MANUFACTURING STRATEGY AND PERFORMANCE
MEASUREMENT SYSTEM DESIGN

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Submitted in total fulfilment of the requirements of the degree of Doctor of Philosophy

March, 1998

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Printed on acid free paper.
ABSTRACT

This study explores the link between strategy and the use and design of manufacturing subunit performance measures by profit centre managers. More specifically, it examines the relationship between manufacturing competitive strategy and
1. relative reliance on financial and non-financial performance measures for manufacturing management control
2. the way cost benchmarks used in financial performance measures are constituted to integrate non-financial dimensions of performance.

These links between manufacturing strategy, reliance on performance measures and constitution of financial benchmarks are examined also for implications on performance measurement system effectiveness. Data were collected using a semi-structured interview in conjunction with a structured questionnaire administered to 36 profit centre managers and 12 manufacturing managers in 36 manufacturing firms in Victoria, Australia.

Both the recent ‘strategic management accounting’ literature focused on integrated performance measurement and the balanced scorecard, and the broader literature studying the implications of strategy for performance measurement system design form the conceptual foundations for this study. The study seeks to contribute to this literature in several ways. Firstly, it examines the implications of the joint pursuit of multiple strategies for performance measurement system design. Secondly, the techniques used to integrate multiple financial and non-financial performance measures are examined. Thirdly, the study relies extensively on the analysis of qualitative data collected during field interviews to elaborate on contingent links between strategy and performance measurement system design characteristics. The insights gained from this analysis are used to build or refine theory.

The findings reflect evidence of an overwhelming emphasis on differentiation or joint strategies among the firms in the sample, and an absence of pure cost leaders. Elaborated responses are used to shed light on the contextual influences that determine this strategic profile. The strategic characteristics of the sample appear to result in the development of complex performance measurement systems where both financial and non-financial measures vie for importance. Given the potential conflicts between such measures, performance measurement system integration becomes a critical issue.

This study examines empirically the integration of multiple measures. The findings identify differential difficulty in designing mutually reinforcing and internally consistent performance measurement systems. It emerges as relatively straightforward to integrate performance dimensions related to quality into financial benchmarks used in evaluating manufacturing efficiency. On the other hand the simultaneous pursuit of performance goals relating to efficiency and customer responsiveness emerges as significantly more problematic. There is little evidence of attempts to modify cost benchmarks to embody the costs of flexibility and responsiveness. Instead, there is evidence of persistent conflict and goal displacement.

These issues are drawn together through the use of a framework focused on vertical and horizontal dimensions to the design of effective ‘strategic’ performance measurement
systems. The vertical dimension links strategy and the composition of performance measurement systems. The findings reported here suggest that recognition of the pursuit of mixed strategies is critical to establishing this link, and may help to reconcile some of the conflict evident in the findings from prior studies of the relationship between strategy and management control system design. The horizontal dimension reflects internal consistency or mutual reinforcement between multiple measures. This study suggests that the horizontal integration of multiple measures is problematic, and constitutes an obstacle to effective performance measurement system design. This horizontal dimension has received little attention in the literature and offers significant opportunities for future research.

DECLARATION

This is to certify that
i. the thesis comprises only my original work,
ii. due acknowledgment has been made in the text to all other material used,
iii. the thesis is less than 100,000 words in length, exclusive of tables, bibliographies, appendices and footnotes.

__________________________________________

ANNE M. LILLIS
ACKNOWLEDGMENTS

First and foremost, I am indebted to Professor Margaret Abernethy for her invaluable assistance throughout this project. Her rigour, attention to detail, interest and constant encouragement have carried me through every step of the way. I am also most indebted to the late Professor Peter Brownell. As co-supervisor prior to his untimely death, Peter’s scholarly insights were a constant source of inspiration. I also benefited enormously from his contagious enthusiasm and his evident belief that I could achieve perfection in anything if I really tried. Despite its clear imperfections, for which I take full responsibility, there is a great deal of both Peter and Margaret’s (Maggie’s) influence reflected in this thesis.

Of course, without the data there would not have been a dissertation. I am grateful to the 50 managers who participated in the project. They gave so freely of their time, and their anecdotes were the foundation for much of the ‘substance’ of this thesis. I am also grateful to the Australian Centre for Management Accounting Development (ACMAD) for financial support to enable me to have the taped interviews transcribed, and to the Australian Society of CPAs, the Institute of Chartered Accountants and the Accounting Association of Australia and New Zealand for joint scholarship support. In addition, Deakin University provided teaching relief, conference and expense support during my candidature.

The final thesis has also benefited from the contributions of participants at
- the Second International Seminar on Manufacturing Accounting Research, Bruges, Belgium, June 1995
- the Management Accounting Research Conference, University of New South Wales, Little Bay, October 1996
- the Accounting Association of Australia and New Zealand annual conference, Hobart, July 1997
- the American Accounting Association annual meeting, Dallas, August 1997
- annual research forums at Deakin University
- annual PhD forums at the University of Melbourne

where various parts of this thesis have been presented and discussed. Thanks are due also to the many friends and colleagues who, in less structured settings, have contributed thoughts and constructive criticism along the way.

Finally, special thanks go to my family, Theo, Michael and Genevieve, for their unfailing support and encouragement, and for the sacrifices they have had to make in freeing me to pursue this goal.
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PREFACE

The first chapter serves as a preface to this thesis. It outlines, in summary form, the conceptual foundations, motivation, and design of the study. In addition, the abstract summarizes the whole thesis, including the findings. So I will not repeat these summaries or introductions here.

However, two notes to the reader are relevant. Firstly, this thesis is designed to be read from start to finish. However, it is recognized that this approach takes the reader through the ponderous detail of method, tests and findings without a genuine overview of the whole study. For the reader who appreciates reading the detail, with an appreciation of the whole study in overview, I would draw your attention to the possibility of reading Chapter 9 first. Chapter 9 recaps on the research question and the motivation for the study. It also recaps on all the findings, and attempts to synthesize these findings in the context of the original motivations for the study and the extant literature. Thus, while not written as a stand-alone chapter, it may provide an effective ‘big picture’.

The general structure of the whole thesis is as follows. Chapter 1 introduces the design, motivation, conceptual foundations and method of the study in overview. Chapter 2 details the literature review that forms the foundation for the study. Chapter 3 states the hypotheses. Chapters 4 details the study design and method. Chapter 5 focuses on the analytical protocol used to analyse qualitative data. Chapters 6 to 8 detail the findings. Chapter 9, as stated above, attempts to draw the findings together. Chapter 10 outlines the limitations of the study and identifies potential directions for future research.

The second note of relevance to the reader is that the spelling used throughout this thesis is based on the Oxford English dictionary.
CHAPTER 1

INTRODUCTION

1.1 The research issue

This study explores the link between strategy and the use and design of manufacturing subunit performance measures by profit centre managers. More specifically, it examines the relationship between manufacturing competitive strategy and

1. relative reliance on financial and non-financial performance measures for manufacturing management control

2. the way cost benchmarks used in financial performance measures are constituted to integrate non-financial dimensions of performance.

These links between manufacturing strategy, reliance on performance measures and constitution of financial benchmarks are examined also for implications on performance measurement system effectiveness.

This study explores the relationship between strategy and performance measurement system design characteristics. It is distinguished from prior studies examining the link between strategy and management control system design in several ways. Firstly, rather than focusing on strategic archetypes, the implications of joint strategies are evaluated. Secondly, this study examines the impact of strategy on the design of comprehensive performance measurement systems embodying multiple financial and non-financial criteria. Thirdly, it explores the design issues associated with the effective integration of multiple performance measures. Finally, this study relies extensively on the analysis of
elaborated responses collected during semi-structured interviews in the field. These responses are analysed using a rigorous auditable protocol and are used to elaborate on contextual influences relating to the link between strategy and performance measurement system design, as well as to propose new or refined theory relating to this link.

The remainder of this chapter is organized as follows. The next Section (1.2) establishes the motivation for the study. This is followed by an overview of the conceptual foundations of the study (Section 1.3), and a description of the 'pilot test' of the conceptual framework (Section 1.4). The expected contribution to the literature, and the epistemological stance adopted are outlined in Sections 1.5 and 1.6 respectively. The chapter concludes with an overview of the study design and method (Section 1.7).

1.2 Motivation

The motivation for this study arises out of the convergence of three issues evident in both the academic and practitioner-oriented literatures:

1. the current attention focused on performance measurement in manufacturing industry,
2. the traditionally significant role of accounting in performance measurement, and
3. strategic changes in manufacturing in the past decade which have changed the performance measurement agenda.

Performance measurement problems were described several years ago as “the most important unsolved problems in management accounting” (Anthony, 1989:17). There is evidence that attempts have been made in the literature to develop solutions to performance measurement problems in manufacturing. Integrated performance
measurement (Nanni et al., 1992) and the balanced scorecard (Kaplan and Norton, 1992; 1996(a); 1996(b); 1996(c)) are examples of these developments. The interest of practitioners and managers in these developments is evidenced by their primary publication in practitioner-oriented journals (Kaplan and Norton, 1992; 1996(a); 1996(b)), and the volume of brochures in circulation promoting seminars on integrated performance measurement and the balanced scorecard.

The importance of designing comprehensive performance measurement systems that include both financial and non-financial indicators is well established in the general management accounting literature as well as in the more recent literature on 'strategic performance measurement'. For example, Simon et al. (1954) and McKinnon and Bruns, (1992) documented the importance of both financial and non-financial performance measures in practice. The literature on 'strategic performance measurement' focuses particularly on the development of critical non-financial measures (Dixon et al. 1990, Kaplan and Norton, 1992; 1996(b)). It is notable that this literature has sparked comparisons with the French Tableau de Bord which also focused on the need for multiple financial and non-financial indicators and predated developments in 'strategic performance measurement' (Lebas, 1994; Epstein and Manzoni, 1997). Furthermore, performance measures which report on quality, lead time, delivery performance and other strategically important criteria as well as more traditional productivity and efficiency measures are readily observed in practice. Such systems may be, at least superficially, consistent with notions of 'strategic performance measurement' in comprehensively measuring performance on a range of critical determinants of competitive success.
In their discussion of the Northern Telecom case, Nanni et al. (1992) capture the themes in the recent literature on performance measurement. They outline the following event involving the trashing of accounting performance data:

“One of (the Plant Manager's) department managers gave him a fastidiously prepared budget plan based on elaborate analysis of prior period budget variances. The Executive ripped the report in half and threw it in the waste basket, telling his subordinate that he never wanted to see time wasted on revisiting the past like that again. He (the subordinate) was told to get out in the factory and cut the lead times, inventories, and defect rates. The numbers would work themselves out. Subsequently, the plant's traditional variance-based reporting system was replaced by a system that integrated detailed operational measures with aggregate cost results.” (Nanni et al. 1992:6)

While most of the solutions to performance measurement problems proposed in the literature are focused on the development of non-financial indicators that 'drive performance' (Kaplan and Norton, 1992), there is less emphasis on the form and role of financial elements within such systems. For example, what are the 'aggregate cost results' referred to in the above quotation and how do they differ from traditional aggregate reports of actual and expected costs?

The design of financial measures of performance within effective strategic performance measurement systems is particularly relevant at higher levels of management where financial assessments of manufacturing performance are likely to be a critical element in the control cycle (McKinnon and Bruns, 1992). Traditionally, such financial assessments focused on the analysis of variances between actual and expected costs. The recent strategic performance measurement literature has criticized such analyses because they emphasize past performance and encourage standardization, volume and efficiency as the means of avoiding unfavourable variances. These traditional approaches to control are
difficult to reconcile with the competitive focus on quality, customer responsiveness and flexibility that have become the norm (Samson et al., 1991; Milgrom and Roberts, 1995).

In fact, there has been significant recognition that accounting may be 'getting in the way' of effective strategic management in the current manufacturing environment (Richardson and Gordon, 1980; Johnson and Kaplan, 1987; Berliner and Brimson, 1988; Hayes et al. 1988; Drucker, 1990; Kaplan, 1990; Nanni, et al., 1992; Otley 1994; Perera et al., 1997).

While this literature is persuasive in identifying the potential dysfunctional consequences from emphasizing cost variances in control, it does not deal systematically with either the influence of management level on the need for financial measures of performance, or the ways in which such financial measures might be constituted to integrate performance expectations relating to quality or customer responsiveness.

The convergence of these issues exposes questions that are of interest to both practice and theory. The changing strategic context of manufacturing appears to create performance measurement problems involving the balancing of competing priorities and a shift in emphasis away from efficiency and productivity towards quality, flexibility and customization. Such changes potentially undermine the value of traditional accounting performance measures such as cost variances. Considerable attention has been devoted to the development of performance measures that can support a range of strategic initiatives.
The focus of recent literature on performance measurement is on integration (Nanni et al., 1992), the notion of a balanced scorecard (Kaplan and Norton, 1992; 1996(a); 1996(b); 1996(c)) or the attempt to define critical performance variables that represent important dimensions of a given strategy (Simons, 1995). In all cases, the message is that effective performance measurement systems must be able to assess progress on strategic initiatives and will contain both financial and non-financial elements (Moon and Fitzgerald, 1996). The recent literature has emphasized particularly the development of 'scorecards' of predominantly non-financial indicators of operating performance consistent with strategic goals. The design of systems for monitoring overall manufacturing performance, the relative role of financial and non-financial performance measures and the integration of multiple measures within such monitoring systems have received less attention (Chenhall, 1997). It is not at all clear how the relevance and design of financial measures of manufacturing performance are adapted by higher level managers to reflect a strategic focus on quality or customer responsiveness. Interesting questions are raised relating to the ways profit centre managers use financial and non-financial reports of manufacturing performance, how multiple performance criteria are integrated, and how these characteristics are influenced by strategic priorities.

1.3 Overview of conceptual foundations

The conceptual foundations for the study are derived from two streams of literature. Firstly, there has been a recurrent theme in the management accounting literature of the last decade suggesting that traditional cost management and performance measurement systems are either irrelevant or potentially dysfunctional in the manufacturing
environments that emerged out of the 1980's (e.g. Johnson and Kaplan, 1987; Berliner and Brimson, 1988; Drucker, 1990; Kaplan, 1990; Nanni et al., 1992). This literature has, however, tended to focus on the dysfunctional consequences of using traditional management accounting controls in the day-to-day operational control of manufacturing activity. The influence of strategy on the role of financial and non-financial measures in monitoring systems at higher levels of management has not been addressed. The implications of management level for assessments of the relevance of accounting reports for management control are discussed in the next section.

The literature focusing on the link between strategy and management control system attributes is also an important foundation for this study. This literature, which is generally set within a contingency framework, has sought systematically to uncover patterns in reliance on accounting and other control system attributes in specific strategic contexts. It would be expected that this literature could support predictions about the influence of strategy on the relative role of financial and non-financial performance measures in the design of management control systems for manufacturing. Despite its relatively robust theoretical and empirical bases, the results of empirical studies of the implications of strategy for management control system design have been conflicting and unconvincing. In part, the lack of a coherent body of literature linking strategy and management control system characteristics provides evidence of many of the problems associated more generally with applications of the contingency model (Otley, 1980; Selto et al., 1995; Chapman, 1997). In addition, the variety of strategy-contingent control system attributes studied reduces 'additivity' within this literature. Finally, and most critically for the design of this study, the incidence of 'joint' or mixed strategies and the integration of
multiple performance measures may be significant to the development of effective strategy-contingent performance measurement systems.

