.62(4)	6.50(1)	3.50(8)	5.09(5)	5.63(3)	4.79(6)	5.327***
$ST_{M\&S}$	5.33(2)	5.33(2)	5.81(1)	4.00(6)	2.50(8)	4.91(5)	5.00(4)	2.71(7)	6.885***
$SM_{G\&G}$	.155(4)	-.17(7)	.191(3)	-.30(8)	.200(1)	.198(2)	.025(6)	.071(5)	1.024
$ST_{M\&F}$	5.45(1)	4.27(5)	4.89(2)	4.80(3)	1.60(8)	3.58(6)	4.38(4)	3.51(7)	8.734***
MAPs:									
SMA	6.31(1)	2.50(3)	5.26(4)	6.25(2)	5.34(3)	4.49(6)	5.26(5)	3.35(7)	25.446***
BM	6.05(2)	4.33(7)	5.85(3)	6.25(1)	4.78(4)	4.69(6)	4.75(5)	3.48(8)	10.533***
ABP	6.54(2)	5.11(5)	5.79(4)	7.00(1)	5.84(3)	4.62(7)	4.77(6)	4.53(8)	10.692***
CPM	6.23(1)	4.08(6)	5.15(2)	4.25(5)	4.79(4)	3.75(7)	5.06(3)	3.19(8)	11.884***
TB	6.35(1)	4.95(5)	5.86(3)	6.29(2)	4.64(6)	4.51(7)	5.51(4)	4.29(8)	13.535***
TC	6.29(2)	3.78(8)	5.63(4)	7.00(1)	5.63(3)	4.92(6)	5.39(5)	4.46(7)	10.304***
TPM	6.49(1)	3.78(8)	5.60(3)	4.33(5)	6.17(2)	3.81(7)	5.09(4)	3.90(6)	17.114***
MTs:									
HRM	6.76(1)	5.67(3)	6.09(2)	5.25(4)	3.75(8)	4.68(6)	5.07(5)	4.16(7)	19.852***
IS	6.42(1)	5.07(5)	5.72(3)	5.80(2)	2.60(8)	4.63(6)	5.22(4)	3.81(7)	28.584***
TBS	6.26(1)	4.89(4)	5.75(2)	5.00(3)	2.67(8)	4.34(6)	4.75(5)	3.67(7)	27.462***
QS	6.54(1)	4.58(6)	5.75(2)	5.50(3)	4.45(7)	4.78(5)	5.02(4)	4.06(8)	22.092***
INRE	5.96(1)	4.56(6)	5.43(2)	4.67(4)	2.00(8)	4.56(5)	4.77(3)	3.68(7)	29.326***
OP	5.03(1)	4.48(3)	4.45(4)	4.87(2)	4.34(5)	4.22(6)	4.10(7)	2.95(8)	4.847***

Note: Values in cells are mean scores of variables within clusters while the values in parenthesis are ranking of variables across clusters

Clusters in group 1 exhibit differentiation/ prospector/ entrepreneurial/ build strategies
Clusters in group 2 exhibit cost leadership/ defender/ conservative/ harvest strategies

***Significant at the 0.01 level ($P < 0.01$).
**Significant at the 0.05 level ($P < 0.05$).
*Significant at the 0.10 level ($P < 0.10$).

Variable definitions
D = Differentiation
CO = Customer orientation
CE = Cost efficiency
$ST_{M\&S}$ = Strategic types of Miles and Snow
$SM_{G\&G}$ = Strategic missions of Gupta and Govindarajan
$ST_{M\&F}$ = Strategic types of Miller and Friesen
MAPs = Management accounting practices
SMA = Strategic management accounting
BM = Benchmarking
ABP = Activity based practice
CPM = Contemporary performance measure
TB = Traditional budgeting
TC = Traditional costing
TPM = Traditional performance measure
MTs = Management techniques
HRM = Human resource management
IS = Integrating system
TBS = Team based structure
QS = Quality system

INRE = Innovation and reorganization
OP = Organizational performance

Particularly, C1, C2 and C3 represents the companies pursuing differentiation/ prospector/ entrepreneurial/ build strategies. The higher performance of C1 compared to C3 may derive from higher benefit from contemporary MAPs and MTs concerning quality, employee empowerment, customization and flexibility. The companies in C4 and C7 exhibit the characteristics of cost leadership and harvest strategies while those in C5 and C8 are defender and conservative firms. The higher performance of C4/C5 compared to C7/C8 may result from higher benefit from traditional MAPs and MTs concerning cost efficiency. Thus, similar interpretations can be drawn; hence, it can be concluded that the cluster solution is stable and can be generalizable.

Criterion or predictive validity can be assessed through the significance tests of the variables which are not used to define the cluster but theoretically related to the clusters (Ketchen and Shook, 1996). Organizational performance is selected to assess criterion validity. Analysis of variance (ANOVA) was performed to address the statistical significance of criterion variables shown in Table 8-6. It was found that there are significant differences on this criterion variable assuring predictive validity.

Table 8-6: Assessing criterion validity

	Clusters								
	C1	**C2**	**C3**	**C4**	**C5**	**C6**	**C7**	**C8**	
No. of companies	**17**	**18**	**24**	**28**	**28**	**8**	**7**	**5**	***F*-test**
Organizational Performance	5.34	4.67	4.66	4.31	4.28	3.56	3.55	2.89	8.664***

Note: Values in cells are mean scores of variables within clusters
***Significant at the 0.01 level (P < 0.01).
**Significant at the 0.05 level (P < 0.05).
*Significant at the 0.10 level (P < 0.10).

Chapter 9
Interviews

In responding to the questionnaire survey, a number of respondents indicated willingness to be interviewed. This would be an important source of triangulation and confirmation of the survey. Explanatory case studies[38] were conducted to derive useful qualitative data. It is expected that these qualitative data will provide richer and deeper understanding of the organizational contexts, which might not be found from the survey. Multiple case studies were carried out by selecting from the questionnaire-responding companies, those indicating willingness to participate in the further interviews. Seven companies, operating in different industries such as manufacturing, commerce, services, and financial sector, were selected. Prior to the interview, background material was prepared by reference to the annual reports and company's websites.

Semi-structured interviews, which are more appropriate to and used more frequently for an explanatory study (Saunders et al., 2003), were carried out aiming to explore and explain the alignment between MAPs and other key constructs, and to validate the research findings from the survey. A list of themes and an interview protocol were developed prior to the interviews based on the research questions, hypotheses, and questionnaire (See Appendix B). Most of the interviewees are in the senior position in the accounting department, and were interviewed in Thai language. All interviews were tape recorded (with the average duration of around one hour) and carefully transcribed and translated into English language. The detail of each interview is shown in Table 9-1. The interviewees were asked to identify the important MAPs and MTs they adopted as well as the strategies they used to compete within their business environment. The link and the alignment between key constructs including organizational performance were implicitly and explicitly explored in the questioning.

The chapter is organized as follows. First, the detail of each company is briefly described including company background, business environment, strategies, the adopted practices

[38] 'An explanatory case study presents data bearing on cause-effect relationships—explaining how events happened' (Yin, 2003a, p.5).

and techniques. The qualitative data are then analyzed by using content analysis, and the discussions are eventually drawn to compare and contrast with the survey findings.

Table 9-1: The Detail of the Interviews

Companies	Interviewees	Nature of companies	Duration
A	Executive Director	A securities company operating four types of securities business including securities brokerage, securities trading, investment advisory, and underwriting	50 mins
B	Accounting Manager	A retail company selling home products and providing complete range of services relating to construction	43 mins
C	Senior Vice-President Accounting	An integrated property company involving many distinctive property projects	66 mins
D	Director of Finance	A hotel under a world leader hotel chain which operate over 160 hotels and resorts in over 35 countries	47 mins
E	Chief Financial Executive	A private hospital providing a range of medical and surgical services	110 mins
F	Assistant Director Finance & Accounting Dept.	An internet service provider with the widest range of services	53 mins
G	Assistant Finance and Accounting Manager	A manufacturer of a wide range of automotive parts for Ford, Mazda, Nissan, Isuzu, Honda, Toyota, and GM	61 mins

9.1 Background of the Case Companies

9.1.1 Company A: Securities Company

Background of the company

The company was established in 1974, and granted license from the Ministry of Finance in 1975 to operate four types of securities business including securities brokerage, securities trading, investment advisory, and underwriting. The company has been a member of the Stock Exchange of Thailand (SET) since 1987. Its objective is to be ready for liberalization in the future and take the company to the next step of fully-integrated securities business. The company merged with the leader in investment banking service in 2004. This complemented the existing core services of the company and created value-added services for the customers. In addition, the company expanded its service in the area of asset management. At present, the company is managing funds worth about 4,000 million baht in assets. In 2008, the company established a subsidiary to support its financial advisory services, which is expecting more growth in the near future. With the determination to

provide best quality and efficiency services and strive for excellence in human resources and technology development, the company has gained increasing trust and credibility from investors and moved forward to be one of the leading securities companies in Thailand. Currently, there are 21 branches across the country, eight of which are in Bangkok, including the headquarters, while the rest are in provincial areas. The company's vision is to remain an industry leader providing a full range of financial services under the fast evolving globalization age.

Business environment and strategies

The company is operating in a dynamic and competitive environment resulting from many competitors both in Thailand and from abroad. This, together with the challenges from the increasing new financial products or instruments as well as the changes in regulations, may affect the firm's profitability. Hence, the strategies have been developed to cope with this volatile business environment, and to maintain the market share and remain the leading position in the industry. These can be achieved through providing good quality of financial products and services to the clients as well as enhancing efficiency and speed. The company also attempts to diversify the income base rather than concentrating only on brokerage. In the company's perspective, cost control is critical to the success, and being one of its strong points.

Management techniques (MTs)

The company invested substantially in computerization to establish electronic communication and electronic payment with clients. HRM is also important to the company. MTs that the company used to support an HR approach are people development and training. The training programs are applied to all levels of the employees, and related to both introducing new products and enhancing employees' skills. An annual plan for training programs has been developed over time based on the employees' requirements. It is operated by in-house services, experts by invitation, and outsourcing training programs.

The company pays high attention to the quality of services. MTs used to improve the quality are evaluating the feedback from the institutional clients and comparing the quality with other research houses (benchmarking). The company has adopted outsourcing as the mean to reduce the costs. The activity they outsourced is messenger also called collector

service. The company experienced downsizing when it merged with another company in 2004. About 20 percent of employees were laid off at that time.

Management accounting practices (MAPs)

The company concentrates on the budget for planning in order to forecast the aspects of the market share, costs and expenses of each department. A profit and cost centre system together with cost allocation is also used to support the budgeting system. Cost control system is adopted to minimize costs and expenses such as telephone bills, and papers for photocopy. The company used absorption costing to view the whole total cost, payback period to measure the investments in both technology and share of other companies, and benchmarking of the products to sustain the standard of products and services. A KPI system is set up and adjusted over time for each department in planning and performance evaluation, which affect the divisional bonus and salary. However, a KPIs system is not developed to the balanced scorecard framework. The company also studied and tested activity based costing, but it did not implement the system because of its complexity. Budgeting for day-to-day operation received very little attention because the company places much more emphasis on long term perspective.

9.1.2 Company B: Retail Stores

Background of the company

The company was founded in 1995 as a joint venture among successful well-known companies with an objective to operate a retail business in the home improvement segment by selling products and providing a complete range of services relating to construction and renovation of buildings, houses, and places of residence. The company was listed in the Stock Exchange of Thailand (SET) in 2001. Currently, the company has 30 branches, 17 of which are located in Bangkok and the rest are located in up-country provinces, which creates convenient access to the stores. The company aims to be a leader in this specific industry sector, offering a wide range of products and services to satisfy its customers. There are more than 60,000 items of products at the present. Regarding its social responsibility, the company and its partners contributed to communities by improving restrooms in two primary schools in Chonburi province. The company plans to expand this

project further to cover other schools. Its initial target is to improve 800 toilets in primary schools nationwide. 24 million Baht is allocated to make this project happen.

Business environment and strategies

Despite a high competition in this industry, the company has expanded rapidly and constantly in terms of increasing sales growth rate and the number of branches. The main strategy is 'one stop shopping', which aims to provide a complete range of home products and services relating to construction and renovation to maximize customer satisfaction. The company attempts to differentiate itself by offering convenience to the customers in term of product availability and accessibility. This is together with high quality of products and services. The employees, especially marketing staff, are properly trained and knowledgeable to be able to provide good quality of services to the customers. It appears to be a customer-orientated firm. Nevertheless, the company does not ignore costs while competing in the market. The prices of most products are competitive; however some items remain higher priced than those of competitors.

Management techniques (MTs)

The company established a training center to develop the employees at all levels, expecting they will have knowledge and ability to provide good service to customers. The training center offers continuous training with many courses providing both sale-related training programs and non sale-related training programs such as team building. Additionally, the company has developed an information technology system relating to the retail business being up-dated and efficient. Integrated systems have been built up supporting both internal and external links. The company uses SAP within the organization. This system allows the company to check the inventory stock in real time at all branches; hence, transferring products among all branches can be made to respond quickly to the customer requirements. For external links, the system called Vendor Relationship Management (VRM) is used to send purchase order (PO) and payment information to the vendors.

Logistics is critical to the company due to the many items of products it holds. The company established a distribution center to enhance the efficiency of its logistics system, resulting in a more efficient system of inventory management. In 2006, the distribution center was expanded to create larger space in order to support the increasing demand.

Outsourcing was applied to the delivery activity of the company; however, the quality of services provided by sub-contract firms is regularly monitored.

Management accounting practices (MAPs)

The company uses a budgeting system to control its costs and expenses. Each department has its own budget, and cannot exceed the spending limit unless approval is obtained. The company evaluates performance based on divisional reports, focusing on profit and cost centers. The departments acting as a profit centre need to provide divisional profit and loss statements while those acting a cost centre need to provide divisional expense reports. Product profitability analysis (PPA) is one of the most useful MAPs. The company has separated the products into 23-24 categories or 140 sub-categories, and then used PPA to evaluate profitability of each product group. Cost-volume-profit (CVP) analysis is used to present the information to branch managers because it is straight forward and easy to understand. The company adopted benchmarking as the criteria for performance evaluation, which is based on current market conditions and competitors' performance.

9.1.3 Company C: Property Development

Background of the company

The company was established in 1989 as an investing company in property business. It initially focused on office building for rent with high technology and energy saving concepts. In 2002, the company maintained its image as the leader in technology and environmental friendliness, and expanded its business to property development providing many types of residential homes. It was listed in the Stock Exchange of Thailand (SET) in 2003. Currently, the company is committed to be the leading integrated property company in the country. It has invested, developed, managed, and restored many property projects including commercial office building, single detached houses, townhouses, and condominiums. Its products and services are distinctive, innovative and in compliance with all specified standards. The company also focuses on offering information technology and energy savings approaches to all its property projects with the aims that its clients will have better working and living environments. The target group of the customers is the higher end of the market. The company has developed its business by placing emphasis on a balance between long-term and short-term income that mixes income from commercial

office building rents with income from the development of property projects. Modern management and corporate government principles are used to operate the business to achieve high levels of efficiency and transparency.

Business environment and strategies

The company is operating in a rapidly changing environment. The prices of construction materials are fluctuating due to petrol costs. Competitors launch new products almost every quarter. Consequently, the company has developed and implemented effective strategies since the beginning of 2007. The strategies are practical design, lively neighborhood, intelligent home, security care, and accessible location. The company strives to be the leader in this industry with high technology, energy saving and environment friendly approaches. All these strategies differentiate the company from its competitors, and help the company to compete in the market successfully. The revenue growth rate increased 76 percent in 2007 compared to that in 2006.

Management techniques (MTs)

The company focuses on the integrating systems within the organization. There is a strong link between business and operational strategies. Operational strategy is developed in line with business strategy, which is consistent with the company's vision and mission. Hence, the company's values are reflected in its products, and the customers recognize the differentiation from the competitors. The management believes that it is also important to transfer organizational culture, company's policy, working styles, and strategic thinking to all employees in order to achieve their main objectives. Thus, HRM plays a vital role in training both organizational culture and work-related knowledge to the employees. The company adopted a team based structure or temporary working group due to the nature of the property business. Each property project is organized as a project based team, which includes many employees from different functions such as project designer, engineer, marketing, and accounting and finance. The company uses outsourcing for design activity because this can be completed faster with more creative and new ideas.

Management accounting practices (MAPs)

The company obtains high benefit from its performance evaluation system. It measures the organizational performance based on divisional profit as well as profit per revenue source

including rental incomes and sales revenues, which can be separated into sub-categories such as sales revenues from single-houses, town-houses, and condominiums. The concept of product profitability analysis (PPA) is applied in calculating profit per revenue source. The company fundamentally adopted absorption costing and variable costing in financial statements and budgeting. Budgeting systems are used for many cost control purposes except compensating the managers. Instead, the bonus and salary of executive managers will be dependent on the achievement of KPIs such as revenue growth, customer services, and product development. However, these KPIs are not developed into a BSC.

The company uses benchmarking, which is set up based on the available information of the top 20 competitors who operate in the same industry. Activity based costing (ABC) has been studied and tested; however, the company eventually decided not to implement ABC due to its complexity. The concept of ABC is only applied to some expenses, which are shown in activities rather than accounting elements. For example, the expenses relating to seminars are displayed as 'seminar activity' instead of 'register fee', 'hotel fee', and 'transportation fee'. The company currently uses standard costing in estimating costs and pricing. It plans to adopt target costing in the future to control costs. Capital budgeting is used to evaluate the return from investment in new property projects. The company will invest in the new projects, only if there is an acceptable return.

9.1.4 Company D: Hotel

Background of the company

The world famous hotel chain was formed by two hotels in Washington, USA in 1930. Currently, there are more than 150 hotels and resorts across over 37 countries around the world. The hotels and resorts are architecturally inspiring, thoughtfully designed and located in the world's most exciting cities and sumptuous resort destinations. It aims to be a world leader in the hospitality industry providing a distinctive and luxury alternative with efficient services and an unforgettable experience to customers. The hotel chain maintains its commitment to quality, people, consistency, and innovation. The interview was conducted with a hotel in this hotel chain located in the centre of Bangkok surrounded by shopping centers, restaurants, entertainment area, and convenient transportation. It provides 363 deluxe guest rooms and suites, restaurants and bars offering a variety of

delectable foods, spa and massage services, business centre, laundry, fitness centre, and gift shop.

Business environment and strategies

The hotel is operating in a highly competitive international environment according to many observers. Additionally, the hospitality industry is susceptible to several factors or events, which recently occurred in Thailand such as political disturbances and political uncertainty, the coup and terrorists, the tsunami, and pandemic deceases such as avian influenza. These threats have negative effects on tourism, and eventually affect the demand in the hotel business sector. Hence, the hotel attempts to differentiate itself by highlighting the strength of the hotel brand, and providing good quality services to the customers. Low cost strategy is only applied to the activities, which are not related to the customers. With these strategies, the hotel successfully competes in the industry, which can be seen from the increase in annual profit and customer satisfaction index.

Management techniques (MTs)

Key adopted MTs are all related to customers. The hotel aims to enhance the customer satisfaction by using different MTs such as brand standard, quality, information technology, and HRM. It is important to create a good impression to the customers. This can be done by 'customer recognition' and 'friendly personnel'. The employees, especially reception, should be able to recognize guest's faces and names while always responding in a friendly and positive manner to the customers via both telephone calls and in personal communications. The brand image is one of its concerns. The hotel needs to provide good services to the same 'world-wide' standard as the services provided by any other hotels in the hotel chain. HRM plays an important role in preparing the employees to provide good service standards. The training programs are developed and established by the hotel chain. There is a high degree of employee empowerment, so that the employees can make decisions spontaneously to respond to customers' requirements, resulting in higher customers' satisfaction. The brand standard and quality issues are not only applied to the services, but also applied to the products such as foods. On a regular basis, the products offered to the customers are inspected by the hotel chain auditors to ensure that all products are met the brand standard regarding quality and hygiene. The hotel also uses high levels of information technology to provide good services such as high speed internet,

wireless, and express checkout. Outsourcing is applied to the functions or activities, which are not related to the customers, in order to reduce costs such as security, and cleaners for the area outside the guest rooms.

Management accounting practices (MAPs)

The hotel adopted a system of KPIs to measure organizational performance relating to customer satisfaction, productivity, and revenue. For example, the main KPI called 'Guest Satisfaction Index' or GSI is developed in order to measure customer satisfaction while the number of employees per room or per customer is used as a KPI to measure productivity. Although the KPI system is vital to the hotel chain in order to measure performance of each hotel, it is not developed as a BSC. The hotel fundamentally uses the budget for business planning. Both KPIs and budgets are set up and evaluated based on benchmarking. The benchmarking for each hotel is determined by the hotel chain based on historical data of the hotel and available industry data, particularly in the Asia Pacific area. Regarding cost allocation, the hotel simply uses direct cost allocation based on revenue rather than more complicated cost allocation like activity based allocation.

9.1.5 Company E: Private Hospital

Background of the company

The hospital was established in 1986 by a group of medical doctors, who desired to give better services to patients. It was first traded on the Stock Exchange of Thailand (SET) in 1992. The hospital is a private hospital providing a range of medical and surgical services. Its mission is to provide preventive, diagnostic, and therapeutic healthcare under the guiding principles of medical professionalism with superior care, safety, advanced technology, and qualified medical staff to the community. The hospital is located in the Northern part of Bangkok serving over 20,000 inpatients and 300,000 outpatients a year. There is a distinguished medical staff of over 300 physicians, who are the experts in various fields such as cardiovascular, orthopedics, surgery, plastic surgery, and cancer.

Business environment and strategies

Even though there is competition in the healthcare business, the relationships among hospital are more likely to be as alliances rather than as competitors. The hospital has

established a network among private hospitals in order to exchange medical information and knowledge, and transfer of patients. Organizational culture is closely related to a charity recognizing moral issues. It aims to respond to national policy in providing health care services for the population instead of maximizing profit. It attempts to satisfy three main parties equally including population, employees and shareholders. The strategy the hospital uses to compete is to create a good impression to its customers by providing good quality of services. It is believed that with satisfaction and trust the customers will introduce the hospital to their family and friends. The majority of the customers are people in the ages of 20 to 40 years old; thus, many medical programs suitable to this group of customers are provided.

Management techniques (MTs)

In order to arrive at good quality of services, HRM plays an important role in training employees at all levels. The hospital has its own training department, which delivers the training programs related to both introducing new knowledge about equipment, medical techniques, and improving the service quality. Many of the physicians are internationally trained and are supported by well-trained medical staff. Regarding quality, the hospital was conferred the ISO 9001 accreditation in 1999 and is currently a candidate for Hospital Accreditation (HA) and Joint Commission International (JCI), which focus on quality in health care. The hospital has invested in information technology, which provides a real time integrating system. Physicians are able to view the patients' profiles, order the medicines, and obtain the results from X-Ray and Lab real time. Moreover, this system is linked to external organizations such as national health insurance department, society insurance, and suppliers. The hospital has been a member of one of the biggest private hospital networks within the nation since 1991, in order to exchange knowledge and know-how as well as obtain bargaining power over medical suppliers.

Management accounting practices (MAPs)

The budgeting system is generally used for planning and forecasting, especially emphasizing the long-term view. The hospital applied a profit and cost center system to its departments and clinics. For example, outpatient department (OPD) and inpatient department (IPD) are treated as profit centers while those supportive departments such as laboratory, X-Ray, and medicine departments are treated as cost centers. Basic cost

allocation is used to allocate costs from cost centers to profit centers mainly based on unit cost drivers, specifically the number of the patients. The concept of product profitability analysis (PPA) is also applied to each profit center. Prior to the establishment of a new clinic or investment in expensive medical equipment, investment analysis is required to estimate the profit and return on investment. The hospital adopted KPIs as performance evaluation system for each department. KPIs are linked to the strategic plan and business targets, which can be separated into many areas such as employees, customers, new developments, revenues, and costs.

9.1.6 Company F: Internet Service Provider (ISP)

Background of the company

The company is Thailand's leading internet service provider (ISP) with the widest range of services, serving all groups of customers, employing various methods of technology. The company has been registered as a listed company since 2004. It entered into concession agreements with CAT Telecom Public Company Limited for a period of 22 years from 1994 to 2016 to provide satellite uplink-downlink and satellite internet services. It has been granted licenses by the National Telecommunications Commission (NTC) to internet access services in Thailand. The major products and services of the company are internet service via leased circuit (Leased Line), high speed internet services via telephone line (ADSL), high speed internet services via satellite network (IPSTAR), internet services via telephone line (Dial-up), internet data center or the IDC, uplink/ downlink services, and value added services. It serves customers nationwide both the individual and the multi-simultaneous-users, which is called corporate service, particularly for those corporations requiring the internet for their businesses operations. The company maintains its leading status through the effectiveness of the network management and continuous improvement, together with value added and after-sales service that can respond well to the customers' requirements.

Business environment and strategies

There is intense competition in the telecommunication industry not only from the new ISPs being granted licenses from the NTC, but also from new telecommunication network providers. However, the company consistently maintains good performance by

implementing policies focused on corporate customers, and expanding its customer base. It is committed to provide top-quality internet services, both in access to technical networks and after-sales service, in order to increase usage and the customer base. There is no policy of competing on price. Key marketing strategies are building brand image as 'Thailand's leading top-quality ISP', determined on service and quality improvement, maintaining good relationships with customers, continuously investing in technology, and developing network alliances.

Management techniques (MTs)

The company aims to provide a good quality of internet services in order to satisfy its customers; hence, key adopted MTs are related to quality, system and network, and customer relationships. In order to establish confidence among customers, ISO 9001:2000 was implemented to ensure the quality of services. Quality teams are organized as cross-functional teams, so that employees from different department can participate in the quality program. The company invested in the development of the system and network to support the country's growing demand and to improve the overall service efficiency. The number of telephone lines is maintained to be enough to serve the customers, and the efficiency of nationwide networks is continuously improved. Maintaining good relationship with the customers is very important. The company arranges many activities to maximize customers' satisfaction such as holding knowledge sharing seminars in major provinces across the country, visiting customers regularly, providing 24 hour call centers, and surveying customers' satisfaction.

Management accounting practices (MAPs)

Formal strategic planning is used annually to plan the direction of the company and its subsidiaries, which should be mutually supportive. Vision and mission are established related to this strategic plan. The company adopted the balance scorecard (BSC) as a performance evaluation framework, which is linked to the vision and mission of the company. KPIs used in BSC can be separated into four areas including financial, customer, internal process, and learning and growth perspectives. The weight of the percentage given to each perspective is however different. All KPIs are also linked to the budgeting system. The company reviews its performance, both financial and non-financial, every quarter to ensure they are heading in the right direction or not. Product profitability analysis (PPA) is

important to the company. BCG metrics and margins by products are applied to analyze the product portfolio of the company, which includes Leased Line, Dial-up, ADSL, and IPSTAR. Nevertheless, allocating shared costs to each product is still based on an average rather than an accurate method like ABC. The company uses capital budgeting such as PB and IRR for decision making to invest in the new projects.

9.1.7 Company G: Manufacturer of Automotive Parts

Background of the company

The company was established in 1985 as the manufacturer of automotive parts. It was listed on the Stock Exchange of Thailand (SET) in 2002. The core competency of the company is manufacturing and it aims to be an excellent manufacturing organization based on safety, quality, on time delivery, lowest cost, and good management by working through a set of sustainable values to achieve a lean and happy organization with reasonable returns to shareholders. The company's values are teamwork, problem solution, love (family, company, country and people), loyalty and honesty, and mutual respect. There are 20 subsidiaries and 5 associate companies located in Thailand, Malaysia, Singapore, and China. Main products are Jigs, Dies, OEM press parts and assembly, fuel tanks, and satellite navigation. It is also a Ford dealership. It supplies automotive parts to many customers including Toyota, Honda, Mazda, Isuzu, Nissan, Yamaha, BMW, GM, Ford, Benz, and Volvo. The company is committed to achieving the status of a "World class manufacturer of automotive products" and dedicated to total customer satisfaction through continual improvement.

Business environment and strategies

There is very vigorous competition in the automotive industry because the customers, which are big automotive manufacturers, are limited in number. Maintaining good relationships with the customers is vital in order to be competitive. The company has no bargaining power over the customers; hence, the prices of the products cannot be increased. Instead, the customers attempt to bargain for the lowest prices. The company needs to control costs and work on cost reduction as well as to enhance efficiency. The strategy is to produce automotive parts with the lowest cost, but maintain good quality in the same time. It is also important to create new products to respond to the customers'

requirements. The company gains competitive advantage over competitors by obtaining privileges from Thailand Board of Investment (BOI) such as exemption from corporate income tax. With these strategies, the company has been expanding rapidly and steadily in terms of growing number of new businesses and plants.

Management techniques (MTs)

Quality is the main issue of the company. It achieves the ISO/TS 16949:2002 standards, and establishes its own Quality Management System (QMS). In order to attain the highest quality standards, the company implemented Oracle ERP in 2006. The Oracle ERP system is the latest computer based technology in Supply Chain Management. It is the first manufacturing company in Thailand to implement the Oracle ERP system on top of Lean Manufacturing. Its investment will eliminate waste and reduce risk in supply chain management for the benefits of all customers.

Being a supplier for Toyota, the company needs to adopt Toyota Production System (TPS) as its manufacturing philosophy. TPS focuses on three main goals, which are to design out overburden (muri), to smooth production (mura), and to eliminate waste (muda). Lean manufacturing is also used to eliminate waste, improve quality and production time, reduce costs, and improve the 'flow' or smoothness of work. The company uses six sigma to solve some problems, for example reducing variation in process outputs, and measuring and improving manufacturing and business processes. Total Productive Maintenance (TPM) is adopted to enable the machine operators to perform most of the routine maintenance tasks themselves. The company is implementing World Class Manufacturing (WCM) to ensure sustainable continuous improvement.

The company outsources the manufacturing of some automotive parts, if there is not enough capacity in its factories. However, inspection teams are sent out to check the quality of the sub-contract companies. People are viewed as the most valuable resource; therefore, the company provides a full range of benefits including opportunities for internal, external and overseas training, scholarships, free lunch and transportation. It values working as a team rather than working individually.

Management accounting practices (MAPs)

Generally, the company reviews its performance monthly by retrieving and analyzing the information from financial statements in order to ensure that there is no problem in its operation. Budgeting systems were adopted for planning and control, performance evaluation, and cost reduction. The concept of PDCA (plan-do-check-act) is mainly used for internal planning. The company uses standard costing for its costing system; however, its standard costing is adapted based on both western and eastern views such as target costing, kaizen costing and kanban costing. Target costing is implemented to deal with cost control and cost reduction because the prices cannot be increased due to its limited bargaining power. Kaizen costing was adopted to accommodate the idea of continuous improvement while kanban costing was used as a means to achieve Lean and Just-In-Time (JIT) production. Regarding the importance of the customers, the company adopted customer profitability analysis (CPA) rather than product profitability analysis (PPA). To evaluate the return from investment, the company currently uses breakeven point and payback period due to their simplicity and ease of use. The company is also aware of the use of NPV, IRR and ARR in evaluating the projects; however, they are not implemented because of their complexity. ABC is not adopted and may not be appropriate to the company due to its cost structure. The percentage of overhead costs is very little comparing to that of raw materials; hence, there is no requirement for extremely accurate overhead cost allocation.

9.2 Data Analysis

There are many approaches to qualitative data analysis such as content analysis, pattern matching, explanation building, template analysis, analytic induction, narrative analysis, and grounded theory. Some of them are highly structured, formalised, and proceduralised whiles other accept a much lower level of structure (Saunders et al., 2003). Two distinct ways of analyzing qualitative data, which are content analysis and grounded analysis, represent two extreme ends of the continuum. The advocates of the former analyze the data based on numbers while those of the latter interpret the data based on feeling and intuition. Both however attempt to produce common or contradictory themes and patterns from the

qualitative data (Easterby-Smith et al., 2004). Table 9-2 provides the differences between content analysis and grounded analysis.

Table 9-2: Qualitative Data Analysis: Content versus Grounded Methods

Content analysis	Grounded analysis
Searching for content (prior hypotheses)	Understanding of context and time
Fragmented	Holistic
Objective	Subjective: faithful to views of respondents
More deductive	More inductive
Aims for clarity and unity	Preserves ambiguity and contradiction

Source: Easterby-Smith et al. (2004, 118)

Content analysis was used to analyze the qualitative data in this study owing to its appropriateness to the nature of the research, which is more aligned with a hypothesis testing approach and deductive, rather than hypothesis generating and inductive. It is a widely used method used in deriving meaningful information from text messages. Content analysis can be concisely defined as 'the systematic, objective, quantitative analysis of message characteristics' (Neuendorf, 2002, 1). It is consistent with one of the general strategies used to analyze case study evidence proposed by Yin (2003b), so called 'relying on theoretical propositions'. The researcher used theoretical propositions to guide the design of the case studies as well as research questions.

Since the 1950s, content analysis has been used as a quantitative approach to analyze the content of media text by breaking down the qualitative data into quantifiable units. It utilizes a systematic method of reduction and analysis to produce the core constructs from textual data (Priest et al., 2002). The process of content analysis commences with identifying key themes, patterns, or categorizes based on the theoretical framework or hypothesis the researcher desires to explore. The presences of phrases or words from the interviews relating to the established themes are then counted, and their frequencies are analyzed. Unidentified themes, which may occur later from the interviews, are added into the framework. The relationships among these apparent themes may be used to test hypothesis, and from these, conclusions are drawn (Easterby-Smith et al., 2004).

Content analysis has been criticized however, in that text may lose meaning through radical reduction, and a more qualitative approach has been suggested. Hence, a new

version of content analysis, qualitative content analysis, is proposed (Priest et al., 2002). The qualitative content analysis can be undertaken through both manifest content, where the interpretations are drawn from interviewees' actual words, and latent content, where the interpretations are derived from the judgment of participants' responses (Woods et al., 2002). Given the extent of the interviews and their position in the thesis, a detailed quantitative content analysis was not undertaken. For example, the computer package NVivo was not used. However, qualitative data was used to support the interpretation and explanation of the quantitative findings.

9.3 Findings and Discussions

Based on the research model and the findings from the survey, key constructs were used as main categories in content analysis. These are management accounting practices (MAPs), management techniques (MTs), and strategies, and the relationships among these constructs.

9.3.1 Management Accounting Practices (MAPs)

From the interviews, key adopted MAPs both traditional and contemporary practices are identified and their frequencies are reported across the case companies, which are shown in the Table 9-3.

It was found that most of the companies tend to adopt more traditional MAPs rather than contemporary MAPs. The popular traditional practices are revealed as budgeting system for planning and control (cited by six of the seven interviewees), capital budgeting (referred to by five interviewees), cost allocation (mentioned by four interviewees), budgeting system for controlling costs, and profit and cost centre (both cited by three interviewees). Although contemporary practices are rarely adopted, some of them are used by more than half of case companies such as benchmarking, KPI system, and product profitability analysis (all referred to by four interviewees). These findings are in line with the results from the survey and the literature. The case studies therefore provide

confirmation of the high adoption of traditional MAPs and low adoption of contemporary MAPs as follows.

Table 9-3: Key Adopted Management Accounting Practices across Cases

	Companies						
Management Accounting Practices (MAPs)	**A**	**B**	**C**	**D**	**E**	**F**	**G**
Traditional MAPs:							
Absorption costing	√	-	√	-	-	-	-
Budgeting system for controlling costs	-	√	√	-	-	-	√
Budgeting system for performance evaluation	-	-	√	-	-	-	√
Budgeting system for planning and control	√	-	√	√	√	√	√
Capital budgeting e.g. PB, IRR, breakeven point	√	-	√	-	√	√	√
Cost allocation	√	-	-	√	√	√	-
Cost control system	√	-	-	-	-	-	-
Cost-volume-profit analysis	-	√	√	-	-	-	-
Formal strategic planning	-	-	-	-	-	√	-
Performance evaluation based on divisional profit	-	√	√	-	-	-	-
Profit and cost centre	√	√	-	-	√	-	-
Standard costing	-	-	√	-	-	-	√
Variable costing	-	-	√	-	-	-	-
Contemporary MAPs:							
Balance scorecard	-	-	-	-	-	√	-
Benchmarking	√	√	√	√	-	-	-
Customer profitability analysis	-	-	-	-	-	-	√
Kaizen costing	-	-	-	-	-	-	√
Kanban costing	-	-	-	-	-	-	√
KPI system	√	-	√	√	√	-	-
Performance evaluation based on customer survey	-	-	-	√	√	-	-
Product profitability analysis	-	√	√	-	√	√	-
Target costing	-	-	-	-	-	-	√

High perceived benefit and wide use of traditional MAPs may be attributed to the straight forward and easiness of use of the practices. In contrast, low adoption of contemporary MAPs may be partly derived from the complexity of the practice and issues related to cost and benefits. For example, the interviewee B commented the benefit derived from the use of cost-volume-profit (CVP) analysis, and the interviewee D mentioned his preference of direct cost allocation compared to more complex cost allocation. The interviewees A and C mentioned their negative experiences of activity based costing (ABC) implementation while the interviewee G criticized its concept.

"As I told you…we need to prepare and present [management accounting] information to many branch managers. Most of them have no background in accounting. The use of CVP analysis provides high benefit to our company. It's very straight forward and easy to understand, even though it is quite an old practice."—company B

"We are happy with the use of simple cost allocation to allocate administration expenses. We allocate the costs based on revenue rather than activity. We didn't allocate costs based on activities because it's too complicated."—company D

"We studied the concept of ABC and tried to use it in our organization many years ago. Some how, it's very tough to apply to every part or every bit. It takes time to do this, and it's very complex. We did try, but it didn't work well for us."—company A

"Actually, we tried to implement ABC, but it's very difficult and complicated. We are also not really sure that received benefit will cover all costs. Finally, we didn't fully implement it. Instead, the concept of ABC is only applied to a few expenses such as seminar expenses. Most of expenses are still organized in form of accounting elements rather than activities."—company C

"I think most of large companies in Thailand don't use ABC. The theoretical concept of ABC is great, but it's quite difficult in practice. I heard that those companies tried to implement it, but finally they all stop because of the issue of cost and benefit. Some of them still use for some functions, but not fully implemented. However, ABC is not appropriate to our company because of the cost structure. We didn't have a large portion of overhead, but we do have a large portion of direct material. It's not worth to implement it anyway."—company G

There are some exceptional examples, which demonstrate and explain low adoption of some traditional MAPs, and high adoption of some contemporary MAPs. It was disclosed in the survey that 'budgeting for day-to-day operation' received relatively low benefit from the respondents. Similarly, this practice is not in the list of key adopted MAPs from the interviews. The interviewee A indicated the reason supporting this fact.

"It is quite impossible to use this [budgeting for day-to-day operation] in our organization. We have much longer term view than that. We have like a three-year view."—company A

It was found that there is an ambiguity in management accounting terminologies, especially contemporary practices. The management accounting practitioners indicated that they might use some contemporary MAPs, but they often use different terms. In a few cases, the interviewees admitted that they had no clear idea about new practices and their concepts. The interviewees E and F provided the useful comments.

"Our KPIs are linked to vision and annual strategic plan, and can be separated into different areas such as employees, customers, developments, revenues, and cost control. However, we didn't call it balance scorecard."—company E

"I'm wondering that what you mean exactly 'target costing'. Can you explain a little bit more about it? I'm not really sure that we use it."—company F

The findings from the survey did not provide a discernable future direction of MAPs in Thailand. A limitation of length of the questionnaire prevented any detailed exploration of the respondents' views regarding the future use of techniques. However, future emphasis of MAPs emerged from the interviews. It is suggested that traditional MAPs will still retain their popularity while most of the new concepts of contemporary MAPs that are currently undertaken will remain. Many of the interviewees stated that they will retain the usage of recently adopted practices both traditional and contemporary, and rarely apply any new contemporary practices in the near future. For instance, the interviewees B, C, D, and F pointed out the future direction of MAPs in their organizations.

"We still place high emphasis on those adopted [management accounting] practices such as performance evaluation especially based on return on investment, product profitability analysis, and benchmarking. I think it may be difficult to implement those advanced and complex practices such as ABC or EVA anytime soon."—company B

"I think those recently used [management accounting] practices are not too easy or too difficult, and I think we will still continue using them such as profit by products, budgeting, standard costing, capital budgeting, and CVP analysis. Also, absorption costing and variable costing…we need to use these as the foundation in financial statement and budgeting. For those new practices, we will attempt to use target costing in the future, but I think we need some time."—company C

"I don't think we will implement any new concept of [management accounting] practices like quality costing or social costing in the near future. I think we will continuously use those currently adopted practices [both traditional and contemporary practices] like budgeting, direct cost allocation, benchmarking and KPI system."—company D

"I think the future emphasis of MAPs will remain the same. Those currently used practices still maintain their importance such as KPIs. We're not going to use those new practices such as quality costing, or product life cycle analysis because it's not necessary to our company."—company F

9.3.2 Management Techniques (MTs)

Key adopted management techniques (MTs) were identified from the interviews. The adoption of each MT across cases was counted and their use is illustrated in the Table 9-4.

Table 9-4: Key Adopted Management Techniques across Cases

Management Techniques (MTs)	Companies						
	A	**B**	**C**	**D**	**E**	**F**	**G**
Human Resource Management (HRM)							
Establishing training centre	√	√	√	-	√	-	√
Training the knowledge relating to work, products and/or services to all levels of employees	√	√	√	√	√	√	√
Transferring organizational culture to employees	-	-	√	-	-	-	√
High employee empowerment	-	-	-	√	-	-	-
Occupational health and safety	-	-	-	-	√	-	√
Integrating Systems (IS)							
Investing in information technology	√	√	√	√	√	√	√
Establishing strong link between operational strategy to business strategy	-	-	√	-	-	-	-
Establishing IS across functions internally	√	√	√	√	√	√	√
Establishing IS with customers and/or suppliers	√	√	-	-	√	√	-
Building logistic system (e.g. distribution center)	-	√	-	-	-	-	-
Establishing the network with competitors	-	-	-	-	√	-	-
Quality							
Evaluating quality based on customers' feedback	√	-	-	√	√	-	-
Establishing benchmark of quality based on competitors and/or industry	√	-	-	√	-	-	-
Quality assurance activities (e.g. inspection)	-	-	-	√	-	√	√
Certificate to quality standard (e.g. ISO, quality reward)	√	-	-	-	√	√	√
Advanced manufacturing techniques (AMTs) such as Lean manufacturing, total productive maintenance, and world class manufacturing	-	-	-	-	-	-	√
Team Based Structure							
Project teams	-	-	√	-	-	-	-
Cross functional teams	-	-	-	-	-	√	√
Operating System Innovation							
Outsourcing	√	√	√	√	-	√	√
Improving Existing Processes							
Downsizing	√	-	-	-	-	-	-

The findings related to MTs emerging from the interviews are consistent with those from the survey. It was found that key adopted MTs are related to three main areas, including human resource management (HRM), integrating system, and quality system. There is some evidence showing that the companies value their employees, and adopt a high value

added approach of HRM practices, which involve high levels of training and development. They believe that good service provided by the employees is the key to success. Most of the case companies established their own training centers, which provide training programs appropriate to their employees and help to embed organizational culture into employees' minds. Some organizations also provide occupational health care and safety to their employees, and high employee empowerment is authorized in some cases. The insightful comments are provided by the interviewees A, B, C, E, and G respectively.