This theoretical and empirical literature, which is reviewed in detail in Chapter 2, is currently unable to support any specific conclusions about the impact of strategy on the reliance on accounting in manufacturing management control. To advance the literature, this study addresses several issues that emerge from the review in Chapter 2, and which form the foundation for the contribution this study seeks to make. The two issues most critical to the design of this study, and its contribution to the literature are

1. the influence of management level on assessments of the relative role of financial and non-financial performance indicators, and

2. the prevalence of joint or multiple strategies, and the implications of such jointness on
   a) the design of 'comprehensive' performance measurement systems embodying a range of financial and non-financial performance measures, and
   b) the integration of multiple performance measures.

These issues are outlined in the following subsections, and discussed in more detail in Chapter 2.

1.3.1 The influence of management level

The literature that formed the foundation for the development of 'strategic performance measurement systems' tended to argue strongly for the development of non-financial performance indicators which would 'drive' performance on critical success factors. It was argued that traditional cost-focused controls such as the analysis of cost variances would actively discourage continual improvement, innovation, customization and quality
programs (Richardson and Gordon, 1980; Johnson and Kaplan, 1987; Berliner and Brimson, 1988; Hayes et al. 1988; Drucker, 1990; Kaplan, 1990; Nanni, et al., 1992; Otley 1994; Perera et al. 1997). These arguments, however, failed to distinguish adequately the performance information requirements of operating and strategic management levels. There is ample evidence in the literature that accounting data have always been relatively unimportant in plant-level, day-to-day control (Simon et al., 1954; Dixon et al., 1990; Euske et al., 1993; McKinnon and Bruns, 1992) but that the cumulative, corroborative strength of accounting measures emerges over longer time frames and at tactical or strategic rather than operating levels of management. McKinnon and Bruns (1992) study of manufacturing firms identified the importance of the financial analysis of variances between actual and planned performance not only in a corroborative sense, but also in exerting direct control over expenses and identifying inefficiencies and bottlenecks. McKinnon and Bruns (1992) argue that such inefficiencies and bottlenecks tend to appear in the trends in aggregated cost data, but are camouflaged in micro-level physical performance data. They indicate that the comparison of actual and planned financial results is the most critical control mechanism in manufacturing management control over longer time frames (monthly rather than daily) at higher management levels (strategic rather than operating levels).

It would thus appear to be most important in studies of the contingent design of management control systems to match the level of analysis with the control system elements under study. In order to study the link between strategy and relative reliance on financial and non-financial performance measures in the evaluation of manufacturing performance, this study is focused at the profit centre management level.
1.3.2 The prevalence and implications of joint or multiple strategies

Prior studies of the impact of strategy on management control system design have tended to focus on strategic archetypes such as cost leaders/defenders and differentiators/prospectors (e.g. Simons, 1987; Govindarajan, 1988). During the past decade, it has been suggested that strategies in practice will be mixed rather than falling into clearly distinguishable archetypal categories. The strategic management literature and the manufacturing management literatures have devoted considerable attention to the issue of whether the manufacturing strategies of cost, quality, flexibility and dependability are pursued jointly, independently or sequentially (Buffa, 1984; Crowe and Nuñó, 1991; New, 1992; Belohlav, 1993). Anecdotally, there is a general perception that world class manufacturers will be those that balance all strategies within the manufacturing function (Hill, 1988; Jones and Butler, 1988; Nemetz and Fry, 1988; Drucker, 1990).

To the extent that strategies are, in practice, mixed, the direct link between strategy and management control system design will be conceptually complex, and not predictable from a study of the archetypes at the ends of the continuum. We do not know how strategy mix affects control system design, but implications for both the comprehensiveness of performance measurement systems and the integration of multiple measures would be expected. Performance measurement systems designed to embrace multiple strategically important criteria would be expected to reflect a greater range of critical performance measures. Furthermore, the simultaneous pursuit of low cost, high quality and flexibility raises issues relating to the management of integration and conflict between the measures supporting multiple strategic imperatives.
The prevalence of joint strategies, the implications of jointness for the design of comprehensive performance measurement systems and the need for mechanisms to integrate multiple, potentially conflicting measures are relatively unexplored in the management accounting literature. While literature dealing with integrated performance measurement (Nanni et al., 1992) and the balanced scorecard (Kaplan and Norton, 1992; 1996(b)) deal with multiple measures and the design of comprehensive systems, this literature has not examined either theoretically or empirically, the means by which multiple, potentially conflicting goals are integrated. Nor does it highlight the differential integrative difficulties with particular combinations of measures.

1.4 Pilot test of emergent conceptual framework

The focus of this study on financial and non-financial performance measures and the integration of multiple performance dimensions was subjected to initial scrutiny in the field. Two large manufacturers identified as participants in the Australian Government sponsored 'Best Practice' program were approached and agreed to interviews. An interview was conducted in the first organization with the General Manager and the General Manager (Finance and Administration). In the second organization the General Manager, General Manager (Corporate Affairs) and the Methods/Planning Manager participated in the interview. Both interviews lasted approximately 1.25 hours, and focused on the design of performance measurement systems.

Both firms reported extensive use and constant development of non-financial indicators for operating control. Both also indicated that financial comparisons of actual and
budgeted costs were reported to the general manager at least monthly, as well as aggregate, non-financial measures of, for example, quality, throughput, energy consumption and other critical success factors. Both cases reflected attempts to manage multiple, potentially conflicting performance expectations. The managers in one firm argued that the standards used in the costing system embodied continual improvement and reflected progress towards 'best practice'. In contrast, the managers in the other firm were dissatisfied with the capacity of their financial measures to capture strategically important criteria.

These reports offered some preliminary support for the relevance of the issues under study here. In particular, they supported the focus on cost variance reports as a critical performance report at the profit centre level, the use of multiple non-financial indicators, and the potential to improve performance measurement system effectiveness by linking the systems of financial and non-financial indicators together.

1.5 Expected contribution to the literature

In this study I examine empirically, using a sample of profit centre managers, the way the relative role of financial and non-financial performance measures and the integration of multiple performance measures used in monitoring overall manufacturing performance reflect manufacturing competitive strategy. The design of systems to support the operational implementation of competitive strategy has been identified as high on the practitioners' research agenda, but relatively unexplored in the strategic management literature (Gopinath and Hoffman, 1995). The management accounting literature has examined the implications of competitive strategy for various attributes of management
accounting system design. The evolution and elaboration of the concept and techniques of strategic management accounting dominated much of the literature in the 1980s and early 1990s (Simmonds, 1981; Kaplan, 1983; Shank and Govindarajan, 1989; Bromwich, 1990; Kaplan and Norton, 1992; Nanni et al., 1992; Lord, 1996). However, major empirical contributions have emerged predominantly from contingency frameworks (e.g. Govindarajan and Gupta, 1985; Merchant, 1985; Simons, 1987; Govindarajan, 1988). This study is modelled primarily on empirical studies of strategy-contingent management control systems design.

This study seeks to add to the existing literature in two ways. Hypotheses relating strategy and performance measurement system design are developed to extend the existing literature by considering the impact of joint strategies on performance measurement system design and by examining the integration of multiple measures. These hypotheses are developed based on an analysis of the conflicts that have emerged in the prior literature examining links between strategy and management control system design. It is expected that the results of empirically testing the hypotheses will shed some light as to why prior findings have been inconsistent, and thus increase our understanding of the relationship between strategy and management control system design, at least in the design of performance measurement systems. While this study attempts systematically to overcome the problems in the prior literature, it is recognized that convincing contingency models are notoriously difficult to develop, and the attempts that have been made have attracted significant criticism in the literature (Otley, 1980; Dent, 1990; Selto et al., 1995; Chapman, 1997). Nonetheless, the contingency framework remains relevant (Hopwood, 1989) and the potential link between strategy and management control system design is
both intuitively appealing and a topic which continues to receive considerable attention in the current literature (Abernethy and Lillis, 1995; Ittner and Larcker, 1997; Perera et al., 1997; Rangone, 1997; Sim and Teoh, 1997). This study interprets the empirical evidence of strategy-contingent performance measurement system designs within a general contingency framework. In addition, qualitative data are used to explore more complex contextual influences on contingent relationships. Interview data are used both to interpret the results of the hypothesis tests and, potentially, to build new theory. Such analyses are expected to inform future work by enriching our understanding of contextual influences on the contingent relationship between strategy and performance measurement system design (Langfield-Smith, 1997). While the study is modelled on a contingency framework, it focuses particularly on exploring the association between strategic orientations and performance measurement system design. To the extent that such associations relate to joint strategies and the integration of multiple performance measures, they are exploratory and this study is designed in such a way as to refine or build theory (Keating, 1995). Consistent with prior contingency models, the implications of 'fit' are examined, but are less critical to the contribution of this study.

1.6 Epistemological stance

Consistent with the literature that forms the foundation for this study, a positivist approach is adopted. This is reflected in both the development of hypotheses and attention to reliability and validity in the study design. The use of qualitative data to refine or build theory through the exploration of complex attributes of contingent relationships is, however, interpretive and inductive. While ideally, these interpretations emerge free of theoretical manipulation, all empirical observations are to some extent
theory-laden, and reflect at a minimum, a researcher’s epistemological stance (Otley and Berry, 1994). My own stance is functionalist. Such a stance is consistent with the dominant themes in the strategic management accounting and contingency literature that form the foundation for this study.

A review of this literature reveals many gaps that could be identified and addressed from a variety of perspectives. For example, it is well recognized that performance measurement systems can serve multiple purposes in organizations. These include both highly rational purposes as well as roles related to power and morality (Jönsson and Macintosh, 1997). It is argued that functionalism explains at least significant elements of the use of accounting data in performance measurement, and that functionalist interpretations of new and complex issues in performance measurement contribute to the extensive literature based on this perspective.

Within a functionalist perspective, there are further choices to be made. For example, the integration of multiple, potentially conflicting criteria may be regarded as a feature of effective performance measurement systems (Flamholtz, 1979; McNair et al. 1990; Nanni et al., 1992; Kaplan and Norton, 1996(b)). Alternatively, performance conflict may be viewed as a desirable attribute of performance measurement systems (Hedberg and Jönsson, 1978). This study builds on literature which is not only functionalist in orientation, but treats integration and mutual reinforcement as desirable qualities of effective performance measurement system design. To some extent the approach taken in this study, focusing on the perceptions of the users of performance information, rather than the subordinate 'receivers' of performance measurement system signals, raises the
possibility that, for example, either integration or conflict may emerge in elaborated responses as contributing to performance measurement system effectiveness. However, the hypotheses developed in this study, which influence not only the specific tests undertaken in the quantitative data, but also the interpretive stance taken in relation to the qualitative analyses, reflects both a functionalist perspective and an expectation that performance measurement system integration is preferred to conflict.

It is notable also that the conceptual pilot test conducted for this study confirmed the functional or technical-rational role of accounting data in performance measurement, the desire for mutually reinforcing performance signals by profit centre managers, and the existence of knowledge gaps in the implementation of accounting performance measures in these roles. This study deals with established gaps in the literature in understanding the technical-rational uses of performance information. It remains for other studies to fill further gaps in the literature by examining complex issues of performance measurement from alternative epistemological stances.

1.7 Overview of study design and method

In examining the relationship between strategy and the design of performance measurement systems at the profit centre manager level, this study seeks to

1. Test hypotheses which relate the relative reliance on financial and non-financial performance information to strategy,

2. Build new theory relating to the integration of multiple performance measures by examining the relationship between the constitution of financial benchmarks used in performance measurement and strategy, and
3. draw on qualitative data to elaborate on the contextual influences on the contingent relationship between strategy and performance measurement system design.

Data were collected using a semi-structured interview in conjunction with a structured questionnaire administered to 50 managers in 36 manufacturing firms in Victoria, Australia. The use of a semi-structured interview schedule in conjunction with a structured questionnaire aims to derive the benefits of quantitative and qualitative methods, and to apply appropriate methods to the questions of interest. This study uses established instruments where available (for example, in the measurement of manufacturing strategy and reliance on performance measures). Statistical hypothesis-testing procedures are applied to these data. However, given the conflicting findings from prior research using similar instruments, this study uses elaborated responses obtained through the semi-structured interviews in several ways. Firstly, elaborated responses are tested for convergence with responses on scaled questions. The qualitative data are used also to explore the experience of performance measurement system integration, as established instruments do not exist for this construct. Finally, the qualitative data are used to elaborate on the contextual influences on relationships observed in the testing of hypotheses.

This study places a great deal of reliance on qualitative data. The semi-structured interview method proposed here might be rich in heuristic potential, but is subject always to the intrusive effects of interviewer bias, both during the interview and in the analysis of transcripts. This bias can affect significantly the credibility of theory building from qualitative data. Two tactical approaches are used in this study to attempt to limit bias. Firstly, I have used a systematic auditable process of developing theoretical propositions
from the qualitative data. This process, broadly based on Miles and Huberman (1994), and discussed in Chapter 5, provides an audit trail from transcribed text to the development of propositions. Secondly, the use of structured questions provides a participant-rated quantitative response not only on established scales, but also, more tentatively, on variables evaluated primarily in the qualitative data. These participant-rated data are tested for convergence with the findings based on the analysis of qualitative data.

In summary, this study seeks to establish its contribution to the literature not only through the study of an issue of practical and theoretical importance, but also by

1. drawing on the strengths of both quantitative and qualitative data for the study of the complex questions of interest
2. establishing a rigorous, auditable protocol for the development of propositions from qualitative data, and
3. subjecting, where possible, emergent propositions to scrutiny for support in participant-rated quantitative data.

The study design, utilizing qualitative data collated across multiple field sites, and the use of quantitative data to test for support for emergent propositions is similar to the design adopted by Abernethy and Lillis (1995).

The remainder of this thesis is structured as follows. Chapter 2 reviews in greater detail the literature that forms the conceptual foundation for this study. Propositions arising from that literature are set out in Chapter 3. Chapter 4 outlines the method adopted for the study, and the operationalization of the variables. Chapter 5 describes the protocol
used for the analysis of qualitative data. Chapters 6-9 detail the findings from the study. These chapters address the influence of strategy on the relative role of financial and non-financial performance indicators in the quantitative data (Chapter 6) as well as seeking further insight into these relationships in the qualitative data (Chapter 7). Chapter 8 details the findings relating to the integration of multiple performance criteria, primarily drawing on qualitative data. Chapter 9 synthesizes the findings reported in the prior chapters. Chapter 10 outlines the limitations of the study and directions for future research.
CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This study is founded conceptually in two streams of the management accounting literature. Firstly, the recent management accounting literature has devoted considerable attention to innovative 'strategic' approaches to manufacturing performance measurement (Dixon et al., 1990; Nanni et al., 1992; Kaplan and Norton, 1992; 1996(a); 1996(b); 1996(c)). This literature has not yet, however, examined systematically the relative role of financial and non-financial measures of performance at different management levels. Nor has it dealt adequately with the integration of financial and non-financial measures within 'strategic performance measurement systems'. Anecdotal reports in the literature and casual observations of practice suggest that traditional financial performance measures such as the analysis of cost variances resist redundancy. Literature relating to the influence of management level on the assessment of relevance of such reports, and their integration with multiple, non-financial performance dimensions is examined in Section 2.2.