"Human resource management is very important to us. Driven by a dynamic and competitive environment, people are stolen from one another, from one organization to the other; especially marketing staff…we do have training for our staff for the new products [financial commodity] that we have to introduce to explain what it is. We have to hire the experts to train all our staff, so we can catch up on all the new things. For in-house training, we annually plan the training programs based on the feedback from each department to see what kind of programs they need. So, it's like two-way communication. HR has to know what the departments need, so that appropriate training programs can be provided. Also, we have some ad-hoc training and outsourcing the training. We have done all these regularly for many years."—company A

"We pay attention in providing good services to the customers; hence, all of our employees are properly trained in order to be knowledgeable, and be able to give advice about the products [construction materials] to the customers, and serve the customers better with faster speed. We have our own training center that provides training programs both work-related and non work-related programs such as team building to all levels of employees…executive, management, and operational levels. All employees have right to show their opinions in the organization, but the employees at the lower levels still cannot evaluate their boss."—company B

"We have two types of training programs; transferring organizational culture to all employees and improving their technical capability. The former is related to transferring organizational culture. It aims to implant organizational culture, company's policy, and strategic thinking to all employees as well as adjusting their working styles to create understanding among them. The latter is about updating new knowledge to the employees in many areas such as engineering, marketing, and accounting and finance. We tie training activity with the budget, and spend quite some money on training."—company C

"The main thing to take our organization to the success is good services to the customers. We focus on training all levels of the employees in order that they can provide good services to the patients. We have a training department, which provides training programs relating to new knowledge about equipment and medical techniques, improving service quality for front-line employees, and general issues such as safety, and quality."—company E

"High emphasis is placed on human resources and employee development. The company established its own training center to provide a variety of training programs such as quality control system (QCS) training. All levels of the employees are continuously trained. For new employees, there is a 3-day training course, which introduces the company, policy, and working style to them, so that they can be ready to work. For factory parts, we send the employees to train abroad such as Japan and Germany for 2-3 months, and then they get back to train what they learn to other employees. Organizational culture is also conveyed to the employees by training such as team work, and seniority. The employees are treated like family members. Lunch and transportation are also provided. Safety is also important because we are heavy manufacturing. All related employees are well trained about safety, and safety suit and equipment are mandatory to get into the factory."—company G

It is shown that the case companies perceived the importance of integrating systems as a mean to the success. All case companies invest substantially in information technology in order to establish integrating systems internally across the functions. However, only four of seven interviewees stated that they expanded the computer system to link externally with suppliers and/or customers. Some specific software programs, which facilitate the establishment of integrating systems, are identified such as SAP, VRM, and Oracle ERP. The interviewees A, B, C, E, and G explained about their integrating systems.

"We invested very much in computerization to establish the electronic communication and electronic payment with the clients. In our communication everything is properly prepared both internally and externally."—company A

"Our information system can be separated into two parts; internal and external. We use SAP program for management within the organization. It allows us to check the inventory stock real time at all branches, so that we can efficiently transfer the products to respond quickly to the customers' requirements. For external links, we use VRM [vendor relationship management] program to organize the payment with vendors."—company B

"We use SAP program as the comprehensive software. It has been implemented for a long time over 10 years as the integrating system. SAP makes all the calculations easier, clearer, and faster."—company C

"We upgraded information technology from the database to a real time integrating system. We substantially invested in information systems to support the services to the customers. The doctors are able to receive and view the report or results real time from the laboratory and X-Ray center as well as order the medicines for the patients. Our information system is also linked to external organizations. Currently, we are linked with national health insurance department, society insurance system, and insurance companies for the benefit of the patients."—company E

"We implemented Oracle ERP as the integrating system. It's a big computer system, which allows us to manage the supply chain, and obtain the highest quality standards. We are the first manufacturing company in Thailand to implement this system on top of Lean Manufacturing. It can be used to eliminate waste and reduce risk in supply chain management."—company G

Some companies further revealed that besides investing enormously in IT and establishing internal and external integrating systems, some other techniques were implemented to add value to their integrating systems. These are establishing a strong link between business strategy and operational strategy, building up logistics systems, and forming a network with the competitors. The interviewees C, B, and E talked about their experiences.

"We strongly linked business strategy with operational strategy. We focus on the alignment between these two strategic levels as the working foundation so that our products reflect the company's values, and the customers can feel it, and then lead to the success."—company C

"Logistics system is very important to us due to the nature of the company, which involves a variety of product items. We have our own distribution center to supply all products to different branches."—company B

"We built up the alliance with other private hospitals, so that we can exchange knowledge and know-how, or even transfer the patients over to have better treatments. Moreover, it allows us to obtain higher bargaining power over the suppliers."—company E

It was found from the interviews that the quality of products and services is the main concern of the companies. Almost all interviewees mentioned about quality as the first thing occurring to them when they have been asked about management techniques. However, only a few techniques to deal with the quality issues are identified and implemented. In particular, four of seven interviewees stated that they obtained certificates to quality standard such as ISO while three of seven interviewees admitted that they evaluate quality based on customers' feedback. Quality assurance activities have been used by three of seven cases, benchmarking of quality has been established by two firms, and various advanced manufacturing techniques have been implemented to improve quality in one company case. There are the useful comments related to quality provided by the interviewees A, D, E, F, and G.

"Quality is very important to us because it will lead presumably to more deals more trades more business. We compare the quality of our research papers [products] with that of other research houses as well as evaluate the quality in terms of the feedback from the institutional clients, who seriously use our research papers. If our research papers are good enough, the return is the volume of trading. We also got quality award for the research house from SET [Stock Exchange of Thailand]. So, this is maybe a mark of the quality."—company A

"The brand standard and quality issues are the main concern of our hotel. The quality of services and products has to be the same as world wide standard. Benchmarking of quality has been set by the hotel chain based on the industry and the area in which the hotel operates. The auditors from the hotel chain regularly come to inspect the quality. For example, foods have to be clean and displayed properly in the right temperature."—company D

"We focus on the good quality of services to impress the customers. We have our own quality department responsible for this issue. Our hospital obtained ISO 9001 for quality of management, and now we are the candidate of HA [Hospital Accreditation] and JCI [Joint Commission International] for quality of medical center concerning with medical care, infection prevention, risk of infection etc."—company E

"We are accredited for ISO 9001 to establish the confidence in the quality of [internet] services among customers. We also established our own quality management system, in which the team members come from different departments. Job descriptive, working processes and targets have been set up for each department. The quality team annually evaluates the performance comparing to the targets, so that they know whether they need to improve the quality and how."—company F

"Quality is the main issue of the company. Our products have to achieve high quality. If the products fail to meet the quality standard, we might lose the whole order. We also focus on QCD [Quality Control Delivery]. The products need to be delivered on-time. We achieved the ISO/TS 9001 and 16949, which is concerned with the automotive industry and environment. We have our own quality management system, and many [advanced manufacturing] techniques have been implemented such as Lean Manufacturing, Toyota Production System, Six sigma, Total Productive Maintenance, and World Class Manufacturing."—company G

Regarding other areas of MTs such as team based structure and improving existing processes, there is limited evidence from the cases. It was found that only one of seven interviewees adopted a project team approach to create flexibility while two companies mentioned that they partly used cross functional teams in their organizations. Nevertheless, these three organizations admitted that their organizational structures are formally arranged

as hierarchical, and project teams or cross functional teams are used as temporary working groups for specific reason such as setting up quality management. It implies that most companies still rely mainly on hierarchical structure rather than team based structure. There is the only one company which has experienced downsizing due to a period of merging, which means that the use of downsizing is kept to a minimum and used only when it is necessary, this is often, due to its negative connotations.

It was shown that outsourcing is a popular technique, which is used by almost all companies (cited by six of seven interviewees). The interviewees tend to use outsourcing for their non-core activities. The quality of the sub-contract firms is also of concern when outsourcing is applied. Many benefits from outsourcing are identified including faster, cheaper, more convenient, more capacity, and more creative. The interviewees A, B, C, D, F, and G mentioned about their experiences with outsourcing.

> "We use a lot of outsourcing on messengers, which we called collectors. They collect the deals or hand in hard copy of the research papers [products] to the customers."—company A

> "We don't have our own delivery, but we outsource the delivery to sub-contract firms. We are concerned about the quality of outsourcing as well. So, when the sub-contract firms delivered the products to the customers and returned the forms to us, we will call the customers to check whether they receive the products properly, are they satisfied with the products, or if any problems occurred."—company B

> "We have our own product designers, but it's not a big team. So, we also outsource the product design activity. It's faster and more creative. If we always use the same designer team, the products [property] will be the same concept. Outsourcing allows us to have more alternatives."—company C

> "Our hotel attempts to outsource the activities, which are not directly related to the customers. It's better to let the experts do that kind of activity for us. It's cheaper and better productivity. The costs can be reduced through outsourcing. Currently, we outsource security and cleaners for the area outside the guests' rooms."—company D

> "We use a lot of outsourcing. For example, we outsource billing activity. We don't produce an invoice slip for monthly customers [internet usage]. We hire the sub-contract firms to do it for us. We have to send the information over to them, and they need to produce the invoices and send the invoices to our customers within the date we agree. It's cheaper and more convenient than doing it by ourselves."—company F

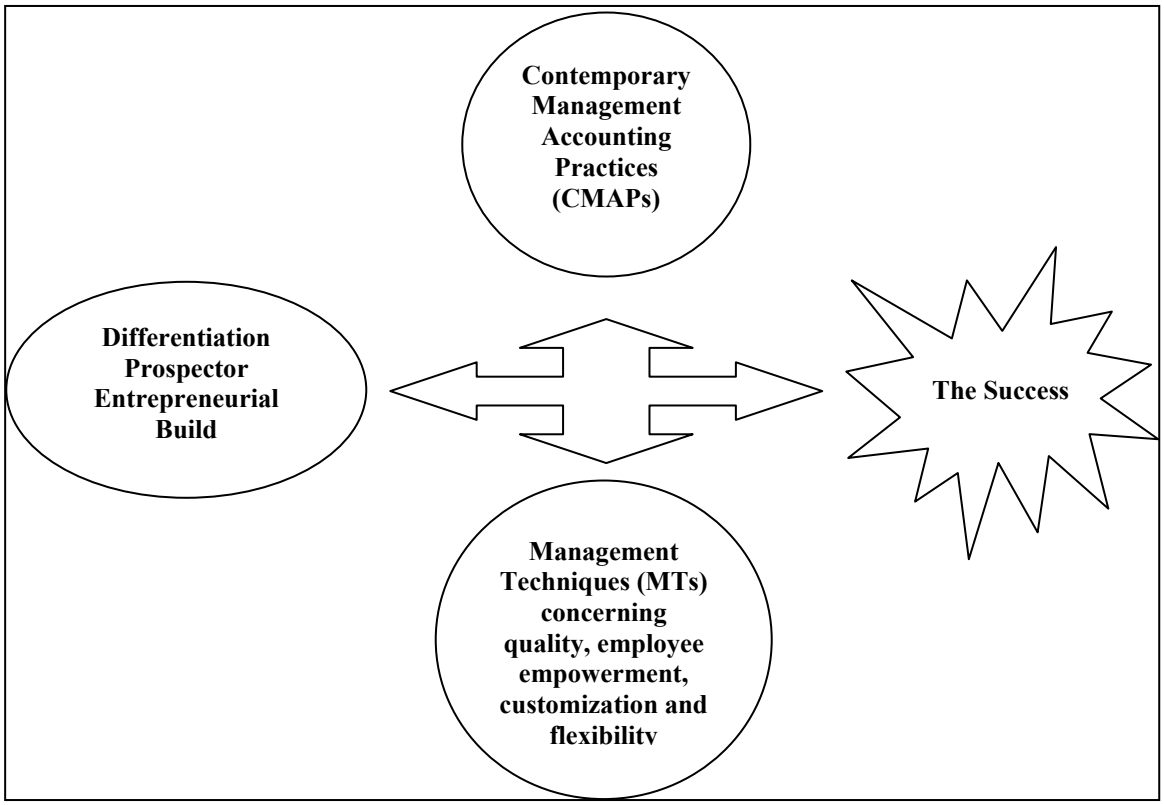
"We outsource some of our manufacturing [automotive parts] when we have not enough capacity due to increasing orders from the customers. We set quality teams to inspect the quality of the outsourced work."—company G

9.3.3 Relationship among the Constructs

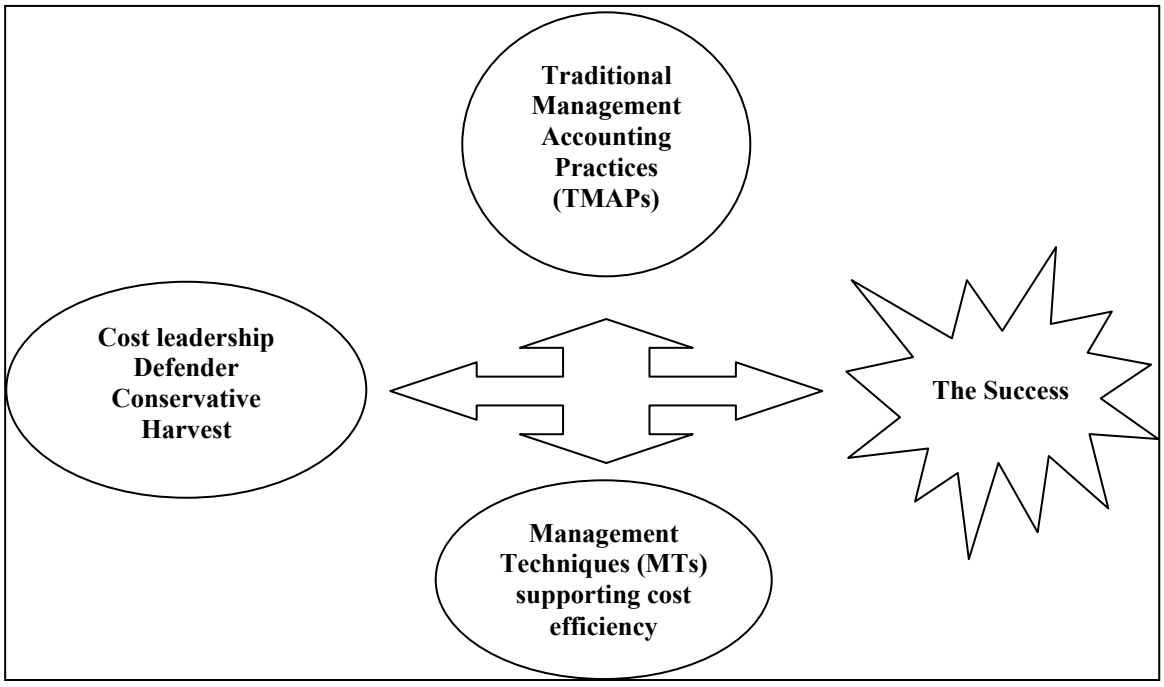
From the literature of contingency studies, it is proposed that the fit between organizational characteristics and contingency factors will lead to higher organizational performance or the greater success of the companies. There are two hypothesized models for this research shown in Figure 9-1.

Figure 9-1: Hypothesized Research Models

Panel A.

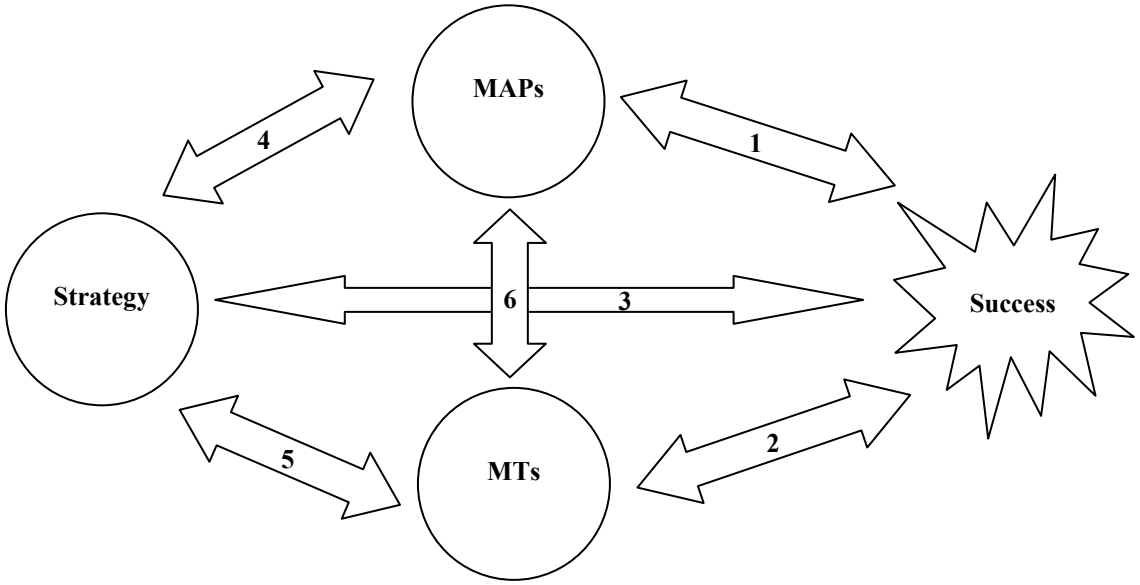


Panel B.



It is proposed that firms will achieve higher organizational performance or success, if the right combination of MAPs and MTs are used to suit their strategies. A pattern matching technique is used to verify the research models. The alignments or the links among the constructs emerged from the interviews. Both a reductionist and holistic view are taken into account in order to explain the relationships. Figure 9-2 demonstrates the relationships found between the key variables.

Figure 9-2: The Links between Key Constructs found from the Interviews



Reductionist view

Based on the reductionist view, there are six relationships between the constructs found from the interviews. They are numbered 1 to 6 in the Figure 9-2. Each of them is described below.

1. Management accounting practices (MAPs) and the success

The uses of MAPs can be linked to the success of the companies. They facilitate business and management activities; particularly assist the managers in decision making, performance measure, and control. The interviewee C, D and F offered the useful comments.

"It's because of the nature of property business in Thailand. Sales are normally happening before the products are finished. Hence, the management accounting

information especially estimated costs is crucial to the success. We are relying on standard costing in which costs are estimated by the engineers. We use this cost information to set the prices. If the information is not accurate, it might affect profitability of the firm."—company C

"The use of MAPs, especially KPI and benchmarking, is important to the success of the organization in terms of decision making and control activities. We provide [MA] information to support these activities. If the information is not correct or slow, it may lead to the wrong decision."—company D

"MAPs can lead to success of the company. We measure organizational performance mainly based on BSC and KPIs. It helps us to know our performance, good or not good, so that we know which areas we should improve, or what makes the customers feel not satisfied."—company F

2. Management techniques (MTs) and the success

The uses of MTs can lead to the success of the organizations. The interviewees believed that using MTs to provide good quality of products or services may lead to success of the organizations such as investment in computerization and technology, training and employee empowerment, and quality. The interviewee B, C, D, and G presented useful statements.

"We focus on the quality of products and services to impress the customers. We believe that it will lead to the success of the company. Hence, our employees are properly trained to provide good services to the customers. We also invested in computer systems in order to work faster to satisfy our customers."—company B

"We use high technology in our office building for rent. It includes high speed internet and energy saving. The system requires high investment. We successfully attract customers who need or are interested in high technology."—company C

"We are a service business; hence, it's very important to impress the customers. Customer's satisfaction is vital to the success of the hotel. Our employees have to make decisions quickly to respond to the customers' needs, so we authorize power to the employees. We value employee empowerment."—company D

"Our customers [automotive firms] are very strict with the quality of products [automotive parts]. We implemented a lot of quality management systems to improve the quality and achieve the quality standard. For example, implementing Toyota Production System substantially reduces scrap while using Kanban systems brings down inventory levels. It's the only way to satisfy the customers and keep them with us. If in only one time the products do not meet the customers' expectation, we might lose the order or lose the

customer completely. Maintaining the quality will lead to the success of the company."—company G

3. Strategies and the success

The strategies can lead to the success of the organization. The interviewee C mentioned about his experience of implementing main strategies, which leads to the success of the company.

"At the beginning of 2007, we implemented our main business strategies, which are practical design, lively neighborhood, intelligent home, security care, and accessible location. All of our properties [products] contain these values. We found that after the implementation, our business grows enormously. Sale growth was 22 percent from 2005 to 2006, and 76 percent from 2006 to 2007. Implementing clear strategies makes our company distinct from the competitors and the customers value this."—company C

4. Management accounting practices (MAPs) and strategies

MAPs can be used to support business strategies. Particularly, traditional MAPs are used to support low cost/ defender/ conservative/ harvest strategies. It was found traditional MAPs such as budgeting, capital budgeting, and breakeven point were used to control costs in order to achieve low cost strategy. The useful comments are provided by the interviewee B and G.

"We use budgeting to control all costs and expenses. For example, we set the budgeting for each item of expenses. If you want to spend more than the limit, you have to present the reasons to the boss why you need to spend more. That's the way to control costs. So, MAPs are used support our strategy."—company B

"Our strategy is to produce products with low cost, but still maintain the quality. We cannot increase the prices, so we need to control cost and increase efficiency. Budgeting is used for cost control and cost reduction purposes. We also use payback period and break even point to control costs for big projects."—company G

In the other way round, MAPs can be linked to business strategies as navigators. The use of management accounting information can inform the firm which direction the firm should go, and how its strategies should be. The interviewee C explained about this.

"MAPs and main strategies are naturally linked. The use of management accounting information can help the manager to have clear ideas about the direction of the

firm. For example, we know the profit of each product from product profitability analysis. So, we know which types of products the company should focus on, and which products we should not invest in. Currently, we target on properties grade B+ to A. We are not interested in the products grade C or lower."—company C

5. Management techniques (MTs) and strategies

It was found that MTs are used to support business strategies. The interviewees A and D provided the examples of the link between MTs and strategies, particularly using technology to control cost.

"We're trying to introduce electronic files for our research papers [products] to the customers. If the customers prefer to receive the electronic files rather than hard copy, our costs can be minimized."—company A

"We use technology to change the working procedures in order to reduce costs. For example, we use computer, email and internet instead of papers or hard copy, and still arrive at the same results. We can reduce costs of paper and reduce the working procedures."—company D

6. Management accounting practices (MAPs) and management techniques (MTs)

The use of MAPs was found to be related to MTs. It is believed that the use of MAPs reflects the management procedures, and supports the adoption of MTs. For instance, the interviewee C mentioned that the use of performance evaluation based on profit by project supports and facilitates its organizational structure, particularly team based structure.

"We arrange the working team in a project based structure which is the nature of the property business. In order to measure firm's performance, we use product profitability analysis to evaluate each property project. Hence, MAPs are reflecting the form of management procedures."—company C

Holistic view

To find relationships among all key constructs simultaneously from the interviews in a case study is highly unlikely. A summary has been made by matching key adopted MAPs, MTs, and strategies of the case companies based on the theoretical propositions presented

in Figure 9-1. The summary of key constructs drawn from the cases is provided in Table 9-5.

Table 9-5: The Summary of Key Constructs for Each Company

Companies	Strategies	MTs	MAPs
A: a security company	- maintain market share - diversify income base - **cost control**	- **invest in information technology and computerization** - people development and training - quality of services - **outsourcing** - **downsizing**	- **budgeting** - profit and cost center - cost allocation - **cost control system** - absorption costing - payback period - benchmarking - KPI system
B: a retail company	- differentiate itself by 'one stop shopping' - provide high quality of products and services with competitive prices - **being customer-oriented firm**	- **invest in information technology system** - **integrated system both internal and external links** - logistics; distribution center - **training** - outsourcing	- budgeting - performance evaluation based on divisional reports - profit and cost center - product profitability analysis - cost volume profit analysis - **benchmarking**
C: a property development company	- **differentiate itself by distinctive products**	- integrating system - **strong link between business and operational strategies** - training - team based structure; project team - outsourcing	- budgeting system - capital budgeting - absorption costing - variable costing - standard costing - performance evaluation based on divisional profit - product profitability analysis - cost volume profit analysis - **benchmarking** - KPI system
D: a hotel	- **being customer-oriented firm** - differentiate itself by strength of hotel brand, high quality of services - low cost for activities, which are not related to the customers	- invest in information technology - brand standard and quality concern - **training** - **customer recognition** - **friendly staff** - employee empowerment - outsourcing	- budgeting for planning - **KPI system** - **benchmarking** - **performance evaluation based on customer satisfaction** - cost allocation
E: a hospital	- **impress customers by providing good quality of services**	- **invest in information technology** - **integrating system** - **quality standard** - **training**	- budgeting for planning - profit and cost center - cost allocation - product profitability analysis - capital budgeting - **KPIs**

Note: The bold letters indicate the matching constructs.

Table 9-5: The Summary of Key Constructs for Each Company (Continued)

Companies	Strategies	MTs	MAPs
F: an internet service provider	- building brand image - **differentiate itself by providing good quality of services**	- **invest in the development of the system and network** - **obtain quality standard** - maintaining good relationship with customers	- budgeting for planning - formal strategic planning - **BSC and KPIs** - product profitability analysis - cost allocation - capital budgeting
G: a manufacturer	- **cost leadership** through cost reduction and efficiency enhancement, but maintain the quality - continuous improvement	- obtain quality standard - quality system; Quality Management System (QMS), Toyota Production System (TPS) - integrating system; Oracle ERP system - **Lean Manufacturing** - **Six sigma** - Total Productive Maintenance (TPM) - **World Class Manufacturing (WCM)** - outsourcing	- **budgeting for cost reduction**, planning and control, and performance evaluation - performance evaluation based on financial measures - **standard costing** - **target costing** - **kaizen costing** - **kanban costing** - customer profitability analysis - breakeven point - payback period

Note: The bold letters indicate the matching constructs.

It was found that there is no unambiguously clear relationship as proposed in research models in Figure 9-1. The companies tend to adopt more than one strategy, instead of focusing exclusively on differentiation or cost leadership. For example, they differentiate themselves, but also have concern about their costs. Consequently, the uses of MAPs and MTs are quite mixed to support all their strategies. Some evidence from case studies however reveals the right combinations between MAPs and MTs to support a particular strategy. Bold letters in Table 9-5 indicate the matching constructs, which are implicitly explained as follows.

Concerning cost leadership strategy, it was found that the companies use some MTs and MAPs to reduce or control their costs in order to achieve cost leadership. Particularly, company A, whose strategy involves cost consciousness, they invested in information technology and computerization as well as adopting outsourcing and downsizing to reduce the costs. These are together with the use of budgeting and cost control system to support cost concern strategy. Another example is provided by company G, who focus on cost

leadership strategy. Many of advanced manufacturing techniques are implemented to enhance efficiency and reduce costs including Lean Manufacturing, Six Sigma, and World Class Manufacturing. The company then adopted a variety of costing systems to control the costs such as standard costing, target costing, kaizen costing, and kanban costing as well as budgeting for cost control.

Regarding customer oriented strategy, it was found that there are some particular MTs and MAPs used to satisfy customers in order to gain the success. Company B used extensive training courses to prepare their employees, so that they can serve the customer excellently. They also invested in information technology and developed integrating systems to allow shorter service time in order to arrive at higher customer satisfaction. Benchmarking was adopted as the criteria for performance evaluation, so that the company knows where and how to improve its performance to meet customers' expectations. Company D, which is a customer oriented hotel, is another example. Their employees have to be friendly and have service in mind. This can be achieved through training. Brand standard and quality are their main concerns to satisfy and impress the customers. These are supported by benchmarking, KPIs and performance evaluation based on customer satisfaction. Similarly, company E the private hospital aims to impress the patients with good quality of service. Thus, physicians, medical staff, and supporting staff are well-trained, and many quality certificates are acquired. They also invested substantially in information technologies and integrating systems to be able to provide better and faster services. These are together with the use of KPIs to ensure customer satisfaction.

In relation to differentiation strategy, the company C differentiates itself by providing distinctive products, which contain five well-defined concepts explained above (in section 9.1.3). They developed a strong link between business and operational strategies in order that the products reflect company's values, and the customers can feel a differentiation from the competitors. These are supported by the adoption of benchmarking. Similarly, the company F differentiates itself by providing best quality of internet services. They invested in the development of the systems and networks as well as obtaining quality standards to guarantee the good quality of the internet network. These are reinforced by the implementation of BSC and KPIs. The findings from both survey and interviews are now brought together in the next and concluding chapter.

Chapter 10
Discussion and Conclusions

10.1 Summary and Discussion of the Findings

This research used a comprehensive overview of the adoption and benefits obtained from various management accounting practices (MAPs) and management techniques (MTs) to develop a picture of MAPs and MTs in Thailand, an economy in which limited prior management accounting research has occurred. The discussion of the findings and comparisons with previous research are provided.

The adoption and benefit of MAPs

The findings on the adoption of MAPs are consistent with previous research in many countries, confirming the popularity of the use of traditional MAPs and the disappointment in the adoption rates of contemporary MAPs. Specifically, the results indicate that most of highly adopted practices and those with the most highly perceived benefits are from traditional MAPs, mainly traditional budgeting, planning tools, performance evaluation based on financial measures, and costing. Compared to prior research in UK, Dugdale (1994) indicated high benefits from budgeting for planning. Drury et al. (1993) reported that the companies widely use standard costing to support budgeting and performance evaluation. Many studies in European countries, particularly Denmark, Germany, Greece and Italy, pointed out the extensive use of formalized budgetary planning (Ballas and Venieris, 1996; Barbato et al., 1996; Israelsen et al., 1996; Scherrer, 1996). An Australian study revealed relatively highly adoption of traditional planning techniques including budgeting and long-term planning (Chenhall and Langfield-Smith, 1998a). The use of traditional accounting practices such as full costing and standard costing was found to be more popular among manufacturers in New Zealand (Adler et al., 2000). Joshi (2001) reported that most highly adopted accounting practices in Indian manufacturing companies were traditional budgeting and performance evaluation systems. Sulaiman et al. (2004) indicated high emphasis on the use of traditional MA techniques cross four Asian countries including Singapore, Malaysia, China and India.

However, there are a few traditional MAPs having low benefit such as budgeting systems for planning day to day operations and operations research technique. For the former, it is indicated that the companies in SET may incorporate a long-term perspective for planning rather than short-term planning. For the latter, the appearance in many textbooks and professional courses is not a guarantee of high perceived benefit of the practices. The low adoption and low benefit may come from its complexity in practical use. Similarly, Chenhall and Langfield-Smith (1998a) found that operations research techniques obtained relatively low benefits; however, they reported high adoption and higher benefit of budgeting to plan day-to-day operations among Australian firms.

Most of contemporary MAPs are less frequently adopted and some have relatively low perceived benefit, especially all activity based practices (e.g. ABC[39], ABM and ABB), performance evaluation based on non-financial measures (e.g. BSC, supplier evaluation and employee attitudes), contemporary budgeting and costing (e.g. zero-based budgeting, Kaizen costing, target costing, and cost of quality), and value based techniques (e.g. economic value added and value chain analysis). However, a few contemporary MAPs obtain relatively high adoption and relatively high perceived benefit (e.g. product profitability analysis, customer profitability analysis, and performance evaluation based on customer satisfaction surveys). This implies that companies in Thailand may place their main priorities on the profitability of the firm and customer orientation.

The relatively low adoption rates and low benefit of contemporary MAPs in Thai firms are consistent with those from previous research. In UK, the surveys in 1990s reported only 10 percent adoption rate for ABC (Innes and Mitchell, 1991; Drury et al., 1993) while this adoption rate is improved in extended studies of ABC (Innes and Mitchell, 1995; Innes et al., 2000). Low adoption rate of activity based techniques can also be found in some European countries such as Denmark (Israelsen et al., 1996) and Germany (Scherrer, 1996) whilst no evidence of the development of ABC occurs in other European countries such as Greece (Ballas and Venieris, 1996) and Italy (Barbato et al., 1996). The Australian study by Chenhall and Langfield-Smith (1998a) reported relatively low adoption and low benefit

[39] It is noted that ABC is not commonly adopted; however, it is perceived as relatively high benefit from the Thai respondents.

from some recently-developed practices, for example ABC, product life cycle analysis, value chain analysis, shareholder value analysis, and target costing. Similarly, Adler et al. (2000) revealed limited use of recently developed advanced management accounting techniques among manufacturers in New Zealand, particularly ABC, SMA and cost of quality reporting. There is evidence from the Indian study indicating low and slow adoption rates, but high benefits of recently developed practices such as ABC, product profitability analysis, and target costing (Joshi, 2001). The limited use of contemporary MA tools has been revealed across four Asian countries including Singapore, Malaysia, China and India (Sulaiman et al., 2004). Nevertheless, target costing is commonly used in some European countries including Denmark (Israelsen et al., 1996) and Germany (Scherrer, 1996) while benchmarking maintains its importance among Australian companies (Chenhall and Langfield-Smith, 1998a).

Although activity based practices are not commonly used by Thai firms, the findings report that ABC is perceived to have a high benefit in practice. This may imply that the respondents perceive a benefit from ABC, but they have not yet adopted the practice due to the lack of expertise to implement the concept of ABC, its difficulty in practical use as well as time and money involved in developing it, which have been suggested in the studies of Adler et al. (2000) and Waldron (2005). Maybe they are encouraged to believe that it offers benefits by the substantial publicity it has received, the consultancy promotion and wide international adoption of it by large companies.

The survey also confirms the importance of financial measures, and it can be deduced that the companies in SET rely mainly on financial measures supplemented with a few non-financial measures; particularly performance evaluation based on customer satisfaction rather than rely exclusively on a variety of non-financial measures. This is perhaps a plausible finding. The high emphasis of financial measures in Thailand is consistent with earlier research including UK studies by CIMA (1993) and Dugdale (1994), and the Australia study by Chenhall and Langfield-Smith (1998a), which revealed that financial measures of performance dominated. However, the limited use of non-financial measures in Thailand is not consistent with these researches. The studies in UK reported the growing importance of non-financial measures and the need to combine non-financial and financial

information in accounting reports while the Australian study found the use of financial measures supplemented with a variety of non-financial measures.

In summary, the findings from current study in Thailand are quite consistent with those from previous studies in many developed countries, which were conducted over approximately the past decade. The high adoption of traditional practices and low adoption of contemporary practices may result from the research taking place in an emerging economy. The business environment in developing countries encourages the firms to adopt the practices such as traditional budgeting to deal with cost control and cost concern rather than the practices such as value based techniques to build up firm's value. Hence, management accounting in Thailand is pretty much involved in stage 3 of management accounting evolution identified by IFAC (1998), which focus on the reduction of waste in resources used in business processes.

The adoption and benefit of MTs

The most highly adopted and 'highly perceived benefit' MTs of Thai companies are human resource management (HRM) techniques. This occurs with relatively low adoption of sub-contracted labour. It implies that most of the responding companies value their employees, and use more permanent employees rather than relying on sub-contracted working. They prefer a high value added approach of HRM activities involving high levels of training and development for all employees, encouraging a high degree of employee participation and involvement, and providing job security.

MTs representing integrating system concepts are widely adopted and provide relatively high benefit to the responding companies except integrating information systems with suppliers and distributors. It implies that the companies in SET may value information sharing and the alignment between operational and business strategies as well as the alignment among business processes. They tend to develop the internal integrating systems within their organizations rather than external integrating systems, specifically the links with suppliers, customers, or distributors. As they develop further their supply chain focus may develop.

It was revealed that team based structures are not widely adopted, and their perceived benefits are relatively low, with the exception of project teams and cross-functional teams. Besides the advantages provided by team based structures such as enhanced flexibility, promotion of employee empowerment, and increased customer satisfaction, it implies that the organizational structure of most Thai companies may still be based mainly on a traditional style or hierarchical based structure rather than non-hierarchical and flatter or team based structure.

The responding companies perceive relatively high benefit from quality based techniques; however, the adoption of these quality systems including certifications to quality standards is surprisingly not high. It is possible that Thai companies may develop and implement quality systems more in the near future according to the high perceived benefit, this remains to be seen. The questionnaire did not explore the future intensions of management regarding MAPs or MTs, although some other surveys have explored this.

MTs reflecting innovation are widely adopted by the companies in SET. These are outsourcing and implementing new operating methods. However, the perceived benefits from these MTs are relatively low. It implies that the respondents may experience disadvantage from these highly adopted MTs. For instance, outsourcing may negatively affect the control over critical functions and suppliers as well as damage to organizational learning and development.

It was found that MTs representing reorganizing and improving existing processes are rarely adopted and contribute relatively low benefit to the responding firms. Low adoption and low benefit of downsizing can be explained by its detrimental effects on the firms such as de-motivation, job-insecurity, and reduction in employees' loyalty and organizational commitment. Hence, it is expected that the companies may use these MTs only when it is absolutely necessary.

Classifications of MAPs and MTs

Using factor analysis, the MAPs were structured into meaningful groups of MAP items, both contemporary and traditional. These are in line with the findings reported in the

development of MAPs from various other international researches including the study of Chenhall and Langfield-Smith (1998b). Particularly, the contemporary MAPs consist of strategic management accounting, benchmarking, activity based practices, and contemporary performance measures whilst the traditional MAPs encompass traditional budgeting, costing, and performance measures. There are five groups of MTs emerging from factor analysis including human resource management, integrating systems, team based structure, quality systems, and innovation and reorganization. These all display acceptable levels of Cronbach's alpha, indicating acceptable reliability.

Contingency factors, particularly management techniques (MTs) and strategic typologies, were used to help place the adoptions and benefits of the MAPs into some context. Three contingency forms of fit were adopted in order to test the hypotheses including selection approach, interaction approach, and systems approach, in line with the contingency methodology (Chenhall, 2003).

10.1.1 Summary and Discussions of the Findings from Selection Approach

Concerning selection approach, the relationships between MAPs and strategic typologies, and those between MTs and strategic typologies have been explored via correlation analysis and multiple regression analysis. The results are summarized as follows.

The alignments between MAPs and strategic typologies

It was found that there are some alignments between MAPs and strategic variables except strategic mission of Gupta and Govindarajan, which is not statistically significant with any MAPs. In line with expectations, according to strategic priorities of Porter there are positive relationships between differentiation strategy and three groups of contemporary MAPs including benchmarking, activity based practices, and contemporary performance measures. The findings indicate that the higher emphasis placed on differentiation strategy, the more benefit obtained from most of the contemporary MAPs. This is consistent with previous findings by Abernethy and Lillis (1995), Ittner and Larcker (1997), Perera et al. (1997), Bouwens and Abernethy (2000), Davila (2000), Baines and Langfield-Smith (2003), Abas and Yaacob (2006) and Van der Stede et al. (2006), indicating that an

organization pursuing differentiation strategy and functional strategies supporting differentiation such as flexibility, customization, customer-focus, and quality focus strategies may require more sophisticated MAS, specifically the use of broad set of measures and non-financial measures.

A positive relationship is also found to be statistically significant between cost leadership strategy and traditional performance measures. The findings indicate that the higher emphasis placed on cost leadership strategy, the more benefit obtained from traditional performance measures. However, some contradictions to the expectations have also occurred. Differentiation strategy was found to be aligned with traditional performance measures while cost leadership strategy was related to activity based practices and contemporary measures. This implies that differentiators seem to maintain a regular 'eye' on financial results. Also, activity based practices are seen as techniques which support cost reduction and cost control in addition to the suggestion that they support differentiation.

Similarly, a fit between MAPs and strategic types of Miles and Snow has been revealed. In line with expectations, it was found that prospector orientated firms obtain a higher benefit from two contemporary practices; benchmarking and contemporary performance measures. This is similar to the findings from prior research of Abernethy and Guthrie (1994), Guilding (1999), Said et al. (2003), Jusoh et al. (2006), and Cadez and Guilding (2008), which found a positive link between the adoption of prospector strategy and the use of broad scope MAS and contemporary MAPs such as competitor-focused accounting (CFA), strategic management accounting (SMA), and non-financial measures. However, it was unexpectedly found that the more defender orientated firms are, the higher benefit was obtained from activity based practices. There is no relationship detected between traditional MAPs and this strategic type. It implies that whether firms pursue prospector or defender strategies, there is no difference in the reported benefit obtained from traditional practices.

Likewise, there is a fit between the strategic type of Miller and Friesen and contemporary practices, but not traditional practices. Specifically, the more entrepreneurial characteristics the firms display, the higher benefit obtained from contemporary performance measures.

There is no evidence supporting the expected alignment between conservative attributes and traditional MAPs. Instead, it was observed that the more entrepreneurial characteristics the firms display, the higher benefit obtained from traditional budgeting.

In summary, most of research findings are in line with those of previous research and the expectations, indicating the alignments between contemporary practices and differentiation/ prospector/ entrepreneurial strategies, and those between traditional practices and cost leadership strategies. No relationships between traditional practices and defender/ conservative strategies have been observed. These are together with unexpected relationship between differentiation/ entrepreneurial strategies and some traditional practices. It may be because of the predominant use of traditional practices of Thai firms in SET. Hence, no matter which strategies the firms pursue (differentiation/ prospector or cost leadership/ defender), traditional practices are fundamentally used and valued by the respondents. The high benefit obtained from traditional budgeting of entrepreneurial firms may be explained by the fact that they need to use traditional budgeting as part of tight control to restrain excessive innovation. Interestingly, it was found that the companies pursuing cost leadership and defender strategies obtain higher benefit from activity based practices. It might imply that costs and expenses are their main concern; thus, the accuracy of costs is vital to them, resulting in high perceived benefit from activity based practices. Whether cost leader are using ABPs to support their cost minimizing strategy or differentiator are using it for cost/value added analysis, it seems ABPs has found favor with Thai companies just as in other parts of the world.

The alignments between MTs and strategic typologies

There are some alignments between MTs and strategic variables except strategic mission of Gupta and Govindarajan. Specifically, it was found that there are some alignments between MTs and strategic priorities of Porter. In line with expectations, there are positive relationships between differentiation strategy and three groups of MTs including human resource management, integrating systems, and quality systems. This implies that the higher emphasis placed on differentiation, the higher benefit obtained from these MTs concerning quality, employee empowerment, and flexibility. However, there is no evidence supporting the relationship between cost leadership and MTs relating to cost reduction

processes. Instead, cost leadership is found to be positively related to quality systems. This seems to imply, from the responses, that quality is a 'mantra' adopted by many companies whatever their strategic orientation.

Regarding the strategic type of Miles and Snow, the results confirm some fits between prospector strategy and integrating systems, which is useful to increase flexibility. It implies that the more prospector strategy the firms pursue, the higher benefit obtained from integrating systems. Surprisingly, defender strategy was found to be related to quality systems. It means the more defender strategy the firms pursue, the higher benefit obtained from quality systems.

Concerning the strategic type of Miller and Friesen, the fit between entrepreneurial firms and the benefit obtained from integrating systems is disclosed. It implies that the more characteristics of entrepreneurship the companies pursue, the higher benefit obtained from integrating systems. There is no evidence supporting the fit between conservative firms and MTs concerning cost efficient processes.

In summary, the findings confirm the alignments between differentiation strategy and MTs concerning quality, employee empowerment, and flexibility. Also, there is a link between prospector/ entrepreneurial strategies and MTs concerning flexibility. These imply that Thai companies require MTs supporting flexibility, quality and high value of HRM to accommodate specific strategies they pursue; differentiation/ prospector/ entrepreneurial in particular. However, there is no evidence supporting the alignments between cost leadership/ defender/ conservative strategies and MTs relating to cost reduction processes. Instead, it was found that firms pursuing cost leadership/ defender strategies obtain higher benefit from quality systems.

10.1.2 Summary and Discussions of the Findings from Interaction Approach

The moderated role of contingency factors has been explored based on interaction approach via moderated regression analysis. Strategic typologies and MTs are used as moderators. It is noted that only a few interaction effects of moderators on the relationship between MAPs and organizational performance have been detected.

Strategic variables as moderators

It was found that strategic priorities of Porter and strategic missions of Gupta and Govindarajan moderate the relationship between some MAPs and organizational performance. Particularly, the moderator role of strategic mission of Gupta and Govindarajan has been found to have an interaction effect on the relationship between strategic management accounting (SMA) and organizational performance. In line with the expectations, it was found that the higher level of strategic mission (moving toward 'build'), the stronger positive relationship between the benefit obtained from SMA and organizational performance. It implies that the companies in SET may require the use of SMA to assist in pursuing build strategic mission, resulting in higher organizational performance.

However, the interaction effects found from strategic priorities of Porter are unexpected. Specifically, it was found that there is an interaction effect between traditional costing and customer orientation on organizational performance. Surprisingly, the higher emphasis placed on customer orientation, the higher positive relationship between traditional costing and organizational performance. Likewise, an interaction effect between SMA and differentiation on organizational performance has been found. It was unexpectedly found that the higher emphasis on differentiation, the weaker positive relationship occurred between the benefit obtained from SMA and organizational performance.

MTs as moderators

Team based structure (TBS) was found to be moderator affecting the relationship between SMA and organizational performance. It was unexpectedly found that the higher benefit obtained from TBS, the weaker positive relationship between the benefit obtained from SMA and organizational performance. In other words, TBS buffers the effect of benefit obtained from SMA on organizational performance. Organizational performance is a notoriously difficulty variable to capture whether using objective or subjective measures. Additionally, the extent of 'lag' that may occur between the adoption of MAPs or MTs and

any subsequent performance change is unknown. This may account for relatively modest findings in this part of the study.