Secondly, contingency studies of management control system design are reviewed for the insight they can offer on the link between strategy and the relative role of financial and non-financial performance measures in manufacturing management control. The inconclusiveness of these studies has attracted attention in the literature (Dent, 1990; Langfield-Smith, 1997). A review of this literature suggests that the conflicting findings
may be related to differing construct definitions and levels of aggregation, and lack of
evaluation of the impact of jointness in strategy on management control system design.
These interpretations of the conflicting findings of prior studies are discussed in turn in
Section 2.3.

The outcome of the literature review that follows is a set of propositions which
1. relate manufacturing strategy to the relative reliance on financial and non-financial
   performance measures by profit centre managers in exercising management control
   over the manufacturing function,
2. relate manufacturing strategy to the integration of financial and non-financial
   performance measures, and
3. suggest implications for performance measurement system effectiveness of linking
   manufacturing strategy with performance measurement system design
   characteristics.

These propositions are established in Chapter 3.

2.2 Models of performance measurement: - the new and the old

During the early part of the past decade, the management accounting literature continually
questioned the relevance of traditional cost management and performance measurement
systems in 'new' manufacturing environments. It was widely suggested that measures
such as variances from standard may not only be irrelevant but their continued use may,
in fact, actively discourage continual improvement, innovation, customization and quality
programs (Richardson and Gordon, 1980; Johnson and Kaplan, 1987; Berliner and
Brimson, 1988; Hayes et al., 1988; Drucker, 1990; Kaplan, 1990; Nanni et al., 1992;
Fisher, 1992; Kaplan and Norton, 1992). This literature exhorted us to abandon traditional systems and to develop new cost management and performance measurement systems that would support both the development and implementation of new competitive priorities. Almost invariably, these prescriptions involved increasing reliance on non-financial, quantitative performance measures and the design of new 'strategic' cost management systems based on, for example, activity-based costing, value-added accounting or target costing (Cooper and Kaplan, 1988; Berliner and Brimson, 1988; Shank, 1989; Kaplan, 1990). While not new, the suggestion that performance measurement systems should measure strategically important financial and non-financial criteria has gained momentum (Flamboltz, 1979; Kaplan and Norton, 1992; Nanni et al., 1992; Simons, 1995; Kaplan and Norton, 1996(b); Moon and Fitzgerald, 1996).

Two analytical deficiencies are, however, evident in this literature. Firstly, the literature focused on new costing and performance measurement approaches has tended to dismiss cost accounting-based performance measures as irrelevant and dysfunctional in the context of day-to-day operational control. The significance of such assessments is questionable given that the limited relevance of accounting reports in plant-level control is already widely acknowledged in the literature. Secondly, the types of accounting performance reports described in the literature proposing new 'strategic' performance measurement approaches frequently assume that accounting performance measures are developed using unsophisticated, inadequate cost benchmarks. This literature may underestimate the quality of cost-based performance reporting systems in practice. These two issues are addressed in turn.
2.2.1 Management level and the relevance of cost-focused performance reports.

Studies of the use of internal accounting reports across management levels almost invariably report little use of accounting data at operating management levels and significant use at higher levels (Simon et al., 1954; Dixon et al., 1990; Euske et al., 1993; McKinnon and Bruns, 1992). McKinnon and Bruns (1992) confirm and extend the early findings of Simon et al. (1954). They found no instances of financial indicators being used for day-to-day operational control. On the other hand, they found that monthly income or expense reporting was regarded as critically important in management control. In particular, the analysis of variances between actual and planned performance becomes a primary element in manufacturing management control over monthly time frames, and at higher levels of management. These reports achieve their importance in two ways. Firstly the financial data provide a model from which day-to-day quantitative measures are derived. Secondly, when considered over a longer time dimension, financial indicators transcend physical counting measures in the importance placed on them by higher level managers. In line with Simon et al. (1954) and Dixon et al. (1990), McKinnon and Bruns (1992) conclude that the importance of internal accounting reports in manufacturing relates to

- their corroborative nature,

- the fact that they reflect an accumulation and averaging of day-to-day events,

- the need to assess whether expectations have been met,

- the need for an overview of the financial ramifications of managers' actions over time,

- using financial reporting to reinforce mental models of the relationships between physical events and financial outcomes.
It is notable that these roles for internal accounting reports do not relate to operational management or daily time frames. The management accounting literature has tended to dismiss financial reporting systems for manufacturing management control without full consideration of these types of broad monitoring purposes, and without identifying how non-accounting sources can satisfy these information needs. Furthermore, in considering the relevance or potential dysfunctionality of accounting in particular strategic contexts, it does not systematically evaluate relevance in these roles. Rather this literature tends to be critical of traditional cost accounting practices for failing to recognize operational improvements (Kaplan, 1983; 1990) and identify sources of value and drivers of waste (Johnson, 1990). In contrast, following McKinnon and Bruns (1992), it can be argued that over longer time frames and at higher levels of management the conversion of both expectations and outcomes to financial terms potentially allows for the combination of performance on multiple criteria, and the evaluation of the effect of inherent trade-offs between conflicting criteria (Fisher, 1992). Similarly, Dixon et al. (1990:118) conclude that firms are not simply slow to break with financial measures, but that "differential use of accounting-based measures reflects different needs and different questions for different problems".

Studies such as McKinnon and Bruns (1992) and Euske et al. (1993) offer an empirically grounded theoretical explanation for the persistent popularity of cost-based performance reports. They suggest that evaluations of the relevance or roles of such systems must focus on appropriate time frames, appropriate levels of management, and must allow for performance measures to take on corroborative and monitoring roles rather than assuming
that they must be 'drivers of action'. Such systematic evaluations have not taken place in the 'strategic management accounting' literature. In general, this literature has failed to address consistently the managerial level of analysis in its examination of the importance or characteristics of specific accounting controls and their links with strategic priorities. In addition, it has been suggested elsewhere that it is the control practices in use at the profit centre level which are both critical (Merchant, 1985) and not well understood (Otley, 1994) in the literature.

The combination of the literature which deals with performance reporting as a function of the level of management (Euske et al., 1993; McKinnon and Bruns, 1992) and the literature which deals with strategic approaches to performance measures (Nanni et al., 1992; Kaplan and Norton, 1992; 1996(b)) would suggest that both financial and non-financial dimensions of performance are likely to be important at the profit centre management level. Section 2.3 examines how relative reliance on financial and non-financial performance dimensions is linked with manufacturing strategy.

This study examines the use of financial and non-financial performance indicators by profit centre managers in the evaluation of overall manufacturing performance. Following McKinnon and Bruns (1992), this study focuses on cost variance reports as a critical financial performance report at the profit centre level. There is evidence of persistent use of cost variance reports at this level in practice, despite significant criticism of such controls in the literature on 'strategic performance measurement'. For this study, cost variance reports are defined as periodic reports that compare actual and budgeted
manufacturing costs. The integration of financial and non-financial performance dimensions is examined in the next subsection.

2.2.2 The relationship between cost targets and non-financial dimensions of performance

The recent literature on performance measurement not only fails to adequately distinguish information needs at different levels of management, it also has paid little attention to differences in the way cost benchmarks are constituted in practice to integrate multiple performance expectations. The management accounting literature has not studied systematically the relationship between cost targets and non-financial performance indicators used in the overall monitoring of manufacturing performance. The literature tends to argue that traditional cost management systems based on internally-engineered cost standards are incongruous with notions of continual improvement because such standards may embody unacceptable waste and slack compared with 'best practice' benchmarks (Kaplan, 1983; 1990; Berliner and Brimson, 1988; Martin et al., 1992). In addition, traditional cost standards promote target achievement rather than performance improvement (Goold and Quinn, 1990). Furthermore, standard cost comparisons are seen to promote over-production and poor quality by focusing on production efficiency at the expense of competing goals (Berliner and Brimson, 1988; Kaplan, 1990). These criticisms are all to be levelled at poorly constituted benchmarks. For example, cost targets based on incremental adjustments to internal, efficiency-focused historical data may be dysfunctional to quality improvement, inventory reduction or flexibility. Alternatively, it is feasible that cost benchmarks are developed to reflect the anticipated cost of multiple goal achievements. Cost targets which look qualitatively 'simple' may reflect expected progress towards international best practice benchmarks, taking into
account quality improvements, technological changes, manufacturing flexibility and shortened cycle times. All of these process changes have cost implications and those implications can, at least theoretically, be embodied in standards. McNair et al. (1990) argue that leading edge firms are changing the definition of a standard rather than eliminating standard costing, and seeking 'connections' between financial and non-financial performance scorecards. Standards modified to incorporate the 'cost' implications of multiple performance expectations would establish such connections. Such standards would be potentially both congruent with new manufacturing priorities and a relevant tool for monitoring strategy implementation.

While it may be argued that such systems are not traditional, it is important to note that they would not, on face value, look significantly different from traditional cost variance reports. Essentially, problems such as excessive inventories, poor quality or inflexibility may not arise because actual financial results are compared with expectations, but because the benchmarks used in the comparison do not accommodate commitments to high quality, flexibility and low inventories. The argument here is consistent with Otley's (1994:295) suggestion that "there is nothing in the traditional cybernetic control model which precludes the philosophy of continual improvement but neither has it contained much to stimulate it". Given that the arguments used to dismiss cost-based performance measures are based generally on technical inadequacy, it is likely that differences in the constitution of cost benchmarks may significantly affect relevance. Furthermore such differences in constitution may be related systematically to strategy. As firms adopt strategies focused on quality or flexibility, and continue to use comparisons of actual and expected costs, it may become more important to modify cost benchmarks to allow 'less
efficient' performance choices which are consistent with quality or flexibility goals. This study examines differences in the way cost targets are constituted to integrate performance expectations relating to quality and customer responsiveness, and seeks evidence of links between benchmark constitution and strategy.

To summarize, this study seeks to contribute to the literature on strategic performance measurement by focusing on two design dimensions that have received little attention in the literature. Firstly, this study examines the use of accounting performance measures by profit centre managers in evaluating manufacturing performance. Secondly, this study examines empirical attempts to integrate financial and non-financial performance expectations. Both of these dimensions are potentially relevant to clarifying the link between strategy and the design of performance measurement systems.

2.3 The strategy/management control system design literature

In contrast to the literature discussed in the preceding section, the literature linking strategy and management control system design, developed predominantly from a contingency perspective, has sought systematically to uncover patterns in reliance on accounting in performance measurement in specific strategic contexts. This literature has tended to focus on reliance on accounting at the strategic business unit management level. However, despite its more robust theoretical and empirical bases, compared with the recent literature on performance measurement in manufacturing, the results of these studies have been conflicting and unconvincing (Dent, 1990; Langfield-Smith, 1997).
It is implicit in the strategic management accounting literature reviewed earlier that a focus on meeting cost targets is not aligned with a strategic emphasis on, for example, quality and manufacturing flexibility. Similarly, both Miles and Snow (1978) and Porter (1980) argue that defenders or cost leaders maintain their position by careful attention to cost, whereas prospectors and differentiators need to shift the emphasis of management controls to monitor their sources of competitive advantage. Studies of the impact of strategy on management control system design provide little empirical support for the proposition that cost-focused performance measurement systems are less important as manufacturing strategies move away from cost leadership. Rather, commitments to flexibility and other differentiation strategies in manufacturing seem to imply the need for measures that supplement rather than supplant traditional cost accounting measures (Khandwalla, 1972; Govindarajan and Gupta, 1985; Dunk, 1992; Abernethy and Lillis, 1995). Even this level of generalization from empirical studies of the strategy-management control system design link is, however, problematic. The research to date has produced conflicting findings. It appears that reliance on financial control systems can be hypothesized to be either high (Miller and Friesen, 1982; Simons, 1987; Sim and Teoh, 1997) or low (Govindarajan, 1988) for prospector-type firms. Financial control may not be related to performance for defender-type firms (Simons, 1987), it may be hypothesized to be high (Govindarajan, 1988; Abernethy and Lillis, 1995) or it may appear to be unrelated to strategic commitment (Govindarajan and Gupta, 1985; Merchant, 1985).

An analysis of the commonalities and conflicts in the findings of these studies provides the potential for a significant contribution to theory development. The lack of consistent
results emerging from these studies arises, at least in part, from incomparable variable
definitions and levels of aggregation that tend to confound comparative interpretations of
their results. More specifically, two limitations of prior studies are identified as important
to the development of the hypotheses of this study. Firstly, prior studies tend to aggregate
control system elements in a way that does not support conclusions regarding the
influence of strategy on the use of any specific control techniques. Secondly, these
studies tend to focus on strategic archetypes and ignore the implications of jointness in
strategy. These issues are discussed in turn in the subsections that follow.

2.3.1 Incomparable definitions of the elements and characteristics of management
control systems in contingency studies

Some apparent conflict in the findings of prior studies of the link between strategy and
management control system design may arise because of incomparable levels of
aggregation in the definitions of control systems. The aspects of control systems studied
include individual elements such as standard costs and variances (Khandwalla, 1972;
Simons 1987), categories such as 'efficiency measures' (Abernethy and Lillis, 1995), the
components of incentive schemes (Govindarajan and Gupta, 1985), budget evaluative
style, (Govindarajan, 1988) and average use of controls (Miller and Friesen, 1982). It is
clear from those studies that have focussed on the separate elements of control systems
(Khandwalla, 1972; Macintosh and Daft, 1987; Simons, 1987) that aggregated control
system measures will hide shifts in reliance on individual elements. For example, Simons
(1987) found that high-performing prospector firms attached a great deal of importance to
tight budget goals and output monitoring, but not to cost control. Such subtle distinctions
are missed in studies focused on more aggregate control system characteristics such as the
use of efficiency measures (Abernethy and Lillis, 1995) or budget evaluative style
(Govindarajan, 1988). The incomparable control system attributes, levels of aggregation and construct definitions in these studies result in a failure to develop coherent interlocking theory on strategy-contingent management control system designs (Langfield-Smith, 1997). It remains difficult to predict the impact of strategic differences on the roles of specific, critical control techniques.

In summary, the impact of strategy on the choice of manufacturing performance criteria by profit centre managers has not been empirically tested. On one hand, the recent strategic management accounting literature has focused on the choice of criteria, but generally at operating levels of management. On the other hand, the strategy/management control system design literature has focussed on the reliance on various forms of quantitative performance measures or other management control system characteristics at the profit centre management level, but has not reliably extracted the reliance on any specific accounting performance measures.