10.1.3 Summary and Discussions of the Findings from Systems Approach

Based on a systems approach, the relationships among MAPs, MTs, strategic typologies, and organizational performance have simultaneously been examined via cluster analysis. The responding companies were categorized into groups based on the similar characteristics of the strategies they pursue, and the benefit obtained from MAPs and MTs. Eventually, there were eight clusters emerging from the analysis. Three of them exhibit differentiation/ prospector/ entrepreneurial/ build strategies while the rest demonstrate the characteristics of cost leadership/ defender/ conservative/ harvest strategies. In line with expectations, there is some evidence showing that the companies under differentiation/ prospector/ entrepreneurial/ build strategies tend to have higher organizational performance when they obtain higher benefit from contemporary MAPs and MTs concerning quality, employee empowerment, customization and flexibility. It was also found that the companies pursuing cost leadership/ defender/ conservative/ harvest strategies tend to have higher performance when they obtain higher benefit from traditional MAPs and MTs relating to cost reduction processes.

However, there are some unpredicted findings. It was found that the companies pursuing differentiation/ prospector/ entrepreneurial/ build strategies may also require the benefit from traditional MAPs and MTs concerning cost efficiency in order to support their operations to be highly efficient and innovative. This finding confirms that the firms emphasizing differentiation types do not ignore their costs. Likewise, there is a requirement for the companies with cost leadership/ defender/ conservative/ harvest strategies to obtain some degree of benefit from contemporary MAPs and MTs supporting quality, high value of HRM, and flexibility.

Some of the findings are in line with previous research of Chenhall and Langfield-Smith (1998b) indicating that differentiator firms tend to have higher performance when the combinations of MTs (quality systems, integrating systems, team-based structures, HRM policies, improving existing processes, manufacturing systems innovations) and MAPs

(mainly contemporary MAPs including strategic planning techniques, balanced performance measures, benchmarking, employee-based measures, and activity-based techniques) are used. Cost leadership firms tend to have higher performance when the combinations of MTs (improving existing processes, manufacturing systems innovations, integrating systems) and MAPs (traditional accounting techniques and some contemporary MAPs including activity-based techniques, benchmarking and strategic planning techniques) are adopted.

10.1.4 Summary and Discussions of the Findings from Interviews

The findings from the interviews were used as an important source of triangulation and confirmation of the survey. There were seven responding companies participating in these interviews. It was found that the findings from the interviews were in line with those from the survey. It also provided more understanding of the context of the companies with greater explanations.

Specifically, there is evidence showing that highly perceived benefit and wide use of traditional MAPs may come from the straight forward and ease of use and understanding of the practices. Low adoption of contemporary MAPs may be partly attributable to the complexity of the practices and the issue related to cost and benefit. Budgeting for day-to-day operation is rarely adopted and received relatively low benefit scores, because the respondents may pay more attention on long-term planning rather than short-term planning.

Future intensions of the companies related to MAPs, which were not provided from the survey, were explored in interviews. It was found that traditional MAPs will retain their popularity while most of the new concepts of contemporary MAPs that are currently undertaken will remain. Many of the interviewees admitted that they will retain the usage of recently adopted practices both traditional and contemporary, and rarely anticipated that they will apply any new contemporary practices in the near future. This has interesting implications for change management. It seems the interviewee accountants are reluctant to change their systems and practices that work well for them at the moment. It reflects the

introversion and resistance to change which might pervade much of accounting thinking, in that accounting ‘lags’ rather than ‘leads’ development in other areas.

All findings related to MTs emerging from the interviews are in line with those from the survey. It was found that the main adopted MTs involve with HRM, integrating systems, and quality systems. The companies value their employees, and adopt a high value added approach of HRM practices engaging in high levels of training and development. They believe that good service provided by the employees is the key to success. Most of the case companies established their own training centers, which provide training programs appropriate to their employees and assist in implanting organizational culture. They also provide occupational health care and safety to their employees, especially in manufacturing firms. High employee empowerment is authorized in some cases.

It was found that integrating systems are important to the companies in SET as a means to their success. All case companies invest substantially in information technology, and establish integrating systems internally across the functions. However, only half of them expanded the computer system to link externally with suppliers and/or customers. Some specific software programs, which support the establishment of integrating systems, are identified such as SAP, VRM, and Oracle ERP. Besides investment in IT, some companies adopt other techniques to add value to their integrating systems including establishing a link between business strategy and operational strategy, building up logistics systems, and setting up networks with competitors.

It appeared from the interviews that quality of products and services is the main concern of the companies. However, only a few techniques dealing with quality are implemented such as certification to quality standards, customers’ feedback, quality assurance activities, and benchmarking of quality. There is limited evidence from the companies of adopting team based structures. The companies admitted that their organizational structures are formally arranged, and they only use project teams and cross functional teams either to increase flexibility or to create temporary working groups for specific reasons such as setting up the quality team. This implies that most companies still rely mainly on a hierarchical organizational structure rather than team based structure. It was shown that outsourcing is a popular technique, but the companies tend to use outsourcing for their non-core activities,

that are, not their main business activities. This may be because of many benefits such as faster, cheaper, more convenient, more capacity, and more creative. However, the quality of sub-contract firms is also of concern when outsourcing is applied. Downsizing was rarely adopted due to its negative effects. It is used when it is necessary such as during a period of merging of companies.

The relationships among the constructs emerging from the interviews

It was found that the uses of MAPs, MTs, and strategies can be linked to the success of the companies. MAPs facilitate business and management activities; particularly assisting the managers in decision making, performance measurement, and control. It is believed that using MTs to provide good quality of products or services may lead to the success of the organizations such as investment in computerization and technology, training and employee empowerment, and quality. Some interviewees reported experience of the implementation of major improvement strategies, which led to greater performance improvement of their companies.

From the conversations, MAPs and MTs were found to be used to support business strategies. It was also indicated that the use of MAPs reflects the management procedures, and supports the adoption of MTs. Particularly, traditional MAPs such as budgeting, capital budgeting, and breakeven point were used to control costs and expenses in order to achieve cost leadership strategy. Some examples demonstrate the use of MTs, specifically technology, to control costs. The use of MAPs particularly performance evaluation based on profit by project was found to support and facilitate the organizational structure, specifically team based structure.

However, the simultaneous relationship among all key constructs is unlikely to emerge. This is because the companies tend to adopt more than one strategy. For example, they differentiate themselves, but also have concern about their costs. Thus, the use of MAPs and MTs are relatively mixed in order to support all these strategies.

All key findings are summarized in Table 10-1 as follows.

Table 10-1: Key Findings

Approach	Related research questions (RQ)	Key findings (hypotheses testing)
1. Descriptive	**RQ1:** What are MAPs that companies in Thailand use and what is the extent of the benefit perceived from these MAPs?	- The findings confirm the popularity of the use of traditional MAPs and reveal disappointing adoption rates of contemporary MAPs. - Most highly adopted practices and highly perceived benefits are mainly from traditional MAPs such as traditional budgeting, planning tools, performance evaluation based on financial measures, and traditional costing. - A few traditional MAPs have low perceived benefit including budgeting systems for planning day to day operations and operations research techniques. - Most of contemporary MAPs are less frequently adopted and perceived relatively low benefit except those practices relating to profitability of the firm and customer orientation. - The importance of financial measures is confirmed through the reliance mainly on financial measures supplemented with a few non-financial measures; particularly performance evaluation based on customer satisfaction rather than reliance exclusively on a variety of non-financial measures. - Activity based costing (ABC) is perceived to have a high benefit in practice; however, it is not commonly used.
	RQ2: What are MTs that companies in Thailand use and what is the extent of the benefit perceived from these MTs?	- The most highly adopted and 'highly perceived benefit' MTs of Thai companies are human resource management (HRM) techniques. - It reflects a high value added approach of HRM activities involving high level of training and development, encouraging a high level of employee participation and involvement, and providing job security. - MTs representing integrating system concepts are widely adopted and provide relatively high benefit to the responding companies except integrating information systems with suppliers and distributors. - Team based structures are not widely adopted and their perceived benefits are relatively low. It implies that organizational structure of most Thai firms may still be based mainly on a hierarchical structure.

Table 10-1: Key Findings (Continued)

Approach	Related research questions (RQ)	Key findings (hypotheses testing)
1. Descriptive	**RQ2:** (continued)	- The responding companies perceive relatively high benefit from quality based techniques; however, the adoption of these quality systems including certifications to quality standards is surprisingly not high. - MTs reflecting innovation are widely adopted by the companies in SET. These are outsourcing and implementing new operating methods. However, the perceived benefits from these MTs are relatively low. - It was found that MTs representing reorganizing and improving existing processes are rarely adopted and contribute relatively low benefit to the responding firms.
2. Selection Approach	**RQ3.** What are the MAPs and MTs that provide benefits to the companies with different strategic priorities in Thailand? a. To what extent is there alignment of MAPs to different strategic typologies?	- **Some findings supported H1:** there are positive relationships between differentiation strategy and three of contemporary MAPs: benchmarking, activity based practices, and contemporary performance measures. A positive relationship is also found to be statistically significant between cost leadership strategy and traditional performance measures. - Contradictions to the expectations have also occurred. Differentiation strategy was found to be aligned with traditional performance measures while cost leadership strategy was related to activity based practices and contemporary performance measures. - **Some findings supported H2:** prospector orientated firms obtain a higher benefit from two contemporary practices: benchmarking and contemporary performance measures. However, it was unexpectedly found that the more defender orientated firms are, the higher benefit was obtained from activity based practices. - There is no relationship detected between traditional MAPs and this strategic type. - **No findings supported H3:** there is no alignments between strategic mission of Gupta and Govindarajan and any MAPs - **Some findings supported H4:** the more entrepreneurial characteristics the firms display, the higher benefit obtained from contemporary performance measures

Table 10-1: Key Findings (Continued)

Approach	Related research questions (RQ)	Key findings (hypotheses testing)
2. Selection Approach	**RQ3:** (Continued) a. To what extent is there alignment of MAPs to different strategic typologies?	- There is no evidence supporting the expected alignment between conservative attributes and traditional MAPs. Instead, it was observed that the more entrepreneurial characteristics the firms display, the higher benefit obtained from traditional budgeting.
	b. To what extent is there alignment of MTs to different strategic typologies?	- **Some findings supported H5:** there are positive relationships between differentiation strategy and three of MTs including human resource management, integrating systems, and quality systems. - However, there is no evidence supporting the relationship between cost leadership and MTs relating to cost reduction processes. Instead, cost leadership is found to be positively related to quality systems. - **Some findings supported H6:** there are some fits between prospector strategy and integrating systems, which is useful to increase flexibility. - Surprisingly, defender strategy was found to be related to quality systems. - **No findings supported H7:** there is no alignments between strategic mission of Gupta and Govindarajan and any MTs - **Some findings supported H8:** there is a fit between entrepreneurial firms and the benefit obtained from integrating systems. - There is no evidence supporting the fit between conservative firms and MTs concerning cost efficient processes.
3. Interaction Approach	**RQ4:** What are positive combined effects of MAPs and contingency factors on organizational performance? a. To what extent is there any interaction effect of different strategies on relationship between MAPs and organizational performance?	- It is noted that only a few interaction effects have been detected. - It was found that strategic priorities of Porter and strategic missions of Gupta and Govindarajan moderate the relationship between some MAPs and organizational performance. - **Some findings supported H9**: the higher level of strategic mission (moving toward 'build'), the stronger positive relationship between the benefit obtained from strategic management accounting and organizational performance.

Table 10-1: Key Findings (Continued)

Approach	Related research questions (RQ)	Key findings (hypotheses testing)
3. Interaction Approach	**RQ4:** (Continued) a. To what extent is there any interaction effect of different strategies on relationship between MAPs and organizational performance?	- It implies that the companies in SET may require the use of SMA to assist in pursuing build strategic mission, resulting in higher organizational performance. - However, the interaction effects found from strategic priorities of Porter are **unexpected**. Particularly, customer orientation strategy is found to strengthen a positive relationship between traditional costing and performance. Differentiation strategy is found to weaken a positive relationship between strategic management accounting and performance.
	b. To what extent is there any interaction effect of MTs on relationship between MAPs and organizational performance?	- **No findings supported H10:** instead, team based structures are found to buffer the effect of benefit obtained from strategic management accounting on organizational performance
4. Systems Approach	**RQ5:** What are the viable combinations of strategies that Thai firms pursue? Do they reflect appropriate combinations of strategy?	- There are eight groups of Thai companies emerging from the analysis. Three of them exhibit the characteristics of differentiation/ prospector/ entrepreneurial/ build strategies. - No individual group exhibits all the combined characteristics of cost leadership/ defender/ conservative/ harvest strategies. However, there are two groups, which demonstrate the characteristics of cost leadership and harvest strategies, and three groups exhibit the attributes of defender and conservative strategies.
	RQ6: What are the appropriate combinations between MAPs and MTs for companies with different strategic typologies in order to enhance their performance?	- **Some findings supported H11:** the companies under differentiation/ prospector/ entrepreneurial/ build strategies tend to have higher organizational performance when they obtain higher benefit from contemporary MAPs and MTs concerning quality, employee empowerment, customization and flexibility. - It was also found that the companies pursuing cost leadership/ defender/ conservative/ harvest strategies tend to have higher performance when they obtain higher benefit from traditional MAPs and MTs relating to cost reduction processes. - **Unexpected results:** firms pursuing differentiation/ prospector/ entrepreneurial/ build strategies may also require the benefit from traditional MAPs and MTs concerning cost efficiency in order to support their operations to be highly efficient and innovative.

Table 10-1: Key Findings (Continued)

Approach	Related research questions (RQ)	Key findings (hypotheses testing)
4. Systems Approach	**RQ6:** (Continued)	- **Unexpected results:** there is a requirement for the companies with cost leadership/ defender/ conservative/ harvest strategies to obtain some degree of the benefit from contemporary MAPs and MTs supporting quality, high value of HRM, and flexibility.
5. Interviews	**RQ7:** What are firms' experiences with the adoption of MAPs and MTs? (The findings from interviews are used to validate those from survey)	- The findings from the interviews related to both MAPs and MTs were in line with those from the survey. They provide more explanation as follows. - High benefit and wide use of traditional MAPs may come from the straight forward and ease of use and understanding of the practices, in particular CVP analysis and direct cost allocation. - Low adoption of contemporary MAPs, particularly ABC, may be partly attributable to the complexity of the practices and the issue related to cost and benefit. - Budgeting for day-to-day operation is rarely adopted and received relatively low benefit scores, because the respondents may pay more attention on long-term planning rather than short-term planning. - Many of the interviewees indicated reluctance to change in their MA systems and practices that work well for them at the moment. - Main adopted MTs involve with HRM, integrating systems, and quality systems. - The companies value their employees, and adopt a high value added approach of HRM practices engaging in high levels of training and development, employee empowerment, and occupational health care and safety. - All case companies invest substantially in IT, and establish integrating systems internally across the functions. However, only half of them expanded the computer system to link externally with suppliers and/or customers. Some specific software programs, supporting the establishment of integrating systems, are identified such as SAP, VRM, and Oracle ERP. - Quality of products and services is the main concern of the companies. However, only a few techniques are implemented such as certification to quality standards, customers' feedback, quality assurance activities, and benchmarking of quality.

Table 10-1: Key Findings (Continued)

Approach	Related research questions (RQ)	Key findings (hypotheses testing)
5. Interviews	**RQ7:** (Continued)	- There is limited evidence from the case companies of adopting team based structure, which implies that most companies still rely mainly on a hierarchical organizational structure. - It was shown that outsourcing is a popular technique, but the companies tend to use outsourcing for their non-core activities, which are not their main business activities. The quality of sub-contract firms is also of concern when outsourcing is applied. - Downsizing was rarely adopted due to its negative effects. It is used when it is necessary such as during a period of merging.
	RQ8: In what way can those appropriate combinations affect firms' performance under different strategies?	- The uses of MAPs, MTs, and strategies can be linked to the success of the companies. - MAPs facilitate business and management activities; particularly assisting the managers in decision making, performance measurement, and control. - It is believed that using MTs to provide good quality of products or services may lead to the success of the organizations such as investment in computerization and technology, training and employee empowerment, and quality. - Some interviewees reported experience of the implementation of strategies, which led to greater performance improvement of their companies. - MAPs and MTs were found to be used to support business strategies. It was also indicated that the use of MAPs reflects the management procedures, and supports the adoption of MTs. - Traditional MAPs such as budgeting, capital budgeting, and breakeven point were used to control costs and expenses in order to achieve cost leadership strategy. Some examples demonstrate the use of MTs, specifically technology, to control costs. - The use of MAPs particularly performance evaluation based on profit by project was found to support and facilitate the organizational structure specifically team based structure.

10.2 Originality of the Research

Originality and the contribution to knowledge are the criteria to differentiate a doctoral thesis from other levels of research report (Collis and Hussey, 2009). It is an important concept to PhD thesis because 'the PhD is awarded for an original contribution to knowledge' (Phillips and Pugh, 2005, p 61). However, 'it is not necessary to have a whole new way of looking at the discipline or the topic. It is sufficient for the student to contribute only an incremental step in understanding' (Phillips and Pugh, 2005, p 62). Similarly, 'the contribution need not be revolutionary, but the research must result in a contribution to our understanding of the phenomenon that has been investigated' (Collis and Hussey, 2009, p 24).

Many authors (Francis, 1976; Phillips, 1993; Howard and Sharp, 1994; Phillips and Pugh, 2005; Collis and Hussey, 2009) provide different definitions of originality. A PhD thesis can achieve the originality in a number of possible ways as follows.

1. Setting down a major piece of new information in writing for the first time
2. Continuing a previously original piece of work
3. Carrying out original work designed by the supervisor
4. Providing a single original technique, observation, or result in an otherwise unoriginal but competent piece of research
5. Showing originality in testing somebody else's idea
6. Carrying out empirical work that has not been done before
7. Making a synthesis that has not been made before
8. Using already known material but with a new interpretation
9. Trying out something that has previously only been done abroad
10. Taking a particular technique and applying it in a new area
11. Bringing new evidence to bear on an old issue
12. Being cross-disciplinary and using different methodologies
13. Looking at areas that people in the discipline have not looked at before
14. Adding to knowledge in a way that has not been done before
15. Worthy, in part, of publication

16. Originality as shown by the topic researched or the methodology employed
17. Evidence of an original investigation or the testing the ideas
18. Competence in independent work or experimentation
19. An understanding of appropriate techniques
20. Ability to make critical use of published work and source materials

The originality of this research can be reflected from some of the possible ways shown above.

Originality as shown by the topic researched or the methodology employed: The topic of this research is 'Organization Strategy, Management Techniques and Management Accounting Practices: Contingency Research in Thailand'. It aims to investigate the current use and perceived benefit of MAPs in Thailand and their relationships with contingency factors, particularly strategy and MTs, which might affect organizational performance. Hypotheses have been developed and tested based on three forms of contingency fit; selection approach, interaction approach, and systems approach. No previous MCS research has been undertaken exploring the relationships between MAPs and these two contingency factors comprehensively using three different forms of contingency fit, especially in Thailand. Consequently, originality of this research as shown by the topic is pretty much tenable.

Evidence of an original investigation or the testing the ideas: Although the study of MCS based on contingency theory is not a new topic, the use of unique contingency factors can indicate the originality of the study. This research contributes to the body of knowledge in testing the idea of incorporating four strategic typologies; strategic typologies of Miles and Snow (1978), strategic priorities of Porter (1980; 1985), strategic types of Miller and Friesen (1982), and strategic missions of Gupta and Govindarajan (1984b). It develops a comprehensive set of strategies to depict the viable combinations of strategies, which Thai firms pursue. No previous research has been undertaken integrating these strategic types in a holistic view before; hence, the original idea and its original investigation have been demonstrated.

Carrying out empirical work that has not been done before: Collis and Hussey (2009) stated that 'primary data are data generated from an original source such as your own experiments, questionnaire survey, interviews or focus groups' (p 73). This research is an empirical research, which collects primary data through survey and interviews. Although some questions in the questionnaire have been drawn from previous research, they were adapted and reorganized in order to collect the data in responding to research questions and testing the hypotheses. No previous research has applied this questionnaire and interview protocol, especially in Thailand before; hence, this empirical research represents a most comprehensive survey and explanation of MAPs in Thailand, and can be viewed as an original piece of work.

Ability to make critical use of published work and source materials: Literature review in chapter 2 and discussion in chapter 10 demonstrate the ability to make critical use of published articles and materials. Chapter 2 presents a critical review of existing literature in contingency based MCS research. It also covers a literature review of strategy and management techniques as well as structures previous MA research into three different approaches. Chapter 10 presents discussion and conclusion of the research findings. It indicates critical use of published work and source materials by tying back the research findings to the literature.

Being cross-disciplinary and using different methodologies: The main focus of this research is management accounting (MA); however, it involves the area of management and strategic management. No previous research in Thailand has engaged these cross disciplines before.

An understanding of appropriate techniques: The originality of the study can be shown through an understanding of appropriate techniques. This research relies predominantly on statistical techniques and a statistical software package (in particular SPSS) including factor analysis, multiple regression analysis, moderated regression analysis and cluster analysis. The explanations of these techniques were provided in the chapters prior to the analyses to test the hypotheses. This demonstrates the researcher's knowledge and understanding of these statistical techniques.

Worthy, in part, of publication: Two papers drawn from the thesis have been accepted for the conferences. They have been published in the conference proceeding. After the end of presentation at the conference, the editor of a journal has shown the interest and approached for the paper to be published. These demonstrate the 'publishability' of the thesis.

10.3 Contributions of the Research

Research on management accounting practices in Thailand is currently limited. This study adds to the limited body of knowledge of management accounting in Asian countries, in particular Thailand. It represents a most comprehensive survey and explanation of MAPs in Thailand, which is an emerging economy. The main contributions of this research are to examine the extent to which MAPs and MTs are currently used by the companies in Thailand as well as their benefits to Thai firms, and to explore the relationships among key constructs including MAPs, MTs, and strategic typologies in order to enhance organizational performance.

This research also responds to the recent calls for additional contingency based research in order to enhance our understanding of potential contingency factors which explain management control systems (Gerdin, 2005; Tillema, 2005). It extends the body of knowledge that use the concept of alignment in a contingency theory framework to explore the significant relationships among key variables.

Three forms of contingency fit have been adopted as the basis to develop the hypotheses. It focuses on a comprehensive set of strategic typologies as an important contingency factor. No previous studies have incorporated all these strategic variables, its contributions are in integrating four strategic types, which are predominantly used in MA research. It is claimed that this may assist researchers in mitigating confusion and integrating the research findings that use different strategic variables. Instead of focusing on a single practice or a limited set of MAPs, the current research considers a broad range of practices, which can be categorized into traditional and contemporary MAPs.

It is anticipated that this research will make researchers and practitioners aware of the capability of alternative management accounting practices combined with the right match of management techniques to improve firms' efficiency and effectiveness as well as its fit with various strategies. It is also expected that the findings of this research will provide valuable insights into the nature of management accounting practices, and assist the academics and practitioners in improving management accounting rules and practices in Thailand.

10.4 Limitations and Future Research

Some limitations should be acknowledged in relation to this research and in the interpretation of the findings. The results represent the knowledge and interpretations of one individual in the organization with regard to the use and benefits of practices and techniques as well as strategy and organizational performance, though steps were taken to ensure that the respondent was suitably qualified to answer the questionnaire. Furthermore telephone enquiries were undertaken where any responses where unclear.

The research instrument relied upon translation between English and Thai languages, and concerned a broad range of MAPs and MTs. This could possibly give rise to misinterpreting or misunderstanding of some practices and techniques which may have not received much visibility in Thailand, though the process was carefully managed and a multilingual glossary was provided to clarify any potential ambiguity related to management accounting terminologies.

The expected relationships between the benefit obtained from MAPs and strategic missions of Gupta and Govindarajan were not supported by the data. This may be because of the measurement of the constructs. For example, whilst the strategic mission has been the subject of prior survey research producing significant findings the use of a single question to measure this variable may be limiting and greater attention should be given to developing a more robust construct in any future research. It is noted that this research focuses exclusively on business level strategies. It would be interesting to include other levels of strategy (e.g. functional strategies) as contingency factors, and explore their

relationships with MAPs, other contingencies, and organizational performance in the future studies.

Organizational performance is complex and difficult to measure; thus, the concept of multidimensionality has grown increasing attention as seen in many recent MA researches (Baines and Langfield-Smith, 2003; Chenhall, 2005; Cadez and Guilding, 2008). Subjective multidimensional measures are used to capture the organizational performance in this study. Although a self-rating scale has been criticized on the view of objectivity, no multidimensional objective measures of performance are available. Moreover, there is no clear evidence indicating that such objective measures will provide either more reliable or valid measurements (Abernethy and Guthrie, 1994). A subjective perception of top management team was found to be consistent with firm's actual performance; hence, the use of subjective measures is appropriate in the absence of objective measures (Dess and Robinson, 1984). Further research could attempt to acquire objective measures or anchor responses against objective measures.

In this research, three forms of fit; selection, interaction, and systems approaches, were adopted; thus, the findings were shown in both reductionist and holistic views. However, the findings from different approaches need to be interpreted differently and very careful consideration and qualification is required in the interpretation. Moreover, the hypotheses testing based on systems approach predominantly rely on cluster analysis, which is a descriptive and non-inferential statistic. Future research could adopt more advanced statistical techniques such as structural equation modeling (SEM), which is an inferential statistic, and will be able to examine the relationships among all contingencies, MCS, and organizational performance simultaneously. Some estimation techniques under SEM (e.g. asymptotic distribution free estimation; ADF) are also designed to accommodate non-normality of the data (Smith and Langfield-Smith, 2004); hence, the use of this advance statistical technique to deal with the violation to multivariate normality is encouraged for future research.

As many contingency based MA research, the current study examined MAPs used by larger or more influential companies in Thailand. Another concern should be addressed according to the data collected exclusively from the companies listed on the Stock

Exchange of Thailand (SET). The sampling design therefore restricts the generalizability of the research findings. Hence, the results should be interpreted and generalized to those listed on the SET, not to the general population of the companies in Thailand. Due to little attention on MAPs of smaller and medium sized organizations, future research could extend this study by focusing on the role of MA and the use of various MAPs in those smaller firms in Thailand. This could offer a research opportunity to explore MAPs used by those smaller entities as well as provide a basis for a comparison study on MAPs of larger and smaller companies in Thailand.

Comparison of this research with various other international research findings has occurred above. Behind these comparisons, the cultural environment in which accounting takes place must be noted. No detail attention to this was possible for this research. Further research should pay more attention on the effect of culture on the adoption and benefit obtained from various MAPs. It might be interesting to explore how cultural variables influence the use of different MAPs of Thai organizations. The use of case studies or even longitudinal case study may be required to explore this issue in more detail.

It is observed from both the survey results and the case studies that traditional and financially orientated MAPs have high levels of usage and are argued to have high benefits. Further research with both managers and accountants could seek to explain this phenomenon and the extent of financial accounting mentality in Thailand. This issue is not exclusive to Thailand however, as many researches have revealed this tendency in various countries as observed in the previous chapters. It is also interesting to explore how professional accounting and auditing bodies influence the development of management accounting and the use of several MAPs by Thai organizations regarding the lack of a management accounting body in Thailand.

As all studies using cross sectional methods, the cause and effect relationships or directional associations among the variables cannot be assumed from the findings except the statement that the results are consistent with hypotheses proposed in the thesis. In other words, causality cannot be unambiguously inferred especially from the data collected at a single point in time or cross sectional data (Agbejule and Burrowes, 2007). Hence, the result from regression analysis itself cannot be inferred from directionality. The claims for

causality may instead be drawn from theory and literature as well as qualitative findings, particularly interview results. The words, which imply causality such as 'explain or associate' throughout the thesis, require careful interpretation. This gives opportunity for future studies to explore and assess the cause and effect relationships through longitudinal field research methods.

Further research could extend the case study work initiated here. It would be insightful to observe in more detail how MAPs are used by managers in Thai companies. It is also interesting to examine the use of MAPs by the Thai firms in different industies. The reasons behind the adoption of different MAPs in different industies might emerge from these extended case studies. Furthermore the possible barriers (such as behavioural, organizational, or funding barriers) to the adoption of other or new techniques could be identified as well as the remedies to overcome these barriers, if greater attention to individual case companies or longitudinal research was undertaken. Longitudinal case study, which engages more long term, may be used to explore how the ideas emerge and how they evolve over time. Other research involving different methodologies, for example, agency or institutional theory may throw some light on the reasons for adoption (or non-adoption) of various practices and techniques. Using alternate theories together with this traditional approach may also provide more insight into the organization context which may be required for future research.

Nevertheless, the work represents a most comprehensive survey and explanation of MAPs in Thailand and in this sense it is a contribution to our awareness of management accounting in this emerging economy.

References:

Abas, Z. and Yaacob, Z. (2006). Exploring the relationships between total quality management (TOM), strategic control systems (SCS) and organizational performance (OP) using a SEM framework. *Journal of American Academy of Business,* 9(2), 161-166.

Abdel-Kader, M. and Luther, R. (2006). IFAC's conception of the evolution of management accounting: A research note. *Advances in Management Accounting,* 15, 229-247.

Abdel-Kader, M. and Luther, R. (2008). The impact of firm characteristics on management accounting practices: A UK-based empirical analysis. *The British Accounting Review,* 40, 2-27.

Abernethy, M. A. and Brownell, P. (1999). The role of budgets in organizations facing strategic change: An exploratory study. *Accounting, Organizations and Society,* 24(3), 189-204.

Abernethy, M. A. and Guthrie, C. H. (1994). An empirical assessment of the fit between strategy and management information system design. *Accounting and Finance,* (November), 49-66.

Abernethy, M. A. and Lillis, A. M. (1995). The impact of manufacturing flexibility on management control system design. *Accounting, Organizations and Society,* 20(4), 241-258.

Adesola, S. and Baines, T. (2005). Developing and evaluating a methodology for business process improvement. *Business Process Management Journal,* 11(1), 37-46.

Adler, R., Everett, A. M. and Waldron, M. (2000). Advanced management accounting techniques in manufacturing: utilization, benefits, and barriers to implementation. *Accounting Forum,* 24(2), 131-150.

Agbejule, A. (2005). The relationship between management accounting systems and perceived environmental uncertainty on managerial performance: a research note. *Accounting and Business Research,* 35(4), 295-305.

Agbejule, A. and Burrowes, A. (2007). Perceived environmental uncertainty, supply chain purchasing strategy, and use of MAS information: An empirical study of Finish firms. *Managerial Auditing Journal,* 22(9), 913-927.

Aldenderfer, M. S. and Blashfield, R. K. (1984). *Cluster Analysis*. London: Sage Publications.

Anderson, S. W. and Lanen, W. N. (1999). Economic transition, strategy and the evolution of management accounting practices: The case of India. *Accounting, Organizations and Society,* 24(5-6), 379-412.

Anthony, R., Dearden, J. and Bedford, N. M. (1989). *Management Control Systems*. Homewood: Irwin.

Armstrong, M. (1993). *A Handbook of Management Techniques.* (2nd edn.). London: Kogan Page Limited.

ASEAN. (2007). ASEAN Overview. < http://www.aseansec.org >, accessed 15 June 2007.

Auzair, S. M. and Langfield-Smith, K. (2005). The effect of service process type, business strategy and life cycle stage on bureaucratic MCS in service organizations. *Management Accounting Research,* 16(4), 399-421.

Ax, C. and Bjørnenak, T. (2005). Bundling and diffusion of management accounting innovations—the case of the balanced scorecard in Sweden. *Management Accounting Research,* 16(1), 1-20.

Baines, A. and Langfield-Smith, K. (2003). Antecedents to management accounting change: a structural equation approach. *Accounting, Organizations and Society,* 28, 675-698.

Ballas, A. and Venieris, G. (1996). A survey of management accounting practices in Greek firms. In Bhimani, A. (Ed.), *Management Accounting: European Perspectives.* Oxford: Oxford University Press.

Bandyopadhyay, J. K. (2005). A model framework for developing industry specific quality standards for effective quality assurance in global supply chains in the new millennium. *International Journal of Management,* 22(2), 294-299.

Barbato, M. B., Collini, P. and Quagli, A. (1996). Management accounting in Italy. In Bhimani, A. (Ed.), *Management Accounting: European Perspectives.* Oxford: Oxford University Press.

Barratt, M. (2004). Understanding the meaning of collaboration in the supply chain. *Supply Chain Management: An International Journal,* 9(1), 30-42.

Benjaafar, S., Heragu, S. S. and Irani, S. A. (2002). Next generation factory layouts: Research Challenges and recent progress. *Interfaces,* 32(6), 58-76.

Berry, W. D. and Feldman, S. (1985). *Multiple Regression in Practice*. London: SAGE Publications.

Bhimani, A. (1996). *Management Accounting: European Perspectives.* Oxford: Oxford University Press.

Bjørnenak, T. (1997). Diffusion and accounting: the case of ABC in Norway. *Management Accounting Research,* 8, 3-17.

Bjørnenak, T. and Olson, O. (1999). Unbundling management accounting innovations. *Management Accounting Research,* 10(4), 325-338.

BOT. (2009). Key Economic Indicators: October 2009. <http://www.bot.or.th/English/Statistics/Indicators/Docs/indicators.pdf>, accessed 25 Nov 2009.

Bouwens, J. and Abernethy, M. A. (2000). The consequences of customization on management accounting system design. *Accounting, Organizations and Society,* 25(3), 221-241.

Bowman, C. and Asch, D. (1987). *Strategic Management.* London: Macmillan Education Ltd.

Briggs, A., Clark, T., Wolstenholme, J. and Clarke, P. (2002). Missing....presumed at random: cost-analysis of incomplete data. *Health Economics,* 12(5), 377-392.

Bright, J., Davies, R. E., Downes, C. A. and Sweeting, R. C. (1992). The deployment of costing techniques and practices: a UK study. *Management Accounting Research,* 3(3), 201-211.

Bromwich, M. and Bhimani, A. (1989). *Management Accounting: Evolution not Revolution*. The Chartered Institute of Management Accountants.

Brown, M. L. and Kros, J. F. (2003). Data mining and the impact of missing data. *Industrial Management & Data Systems,* 103(8), 611-621.

Bryman, A. and Bell, E. (2007). *Business Research Methods.* (2nd edn.). Oxford: Oxford Unversity Press.

Budros, A. (1999). A conceptual framework for why organizations downsize. *Organization Science,* 10(1), 69-82.

Burns, J. and Scapens, R. (2000). Conceptualising management accounting change: an institutional framework. *Management Accounting Research,* 11, 3-25.

Burns, J. and Vaivio, J. (2001). Management accounting change. *Management Accounting Research,* 12, 389-402.

Buzacott, J. A. (2004). Modelling teams and workgroups in manufacturing. *Annals of Operations Research,* 126(1-4), 215-230.

Cadez, S. (2006). A cross-industry comparison of strategic management accounting practices: An exploratory study. *Economic and Business Review,* 8(3), 279-298.

Cadez, S. (2007). A configuration form of fit in management accounting contingency theory: an empirical investigation. *The Business Review, Cambridge,* 7(2), 220-227.

Cadez, S. and Guilding, C. (2008). An exploratory investigation of an integrated contingency model of strategic management accounting. *Accounting, Organizations and Society,* 33, 836-863.

Callanan, G. A. (2004). What would Machiavelli think? An overview of the leadership challenges in team-based structures. *Team Performance Management,* 10(3/4), 77-83.

Carbery, R. and Garavan, T. N. (2005). Organisational restructuring and downsizing: issues related to learning, training and employability of survivors. *Journal of European Industrial Training,* 29(6), 488-508.

Cascio, W. F. and Wynn, P. (2004). Managing a downsizing process. *Human Resource Management,* 43(4), 425-436.

Chandler, A. D. (1962). *Strategy and Structure: Chapters in the History of the Industrial Enterprise*. Cambridge, Massachusetts: The M.I.T. Press.

Chapman, C. S. (1997). Reflections on a contingent view of accounting. *Accounting, Organizations and Society,* 22(2), 189-205.

Chase, R. B., Jacobs, F. R. and Aquilano, N. J. (2004). *Operations Management for Competitive Advantage.* (10th edn.). Boston, MA.: Irwin/McGraw-Hill.

Chen, G. and Astebro, T. (2003). How to deal with missing categorical data: Test of a simple bayesian method. *Organizational Research Methods,* 6(3), 309-327.

Chenhall, R. H. (1997). Reliance on manufacturing performance measures, total quality management and organizational performance. *Management Accounting Research,* 8(2), 187-206.

Chenhall, R. H. (2003). Management control systems design within its organizational context: findings from contingency-based research and directions for the future. *Accounting, Organizations and Society,* 28, 127-168.

Chenhall, R. H. (2005). Integrative strategic performance measurement systems, strategic alignment of manufacturing, learning and strategic outcomes: an exploratory study. *Accounting, Organizations and Society,* 30, 395-422.

Chenhall, R. H. (2007). Theorising contingencies in management control systems research. In Chapman, C. S., Hopwood, A. G. and Shields, M. D. (Eds.), *Handbook of Management Accounting Research.* Vol. 1, London: Elsevier.

Chenhall, R. H. and Langfield-Smith, K. (1998a). Adoption and benefits of management accounting practices: An Australian study. *Management Accounting Research,* 9(1), 1-19.

Chenhall, R. H. and Langfield-Smith, K. (1998b). The relationship between strategic priorities, management techniques and management accounting: an empirical investigation using a systems approach. *Accounting, Organizations and Society,* 23(3), 243-264.

Chenhall, R. H. and Morris, D. (1986). The impact of structure, environment, and interdependence on the perceived usefulness of management accounting systems. *The Accounting Review,* LXI(1), 16-35.

Chenhall, R. H. and Morris, D. (1995). Organic decision and communication processes and management accounting systems in entrepreneurial and conservative business organizations. *Omega, International Journal of Management Science,* 23(5), 485-497.

Chong, V. K. and Chong, K. M. (1997). Strategic choices, environmental uncertainty and SBU performance: A note on the intervening role of management accounting systems. *Accounting and Business Research,* 27(4), 268-276.

Chongruksut, W. (2002). *The Adoption of Activity-Based Costing in Thailand.* Ph.D Thesis, Victoria University.

CIMA. (1993). *Performance Measurement in the Manufacturing Sector*. London: Chartered Institute of Management Accountants.

CIMA. (2005). *CIMA Official Terminology*. London: Elsevier.

Cohen, J. and Cohen, P. (1983). *Applied Multiple Regression/ Correlation Analysis for the Behavioral Sciences*. (2nd edn.). London: Lawrence Erlbaum Associates.

Cohen, J., Cohen, P., West, S. G. and Aiken, L. S. (2003). *Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences.* (3rd edn.). London: Lawrence Erlbaum Associates.

Collis, J. and Hussey, R. (2003). *Business Research: A Practical Guide for Undergraduate and Postgraduate Students.* (2nd edn.). New York: Palgrave Macmillan.

Collis, J. and Hussey, R. (2009). *Business Research: A Practical Guide for Undergraduate and Postgraduate Students.* (3rd edn.). New York: Palgrave Macmillan.

Conant, J. S., Mokwa, M. P. and Varadarajan, P. R. (1990). Strategic type, distinctive marketing competencies and organizational performance: A multiple measures-based study. *Strategic Management Journal,* 11(5), 365-383.

Costa, M. M. and Lorente, A. R. M. (2004). ISO 9000 as a tool for TQM: A Spanish case study. *The Quality Management Journal,* 11(4), 20-30.

Costello, A. B. and Osborne, J. W. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Practical Assessment Research & Evaluation,* 10(7), 1-9.

Coulter, M. (2005). *Strategic Management in Action.* (3rd edn.). New Jersey: Pearson Education, Inc.

Creswell, J. W. (2003). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches.* (2nd edn.). London: Sage Publications.

Creswell, J. W. and Plano Clark, V. L. (2007). *Designing and Conducting Mixed Methods Research*. London: Sage Publications.

Cross, R. L., Yan, A. and Louis, M. R. (2000). Boundary activities in 'boundaryless' organizations: A case study of a transformation to a team-based structure. *Human Relations,* 53(6), 841-868.

Davila, T. (2000). An empirical study on the drivers of management control systems' design in new product development. *Accounting, Organizations and Society,* 25, 383-409.

De Meyer, A., Nakane, J., Miller, J. G. and Ferdows, K. (1989). Flexibility: The next competitive battle: The manufacturing futures survey. *Strategic Management Journal,* 10(2), 135-144.

De Vaus, D. (2001). *Research Design in Social Research*. London: Sage Publications.

Demeester, L., Eichler, K. and Loch, C. H. (2004). Organic production systems: What the biological cell can teach us about manufacturing. *Manufacturing & Service Operations Management,* 6(2), 115-132.

DeSarbo, W. S., Di Benedetto, C. A., Song, M. and Sinha, I. (2005). Revisiting the Miles and Snow strategic framework: uncovering interrelationships between strategic types, capabilities, environmental uncertainty, and firm performance. *Strategic Management Journal,* 26(1), 47-74.

Dess, G. G. and Robinson, R. B. (1984). Measuring organizational performance in the absence of objective measures: The case of the privately-held firm and conglomerate business unit. *Strategic Management Journal,* 5(3), 265-273.

Donaldson, L. (2001). *The Contingency Theory of Organizations*. London: Sage Publications, Inc.

Douglas, J. D. (1976). *Investigative Social Research*. London: Sage Publications.

Drazin, R. and Van de Ven, A. H. (1985). Alternative forms of fit in contingency theory. *Administrative Science Quarterly,* 30, 514-539.

Drury, C., Braund, S., Osborne, P. and Tayles, M. (1993). *A survey of management accounting practices in UK manufacturing companies*, Chartered Association of Certified Accountants.

Drury, C. and Tayles, M. (2005). Explicating the design of overhead absorption procedures in UK organization. *British Accounting Review,* 3(1), 47-84.

Dugdale, D. (1994). Theory and practice: the views of CIMA members and students. *Management Accounting (UK),* (September), 56-59.

Easterby-Smith, M., Thorpe, R. and Jackson, P. R. (2008). *Management Research.* (3rd edn.). London: Sage Publications Ltd.

Easterby-Smith, M., Thorpe, R. and Lowe, A. (2004). *Management Research: An Introduction.* (2nd edn.). London: Sage Publication Ltd.

EI-Ebaishi, M., Karbhari, Y. and Naser, K. (2003). Empirical evidence on the use of management accounting techniques in a sample of Saudi manufacturing companies. *International Journal of Commerce & Management,* 13(2), 74-101.

Everitt, B. S., Landau, S. and Leese, M. (2001). *Cluster Analysis.* (4th edn.). London: Arnold.

Fabrigar, L. R., Wegener, D. T., MacCallum, R. C. and Strahan, E. J. (1999). Evaluating the use of exploratory factor analysis in psychological research. *Psychological Methods,* 4(3), 272-299.

Field, A. (2000). *Discovering Statistics Using SPSS for Windows: Advanced Techniques for the Beginner*. London: SAGE Publications.

Field, A. (2005). *Discovering Statistics Using SPSS (and sex, drugs and rock 'n' roll).* (2nd edn.). London: Sage Publications.

Fisher, J. (1995). Contingency-based research on management control systems: Categorization by level of complexity. *Journal of Accounting Literature,* 14, 24-53.

Fisher, S. R. and White, M. A. (2000). Downsizing in a learning organization: are there hidden costs? *Academy of Management Review,* 25(1), 244-251.

Francis, J. R. D. (1976). Supervision and examination of higher degree students. *Bulletin of the University of London,* 31, 3-6.

Frankfort-Nachmias, C. and Nachmias, D. (1992). *Research Methods in the Social Sciences.* (4th edn.). London: Edward Arnold.

Fry, T. D., Steele, D. C. and Saladin, B. A. (1995). The role of management accounting in the development of a manufacturing strategy. *International Journal of Operations & Production Management,* 15(12), 21-31.

Galunic, D. C. and Eisenhardt, K. M. (1994). Renewing the strategy-structure-performance paradigm. *Research in Organizational Behavior,* 16, 215-255.

Gerdin, J. (2005). Management accounting system design in manufacturing departments: an empirical investigation using a multiple contingencies approach. *Accounting, Organizations and Society,* 30, 99-126.

Gerdin, J. and Greve, J. (2004). Forms of contingency fit in management accounting research—a critical review. *Accounting, Organizations and Society,* 29, 303-326.

Ghauri, P. and Gronhaug, K. (2002). *Research Methods in Business Studies: A Practical Guide.* (2nd edn.). London: Prentice Hall.

Ghauri, P. and Gronhaug, K. (2005). *Research Methods in Business Studies: A Practical Guide.* (3rd edn.). London: Pearson Education Limited.

Govindarajan, V. (1988). A contingency approach to strategy implementation at the business-unit level: integrating administrative mechanisms with strategy. *Academy of Management Journal,* 31(4), 828-853.