The proposed study seeks to evaluate the relative reliance by profit centre managers on cost-based and non-financial performance criteria in manufacturing performance measurement. By adopting a focus on cost variance reports, this study attempts to explore the implications of strategy on the use of specific accounting performance measures. This study attempts also to identify separately the non-financial criteria which may be strategically important at the profit centre management level, and to relate reliance on non-financial performance measures to strategy.
2.3.2 The unexplored implications of joint strategies

A second potential limitation of prior strategy-management control system design studies arises from the incomplete specification of the strategy variable. Several of the studies referred to in previous subsections define strategy in terms of cost leader/differentiator or prospector/defender archetypes (Simons, 1987; Govindarajan, 1988). These opposite ends of a continuum are a useful focus in order to understand the implications of strategic difference on control system design. This approach, however, ignores the implications of jointness in strategy. It is notable that the strategic management and manufacturing management literatures have devoted considerable attention to the issue of whether the manufacturing strategies of cost, quality, flexibility and dependability are pursued jointly, independently or sequentially (Crowe and Nuño, 1991; New, 1992; Buffa, 1984; Belohlav, 1993). Evidence is accumulating that global competitiveness in manufacturing requires that firms choose a combination of manufacturing strategies and that world-class manufacturers will be those that balance all strategies within the manufacturing function (Hill, 1988; Jones and Butler, 1988; Nemetz and Fry, 1988; Drucker, 1990). This adds to the impression that mixed strategies may be increasingly common.

While Porter's (1980) strategic taxonomy does not allow for mixed strategies, Miles and Snow (1978) include an 'analyser' category. The 'analyser' is a viable combination of prospector and defender attributes with its own distinct configuration and strengths and weaknesses. As such, it is an archetype that reflects jointness in strategic directions. To the extent that strategies are, in practice, mixed, the direct link between strategy and management control system design will be conceptually complex, and not predictable from a study of the archetypes at the ends of the continuum. Given that we do not know
how or to what extent strategy mix affects control system design, it is feasible that the conflicting findings in the studies to date reflect unrecognized mixed strategic commitments. Jointness in strategy may provide a rationale for the prevalence of financial controls in varied strategic contexts. As prospector and defender attributes are combined, the management focus shifts to balancing efficiency against the achievement of goals related to market effectiveness (Miles and Snow, 1978). For example, in a manufacturing environment, joint strategies would be reflected in an attempt to balance maximum production efficiency against commitments to quality and customer responsiveness. Given the mounting evidence in the strategic and manufacturing management literatures regarding the competitive drive to balance joint strategic priorities, the pursuit of joint strategies is admitted into the model studied here.

Porter's (1980) strategic taxonomy is preferred to Miles and Snow (1978) for the study of manufacturing strategy because Porter focuses on identifiable competitive capabilities that support differentiation and cost leadership. These capabilities have direct implications for the manufacturing function (Buffa, 1984; Ward et al., 1996). Furthermore, the way in which firms compete in product markets determines the relative importance of quality, resource flexibility and cost control, with potentially direct implications for the design of performance measurement systems. While Porter's taxonomy was developed originally to classify business unit strategy, it has been extended to classify manufacturing strategic priorities (Buffa, 1984). Porter did not consider joint commitments to cost leadership and differentiation to be viable at the time his model was developed. However, recent evidence would suggest that the competitive environment and technological capacity for manufacturing to differentiate at low cost have both changed (Hill, 1988; Pine, 1993;
Kotha, 1995; Schroeder et al., 1995). For this study, Porter's taxonomy is used as a means of defining strategic priorities, but cost leadership and differentiation are treated as independently determined commitments rather than forced-choice alternatives. It is argued that the pursuit of cost leadership is related to the reliance on cost variance reports in manufacturing performance measurement and the pursuit of strategic differentiation through quality and/or flexibility is related to the reliance on non-financial quantitative performance measures. Strategic commitments to cost leadership and differentiation are measured on independent scales, and the two contingent relationships are examined both separately and jointly.

2.4 Matching strategy and performance measurement system design - the impact on effectiveness

Selto et al. (1995) suggest that it is a potential strength of contingency frameworks that they include a test of whether an appropriate fit between control system attributes and contextual factors results in superior firm performance. The prospect of testing the implications for firm performance of matching control system design to contextual attributes is highly appealing. This is especially true in accounting where it is assumed that control systems contribute to the successful operation and profitability of the firm (Merchant and Simons, 1986). The impact of such a fit on performance has, however, been notoriously difficult to test because of the static, cross-sectional nature of most of these studies and the confounding influences on performance beyond control system design (Otley, 1980; Abernethy and Lillis, 1995) as well as the general imprecision in modelling contingent interactions (Schoonhoven, 1981). Merchant and Simons (1986) suggested more than a decade ago that contingency research had generally failed to
demonstrate that the hypothesized relationships benefited the organization. Langfield-Smith's (1997) review suggests little has changed.

For this reason, it is proposed in this study to measure the effectiveness of the manufacturing performance measurement system directly rather than assume that firm performance is a significant function of the fit between strategy and performance measurement system design. It is proposed firstly that the relative importance of financial and non-financial performance measures in measuring the performance of manufacturing subunits, when matched to an appropriate strategic context, will result in a more effective performance measurement system. Secondly, it is proposed that the constitution of the cost targets used in financial performance measurement to 'integrate' non-financial performance expectations can enhance the effectiveness of the performance measurement system when cost targets are used in differentiation contexts.

Flamholtz (1979) outlined three dimensions along which the effectiveness of a management control system could be evaluated:

**Behavioural relevance** - extent to which the control system identifies all relevant behaviours or goals which are required by the organization.

**Behavioural validity** - extent to which a control system leads to the behaviour to which it purports to lead.

**Behavioural reliability** - extent to which a control system repeatedly produces the same behaviour, regardless of whether this behaviour is intended or not.
Two of these constructs are used in this study for the assessment of performance measurement system effectiveness - behavioural relevance and validity\(^1\). These two dimensions embody the firm's goal preferences in that they capture the extent to which the performance measurement system encompasses all strategically important criteria, and promotes the achievement of strategically important goals. There are many potential dimensions along which effective performance measurement systems could be measured, although there is no evidence of systematic attempts to do so in the accounting literature. The dimensions of relevance and validity are used in this study as they capture both the sources of criticism of traditional performance measurement systems and the rationale for new developments in strategic performance measurement systems. The recurrent themes in that literature would suggest that strategic performance measurement systems will encompass the range of strategically important criteria (relevance) and that they will avoid displacement of strategically important goals (Nanni et al., 1992; Kaplan and Norton, 1996(b); Moon and Fitzgerald\(^1\), 1996). Anecdotally, it is suggested in this literature that such strategic performance measurement systems are more effective management controls than traditional performance measurement systems because of their strategic fit. Thus, rather than assuming that there is some universal concept of firm effectiveness that can be defined and measured, this approach attempts to focus on the realization of specific firm intentions (Steers, 1975). The relevance and validity of the performance measurement system are assessed in terms of intended consequences of the performance measurement system.

\(^1\) The third construct, 'behavioural reliability' relates to a system producing valid or invalid behavioural stimuli consistently. It was determined that this was not an appropriate measure of performance measurement system effectiveness for this study, and that the performance measurement system attribute of promoting goal congruence was captured by the other two dimensions.
2.5 Summary

This study seeks empirical evidence of a link between competitive strategy, relative reliance on financial and non-financial performance measures and the integration of multiple performance criteria in the evaluation of manufacturing performance by profit centre managers. This study takes its conceptual foundations from recent models of strategic performance measurement, and from the empirical findings of prior contingency studies. More specifically, this study seeks to advance the literature by:

1. focusing on the use of financial and non-financial performance measures rather than investigating links between 'whole systems' or their generic characteristics and contingent factors,

2. clearly matching the managerial level of analysis to the performance measurement system design issues under study,

3. examining the way cost benchmarks are constituted and integrated with other non-financial performance criteria, and

4. examining the implications of joint strategies on performance measurement system design.
CHAPTER 3

RESEARCH QUESTIONS AND HYPOTHESES

3.1 The research issue

This study examines the relationship between manufacturing competitive strategy and
1. reliance on financial and non-financial performance measures for manufacturing
   management control, and
2. the way cost benchmarks used in financial performance measures are constituted to
   integrate non-financial dimensions of performance.

These links between manufacturing competitive strategy and the design and constitution
of performance measurement systems are tested also for implications on performance
measurement system effectiveness.

Following the literature review in Chapter 2, this chapter establishes propositions
concerning the expected direction of the relationships expressed in the research questions.
The general structure of these propositions is reflected in Figure 3.1. In Section 3.3,
Hypotheses 1-3 specify the linkages marked 'A', 'B' and 'C' in Figure 3.1. Reporting the
results of testing these hypotheses is, however, only a partial contribution of this study.
The hypotheses are established both to test propositions which are based on
interpretations of the existing literature, and as a focus for the analysis of qualitative data
in theory building. This dual role of the formal hypotheses established in Section 3.3 is
discussed in the next section.
3.2 The role of hypotheses in this study

A major potential contribution of this study lies in the attempt to combine a hypothetico-deductive method with an attempt to build theory from the analysis of qualitative empirical data. The hypotheses established in the following section (Section 3.3) are tested using established quantitative techniques. For several reasons, these hypothesis tests are not intended to be the most critical contribution of this study.

Firstly, one of the questions of interest is exploratory, and established instruments relating to this construct do not exist. More specifically, the relationship between the integration of multiple performance dimensions and strategy is exploratory. A primary aim of this thesis is to develop new theory in this area by drawing on both expanded interview data, and relevant participant-rated quantitative data. The hypotheses developed in Section 3.3,
to the extent that they relate to this relatively exploratory issue, represent a focus for data analyses rather than an end in themselves. They represent broad propositions based on existing theory, which provide the basis on which the contribution of the qualitative data from this study can be analysed.

In the case of hypotheses linking reliance on financial and non-financial performance measures with strategy, and those proposing effectiveness implications of the fit between strategy and performance measurement system design characteristics, there is an existing body of literature, and established instruments. As argued in Chapter 2, however, prior contingency studies have produced equivocal results. This study attempts to overcome some of the identifiable causes of conflicting findings in prior studies by clarifying the control system elements and level of management under study and by recognizing the potential implications of jointness in the strategy variable. This study is focused also on exploratory 'why' and 'how' questions to elaborate on the relationships expressed in these hypotheses. Such questions are most appropriately explored in qualitative data (Yin, 1994). This study attempts to make a contribution to the contingency literature through both the testing of contingency-type hypotheses, and the analysis of elaborated responses that may shed light on the empirical complexity of strategy-contingent relationships.

Thus, while there is an attempt to test theory in this study, its primary contribution is expected to be in shedding new light on the nature of strategy-contingent performance measurement system design characteristics and thus to build new theory. In this context, the hypotheses can be seen as focusing and defining the issues subject to analyses. Where hypotheses are tested in quantitative data, these results are then interpreted in the light of a
systematic qualitative analysis of expanded responses in order to enhance our understanding of the empirical interpretations of the variables and their interactions. Where participant-rated quantitative data are not available on questions of interest, then those issues are explored through the same systematic qualitative analysis of interview responses. It is anticipated that the interpretations that emerge from that qualitative analysis will support the development of further propositions to inform future research. The following section establishes the formal propositions that are the basis of subsequent hypothesis testing, and the focus of theory building.

3.3 Propositions

3.3.1 Strategy and the relative reliance on financial and non-financial measures

Following McKinnon and Bruns (1992), and arguments developed in Chapter 2 (Section 2.2.1) this study focuses on cost variance reports as a critical financial performance report at the profit centre level. Prior literature examining the link between strategy and reliance on accounting can be used to suggest the direction of formal propositions linking manufacturing competitive strategy and reliance on cost variance reports. Based on the work of Miles and Snow (1978), Porter (1980), Govindarajan (1988), Shank (1989), Kaplan (1990) and Lord (1996), it is argued that reliance on cost variance reports for performance measurement is likely to be related to the pursuit of cost leadership. As the focus shifts from 'low cost' to 'differentiation' by quality, flexibility or service, there is expected to be a greater need to supplement cost variance information with non-financial performance indicators. An emphasis on meeting predetermined cost targets may impede competitive initiatives focused on quality, flexibility or service. Thus, performance measurement systems for differentiating firms are likely to reflect increased reliance on
non-financial quantitative performance measures of quality, flexibility and customer service.

To the extent that firms seek to compete on the basis of both low cost and differentiation, it is expected that the performance measurement system will encompass both financial and non-financial performance measures and that management would need to analyse, interpret and balance a variety of signals (Miles and Snow, 1978; Abernethy and Lillis, 1995).

The following hypotheses are developed to incorporate mixed strategic commitments, and to focus specifically on linking strategy with reliance on cost variance reports and with reliance on non-financial quantitative performance measures. These hypotheses, which elaborate on linkage 'A' in Figure 3.1, are illustrated in Figure 3.2.

H1(a) The pursuit of cost leadership is associated positively with reliance on cost variance reports by profit centre managers in evaluating the overall performance of manufacturing subunits.

H1(b) The pursuit of strategic differentiation is associated positively with reliance on non-financial quantitative performance measures by profit centre managers in evaluating the overall performance of manufacturing subunits.

H1(c) The pursuit of mixed strategic priorities is associated positively with reliance on cost variance reports and non-financial quantitative performance
measures by profit centre managers in evaluating the overall performance of manufacturing subunits.

Figure 3.2
Illustration of expected relationships between strategy and reliance on performance measurement systems (PMS) components

<table>
<thead>
<tr>
<th>Commitment to Cost Leadership</th>
<th>‘Cost Leadership’</th>
<th>‘Mixed’</th>
<th>‘Differentiators’</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Reliance on financial performance measures - High</td>
<td>Reliance on financial performance measures - High</td>
<td>Reliance on non-financial performance measures - High</td>
</tr>
<tr>
<td>Low</td>
<td></td>
<td></td>
<td>Reliance on non-financial performance measures - High</td>
</tr>
</tbody>
</table>

Commitment to Differentiation
Low High

3.3.2 Strategy and the constitution of financial benchmarks

Propositions linking strategy and the constitution of financial benchmarks are tentative and exploratory, and are designed to be explored in the qualitative data rather than in the structured questionnaire data collected from participant managers. The general proposition, developed from the literature in Chapter 2 (Section 2.2.2), is that cost targets used in performance measurement in differentiating contexts would be expected to be modified so that they do not hinder a strategic emphasis on quality or flexibility. The

\[^2\] The empty cell in Figures 3.2 and 3.3 reflect non-viable strategic positions. This study does not propose any performance measurement implications associated with such a position.
form that such modifications take has not been examined previously. It is argued here that modifications may produce cost targets that reflect the anticipated cost of multiple goal achievements. Following debates in the recent management accounting literature, it is expected that relevant financial benchmarks for differentiating firms would need to depart from internal efficiency-focused historical data and would need to integrate the requirements for competitive advantage such as quality and flexibility. Consistent with this proposition, it is expected that not only 'pure differentiators' but also firms pursuing mixed strategies, will modify cost benchmarks in order to integrate the anticipated cost of multiple goal achievements. Given the uncharted nature of the modifications that may be found in practice, Hypothesis 2 is deliberately stated in broad terms. The proposition in this case is used as a focal point for qualitative analysis, rather than for quantitative hypothesis testing. The use of propositions in this way is an integral part of this thesis, and was discussed in Section 3.2. These hypotheses, which elaborate on linkage 'B' in Figure 3.1 are illustrated in Figure 3.3.