Govindarajan, V. and Fisher, J. (1990). Strategy, control systems, and resource sharing: effects on business-unit performance. *Academy of Management Journal,* 33(2), 259-285.

Granlund, M. and Lukka, K. (1998). It's a small world of management accounting practices. *Journal of Management Accounting Research,* 10, 153-179.

Guilding, C. (1999). Competitor-focused accounting: an exploratory note. *Accounting, Organizations and Society,* 24(7), 583-595.

Guilding, C., Cravens, K. S. and Tayles, M. (2000). An international comparison of strategic management accounting practices. *Management Accounting Research,* 11(1), 113-135.

Gupta, A. K. (1987). SBU strategies, corporate-SBU relations, and effectiveness in strategy implementation. *Academy of Management Journal,* 30(3), 477-500.

Gupta, A. K. and Govindarajan, V. (1984a). Build, hold, harvest: Converting strategic intentions into reality. *Journal of Business Strategy,* 4, 34-47.

Gupta, A. K. and Govindarajan, V. (1984b). Business unit strategy, managerial characteristics, and business unit effectiveness at strategy implementation. *Academy of Management Journal,* 27(1), 25-41.

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E. and Tatham, R. L. (2006). *Multivariate Data Analysis.* (6th edn.). New Jersey: Pearson Prentice Hall.

Halim, A. M. S. A. (2004). *A Contingency Model of Activity-Based Costing (ABC) Systems: An Empirical Investigation in the UK's Manufacturing Business Units.* Ph.D Thesis, University of Southampton.

Harrington, H. J. (1991). *Business Process Improvement: The Breakthrough Strategy for Total Quality, Productivity, and Competitiveness*. London: McGraw-Hill, Inc.

Heikkila, J. (2002). From supply to demand chain management: efficiency and customer satisfaction. *Journal of Operations Management,* 20, 747-767.

Herbert, T. T. and Deresky, H. (1987). Generic strategies: An empirical investigation of typology validity and strategy content. *Strategic Management Journal,* 8(2), 135-147.

Hesford, J. W., Lee, S., Van der Stede, W. A. and Young, S. M. (2007). Management accounting: a bibliographic study. In Chapman, C. S., Hopwood, A. G. and Shields, M. D. (Eds.), *Handbook of Management Accounting Research*. Vol. 1, London: Elsevier.

Hofer, C. W. and Schendel, D. (1978). *Strategy Formulation: Analytical Concepts*. New York: West Publishing Company.

Hopper, T., Tsamenyi, M., Uddin, S. and Wickramasinghe, D. (2008). Management accounting in less developed countries: what is known and needs knowing. *Accounting, Auditing & Accountability Journal,* 22(3), 469-514.

Hopwood, A. G. (1976). *Accounting and Human Behavior*. Englewood Cliffs, NJ: Prentice-Hall.

Horvath, L. (2001). Collaboration: the key to value creation in supply chain management. *Supply Chain Management: An International Journal,* 6(5), 205-207.

Howard, K. and Sharp, J. A. (1994). *The Management of a Student Research Project*. Aldershot: Gower.

Howe, W. S. (1986). *Corporate Strategy*. London: Macmillan Education Ltd.

IFAC. (1998). *International Management Accounting Practice Statement: Management Accounting Concepts*. New York.

Innes, J. and Mitchell, F. (1990). The process of change in management accounting: some field study evidence. *Management Accounting Research,* 1, 3-19.

Innes, J. and Mitchell, F. (1991). ABC: a survey of CIMA members. *Management Accounting,* 69(9), 28-30.

Innes, J. and Mitchell, F. (1995). A survey of activity-based costing in the U.K.'s largest companies. *Management Accounting Research,* 6(6), 137-153.

Innes, J., Mitchell, F. and Sinclair, D. (2000). Activity-based costing in the U.K.'s largest companies: a comparison of 1994 and 1999 survey results. *Management Accounting Research,* 11(3), 349-362.

Israelsen, P., Anderson, M., Rohde, C. and Sorensen, P. E. (1996). Management accounting in Denmark: theory and practice. In Bhimani, A. (Ed.), *Management Accounting: European Perspectives*. Oxford: Oxford University Press.

Ittner, C. D. and Larcker, D. F. (1997). Quality strategy, strategic control systems, and organizational performance. *Accounting, Organizations and Society,* 22(3/4), 293-314.

Ittner, C. D., Larcker, D. F. and Randall, T. (2003). Performance implications of strategic performance measurement in financial services firms. *Accounting, Organizations and Society,* 28, 715-741.

Jaccard, J. and Turrisi, R. (2003). *Interaction Effects in Multiple Regression.* (2nd edn.). London: SAGE Publications.

Johnson, H. T. and Kaplan, R. S. (1987). *Relevance Lost: The Rise and Fall of Management Accounting*. Boston, Massachusetts: Harvard Business School Press.

Johnson, P. and Duberley, J. (2000). *Understanding Management Research*. London: Sage Publications.

Joshi, P. L. (2001). The international diffusion of new management accounting practices: the case of India. *Journal of International Accounting, Auditing & Taxation,* 10, 85-109.

Jusoh, R., Ibrahim, D. N. and Zainuddin, Y. (2006). Assessing the alignment between business strategy and use of multiple performance measures using interaction approach. *The Business Review, Cambridge,* 5(1), 51-60.

Kaplan, R. S. (1984). The evolution of management accounting. *The Accounting Review,* LIX(3), 390-418.

Kaplan, R. S. and Atkinson, A. A. (1998). *Advanced Management Accounting.* (3rd edn.). London: Prentice Hall International, Inc.

Keller, R. T. (2001). Cross-functional project groups in research and new product development: diversity, communications, job stress, and outcomes. *Academy of Management Journal,* 44(3), 547-555.

Kellett, B. M. and Sweeting, R. C. (1991). Accounting innovations and adaptations: A U.K. case. *Management Accounting Research,* 2(1), 15-26.

Ketchen, D. J. and Shook, C. L. (1996). The application of cluster analysis in strategic management research: An analysis and critique. *Strategic Management Journal,* 17, 441-458.

Khaisaeng, S. (1998). *Cost evaluation using activity-based costing system in a manufacturing firm.* M.Sc. Thesis, University of Louisville.

Koh, S. C. L., Gunasekaran, A. and Saad, S. M. (2005). A business model for uncertainty management. *Benchmarking: An International Journal,* 12(4), 383-400.

Kuo, R. J., Ho, L. M. and Hu, C. M. (2002). Cluster analysis in industrial market segmentation through artificial neural network. *Computers & Industrial Engineering,* 42, 391-399.

Langfield-Smith, K. (1997). Management control systems and strategy: a critical review. *Accounting, Organizations and Society,* 22(2), 207-232.

Lawrence, T. B., Morse, E. A. and Fowler, S. W. (2005). Managing your portfolio of connections. *MIT Sloan Management Review,* 46(2), 59-65.

Liao, Y. (2005). Business strategy and performance: the role of human resource management control. *Personnel Review,* 34(3), 294-309.

Lindberg, E. and Rosenqvist, U. (2005). Implementing TQM in the health care service: A four-year following-up of production, organizational climate and staff wellbeing. *International Journal of Health Care Quality Assurance,* 18(4/5), 370-384.

Little, R. J. A. and Rubin, D. B. (1987). *Statistical Analysis with Missing Data*. New York: John Wiley & Sons, Inc.

Littler, D. A. and Sweeting, R. C. (1989). *Management Accounting in Technology Based Businesses*. London: CIMA.

Lock, D. (1998). *The Gower: Handbook of Management.* (4th edn.). Hampshire: Gower Publishing Limited.

Luft, J. and Shields, M. D. (2003). Mapping management accounting: graphics and guidelines for theory-consistent empirical research. *Accounting, Organizations and Society,* 28, 169-249.

Luft, J. and Shields, M. D. (2007). Mapping management accounting: graphics and guidelines for theory-consistent empirical research. In Chapman, C. S., Hopwood, A. G. and Shields, M. D. (Eds.), *Handbook of Management Accounting Research.* Vol. 1, London: Elsevier.

Luther, R. G. and Longden, S. (2001). Management accounting in companies adapting to structural change and volatility in transition economies: a South African study. *Management Accounting Research,* 12, 299-320.

Ma, Y. and Tayles, M. (2009). On the emergence of strategic management accounting: an institutional perspective. *Accounting and Business Research,* 39(5), 1-22.

Malina, M. A. and Selto, F. H. (2001). Communicating and controlling strategy: An empirical study of the effectiveness of the balanced scorecard. *Journal of Management Accounting Research,* 13, 47-90.

Malmi, T. (1997). Towards explaining activity-based costing failure: accounting and control in a decentralised organization. *Management Accounting Research,* 8, 459-480.

Malmi, T. (1999). Activity-based costing diffusion across organizations: an exploratory empirical analysis of Finnish firms. *Accounting, Organizations and Society,* 24, 649-672.

Malmi, T. (2001). Balanced scorecards in Finnish companies: A research note. *Management Accounting Research,* 12(2), 207-220.

Malmi, T. and Brown, D. A. (2008). Management control systems as a package--Opportunities, challenges and research directions. *Management Accounting Research,* 19, 287-300.

Marquardt, D. W. (1980). You should standardize the predictor variables in your regression models. *Journal of the American Statistical Association,* 75, 87-91.

McAdam, R. and Bailie, B. (2002). Business performance measures and alignment impact on strategy: The role of business improvement models. *International Journal of Operations & Production Management,* 22(9/10), 972-996.

Merchant, K. and Van der Stede, W. A. (2007). *Management Control Systems.* (2nd edn.). Essex, England: Prentice Hall, Pearson Education Limited.

Merchant, K. A. (1985). *Control in Business Organizations*. Boston: Pitman.

Merchant, K. A. and Otley, D. T. (2007). A review of the literature on control and accountability. In Chapman, C. S., Hopwood, A. G. and Shields, M. D. (Eds.), *Handbook of Management Accounting Research*. Vol. 2, Amsterdam, The Netherlands: Elsevier.

Miles, R. W. and Snow, C. C. (1978). *Organizational Strategy, Structure, and Process*. New York: McGraw-Hill.

Miller, D. and Friesen, P. H. (1982). Innovation in conservative and entrepreneurial firms: Two models of strategic momentum. *Strategic Management Journal,* 3(1), 1-25.

Miller, J. G., De Meyer, A. and Nakane, J. (1992). *Benchmarking Global Manufacturing: Understanding International Suppliers, Customers, and Competitors*. Illinois: Business One Irwin.

Mintzberg, H. (1978). Patterns in strategy formation. *Management Science,* 24(9), 934-948.

Mjema, E. A. M., Victor, M. A. M. and Mwinuka, M. S. M. (2005). Analysis of roles of IT on quality management. *The TQM Magazine,* 17(4), 364-374.

Modell, S. (2005). Triangulation between case study and survey methods in management accounting research: An assessment of validity implications. *Management Accounting Research,* 16(2), 231-254.

Modell, S. (2009). In defence of triangulation: A critical realist approach to mixed methods research in management accounting. *Management Accounting Research,* 20, 208-221.

Morakul, S. (1999). *Cultural influences on the ABC implementation under Thailand's environment.* Ph.D Thesis, University of North Texas.

Morakul, S. and Wu, F. H. (2001). Cultural influences on the ABC implementation in Thailand's environment. *Journal of Managerial Psychology,* 16(2), 142-158.

Morgan, G. and Smircich, L. (1980). The case for qualitative research. *Academy of Management Review,* 5(4), 491-500.

Naranjo-Gil, D. and Hartmann, F. (2006). How top management teams use management accounting systems to implement strategy. *Journal of Management Accounting Research,* 18, 21-53.

Neuendorf, K. A. (2002). *The Content Analysis Guidebook*. London: Sage Publications.

Nicolaou, A. I. (2003). Manufacturing strategy implementation and cost management systems effectiveness. *European Accounting Review,* 12(1), 175-199.

Nilsson, F. (2002). Strategy and management control system: A study of the design and use of management control systems following takeover. *Accounting and Finance,* 42, 41-71.

Nixon, W. A. J. and Burns, J. (2005). Introduction: Management control in the 21st century. *Management Accounting Research,* 16, 260-268.

Nookabadi, A. S. and Middle, J. E. (2006). An integrated quality assurance information system for the design-to-order manufacturing environment. *The TQM Magazine,* 18(2), 174-189.

Otley, D. T. (1980). The contingency theory of management accounting: achievement and prognosis. *Accounting, Organizations and Society,* 5(4), 413-428.

Otley, D. T., Broadbent, J. and Berry, A. (1995). Research in management control: an overview of its development. *British Journal of Management,* 6(special issue), S31-S44.

Ouchi, W. G. (1977). The relationship between organizational structures and organizational control. *Administrative Science Quarterly*, 95-112.

Ouchi, W. G. (1979). A conceptual framework for the design of organizational control mechanisms. *Management Science*, 833-849.

Pallant, J. (2001). *SPSS Survival Manual: A step by step guide to data analysis using SPSS for Windows (Versions 10 and 11)*. Buckingham: Open University Press.

Perera, S., Harrison, G. and Poole, M. (1997). Customer-focused manufacturing strategy and the use of operations-based non-financial performance measures: A research note. *Accounting, Organizations and Society,* 22(6), 557-572.

Perera, S., McKinnon, J. L. and Harrison, G. L. (2003). Diffusion of transfer pricing innovation in the context of commercialization—a longitudinal case study of a government trading enterprise. *Management Accounting Research,* 14, 140-164.

Phadoongsitthi, M. (2003). *The role of managerial accounting in emerging economies: An empirical study of Thailand.* Ph.D Thesis, University of Maryland, College Park.

Phillips, E. M. (1993). The concept of quality in the PhD. In Cullen, D. J. (Ed.), *Quality in PhD Education*. Canberra: Centre for Educational Development and Academic Methods (CEDAM).

Phillips, E. M. and Pugh, D. S. (2005). *How To Get A PhD: A handbook for students and their supervisors.* (4th edn.). Berkshire: Open University Press.

Porter, M. E. (1980). *Competitive Strategy: techniques for analyzing industries and competitors*. New York: Free Press.

Porter, M. E. (1985). *Competitive Advantage: Creating and Sustaining Superior Performance*. New York: The Free Press: A Division of Macmillan, Inc.

Priest, H., Roberts, P. and Woods, L. (2002). An overview of three different approaches to the interpretation of qualitative data. Part1: theoretical issues. *Nurse Researcher,* 10(1), 30-42.

Remenyi, D., Willians, B., Money, A. and Swrtz, E. (1998). *Doing Research in Business and Management: An Introduction to Process and Method*. London: Sage Publications.

Ryan, B., Scapens, R. W. and Theobald, M. (2002). *Research Method & Methodology in Finance & Accounting.* (2nd edn.). London: Thomson Learning.

Said, A. A., HassabElnaby, H. R. and Wier, B. (2003). An empirical investigation of the performance consequences of nonfinancial measures. *Journal of Management Accounting Research,* 15, 193-223.

Saunders, M., Lewis, P. and Thornhill, A. (2003). *Research Methods for Business Students.* (3rd edn.). Essex: Pearson Education Ltd.

Schafer, J. L. and Graham, J. W. (2002). Missing data: Our view of the state of the art. *Psychological Methods,* 7(2), 147-177.

Scherrer, G. (1996). Management accounting: a German perspective. In Bhimani, A. (Ed.), *Management Accounting: European Perspectives*, Oxford: Oxford University Press.

Schniederjans, M. J. and Zuckweiler, K. M. (2004). A quantitative approach to the outsourcing-insourcing decision in an international context. *Management Decision,* 42(7/8), 974-986.

Schroeder, L. D., Sjoquist, D. L. and Stephan, P. E. (1986). *Understanding Regression Analysis: An Introductory Guide*. London: SAGE Publications.

Scott, S. G. and Einstein, W. O. (2001). Strategic performance appraisal in team-based organizations: One size does not fit all. *Academy of Management Executive,* 15(2), 107-116.

Sekaran, U. (2000). *Research Methods for Business.* (3rd edn.). New York: John Wiley & Sons, Inc.

Sharma, S., Durand, R. M. and Gur-Arie, O. (1981). Identification and analysis of moderator variables. *Journal of Marketing Research,* 18(August 1981), 291-300.

Shields, M. D. (1997). Research in management accounting by north Amaricans in the 1990s. *Journal of Management Accounting Research,* 9, 3-61.

Smith, D. and Langfield-Smith, K. (2004). Structural equation modeling in management accounting research: Critical analysis and opportunities. *Journal of Accounting Literature,* 23, 49-86.

Sofianopoulou, S. (2006). Manufacturing cells efficiency evaluation using data envelopment analysis. *Journal of Manufacturing Technology Management,* 17(1/2), 224-238.

Srdoc, A., Sluga, A. and Bratko, I. (2005). A quality management model based on the deep quality concept. *The International Journal of Quality & Reliability Management,* 22(2/3), 278-302.

Storey, J. (2001). *Human Resource Management: A Critical Text.* London: Thomson.

Sulaiman, M., Ahmad, N. N. N. and Alwi, N. (2004). Management accounting practices in selected Asian countries. *Managerial Auditing Journal,* 19(4), 493-508.

Sulaiman, S. and Mitchell, F. (2005). Utilising a typology of management accounting change: An empirical analysis. *Management Accounting Research,* 16(4), 422-437.

Sun, H. and Hong, C. (2002). The alignment between manufacturing and business strategies: its influence on business performance. *Technovation,* 22(11), 699-705.

Szendi, J. Z. and Elmore, R. C. (1993). Management accounting: Are new techniques making in-roads with practitioners? *Journal of Accounting Education,* 11(1), 61-76.

Tabachnick, B. G. and Fidell, L. S. (2007). *Using Multivariate Statistics.* (5th edn.). London: Pearson Education, Inc.

Tayles, M. and Drury, C. (1994). New manufacturing technologies and management accounting system: Some evidence of the perceptions of UK management accounting practitioners. *International Journal of Production Economics,* 36, 1-17.

Tayles, M. and Walley, P. (1997). Integrating manufacturing and management accounting strategy: Case study insights. *International Journal of Production Economics,* 53, 43-55.

Thompson, J. L. (2001). *Strategic Management.* (4th edn.). London: Thomson.

Tillema, S. (2005). Towards an integrated contingency framework for MAS sophistication: Case studies on the scope of accounting instruments in Dutch power and gas companies. *Management Accounting Research,* 16(1), 101-129.

Tomkins, C. and Groves, R. (1983). The everyday accountant and researching his reality. *Accounting, Organizations and Society,* 8(4), 361-374.

Vaivio, J. (1999). Exploring a 'non-financial' management accounting change. *Management Accounting Research,* 10, 409-437.

Van de Ven, A. and Drazin, R. (1985). The concept of fit in contingency theory. *Research in Organizational Behavior*, 333-365.

van den Heuvel, J., Koning, L., Bogers, A. J. J. C., Berg, M. and van Dijen, M. E. M. (2005). An ISO 9001 quality management system in a hospital: Bureaucracy or just benefits? *International Journal of Health Care Quality Assurance,* 18(4/5), 361-369.

Van der Stede, W. A. (2000). The relationship between two consequences of budgetary controls: budgetary slack creation and managerial short-term orientation. *Accounting, Organizations and Society,* 25(6), 609-622.

Van der Stede, W. A., Chow, C. W. and Lin, T. W. (2006). Strategy, choice of performance measures, and performance. *Behavioral Research in Accounting,* 18, 185-205.

Velicer, W. F. and Jackson, D. N. (1990). Component analysis versus common factor analysis: Some issues in selecting an appropriate procedure. *Multivariate Behavioral Research,* 25(1), 1-28.

Virameteekul, V., Jones, C. J. and Chansarkar, B. (1995). An exploratory study of budgetary participation, motivation and performance in Thailand. *Research in Accounting in Emerging Economies,* 3, 181-189.

Vriens, M. and Melton, E. (2002). Managing missing data. *Marketing Research,* 14(3), 12-17.

Waldron, M. (2005). Overcoming barriers to change in management accounting systems. *Journal of American Academy of Business,* 6(2), 244-249.

Walker, O. C., Boyd, H. W., Mullins, J. and Larreche, J.-C. (2003). *Marketing Strategy: Planning and Implementation.* (4th edn.). Homewood: Irwin/McGraw-Hill.

Walliman, N. (2006). *Social Research Methods*. London: Sage Publications.

Waweru, N. M., Hoque, Z. and Uliana, E. (2004). Management accounting change in South Africa. *Accounting, Auditing & Accountability Journal,* 17(5), 675-704.

Webster, E. and Wood, G. (2005). Human resource management practice and institutional constraints: The case of Mozambique. *Employee Relations,* 27(4/5), 369-385.

Williams, M. and May, T. (1996). *Introduction to the Philosophy of Social Research*. London: UCL Press.

Woods, L., Priest, H. and Roberts, P. (2002). An overview of three different approaches to the interpretation of qualitative data. Part2: practical illustrations. *Nurse Researcher,* 10(1), 43-51.

WorldBank. (2007a). East Asia and Pacific Regional Update Report, April 2007. <http://siteresources.worldbank.org/INTEAPHALFYEARLYUPDATE/Resources/550192-1175629375615/EAP-Update-April2007-summary.pdf>, accessed 13 June 2007.

WorldBank. (2007b). World Bank list of economies, April 2007. <http://siteresources.worldbank.org/DATASTATISTICS/Resources/CLASS.XL>, accessed 25 June 2007.

WorldBank. (2009a). Thailand Data & Statistics. <http://www.worldbank.or.th/WBSITE/EXTERNAL/COUNTRIES/EASTASIAPACIFICEXT/THAILANDEXTN/0,,contentMDK:20174458~menuPK:333304~pagePK:1497618~piPK:217854~theSitePK:333296,00.html>, accessed 24 Nov 2009.

WorldBank. (2009b). Thailand Economic Monitor April-June 2009. <http://siteresources.worldbank.org/INTTHAILAND/Resources/333200-1177475763598/3714275-1234408023295/5826366-1246434344887/thailand-economic-monitor-april-june2009.pdf>, accessed 24 Nov 2009.

WorldBank. (2009c). Thailand Economic Monitor, April-June 2009. <http://www.worldbank.or.th/WBSITE/EXTERNAL/COUNTRIES/EASTASIAPACIFICEXT/THAILANDEXTN/0,,contentMDK:22241515~pagePK:1497618~piPK:217854~theSitePK:333296,00.html>, accessed 24 Nov 2009.