H2(a) The pursuit of cost leadership is associated positively with the use of 'traditional' budgeted cost benchmarks in cost variance reports.

H2(b) The pursuit of strategic differentiation is associated positively with the use of 'modified' cost benchmarks in cost variance reports.

H2(c) The pursuit of mixed strategic priorities is associated positively with the use of 'modified' cost benchmarks in cost variance reports.
While the constitution of cost benchmarks is relatively unexplored empirically, the use of 'modified' rather than 'traditional' cost benchmarks relates to the extent to which cost benchmarks used in cost variance analysis are modified to integrate the anticipated cost of meeting goals related to quality and customer responsiveness.

![Figure 3.3](image)

**Figure 3.3**

Illustration of expected relationships between strategy and constitution of cost benchmarks

<table>
<thead>
<tr>
<th>High Commitment to Cost Leadership</th>
<th>'Cost Leadership' Tradition benchmarks</th>
<th>'Mixed' Modified benchmarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Commitment to Differentiation</td>
<td>'Differentiators' Modified benchmarks</td>
<td></td>
</tr>
</tbody>
</table>

3.3.3 Strategy, performance measurement system design and effectiveness

Finally, propositions linking contingent relationships with performance measurement system effectiveness are stated. These hypotheses, which elaborate on linkage 'C' in Figure 3.1, are illustrated in Figure 3.4.

H4(a) In the management control of manufacturing subunits, an appropriate match between manufacturing strategy and the relative reliance on financial
and non-financial performance measures results in greater performance measurement system effectiveness.

H4(b) In the management control of manufacturing subunits, an appropriate match between manufacturing strategy and the constitution of financial benchmarks used in cost variance analysis results in greater performance measurement system effectiveness.

3.4 Summary

This chapter has established a set of formal propositions which state directional expectations regarding the relationships between variables expressed in the research questions. Given both the exploratory nature of the research question underlying Hypothesis 2, and the equivocal results from prior studies of the research question underlying Hypothesis 1, considerable importance is attached to the interpretation of expanded interview responses in this study. Rather than simply testing hypotheses, this study aims to contribute to the literature through the analysis of qualitative data to interpret the empirical nature of the variables, to interpret findings and build theory. The research design and method to achieve these aims are discussed in Chapter 4. Steps have been taken in this study to reduce bias and enhance the validity of these theory-building processes. These steps are discussed fully in Chapter 5.
Figure 3.4
Illustration of 'effective' relationships between strategy and performance measurement system design variables ('✓' represents expected positive outcomes and '×' represents outcomes expected to be less effective).

(1) Effectiveness implications of matching commitment to cost leadership with reliance on financial performance measures.

<table>
<thead>
<tr>
<th>High</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commitment to Cost Leadership</td>
<td></td>
</tr>
<tr>
<td>✓</td>
<td>×</td>
</tr>
<tr>
<td>×</td>
<td>✓</td>
</tr>
</tbody>
</table>

Reliance on Financial Performance Measures

(2) Effectiveness implications of matching commitment to differentiation with reliance on non-financial performance measures.

<table>
<thead>
<tr>
<th>High</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commitment to Differentiation</td>
<td></td>
</tr>
<tr>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td>✓</td>
<td>×</td>
</tr>
</tbody>
</table>

Reliance on Non-financial Performance Measures

(3) Effectiveness implications of matching constitution of cost benchmarks with strategy.

<table>
<thead>
<tr>
<th>High</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional Benchmarks</td>
<td>Modified Benchmarks</td>
</tr>
<tr>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Commitment to Differentiation

47
CHAPTER 4

METHOD - THE STUDY DESIGN

4.1 Introduction

In examining the relationship between strategy and the design of performance measurement systems at the profit centre manager level, this study seeks to

1. test hypotheses which link the relative reliance on financial and non-financial performance measures to strategy and

2. build new theory through the empirical exploration of the mechanisms used to integrate financial and non-financial performance measures, and how these mechanisms relate to strategy.

The study was conducted using semi-structured interviews in conjunction with data collected via a structured questionnaire to support tandem processes of hypothesis testing and theory building. The interaction between qualitative and quantitative data is a critical design feature of this study.

This chapter is structured as follows. Sections 4.2 and 4.3 outline the sample and instrument design respectively. Section 4.4 describes the way in which each variable was operationalized. In each case, a description of the properties of qualitative and quantitative variables relevant to the hypotheses is provided.
4.2 The sample

4.2.1 The population

The research questions call for the study of performance measures used by profit centre managers in evaluating manufacturing performance and an examination of the relationship between characteristics of performance measures and strategy. Time and cost considerations associated with the collection of qualitative data limited the sample of participant firms to the population of manufacturers in the State of Victoria, Australia. The population was further restricted to relatively large manufacturing firms with more than 200 employees\(^3\). This was considered necessary to increase the probability that firms would have formal performance measurement systems in place, and also to increase the comparability of firms.

A listing of Victorian manufacturing firms with more than 200 employees was obtained in May 1994, from the Victorian State Department of Business and Employment. The following descriptive data were provided for each firm.

- Contact address and telephone number
- Australian Standard Industrial Classification (ASIC) code
- Year commenced manufacturing
- Export data
- Products manufactured
- Contact names and positions of senior managers

\(^3\) When contact was made with the firms in the sample, it emerged that 8 firms had reduced their employment level below two hundred employees since the database was last updated. These firms were still included in the sample.
Table 4.1 identifies the industry classification of the firms in the population from which the sample was drawn.

### Table 4.1
**Population by industry classification**

<table>
<thead>
<tr>
<th>ASIC code</th>
<th>Description</th>
<th>No. of firms listed</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>Food, beverages, tobacco</td>
<td>53</td>
</tr>
<tr>
<td>23</td>
<td>Textiles</td>
<td>23</td>
</tr>
<tr>
<td>24</td>
<td>Clothing and footwear</td>
<td>29</td>
</tr>
<tr>
<td>25</td>
<td>Wood, wood products and furniture</td>
<td>7</td>
</tr>
<tr>
<td>26</td>
<td>Paper, paper products, printing and publishing</td>
<td>23</td>
</tr>
<tr>
<td>27</td>
<td>Chemical, petroleum and coal products</td>
<td>36</td>
</tr>
<tr>
<td>28</td>
<td>Non-metallic mineral products</td>
<td>15</td>
</tr>
<tr>
<td>29</td>
<td>Basic metal products</td>
<td>8</td>
</tr>
<tr>
<td>31</td>
<td>Fabricated metal products</td>
<td>31</td>
</tr>
<tr>
<td>32</td>
<td>Transport equipment</td>
<td>37</td>
</tr>
<tr>
<td>33</td>
<td>Other machinery and equipment</td>
<td>48</td>
</tr>
<tr>
<td>34</td>
<td>Miscellaneous Manufacturing</td>
<td>30</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>340</strong></td>
</tr>
</tbody>
</table>

### 4.2.2 The sample

Several features of the study design determined the sample size. The sample was required to be sufficiently large to be able to observe patterns across firms, and to conduct simple inferential statistical evaluation of results. However, the sample size was to be limited because the study design required semi-structured interviews and a structured questionnaire to be administered by the researcher alone. A sample size of 30-40 manufacturing firms was determined to be appropriate in this context. The firms were selected across industry categories with the aim of obtaining the participation of firms of comparable size, and with a variety of strategic orientations. Rather than sampling randomly from the 340 firms across all industry categories, the sample was drawn from ASIC codes 23, 24, 25, 26, 31 and 34. The aim was to select from
industries most likely to consist of firms pursuing a range of strategies, and where one or two very large firms would not dominate the industry.

Firms were selected randomly within each of these industry categories. Each firm was contacted, the name of the general manager obtained and a letter sent. A copy of the letter is included in Appendix A. One week later, the general manager was contacted by telephone to obtain agreement to participate and to schedule an interview. Table 4.2 shows the number of firms contacted and the number in each category that agreed to participate. The unadjusted response rate is 36/66 or 54 percent.

Table 4.2  
Industry classification of respondents and non-respondents

<table>
<thead>
<tr>
<th>ASIC code</th>
<th>Description</th>
<th>Number of firms contacted</th>
<th>Number agreeing to participate</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>Textiles</td>
<td>11</td>
<td>8 72.7</td>
</tr>
<tr>
<td>24</td>
<td>Clothing and footwear</td>
<td>13</td>
<td>7 53.8</td>
</tr>
<tr>
<td>25</td>
<td>Wood, wood products and furniture</td>
<td>2</td>
<td>1 50.0</td>
</tr>
<tr>
<td>26</td>
<td>Paper, paper products and publishing</td>
<td>8</td>
<td>4 50.0</td>
</tr>
<tr>
<td>31</td>
<td>Fabricated metal products</td>
<td>14</td>
<td>5 35.7</td>
</tr>
<tr>
<td>34</td>
<td>Miscellaneous manufacturing</td>
<td>18</td>
<td>11 61.1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>66</strong></td>
<td><strong>36 54.5</strong></td>
</tr>
</tbody>
</table>

The non-respondents are analysed in the next section.

---

4 Given the size of most of the firms in the sample, the general manager was typically a profit centre manager. In two cases it became apparent during an interview that the general manager was not at an appropriate level, and in both cases subsequent contact was made with managers at the profit centre level.
While the measurement of manufacturing performance was to be studied at the profit centre manager level, manufacturing managers were considered potentially valuable 'informants' in either confirming or contradicting the data collected from profit centre managers. In order to obtain limited tests of reliability, and keep the total number of interviews conducted to a manageable maximum of 50, follow-up interviews were conducted with 12 manufacturing managers from sample firms. With one exception, all of the profit centre managers approached for permission to pursue a follow-up interview with a manufacturing manager gave such permission, and all manufacturing managers approached for an interview agreed to participate.

The selection of firms to approach for a follow-up interview was a convenience sample. Random sampling was relatively difficult given the small number of profit centre manager participants, and also because the approach was made during the first interview. In convenience sampling, 'extreme' cases were not approached. That is, very large and very small participating firms, and those where the interview with the profit centre manager revealed very undeveloped systems were not approached for further contact with the manufacturing manager. The extent of agreement/disagreement between profit centre and manufacturing managers, and the implications for data analysis are discussed in Section 4.5.

The final sample consisted of 36 profit centre managers and 12 manufacturing managers. The interviews were conducted between June 1994 and January 1995. With one exception, all interviews were tape recorded and transcribed verbatim. All
transcripts were edited thoroughly to ensure verbatim accuracy. Demographic data relating to the sample, are summarized in Table 4.3

Table 4.3
Demographic data relating to the sample

<table>
<thead>
<tr>
<th>1. Size of participant firms (by number of employees)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Size</strong></td>
</tr>
<tr>
<td>&lt;200</td>
</tr>
<tr>
<td>200 - &lt;400</td>
</tr>
<tr>
<td>400 - &lt;600</td>
</tr>
<tr>
<td>600 - &lt;800</td>
</tr>
<tr>
<td>800 +</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Descriptive Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Size of firms (No. of employees)</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Profit centre manager participants</strong> *</td>
</tr>
<tr>
<td>- Length of service in firm</td>
</tr>
<tr>
<td>- Length of time in current position</td>
</tr>
<tr>
<td>- Age</td>
</tr>
<tr>
<td><strong>Manufacturing manager participants</strong></td>
</tr>
<tr>
<td>- Length of service in firm</td>
</tr>
<tr>
<td>- Length of time in current position</td>
</tr>
<tr>
<td>- Age</td>
</tr>
<tr>
<td><strong>Interview duration</strong></td>
</tr>
</tbody>
</table>

* 8 participants in the 'Profit centre manager' category were actually financial controllers or other senior managers. Where two managers participated in one interview, the characteristics of the most senior manager are included.

4.2.3 Non-response

While only limited data are available about non-respondents, their reasons for non-response are summarized in Table 4.4.
Table 4.4
Summary of reasons for non-response

<table>
<thead>
<tr>
<th>Reason given</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too busy or general manager overseas/going overseas</td>
<td>10</td>
</tr>
<tr>
<td>Unable to make contact with general manager after repeated attempts</td>
<td>7</td>
</tr>
<tr>
<td>Either not manufacturing in Australia, or not manufacturing any longer</td>
<td>6</td>
</tr>
<tr>
<td>Not interested for some other reason</td>
<td>3</td>
</tr>
<tr>
<td>General manager located interstate</td>
<td>2</td>
</tr>
<tr>
<td>General manager resigned after interview arranged</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
</tr>
</tbody>
</table>

If those no longer manufacturing or without a profit centre manager in Melbourne are excluded from the sample, then the response rate becomes 62 percent or 36 participants from 58 effective contacts. It was not possible to examine the relative size of respondents and non-respondents, as the only information included on the database was the classification of firms into the 'over 200 employee' category. There were no significant differences between respondents and non-respondents in the length of time the firm had been manufacturing, but there is some evidence in Table 4.2 that the distribution of non-respondents was not consistent across industry categories. Given the range of industries sampled, it is difficult to assess whether the low response rate from the 'fabricated metal products' industry introduces any bias into the results. There were no other data to assess the potential for non-response bias.

4.3 Instrument design - general characteristics

The study was conducted with a semi-structured interview and structured questionnaire administered in tandem. The interview was designed to seek elaborated responses and

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5 The typical approach used to assess potential non-response bias of comparing early and late respondents, was not available for this study, as the managers were contacted in five separate mailouts. This was necessary to 'spread' the interviews.
the structured questions were designed to elicit scaled responses on the research questions. This section outlines the general design principles adopted in the development of the research instruments.

4.3.1 The interview guide

The interview guide used in the study (Appendix B) is divided into four sections representing self-contained themes. For example, the performance measures used, the constitution of cost benchmarks and competitive priorities represent three separate themes. Each section contains a series of general questions and potential probes to be used in exploring that theme. The interview protocol was developed from methods documented by McCracken (1988) and Brenner, Brown and Canter (1985) based on their qualitative research experiences.

The interview design was based on the dual aim of avoiding bias, and ensuring adequate reporting within the frame of reference of the study (Brenner, 1985:151). The structure adopted helps minimize bias through the pre-specification of non-directive questions and probes. Such pre-conditioning reduces the tendency to resort to unplanned, non-neutral probes whilst in the field (McCracken, 1988). The interview guide was designed also to ensure completeness in covering the terms of reference of the study in each interview. In order to elicit full and undirected accounts from participants on the themes under study, the interview guide was designed to be used flexibly (Brenner, 1985). The guide did not require that questions be addressed in a particular order. The prespecification of questions and probes on each theme assisted in
maintaining a non-directive stance, even if used in a different order from that indicated in the guide.

4.3.2 The structured questionnaire

The structured questionnaire (Appendix C) was designed to be administered during the interview, to elicit participant-rated data on the variables under study. The fact that the structured questionnaire was administered during the interview limited some of the problems typically associated with survey instruments but raised others. The instrument did not rely on participants reading detailed instructions, as would be required for a mail-out survey. Nor was the identity of the actual respondent subject to question. However, the interview context for administration of the structured questions may have introduced bias. The interview invited semi-structured discussions on themes related to those covered by the survey instrument. These discussions may have increased the participants’ introspection on the issues covered. It may have increased also the respondents’ awareness of 'appropriate' responses. In either case, the questionnaire administered during the semi-structured interview may have produced results different from those expected from the same questionnaire administered through a mail-out survey. However, as it is the expanded responses that are most critical to this study, the influence of the interview context on the structured questionnaire responses was unavoidable. As the data are used predominantly for theory building based on drawing together both structured participant-rated responses and expanded responses, this potential bias was considered less problematic than would be the case in a pure hypothetico-deductive study. The next subsection deals with the establishment of face validity of the structured questionnaire established through pilot testing.
4.3.2.1 Pilot testing

As discussed in Chapter 1 (Section 1.4) the first pilot test focused on obtaining evidence of the empirical relevance of the general research questions posed in this study. This pilot test was focused at a conceptual level and tested the appropriateness of the orientation of this study on financial and non-financial performance measures and their integration, and the relevance of these issues at the profit centre management level. The pilot test confirmed the suitability of the framework, and the discussions held in those preliminary interviews assisted in the development of the structured questionnaire and interview protocol to be used in the study. The structured questionnaire was then subject to extensive peer review pilot testing. Many modifications were made to the entire instrument as a result of this peer review.

In addition, both the structured questionnaire and interview guide were re-examined after six interviews, and again after 15 interviews, with some changes being made to the instruments after 15 interviews. The changes made are detailed in Section 4.4 'Operationalization of Variables'. They are not considered to impact on the general useability of the first fifteen interviews. In keeping with the theory building or refinement orientation of this thesis, data redundancy was to be avoided. However, where the changes impacted on particular variables significantly, these were excluded from specific quantitative analyses using these variables. The circumstances in which

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6 Both the instrument development and results of peer review were submitted for assessment in a Master of Arts-level coursework unit in Survey Research Methods.
this occurred are discussed in the next subsection.

4.4 The operationalization of the variables

To test the hypotheses established in Chapter 3, the following variables were operationalized

- reliance on cost variance reports and non-financial quantitative performance measures
- constitution of financial benchmarks
- competitive strategy
- performance measurement system effectiveness

The way each of these variables was operationalized in both the qualitative and quantitative data is discussed in this section. For those variables operationalized in scaled responses, standard tests of reliability are reported here. Full descriptive statistics on these variables and a correlation matrix are in Tables 4.6 and 4.7 at the conclusion of this chapter. For those variables operationalized using the qualitative data, or relying on qualitative analysis for convergent validity tests, the general analytical model used is described in Chapter 5. The specific analyses conducted using the qualitative data are an integral part of the interpretive and theory building process. These analyses are described 'in context' as part of the elaboration of the findings in Chapters 6-9.

4.4.1 Reliance on cost variance reports and non-financial quantitative data

Reliance on cost variance reports was operationalized primarily in structured questions, based on extant instruments designed to measure reliance on accounting performance.
measures. The instrument used here was based on that used by Swieringa and Moncur (1975) and more recently by Abernethy and Stoelwinder (1991) to measure the use of budgeting information in performance evaluation. This instrument was adopted because of its specific focus on the use of budget variance information and prior demonstration of its internal reliability and unidimensionality (Abernethy and Stoelwinder, 1991).

The Swieringa and Moncur instrument uses a 5-item measure of use of budget information in performance evaluation. The item 'investigate items that are overspent' was excluded in this study as being unrelated in many instances to the use of manufacturing cost variance information for performance evaluation. Respondents were asked to indicate on a 7-point Likert-type scale ranging from 'not at all' to 'to a great extent', the extent to which the following four items described managerial behaviour.

- **Measure the performance of the manufacturing plant using actual compared with budgeted cost**
- **Place importance on meeting the cost budget**
- **Hold manufacturing management personally accountable for variances between actual and budgeted costs**
- **Require explanations concerning variances between actual and budgeted costs**

The reliability of the instrument was tested again on the data from this study, and showed a Cronbach coefficient alpha statistic of 0.87 for the above four items.

A similar four-item set was developed to test reliance on non-financial, quantitative measures of, for example, quality and flexibility. Using a similar 7-point Likert-type
scale, respondents were again asked to indicate the extent to which the following four items described managerial behaviour.

- Evaluate the manufacturing plant on quantitative (non-financial) performance indicators (e.g. delivery performance, quality statistics)
- Place importance on meeting quantitative (non-financial) targets
- Hold manufacturing management personally accountable for quantitative (non-financial) production results
- Require explanations concerning variances between actual and expected performance on quantitative (non-financial) targets

A reliability test indicated a Cronbach coefficient alpha statistic of 0.89 for these four items. Factor analysis of the eight items produced two factors with the rotated factor matrix showing the first four items loading onto Factor 1 and the latter four items loading onto Factor 2\(^7\). The factor structure and coefficients provide support for treating the first four items as one scale and the second four items as a separate scale.

For cross validation of the measures of reliance on cost variance reports and non-financial quantitative performance measures, respondents were requested also to list the three most critical performance measures used in the evaluation of the overall performance of the manufacturing subunit. Examination of the first 15 interview transcripts and questionnaires indicated responses to this question reflected differing levels of aggregation. For example, critical performance measures were identified by some managers as

1. cost variances
2. quality statistics

while other managers identified critical performance measures with less aggregation:

1. labour cost variances

\(^7\) Caution is required in interpreting the factor structure due to the limited sample size.
2. material cost variances

3. labour hours

These differences in aggregation may not reflect real differences in performance measurement practices. In order to 'standardize' the level of aggregation for the remaining managers in the sample, a list was compiled from which critical performance measures could be identified and ranked, with an open option to identify and rank unlisted measures used:

- Cost variances
- Quality statistics
- Productivity statistics
- Delivery schedule performance
- Production cycle times
- Lead times (order to supply)
- Customer ratings of manufacturing performance

Other: 1. (Most critical) 
2. 
3. 

Where subsequent analyses use a broad classification of the top ranked measure, the first 15 cases are included. Thus a top-ranked item such as 'labour variances' or 'cost variances' are both treated as 'cost variances' in the classification of the top-ranked measure. Where subsequent analyses use all three ranked measures, all cases potentially affected by the difference in aggregation introduced following the first 15 interviews are excluded.

Consistency between the ranked performance measures and scaled reliance measures was tested by comparing the mean reliance on cost variance reports and on non-financial performance measures for those cases ranking cost variances as the most critical performance measure, and those not. A t-test showed significantly higher
scores for reliance on cost variance reports for those cases indicating cost variances as the most critical performance measure (p=0.03). A similar t-test indicated that those ranking measures other than cost variances as most critical did not have significantly different mean reliance on non-financial performance measures. This result seems to be consistent with the generally high reliance on non-financial performance measures across the sample. This finding is discussed in Chapters 6 and 7.

Cross validation was attempted also with qualitative descriptions of the types of measures used and their relative importance. Both the relative reliance measures and the ranked data on the three most critical measures were examined for consistency with expanded responses during the interview. Elaborated responses regarding actual measures used are discussed in Chapter 7. The elaborated and scaled response data were found to be broadly consistent. The analytical processes by which this and similar evaluations were undertaken in the qualitative data are discussed fully in Chapter 5.

4.4.2 The constitution of performance benchmarks

In the absence of established instruments or prior research examining the constitution of benchmarks used in cost variance analysis, this variable was operationalized in the qualitative data. Managers were asked questions about how benchmarks used in cost variance reports were established and the extent and nature of linkage between financial and non-financial performance measures. The focus of analysis was on the extent to which non-financial performance criteria were 'integrated' with financial criteria.
Using analytical processes described in Chapter 5, firms were classified according to whether cost benchmarks were 'modified' to take into account the cost implications of pursuing goals such as quality and customer responsiveness. The nature of such modifications and evidence of other approaches to integration were examined in the elaborated responses.

4.4.3 Strategy

Manufacturing strategy was measured on three scales. The first measures the extent to which manufacturing strives to achieve low cost relative to competitors. The second and third measure the extent to which manufacturing strives to produce something perceived as unique or superior to competitors in terms of quality and/or flexibility.

The scale was developed based on Govindarajan and Fisher's (1990) operationalization of Porter's (1980) 'cost leadership' and 'differentiation' typology. Their instrument was modified. Firstly, it was adapted for manufacturing subunits. Secondly, rather than using a single weighted strategy index to classify firms as either 'low cost' or 'differentiation' strategic archetypes, this study used three scales to allow cost leadership and each form of differentiation to be independent priorities.

Govindarajan and Fisher (1990) established the construct and convergent validity of their instrument by using Dess and Davis (1984) factor analysis of the competitive methods related to overall low cost and differentiation strategies. They took 11 items with high factor loadings for cost leadership or differentiation, and obtained ratings of the importance of those competitive methods. They also confirmed the construct validity of
the strategy scale by asking managers to rate the current strategic business unit position relative to competitors on five competitive criteria\(^8\).

This study did not use the construct and convergent validity tests used by Govindarajan and Fisher, as they were not considered appropriate for this study. Firstly, they used ratings of current business unit position relative to competitors on five competitive criteria as a construct validity test. This is inherently a test of performance rather than strategic priorities. In addition, the 11 items used by Govindarajan and Fisher (1990) for overall cost leadership or differentiation priorities, were not appropriate at the manufacturing subunit level\(^9\). The competitive methods which would be consistent with Porter’s (1980) cost leadership strategic archetype at the manufacturing level would include elements of system design which make low cost possible, such as in-line operations, fabrication and assembly lines, equipment dedicated to a restricted mix of products, and specialized automated equipment (Buffa, 1984). In addition, Buffa (1984) described the cost leadership strategy as usually involving production to stock to enhance product availability, and product design which takes advantage of cumulative learning. By contrast, the differentiator attempts to offer something that is perceived as unique in quality, innovation or flexibility in product design. Drawing on these characteristics of the archetypal cost leader and differentiator, the following set of items was used to assess the convergent validity of the strategy measures at the manufacturing level.

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\(^8\) In the first test, based on the 11 competitive methods the strategy index (positive for differentiators) correlated positively and significantly at either the .01 or .001 level with relevant 'differentiator' competitive methods. In the second test, based on the current strategic unit competitive position, the strategy index correlated positively and significantly at the .01 level with 'differentiator' competitive advantages.

\(^9\) They include items such as 'control of distribution channels' advertising', 'innovation in marketing' which are SBU level competitive methods.
Proportion of manufactured product produced to stock and to order
Expect high scores for production to stock to be associated with cost leadership, and high scores for production to order to be associated with differentiation.

Proportion of standardized output
Expect high scores for standardization to be associated with cost leadership, and low scores to be associated with differentiation.

Use of specialized equipment dedicated to a restricted range of products and product features
Expect high scores to be associated with cost leadership.

Extent of technological flexibility, to accommodate variations in products and product features
Expect high scores to be associated with differentiation on flexibility.

Importance attached to off-the-shelf product availability
Expect high scores to be associated with cost leadership.

Importance of brand image
Expect high scores to be associated with differentiation on quality.

Using the first 15 interviews, the relationships between profit centre managers' responses on the strategy dimension and the above items were examined. None of the expected correlations appeared present in the data. Expanded responses indicated, for example, that the majority of firms in the sample produced to order rather than stock. This seemed to reflect the desire to limit stocks in all strategic contexts. Standardization emerged as difficult to interpret, posing questions of whether large volume output tailored to a single customer was 'non-standard' or whether minor customizations to a basic product (such as in labelling) rendered it non-standard. The use of specialized equipment appeared to be irrelevant not only to the pursuit of a cost leadership strategy, but also unrelated to product standardization. Importance of off-the-shelf product availability was highly correlated with production to stock, which in turn appeared unrelated to strategy. Finally, the brand image scale appeared to be unrelated to differentiation because of the number of firms not producing branded products. For manufacturers producing materials,
components or equipment for other manufacturers, strategic differentiation is more likely to be independent of brand names.

As it emerged at the end of 15 interviews that this validity test did not appear to be workable, several changes were made to construct a new convergent validity test for strategy. Following Porter's (1985) description of the characteristics of cost leadership and differentiation strategies, managers were asked questions on three themes. Firstly, they were asked to elaborate on the description of their competitive edge. These responses provide more detailed information about the form of strategic choices which can be checked for consistency with the broad classifications of cost leadership and differentiation by quality and flexibility. In identifying the characteristics which distinguish differentiation from cost leadership, Porter (1985) focuses on the development of capabilities which reduce the market’s sensitivity to price and increase profit margins. Differentiation is sustainable as long as the price premium is sustainable in the market and as long as the 'costs' of differentiation do not exceed the price premium obtained (1985:161). In manufacturing, differentiation by quality and/or flexibility ought to be evident in the availability of price premiums relative to competitors. Furthermore, since flexibility may increase manufacturing costs by reducing the emphasis on efficient run sizes and standardization, the pursuit of flexibility ought to be reflected in managerial attitudes to product variations relative to 'most' efficient production runs. Thus, several questions were included in the interview guide probing

- the firm’s competitive edge
- whether or not the firm attracts a price premium for its products to reflect the competitive edge
• whether the firm receives customer requests for significant product variations, and how these are dealt with

Elaborated responses to these questions are analysed using the methods described in Chapter 5. The analysed qualitative data are examined in the 'findings' (particularly Chapters 7-9) for consistency with scaled responses on strategy, and also for independent effects on performance measurement system design. This significant change in the questionnaire and interview protocol was not considered to impact on the useability of the first fifteen questionnaires. The measurement instrument for the strategy variable was not altered. The instrument to test construct validity was altered. As discussed in Chapters 7-9, the elaborated responses consistently support the validity of the scaled response data on strategy, as well as providing further insight into the strategic context of the participant firms.

4.4.4 Effectiveness

As discussed in Chapter 2, this study seeks evidence of micro-level effects from an appropriate fit between strategy and performance measurement system design characteristics. More specifically, it was argued that the implications of appropriate matching might be observed in perceptions of greater performance measurement system effectiveness. A 2-item measure using Flamholtz (1979) definition was developed to operationalize performance measurement system effectiveness. Respondents were asked to indicate on a seven-point Likert-type scale, ranging from 'agree strongly' to 'disagree strongly', their level of agreement with two evaluative statements about the performance measurement system:

The performance measurement system is complete in that it includes all significant manufacturing performance criteria
The performance measurement system for manufacturing actually encourages behaviour which is consistent with organizational goals.

Responses on these two scales are highly correlated (correlation = 0.67, n=35, p < 0.001) and they are averaged to give an overall score for performance measurement system effectiveness.