WorldBank. (2009d). Thailand: Country Overview. <http://www.worldbank.or.th/WBSITE/EXTERNAL/COUNTRIES/EASTASIAPACIFICEXT/THAILANDEXTN/0,,menuPK:333304~pagePK:141132~piPK:141121~theSitePK:333296,00.html>, accessed 24 Nov 2009.

Yazdifar, H. (2003). Management accounting in the twenty-first-century firm: a strategic view. *Strategic Change,* 12(2), 109-113.

Yin, R. K. (1994). *Case Study Research: Design and Methods.* (2nd edn.). London: Sage Publications, Inc.

Yin, R. K. (2003a). *Applications of Case Study Research.* (2nd edn.). London: Sage Publications.

Yin, R. K. (2003b). *Case Study Research: Design and Methods.* (3rd edn.). London: Sage Publications.

Zailani, S. and Rajagopal, P. (2005). Supply chain integration and performance: US versus East Asian companies. *Supply Chain Management: An International Journal,* 10(5), 379-393.

Zimmerman, J. L. (1997). *Accounting for Decision-Making and Control.* (2nd edn.). Chicago, USA: McGraw-Hill.

Zimmerman, J. L. (2001). Conjectures regarding empirical managerial accounting research. *Journal of Accounting and Economics,* 32(1-3), 411-427.

Appendix A: Research Instrument

THE UNIVERSITY OF THE THAI CHAMBER OF COMMERCE

Date:

Subject Research into Management Accounting Practices, Management techniques and Strategy in Thailand

Dear

The letter is to follow up my recent telephone call to your company. I am conducting a study of management accounting practices and have been chosen Thailand for an empirical study. The main objective is to explore the adoption of management accounting practices and management techniques, and their impact on organizational performance in Thai companies. This survey is sponsored by the University of the Thai Chamber of Commerce (UTCC) and being conducted as part of my Ph.D. thesis at the University of Hull, UK.

Your participation is crucial to the completion of this research. In this packet, you will receive a cover letter, questionnaire, glossary of important terms and self-addressed envelope. The survey should take approximately 30 minutes to complete. I hope that this study will expose practitioners to advancing knowledge in management accounting in Thailand. Please be assured that all information collected will be treated as strictly confidential. No individual identity will be revealed; only aggregate results will be presented.

After answering the questions, please place the attached questionnaire in the postage-paid returned envelope provided. The success of this study depends upon your help. Accordingly, I appreciate your participation. For incentive to complete the questionnaire, the respondents will have opportunity to receive a copy of the executive summary of this research, and have opportunity to win a draw prize of £150. If you would like to review the results of the study when completed and participate in the draw prize, please complete section 5. If you have any questions or concerns, please feel free to contact me at my email address, home address, or office address in Thailand provided below.

Sincerely,

Sirinuch Nimtrakoon
Lecturer
School of Accountancy
The University of the Thai Chamber of Commerce

Ph.D. student in Finance and Accounting
University of Hull, U.K.
E-mail: S.Nimtrakoon@2005.hull.ac.uk

Home Address in Thailand:
15 Soi Pheungmee 42
Sukhumvit 93, Bangjak
Prakanong, Bangkok 10260
Tel: 08-3112-0692

Office Address in Thailand:
School of Accountancy
The University of the Thai Chamber of Commerce
126/1 Vibhavadee-Rangsit Rd.
Dindaeng Bangkok 10400
Tel: 02-697-6219
Fax: 02-277-4347

MANAGEMENT ACCOUNTING QUESTIONNAIRE
To be answered by a Senior Accounting Executive
in relation to the organization of which he or she has most experience.

SECTION 1: BENEFITS FROM MANAGEMENT ACCOUNTING PRACTICES

Please indicate the extent of benefit obtained from the following practices that your organization relies upon from no benefit (scored one) to high benefits (scored seven). Leave blank for inapplicable practices. (*Please use 4 infrequently*)

Management Accounting Practices (*see glossary for interpretation)	**Current benefit** **No benefit**						**High benefits**
1. Absorption costing	1	2	3	4	5	6	7
2. Activity-based costing (ABC)*	1	2	3	4	5	6	7
3. Activity-based budgeting (ABB)*	1	2	3	4	5	6	7
4. Activity-based management (ABM)*	1	2	3	4	5	6	7
5. Backflush costing*	1	2	3	4	5	6	7
6. Benchmarking of product/service characteristics	1	2	3	4	5	6	7
7. Benchmarking of operational processes	1	2	3	4	5	6	7
8. Benchmarking of management processes	1	2	3	4	5	6	7
9. Benchmarking of strategic priorities	1	2	3	4	5	6	7
10. Budgeting systems for compensating managers	1	2	3	4	5	6	7
11. Budgeting systems for controlling costs	1	2	3	4	5	6	7
12.Budgeting systems for coordinating activities across the business units	1	2	3	4	5	6	7
13. Budgeting systems for planning day to day operations	1	2	3	4	5	6	7
14. Budgeting systems for planning cash flows	1	2	3	4	5	6	7
15. Capital budgeting techniques (e.g. NPV, IRR, Payback)	1	2	3	4	5	6	7
16. Cost-volume-profit analysis (CVP)*	1	2	3	4	5	6	7
17. Cost modelling*	1	2	3	4	5	6	7
18. Cost of quality*	1	2	3	4	5	6	7
19. Customer profitability analysis (CPA)*	1	2	3	4	5	6	7
20. Economic (shareholder) value added (EVA/SVA)*	1	2	3	4	5	6	7
21. Formal strategic planning	1	2	3	4	5	6	7
22. Kaizen costing*	1	2	3	4	5	6	7
23. Long range forecasting	1	2	3	4	5	6	7
24. Operations research techniques	1	2	3	4	5	6	7
25. Performance evaluation based on budget variance analysis	1	2	3	4	5	6	7
26. Performance evaluation based on controllable profit	1	2	3	4	5	6	7
27. Performance evaluation based on divisional profit	1	2	3	4	5	6	7
28. Performance evaluation based on residual income*	1	2	3	4	5	6	7
29. Performance evaluation based on return (profit) on investment	1	2	3	4	5	6	7
30. Performance evaluation based on cash flow return on investment	1	2	3	4	5	6	7
31. Performance evaluation based on team performance	1	2	3	4	5	6	7
32. Performance evaluation based on employee attitudes	1	2	3	4	5	6	7
33. Performance evaluation based on balanced scorecard*	1	2	3	4	5	6	7
34. Performance evaluation based on customer satisfaction surveys	1	2	3	4	5	6	7
35. Performance evaluation based on supplier evaluations	1	2	3	4	5	6	7
36. Product life cycle analysis*	1	2	3	4	5	6	7
37. Product profitability analysis*	1	2	3	4	5	6	7
38. Standard costing	1	2	3	4	5	6	7
39. Target costing*	1	2	3	4	5	6	7
40. Throughput accounting*	1	2	3	4	5	6	7
41. Value chain analysis*	1	2	3	4	5	6	7
42. Variable costing	1	2	3	4	5	6	7
43. Zero-based budgeting*	1	2	3	4	5	6	7

SECTION 2: BENEFITS FROM MANAGEMENT TECHNIQUES

Please indicate the extent of benefit obtained from the following management techniques that your organization relies upon from no benefit (scored one) to high benefits (scored seven). Leave blank for inapplicable techniques. (*Please use 4 infrequently*)

Management techniques (*see glossary for interpretation)	**Current benefit**						
	No benefit						**High benefits**
1. Certification to quality standards (e.g. ISO 9000 series)	1	2	3	4	5	6	7
2. Cross-functional teams*	1	2	3	4	5	6	7
3. Downsizing the organization*	1	2	3	4	5	6	7
4. Establishing participative culture	1	2	3	4	5	6	7
5. Flattening of formal organizational structure	1	2	3	4	5	6	7
6. Integrated quality system (IQS)*	1	2	3	4	5	6	7
7. Integrating information systems across functions	1	2	3	4	5	6	7
8. Integrating information systems in operations	1	2	3	4	5	6	7
9. Integrating information systems with supplier and/or distributors	1	2	3	4	5	6	7
10. Investing in new physical layout	1	2	3	4	5	6	7
11. Implementing new operating methods	1	2	3	4	5	6	7
12. Linking business processes	1	2	3	4	5	6	7
13. Linking operational strategy to business strategy	1	2	3	4	5	6	7
14. Management training	1	2	3	4	5	6	7
15. Network teams*	1	2	3	4	5	6	7
16. Occupational health and safety	1	2	3	4	5	6	7
17. Outsourcing *	1	2	3	4	5	6	7
18. Project teams*	1	2	3	4	5	6	7
19. Quality assurance activities	1	2	3	4	5	6	7
20. Reorganizing existing operating processes	1	2	3	4	5	6	7
21. Statistical quality control	1	2	3	4	5	6	7
22. Total quality management (TQM)*	1	2	3	4	5	6	7
23. Using more sub-contracted labour	1	2	3	4	5	6	7
24. Work-based teams*	1	2	3	4	5	6	7
25. Worker training	1	2	3	4	5	6	7

SECTION 3: STRATEGY

A. Please indicate the emphasis placed on various strategic priorities from no emphasis (scored one) to high emphasis (scored seven). (*Please use 4 infrequently*)

Strategic priorities	**The emphasis**						
	No emphasis						**High emphasis**
1. Achieve lower cost of products/services than competitors	1	2	3	4	5	6	7
2. Compete mainly on the prices of products/services	1	2	3	4	5	6	7
3. Customize products/services to customers' needs	1	2	3	4	5	6	7
4. Improve the time it takes to provide products/services to customers	1	2	3	4	5	6	7
5. Improve the cost required for coordination of various activities	1	2	3	4	5	6	7
6. Improve the utilization of available equipment, services and facilities	1	2	3	4	5	6	7
7. Make products/services more cost efficient	1	2	3	4	5	6	7
8. Make changes in design and introduce new products/services quickly	1	2	3	4	5	6	7
9. Make rapid volume and/or product mix changes	1	2	3	4	5	6	7
10. Make dependable delivery promises	1	2	3	4	5	6	7
11. Obtain cost advantages from all sources	1	2	3	4	5	6	7
12. Offer a broader range of products/services than competitors	1	2	3	4	5	6	7
13. Provide high quality products/services	1	2	3	4	5	6	7
14. Provide products/services that are distinct from that of competitors	1	2	3	4	5	6	7
15. Provide effective after-sale service and support	1	2	3	4	5	6	7
16. Product/service availability	1	2	3	4	5	6	7

SECTION 3: STRATEGY (Continued)

B. Below is a description of three imaginary organizations: A, B and C. Please read the descriptions and assess, which one best describes your organization. Then, place your organization on the scale 1-7 provided, by circling one of the 7 numbers, whereby a (1) represents organization A, a (4) represents organization B and a (7) represents organization C.

A B C
1 2 3 4 5 6 7

Organization A offers a relatively stable set of products/services. Generally organization A is not at the forefront of new products/services or market developments. It tends to ignore changes that have no direct impact on current areas of operation and concentrates instead on doing the best job possible in its existing arena.

Organization B maintains a relatively stable base of products/services while at the same time moving to meet selected, promising new product/service/market developments. The organization is seldom first in with new products/services. However, by carefully monitoring the actions of institutions like organization C, it attempts to follow with a more cost-efficient or well-conceived product/service.

Organization C makes relatively frequent change in (especially additions to) its set of products/services. It consistently attempts to pioneer by being first in new areas of product/service or market activity, even if not all of these efforts ultimately prove to be highly successful. Organization C responds rapidly to early signals of market needs or opportunities.

C. Given below are descriptions of several alternative strategies. Depending upon the context, each of the descriptions may represent the strategy for all, or only a fraction, or none of an organization's products/services. Please indicate what percentage of your organization's total sales is accounted for by the products/services represented by each of the strategy descriptions. Your answer should total 100%.

- Increase sales and market share, be willing to accept low returns on investment in the short-to-medium term, if necessary …….%
- Maintain market share and obtain reasonable return on investment …….%
- Maximize profitability and cash flow in the short-to-medium term, be willing to Sacrifice market share if necessary …….%
- Prepare for sale or liquidation …….%
- None of the above (please specify……..) …….%

Total 100%

D. Please indicate the extent of your agreement with the following statements in relation to your competitive strategy from strongly disagree (scored one) to strongly agree (scored seven). (*Please use 4 infrequently*)

Statements	**Strongly Disagree**						**Strongly Agree**
1. A strong emphasis on R&D, technological leadership and innovations	1	2	3	4	5	6	7
2. Development of many new product lines or services in the past 5 years	1	2	3	4	5	6	7
3. Changes in product/services lines have been dramatic	1	2	3	4	5	6	7
4. A strong proclivity for high risk projects (with chances of very high returns)	1	2	3	4	5	6	7
5. Bold, wide-ranging acts are viewed as useful and common practice	1	2	3	4	5	6	7

SECTION 4: PERFORMANCE

Please indicate your organization's performance compared to your competitors along the following dimensions from below average (scored one) to above average (scored seven) (*Please use 4 infrequently*). In addition, please indicate the degree of importance attached to these criteria in your organization. For this rating use a 5-point scale from not important (scored 1) to extremely important (scored five), and write them down in column headed 'Importance'.

Performance Dimensions	Performance							Importance
	Below average						Above average	
1. Capacity utilization	1	2	3	4	5	6	7	
2. Cash flow from operations	1	2	3	4	5	6	7	
3. Cost control	1	2	3	4	5	6	7	
4. Customer satisfaction	1	2	3	4	5	6	7	
5. Development of new products/services	1	2	3	4	5	6	7	
6. Employee development	1	2	3	4	5	6	7	
7. Firm's efficiency	1	2	3	4	5	6	7	
8. Market share	1	2	3	4	5	6	7	
9. Market development/ Sales growth rate	1	2	3	4	5	6	7	
10. Product/service quality	1	2	3	4	5	6	7	
11. Return on investment	1	2	3	4	5	6	7	
12. Supplier relationships	1	2	3	4	5	6	7	
13. Overall Business Performance	1	2	3	4	5	6	7	

SECTION 5: ORGANIZATION/BUSINESS UNIT'S DETAIL

Please indicate the detail about the organization/business unit.

1. Estimated the numbers of employees
   [ ] 250 or under [ ] 251-500 [ ] 501-750 [ ] 751-1000 [ ] 1001-1250
   [ ] 1251-1500 [ ] 1501-1750 [ ] 1751-2000 [ ] 2001-2500 [ ] over 2500

2. Estimated the turnover of your organization
   [ ] £0m-£15m [ ] £16m-£30m [ ] £31m-£45m
   [ ] £46m-£60m [ ] £61m-£75m [ ] £76m-£90m
   [ ] £91m-£150m [ ] £151m-£200m [ ] £201m-£300m
   [ ] over £300m

3. Type of business [ ] Manufacturing [ ] Wholesaling or retailing
   [ ] Services [ ] Financial and commercial
   [ ] Others…….

4. Nationality of your organization
   [ ] Thai company [ ] Foreign owned company
   [ ] Others…….

5. Will you be prepared to participate in a further interview through telephone or in person?
   [ ] Yes [ ] No

Thank you for taking the time to complete the questionnaire.

Please return this questionnaire in the self-addressed envelope provided. Add any additional comments on a separate piece of paper and include in the envelope. If you would like to participate in the prize draw of £150 and receive a copy of the summary of the results, please provide your information in the space below or attach your business card with this questionnaire. This information will be used only for the draw prize and sending you a copy of the executive summary of the results. It will not be recorded or revealed to third parties.

Person completing the questionnaire:

Name……Job Title…….
Organization/Company Name…….
Address……...
……Telephone No……..

If you have any questions please do not hesitate to contact me.

Sirinuch Nimtrakoon
Lecturer
School of Accountancy
The University of the Thai Chamber of Commerce

Ph.D. student in Finance and Accounting
University of Hull, U.K.
E-mail: S.Nimtrakoon@2005.hull.ac.uk

Home Address in Thailand:
15 Soi Pheungmee 42
Sukhumvit 93, Bangjak
Prakanong, Bangkok 10260
Tel: 08-3112-0692

Office Address in Thailand:
School of Accountancy
The University of the Thai Chamber of Commerce
126/1 Vibhavadee-Rangsit Rd.
Dindaeng Bangkok 10400
Tel: 02-697-6219
Fax: 02-277-4347

Glossary-Management accounting practices

Activity-based costing (ABC) Approach to the costing and monitoring of activities which involves tracing resource consumption and costing final outputs. Resources are assigned to activities, and activities to cost objects based on consumption estimates. The latter utilise cost drivers to attach activity costs to outputs.

Activity-based budgeting (ABB) Method of budgeting based on an activity framework and utilising cost driver data in the budget setting and variance feedback processes.

Activity-based management (ABM)

- Operational ABM Actions, based on activity driver analysis, that increase efficiency, lower costs and/or improve asset utilisation
- Strategic ABM Actions, based on activity-based cost analysis, that aim to change the demand for activities so as to improve profitability

Backflush costing Method of costing, associated with a JIT (just-in-time) production system, which applies cost to the output of a process. Costs do not mirror the flow of products through the production process, but are attached to output produced (finished goods stock and cost of sales), on the assumption that such backflushed costs are a realistic measure of the actual costs incurred.

Balanced scorecard approach Approach to the provision of information to the management to assist strategic policy formulation and achievement. It emphasises the need to provide the user with a set of information which addresses all relevant areas of performance in an objective and unbiased fashion. The information provided may include both financial and non-financial elements, and cover areas such as profitability, customer satisfaction, internal efficiency and innovation.

Benchmarking Establishment, through data gathering, of targets and comparators, that permit relative levels of performance (and particularly areas of underperformance) to be identified. Adoption of identified best practices should improve performance.

Cost-volume-profit analysis (CVP) Study of the effects on future profit of changes in fixed cost, variable cost, sales price, quantity and mix.

Cost modelling Method of constructing and implementing cost models to improve profitability. Cost models give a clear view of the unit cost and profitability of products/services, support a better understanding of the organization's main cost drivers, and foster evolution towards a margin-driven business.

Cost of quality Difference between the actual cost of producing, selling and supporting products or services and the equivalent costs if there were no failures during production or usage.

Customer profitability analysis (CPA) Analysis of the revenue streams and service costs associated with specific customers or customer groups.

Economic value added (EVA^{TM}) Profit less a charge for capital employed in the period. Accounting profit may be adjusted, for example, for the treatment of goodwill and research and development expenditure, before economic value added is calculated.

Shareholder value Total return to the shareholders in terms of both dividends and share price growth, calculated as the present value of future free cash flows of the business discounted at the weighted average cost of the capital of the business less the market value of its debt.

Kaizen Japanese term for continuous improvement in all aspects of an entity's performance at every level.

Product life cycle Period which begins with the initial product specification and ends with the withdrawal from the market of both the product and its support. It is characterised by defined stages including growth, development, introduction, maturity, decline and abandonment.

Product profitability analysis Analysis of the revenue streams and costs associated with specific products or product groups.

Residual income Profit minus a charge for capital employed in the period. The calculation is exactly the same as that for *economic value added*. However, in the latter case, accounting profit is often adjusted before the calculation of economic value added.

Target cost Product cost estimate derived by subtracting a desired profit margin from a competitive market price.

Throughput accounting (TA) Variable cost accounting presentation based on the definition of throughput (sales minus material and component costs). Sometimes referred to as *super variable costing* because only material costs are treated as variable.

Value-chain analysis Use of the value-chain model to identify the value adding activities of an entity. (Value chain-Sequence of business activities by which, in the perspective of the end-user, value is added to the products or services produced by an entity).

Zero-based budgeting Method of budgeting that requires all costs to be specifically justified by the benefits expected.

Glossary-Management techniques

Cross-functional teams The teams consist of members from different functional areas, such as various research disciplines (like chemistry, electronics and metallurgy), engineering, manufacturing, or marketing. They provide the advantages of multiple sources of communication, information, and perspectives.

Downsizing Organizational restructuring involving outsourcing activities, replacing permanent staff with contract employees and reducing the number of levels within the organizational hierarchy, with the intention of making the entity more flexible, efficient and responsive to its environment.

Integrated quality system (IQS) A system which integrates all quality functions from the beginning to the final phases to satisfy customer quality expectations and achieve maximum effectiveness.

Network teams These teams have a dynamic membership configuration and extremely non-routine task complexity. The members are not limited to time or space. They may come from different geographical areas and collaborate via a variety of communications channels and information technologies. The members can be anyone who is committed to the goal such as workers, customers, vendors, consultants, and organizational employees.

Outsourcing Use of external suppliers as a source of finished products, components or services. This is also known as *contract manufacturing* or *subcontracting*.

Project teams The teams are different from *work-based teams* due to a limited future anticipation. They are formed for a specific reason, and the teams will be terminated when the purposes are achieved. The members also engage in work outside the teams and will return to their functions after the end of the projects. Task complexity of project teams is more non-routine than that of *work-based teams*.

Total quality management (TQM) Integrated and comprehensive system of planning and controlling all business functions so that products or services are produced which meet or exceed customer expectations.

Work-based teams The teams have been set for a long time, and once it exists there is a little change in its membership. The members have expectation for the stability of the teams in the future. The teams' tasks normally involve production or service work, so they are routine and standardized.

Appendix B: Interview Protocol

Interview Protocol

Opening Remark

- Thanks/ confidential issue/ not judge or threaten/ record
- Our research
- What is your position/ role in the company?

General questions and strategy

- Please tell me about your business and its products/ environment/ competition?
- How you compete (strategy)? Is it successful? What is the basis of your success?

Management Techniques (MTs)

- Are there particular MTs or practices that customers value and that contribute to your success? Please tell me about one/some examples?
- Can I learn a little about its origins? How/ why/ when was it developed?
- How they have been maintained?
- Who are major players in this (Can we talk to them later)?
- Can you give me an example of how/ where it works well? How do you monitor this?
- Benefits obtained from them/ how successful?
- Do you have any problem in using them, how to deal with this?
- Future trend for MTs?

Management Accounting Practices (MAPs)

- Can we move onto MAPs? What are your important MAPs?
- Is there a link between MAPs and your success? How?
- How do they relate to your strategy (example)?
- Is there a link between MAPs and MTs? How?
- How does this (a link between MAPs and MTs) apply to strategy?
- Can you elaborate any examples where they have been successful?
- Do you have any problem in using them, how to deal with this?
- Future trend for MAPs