4.5 Comparison of profit centre and manufacturing manager responses

While this study is focused conceptually on the performance measures used by profit centre managers in evaluating manufacturing performance, a sample of manufacturing managers was interviewed also. Manufacturing managers were asked similar questions to general managers regarding performance measures, strategy, constitution of benchmarks, and performance measurement system effectiveness. However, the interview and structured questionnaire administered to manufacturing managers were focused on the information reported from manufacturing managers to profit centre managers. Thus, the interviews and questionnaires should be focused on the same performance measurement system design elements and the same dimensions of strategy. On this basis the manufacturing manager interviews were designed to be evaluated for consistency with profit centre managers' responses, as a test for response reliability from the profit centre managers. For reasons outlined in Section 4.2.2, the number of manufacturing managers interviewed was limited to 12.

A paired comparison of profit centre and manufacturing manager responses on variables used in subsequent analysis shows some cases of significant disagreement in the perceptions of manufacturing managers and profit centre managers. Table 4.5
shows the results of the analysis. Within-pair disagreements by more than 1.5 scale points are highlighted by shading. In the case of the variable 'ranking of cost variance reports', disagreements regarding whether cost variance reports are the most critical are shaded. Disagreements regarding whether cost variance reports are ranked second, third or not at all are not highlighted. Subsequent analysis focuses on the top-ranked criterion, so this is the focus of comparison here.

The greatest incidence of significant differences in responses is evident in the variables 'reliance on non-financial performance measures' and the two components of performance measurement system effectiveness, 'performance measurement system completeness' and 'congruence'. In the case of reliance on 'non-financial performance measures', there was a difference of more that 1.5 scale points within half of the pairs of managers. The differences were not in a consistent direction, with four manufacturing managers reporting perceived reliance on non-financial performance measures to be at least 1.5 scale points lower than the profit centre managers they reported to, and two reporting it to be more than 1.5 scale points higher. In the case of performance measurement system effectiveness, there was significant disagreement in five of the 12 pairs. It is of concern that in this case four of the five cases of disagreement are extreme in that they are at opposing ends of the scale. In all but one of these five cases, the ratings for performance measurement system effectiveness were significantly lower by manufacturing managers than profit centre managers. There were also some cases of significant disagreement in whether or not cost variances were ranked as the most critical measure used.
Table 4.5
Comparison of paired profit centre managers (PCM) and manufacturing managers (MM) on scaled responses

<table>
<thead>
<tr>
<th></th>
<th>Reliance on CVRs</th>
<th>Reliance on NONFIN</th>
<th>Ranking of CVRs</th>
<th>Strategic commitment - Cost</th>
<th>Strategic commitment - Quality</th>
<th>Strategic commitment - Flexibility</th>
<th>PMS Completenss</th>
<th>PMS Congruence</th>
</tr>
</thead>
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<tr>
<td>PCM1</td>
<td>6.00</td>
<td>5.75</td>
<td>1</td>
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</table>

where CVR’s = Cost Variance Reports
NONFIN = Non-financial Performance Measures
PMS = Performance Measurement System
The level of disagreement observed in these 12 pairs raises the possibility of either lack of reliability in the responses from profit centre managers, or significant differences in perceptions between the two levels of management, even in respect of the same control system characteristics. Several methods of dealing with such inconsistency are available, but not all can be applied for this study. These are discussed in the next section.

4.5.1 Dealing with profit centre manager/ manufacturing manager inconsistencies

While the elimination of cases of mismatch is the ideal way to deal with rater differences on the same criteria, it cannot be used here, as there are not multiple ratings for all firms in the sample. The inter-rater conflict observed in the 12 pairs is likely to be an indicator of broader conflict, so it is inappropriate to exclude the few cases for which data are available. A full sample of paired cases, allowing for elimination of mismatches would have required at least 100 interviews in 50 firms to obtain useable data from 36 profit centre managers. Such a study would have been beyond the scope of a single researcher, given relatively tight time constraints.

It is argued that for a study such as this, the elimination of cases of mismatch results also in unnecessary data redundancy. This study is largely exploratory, designed to explore and evaluate through both scaled and expanded responses, the relationship between performance measurement system design and strategy. In addition, for reasons elaborated in Chapter 2, this study is focused on the use of performance information at the profit centre manager level. To some extent, inter-rater disagreement does not affect the quality
of the data reported by profit centre managers as it is their perceptions that impact
significantly the actual role of accounting information at that management level. This is
particularly the case with variables such as reliance on cost variance reports and non-
financial measures. A similar argument may apply to the responses on strategic
commitment. To the extent that business unit strategy, its consequences for manufacturing
functional strategy and the design of performance measurement systems are the preserve of
profit centre managers, then their perceptions may be more reliable on these variables.
Also, the perceptions of the profit centre managers on these variables are the most relevant
for the questions of interest in this study.

On the other hand, manufacturing manager perceptions of performance measurement
system completeness and congruence are of greater interest, and may be as valid a measure
of effectiveness as the perceptions of profit centre managers. Assessments of the extent of
completeness and consistency with organizational goals of the manufacturing performance
measurement system are valid at both levels of management, and the assessments at both
levels reflect on the overall effectiveness of the performance measurement system.
Significant disagreement on this variable raises concern that the assessments made by
profit centre managers may systematically overstate performance measurement system
effectiveness. It could be argued that profit centre managers' understanding of subunit
goals places them in a better position to evaluate the performance measurement system in
terms of consistency with those goals. The system may create tension for subordinates if it
is complete and goal congruent. This view must, however, be balanced against the
potential for profit centre managers to be unaware of the dysfunctional consequences of the
performance measurement systems they implement. To the extent that the observed disagreement raises some doubt regarding the veracity of assessments of performance measurement system effectiveness made by profit centre managers in the whole sample, the results are interpreted with caution in subsequent analysis.

### 4.6 Descriptive statistics and correlations

Tables 4.6 and 4.7 show descriptive statistics and correlations relating to the variables used in subsequent quantitative analysis.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>Theoretical range</th>
<th>Actual range</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliance on CVRs</td>
<td>5.77</td>
<td>1.18</td>
<td>1-7</td>
<td>1-7</td>
<td>36</td>
</tr>
<tr>
<td>Reliance on NONFIN</td>
<td>5.70</td>
<td>1.31</td>
<td>1-7</td>
<td>2-7</td>
<td>36</td>
</tr>
<tr>
<td>Strategy- Cost</td>
<td>4.44</td>
<td>1.63</td>
<td>1-7</td>
<td>1-7</td>
<td>36</td>
</tr>
<tr>
<td>Strategy- Quality</td>
<td>5.47</td>
<td>1.50</td>
<td>1-7</td>
<td>1-7</td>
<td>36</td>
</tr>
<tr>
<td>Strategy- Flexibility</td>
<td>5.01</td>
<td>1.62</td>
<td>1-7</td>
<td>1-7</td>
<td>35</td>
</tr>
<tr>
<td>PMS Completeness</td>
<td>3.77</td>
<td>1.82</td>
<td>1-7</td>
<td>1-7</td>
<td>35</td>
</tr>
<tr>
<td>PMS Congruence</td>
<td>3.19</td>
<td>1.70</td>
<td>1-7</td>
<td>1-7</td>
<td>35</td>
</tr>
</tbody>
</table>

where CVR's = Cost Variance Reports
NONFIN = Non-financial Performance Measures
PMS = Performance Measurement System
<table>
<thead>
<tr>
<th></th>
<th>Reliance on NONFIN</th>
<th>Strategy-Cost</th>
<th>Strategy-Quality</th>
<th>Strategy-Flexibility</th>
<th>PMS Completeness</th>
<th>PMS Congruence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliance on CVRs</td>
<td>0.53 36 0.001</td>
<td>0.36 36 0.03</td>
<td>0.17 n.s.</td>
<td>0.24 35 n.s.</td>
<td>-0.22 35 n.s.</td>
<td>-0.15 35 n.s.</td>
</tr>
<tr>
<td>Reliance on NONFIN</td>
<td>-0.11 36 n.s.</td>
<td>0.10 36 n.s.</td>
<td>0.35 35 0.04</td>
<td>-0.26 35 n.s.</td>
<td>-0.35 35 0.04</td>
<td></td>
</tr>
<tr>
<td>Strategy-Cost</td>
<td>-0.21 36 n.s.</td>
<td>0.13 35 n.s.</td>
<td>-0.28 35 n.s.</td>
<td>-0.06 35 n.s.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strategy-Quality</td>
<td></td>
<td>-0.26 35 n.s.</td>
<td>0.36 35 0.03</td>
<td>0.24 35 n.s.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strategy-Flexibility</td>
<td></td>
<td>-0.06 34 n.s.</td>
<td></td>
<td>-0.38 34 0.03</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PMS Completeness</td>
<td></td>
<td></td>
<td></td>
<td>0.67 35 0.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>where CVR’s = Cost Variance Reports</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NONFIN = Non-financial Performance Measures</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PMS = Performance Measurement System</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
CHAPTER 5

ANALYTICAL METHOD APPLIED TO QUALITATIVE DATA

5.1 Introduction

The motivations for this study reflect a desire to enrich and extend our understanding of empirical links between strategy and performance measurement system design. Such extensions are likely to rely on explanations embedded in elaborated responses collected from participant managers, particularly where those elaborations focus on the 'why' and 'how' of empirical phenomena. Prior descriptions of both the conceptual framework and method have established three major purposes for the analysis of qualitative data in this study.

1. Elaborated responses collected during semi-structured interviews are tested for convergent validity with responses on scaled questions.

2. The qualitative data are used to explore variables relevant to hypothesized relationships in this study, for which established instruments do not exist. In particular, the variable 'constitution of performance targets' is operationalized using qualitative data.

3. The qualitative data are used to elaborate on hypothesized relationships, and also to develop propositions that emerge from the elaborated responses.

All of these applications of qualitative data are subject potentially to bias, not only in the data collection process but also in the analysis. The avoidance of bias in the interview context was discussed in Chapter 4. The focus in this chapter is on the steps
taken to avoid bias in the analysis of qualitative data. Like all other forms of data
analysis, the analysis of qualitative data involves processes of reduction or
summarization, classification and interpretation. Qualitative data are subject to several
threats that might impact on the validity of the data for theory testing or theory
building. There is potential for interviewer-induced bias in the collection of data in the
form of elaborated responses. In addition, the analysis of qualitative data is subject
potentially to significant analytical bias as it relies on interpretations and classifications
imposed by the researcher.

This chapter documents the analytical model that is used in this study to reduce,
summarize, classify and interpret qualitative data. The aim of the model is to limit
analytical bias. The process described in this chapter is based broadly on Miles and
Huberman (1994). It is a systematic and comprehensive analytical approach that
provides for the development of an audit trail from transcribed text to the development
of propositions. Referring to the qualitative methods literature more generally,
Brownell (1995) highlighted the emphasis on data collection techniques and the
absence of fully articulated research methods. This chapter describes an attempt to
develop an articulated research design for this particular study. While it is not directly
generalizable, it aims to deal with issues of validity and reliability through the
development of a systematic analytical protocol. The protocol was designed in the
context of the particular research question, and the form in which the study was
expected to contribute to the literature. The design is most closely aligned both in
rationale and execution with the 'theory refinement' category of case research discussed
5.2 The choice of analytical approach

The current study is primarily positivist, but reflects a desire to access the richness of qualitative data. The empirical descriptions and justifications of events obtained during interviews are used to enhance both the interpretation of findings and to propose new theory. The importance attached to qualitative data in this study requires the use of systematic analytical techniques and the preservation of intellectual distance between the data and researcher. The data are relatively simple. It is the analytical interpretation that is problematic. These problems are addressed through attention to structured methods of analysis. While there is a developing literature in management accounting using naturalistic methods of inquiry, there is little guidance available in this literature on the research and analytical methods used by these researchers (Ferriera and Merchant, 1992). Exceptions include Jasinski and Selto (1995) and Slagmulder, (1997) and papers devoted to method issues such as McKinnon (1988), Eisenhardt, (1989), Larsson (1993) and Lapsley and Llewellyn (1995).

The qualitative data for this study exist in the form of transcribed text of semi-structured interviews with 36 profit centre managers and 12 manufacturing managers. Several broad approaches are commonly used to analyse qualitative data. Both content analysis and grounded theory were evaluated for this study.

Content analysis is defined as a research methodology that utilizes a set of procedures to make valid inferences from text. The inferences are about the sender(s) of message, the message itself or the audience of the message, and the rules for the inferential process vary with the theoretical and substantive interests of the investigator (Weber,
1985). Grounded theory is defined as the discovery of theory from data systematically obtained from social research (Glaser and Strauss, 1967:2). Grounded theory involves a process whereby hypotheses arise from the data during the course of the research.

Content analysis has been applied traditionally to the analysis of archival data rather than interview transcripts. Traditionally, the techniques have been quantitative, and limited to the manifest characteristics of text, such as the number of occurrences of words, or the number of words relating to particular themes. These quantified results are then subject to statistical analysis. More recently, these techniques have been applied to the qualitative analysis of open-ended survey responses with the aim of corroborating survey data. In these applications, content analyses are potentially qualitative rather than quantitative, and may examine latent characteristics of the data such as the meaning of phrases used (Holsti, 1969). Such applications tend to blur the distinctions between content analysis and grounded theory. However, the success of content analytical techniques in these more interpretive contexts is less well established than grounded theory analysis, and there was little guidance as to how they could be used in this study. Traditional content analysis approaches were considered too limiting to uncover themes and patterns in elaborated responses. The analyses required were more consistent with traditional grounded theory approaches.

Pure grounded theory analytical approaches are designed to manage and control the potential bias in building theory from empirical data. They are primarily non-quantitative, and designed to find the latent or embedded meanings in data. In a pure grounded theory analysis, theory emerges during the analysis of data. The emergent
theory is tested constantly against further theoretically sampled empirical data (Strauss, 1987). Control is exerted through an iterative triad of data collection, coding and memoing (Strauss, 1987:10).

The current study is strongly positivist and theory-driven, with one aspect of the analysis focused on the search for new theory or explanations for unexpected relationships observed in the data. While this study attempts to use many of the grounded theory controls established by Strauss (1987), the approach used here would not qualify as pure grounded theory because of its theory-testing orientation, and lack of theoretical sampling.

The approach adopted is perhaps best described as 'pragmatic' grounded theory of the form outlined by Miles and Huberman (1994). Miles and Huberman (1994) describe themselves as 'transcendental realists'. Their methods are inductive and their analytical techniques tend towards the orderly and formal. The general approach focuses on data reduction, display and interpretation to make sense of substantial bodies of unedited text. The next section describes the application of these techniques in the context of the current study.

5.3 The analytical method - structured data displays

Structured data displays were the basic tool used to make qualitative data tractable for theoretical analysis. The displays were focused enough to permit a viewing of a full data set, arranged systematically to answer the research questions at hand. There are several important characteristics of these data displays.
1. They use reduced data. Extended, unreduced bodies of text are too dispersed, poorly ordered, and not able to be seen 'as a whole'. Data displays consist of short blocks of text, quotations, phrases, ratings etc.

2. Precise records are kept of the actual criteria and decision rules used, for example in the selection of particular quotes, and how ratings or judgments were determined.

3. The display design parameters are determined by the nature of the research questions. Conceptually oriented, exploratory or partially ordered, time-oriented and role-ordered matrices are designed to focus on different types of research questions. For example displays may be time-oriented or role-ordered to focus on patterns in the data that are driven by time and participant role respectively. For this study, conceptually oriented displays were required. These displays highlight the patterns across cases around conceptual themes.

The application of these techniques to the current study resulted in the definition of several matrix-form data displays. The first of these was a 'thematic conceptual matrix' to be used for cross-case testing of hypotheses. An outline of this matrix is provided in Figure 5.1. Recall that the variable 'constitution of performance targets' was operationalized in the qualitative data along dimensions related to the integration of multiple performance criteria and, in particular, the use of modified cost benchmarks to achieve integration. This variable was hypothesized to be related to strategy. The structure of the matrix reflects this theoretical proposition.
Figure 5.1
Outline of thematic conceptual matrix:
Hypothesis testing

<table>
<thead>
<tr>
<th>STRATEGY</th>
<th>CONSTITUTION OF PERFORMANCE BENCHMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>COST TARGETS MODIFIED/NOT MODIFIED</td>
</tr>
<tr>
<td></td>
<td>PERCEPTIONS OF CONFLICTING SIGNALS/INTEGRATION</td>
</tr>
<tr>
<td>PREDOMINANTLY COST LEADERSHIP</td>
<td></td>
</tr>
<tr>
<td>MIXED</td>
<td></td>
</tr>
<tr>
<td>PREDOMINANTLY DIFFERENTIATION</td>
<td></td>
</tr>
</tbody>
</table>

The following steps reflect the 'building blocks' in the development and completion of cross-case analytical matrices such as that given in Figure 5.1. These steps are summarized and illustrated at the conclusion of this section, in Figure 5.5. The aim in these steps is to develop an audit trail which can be used to track data from the full, impartial transcripts, through the selective summarization inherent in the data displays and then from the data displays to interpretation and the development of theoretical propositions.

1. Transcripts were coded using the qualitative analysis package QSR NUDIST™. NUDIST was used in this study to code all of the raw, unsummarized interview transcripts, by associating the sentences in the transcript with one or more themes defined in a hierarchical coding structure. Each sentence was given a text-unit

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10 NUDIST is an acronym for Non-numerical Unstructured Data - Indexing, Searching and Theorising. It is a qualitative analysis software package distributed by Qualitative Solutions and Research Pty Ltd, La Trobe University, Bundoora, Victoria, Australia.
number in NUDIST. In this way, each text unit is identified as relating to one or more pre-determined thematic codes. The hierarchical coding structure given in Figure 5.2 reflects the initial codes used to classify text.

**Figure 5.2**

Data coding tree

```
| (1) /BASE DATA | (3 1 2) /STRATEGY/COMP EDGE/FLEXIBILITY |
| (1 1) /BASE DATA/COY CODE | (3 1 3) /STRATEGY/COMP EDGE/COST MIN |
| (1 2) /BASE DATA/INTER NO | (3 1 4) /STRATEGY/COMP EDGE/INTERRELATIONSHIPS |
| (1 3) /BASE DATA/RESPONDENT | (3 1 5) /STRATEGY/COMP EDGE/DEPENDABILITY |
| (1 4) /BASE DATA/STRUCTURE | (3 2) /STRATEGY/CHANGES OVER TIME |
| (2) /PM INFO | (4) /EFFECTIVENESS |
| (2 1) /PM INFO/CVR | (4 1) /EFFECTIVENESS/STRENGTHS |
| (2 1 1) /PM INFO/CVR/IMPORTANCE | (4 2) /EFFECTIVENESS/WEAKNESSES |
| (2 1 2) /PM INFO/CVR/STD COSTING | (5) /SCALED RESPONSES |
| (2 1 3) /PM INFO/CVR/BUDGET FLEXED | (5 1) /SCALED RESPONSES/Q1 RCVR & RNONFIN |
| (2 1 4) /PM INFO/CVR/BENCHMARK INFO | (5 2) /SCALED RESPONSES/Q2 VARIANCE REACTION |
| (2 1 5) /PM INFO/CVR/VARIANCE RESPONSE | (5 3) /SCALED RESPONSES/Q3 STRATEGY |
| (2 1 6) /PM INFO/CVR/MAJOR ROLES | (5 4) /SCALED RESPONSES/Q4 FIRM DATA |
| (2 1 7) /PM INFO/CVR/REPORT LEVEL | (5 5) /SCALED RESPONSES/Q5 FMS QUALITY |
| (2 2) /PM INFO/NONFIN | (5 6) /SCALED RESPONSES/Q6 FIRM EFFECTIVENESS |
| (2 2 1) /PM INFO/NONFIN/INTEGRATION | (6) /OTHER |
| (2 2 2) /PM INFO/NONFIN/CONFLICT | (6 1) /OTHER/PRODUCT INFO |
| (2 3) /PM INFO/CHANGES OVER TIME | (6 2) /OTHER/MARKET CONDITIONS |
| (3) /STRATEGY | (6 3) /OTHER/INTEREST |
| (3 1) /STRATEGY/COMP EDGE | (6 4) /OTHER/NO INTEREST |
| (3 1 1) /STRATEGY/COMP EDGE/QUALITY | (6 5) /OTHER/SCALE EFFECTIVENESS |
```

The coding at this stage was a thematic grouping of text units rather than a scoring process, and bias was a minimal problem. Calls were then made on the NUDIST database (consisting of all transcripts) to collect text relating to a particular theme. In response, all text coded as relevant to the theme was reported, including transcript numbers and text unit numbers for all sentences in the report. Thus the coded data remain readily auditable back to the transcripts, even when taken out of original context. No data reduction occurred at this stage. The aim was to classify all but the most superfluous data, to at least one thematic code. Minimal, superfluous data were in this case, assigned a code of (6 4) 'no interest'.

82
2. A data sheet was prepared manually for each transcript. The text in the transcripts was reconfigured and reported under conceptual headings using NUDIST. The reorganized transcripts were summarized under similar conceptual headings to those used in the coding scheme. These summaries included both quotations and summaries in my own words and thus reflected some data interpretation and reduction. The data sheets used a consistent format for cross-case analysis and could be audited back to the transcript using identifying text-unit numbers. An example section of a case data sheet is given in Figure 5.3. The 'condition for' and 'consequence of' columns in the case analysis were used to highlight causal links expressed by respondents (Strauss, 1987). The standardized design of these 'within-case' analyses readily supported cross-case analysis.

3. The data sheet prepared for each transcript reflects a case-level display. These displays were then stacked in one or more 'meta-matrices'. For this study, these matrices and the analyses they supported were 'variable-oriented'. The variable-oriented approach focuses on variables and their intercorrelations. "The details of any specific case recede behind the broad patterns found across a wide variety of cases, and little explicit case-to-case comparison is done" (Miles and Huberman, 1994:174). Both the theory testing and theory development from qualitative data in this study are based on the observable themes across cases, and are thus suited to the variable-oriented approach. Variables that are to be intercorrelated are organized horizontally and vertically in the matrix. The structure of the meta-matrix given in Figure 5.1 was determined by theoretical questions linking strategy with the constitution of performance targets.
Figure 5.3
Extract of case-level data sheet

<table>
<thead>
<tr>
<th>CASE DATA - TRANS13.DOC</th>
<th>CONDITIONS FOR (because, since)</th>
<th>CONSEQUENCES OF (because of)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>USE OF ACT/BUD COMPARISONS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- General</td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Monthly profit reporting. &quot;Profit is the key measure but each area is measured on their weekly performance&quot; 109</td>
<td></td>
<td>Budget not flexed (?)</td>
</tr>
<tr>
<td>* Variances reflect &quot;using more than they should have&quot; (material) and waste 115</td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Direct costs monitored weekly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Existence of Standard Costing Systems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Whether budget is flexed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Excess usage reflects to some extent the fact that more was produced</td>
<td></td>
<td></td>
</tr>
<tr>
<td>* &quot;Well it’s a stroke forward. The articles are put in by variety, explosion dictates exactly what the usage should be to produce that quantity of goods, and that’s what they’re measured against&quot; 125</td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Efficiency is measured for actual production</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Quality of budget/standards</td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Good - few variances and most resolved quickly</td>
<td>* Variance reaction</td>
<td></td>
</tr>
<tr>
<td>* Not happy with direct labour hour base for overhead allocation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Supplier contracts and partnerships used to generate costings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Time and motion study → Standard production minutes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Standards updated yearly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Continual improvement built in</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>REACTION TO VARIANCES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Substitute material a common cause of variances</td>
<td>* Cause of variances</td>
<td>* Strong faith in variances. Few of these cases, not hundreds</td>
</tr>
<tr>
<td>* Leading hand → investigations to determine correctness of quantities etc → production manager → check stock counts etc, check costing for out-of-date processes etc → if still an apparent unexplained variance then audited very closely next month</td>
<td></td>
<td>* Quality accreditation very current</td>
</tr>
<tr>
<td>* Changing standards - maybe accounts for 10% of variances</td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Holds a conformance file, and corrective action reports</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. The content of the matrix was then built up case by case. Each case was classified initially as 'predominantly cost minimization', 'mixed' or 'predominantly differentiation' based on scores on the scaled strategy variables. This provided for
three rows in the matrix. The columns in the matrix reflect themes relating to the constitution of performance targets. Cells contain descriptions and quotations taken from case-level data sheets. While this sort of tabulation deliberately avoids the case specificity of data, each entry carries a case number to preserve the audit trail.

The entries in each cell contain the case number, respondent type, and quotations or summaries from a transcript relating to the theme identified by the column definition. The vertical position of the case in the matrix is determined by the strategy rating for the case. Figure 5.4 is an example of part of the data-filled meta matrix that illustrates the result of applying the techniques described above\textsuperscript{11}. The outline of this matrix (without data) was provided in Figure 5.1.

The steps described above are illustrated in the flowchart in Figure 5.5.

Other thematic conceptual matrices were developed during the study to support the exploratory analysis of emergent themes of interest. The structure of these matrices was similar to the one that has been described in detail in that they reflected attempts to view the relationship between variables of interest. These matrices are described in context in Chapters 7 and 8 as part of the discussion of findings and emergent propositions.

\textsuperscript{11} The 'inclusions' in the table are brief for readability. The actual matrices, containing all cases, occupy several pages, with many entries being longer than those shown in Figure 5.4.
### Figure 5.4
Completed thematic conceptual matrix:
Hypothesis testing

<table>
<thead>
<tr>
<th>STRATEGY</th>
<th>CONSTITUTION OF PERFORMANCE BENCHMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PREDOMINANTLY COST MIN</td>
<td></td>
</tr>
<tr>
<td></td>
<td>03 P Quality is monitored and charged back. Therefore, not a source of conflict</td>
</tr>
<tr>
<td></td>
<td>14 P Targets not modified</td>
</tr>
<tr>
<td></td>
<td>15 P Standards built up to most efficient way to produce to specification.</td>
</tr>
<tr>
<td></td>
<td>&quot;Now obviously as an organization there are sudden customer demands… Well</td>
</tr>
<tr>
<td></td>
<td>you know we can cope with that. That's not built into our costing system you</td>
</tr>
<tr>
<td></td>
<td>can see anyway.&quot; &quot;No conflict between efficiency and quality… because the</td>
</tr>
<tr>
<td></td>
<td>quality specification sets the parameter&quot;.</td>
</tr>
<tr>
<td></td>
<td>18 P Targets not modified</td>
</tr>
<tr>
<td>MIXED</td>
<td></td>
</tr>
<tr>
<td></td>
<td>03 P Plan is set purely on financial basis so any variations in quality appear</td>
</tr>
<tr>
<td></td>
<td>as variances. Big variances all the time because of the way the plan is set.</td>
</tr>
<tr>
<td></td>
<td>Variances as a result of producing completely different products.</td>
</tr>
<tr>
<td></td>
<td>14 P &quot;We are always striving to produce everything at the lowest cost possible,</td>
</tr>
<tr>
<td></td>
<td>but there is a compromise between cost and quality. Trade-offs between cost</td>
</tr>
<tr>
<td></td>
<td>and quality are tested in the marketplace.</td>
</tr>
<tr>
<td></td>
<td>15 P No perceived conflict, but not integrated either</td>
</tr>
<tr>
<td></td>
<td>18 P &quot;If we can do everything we currently do with half the effort it would</td>
</tr>
<tr>
<td></td>
<td>actually tell us that everything is now costing double what it did before&quot;.</td>
</tr>
<tr>
<td></td>
<td>&quot;We regularly write off half a million bucks worth of product which we cost</td>
</tr>
<tr>
<td></td>
<td>effectively produced&quot;.</td>
</tr>
<tr>
<td>PREDOMINANTLY DIFFERENTIATION</td>
<td></td>
</tr>
<tr>
<td></td>
<td>02 P &quot;And in a situation where you have activity-based costing, if there are</td>
</tr>
<tr>
<td></td>
<td>extra inspection needs you can bring it in under production specification and</td>
</tr>
<tr>
<td></td>
<td>pick up the extra cost&quot;</td>
</tr>
<tr>
<td></td>
<td>04 P No modified targets but innovative approach</td>
</tr>
<tr>
<td></td>
<td>02 P No conflict - relates to the capacity of the ABC system to pick up the</td>
</tr>
<tr>
<td></td>
<td>costs of doing something different</td>
</tr>
<tr>
<td></td>
<td>04 P Gives example of past conflict between purchase of low quality materials</td>
</tr>
<tr>
<td></td>
<td>and subsequent separate effects on efficiency. Claims it wouldn't happen now</td>
</tr>
<tr>
<td></td>
<td>because the value-added measure is highly integrated and evaluates the trade-</td>
</tr>
<tr>
<td></td>
<td>offs on a single criterion.</td>
</tr>
</tbody>
</table>
Figure 5.5
Data analysis flow chart - tracking an example text unit

TRANSCRIPT - INTERVIEW 13

.................
.................
M) That does happen where production is so intent on meeting their weekly targets, if a special order comes in they tend to say "oh no what a nuisance rather than the opportunity presented. And that's fair enough, that's where they're valued at. That's their whole reward system. Yes it does get done, but it takes a lot of management effort to tell people that you are going to do it. 664.8
.................
.................

CASE DATA - TRANS13.DOC

.................
.................
.................

INTEGRATION / CONFLICT IN PMS
* "that does happen .................
.................going to do it.
.................

.................................
.................................
.................................

Text unit coded using NUDIST as (222)/PMS/CONFLICT
(Every sentence in transcript numbered by NUDIST and coded by theme.)

Reported back to me with all text units from transcript 13 dealing with conflict between performance criteria, and entered on case-level data sheet.

Cross-Case Matrix
Hypothesis Testing

<table>
<thead>
<tr>
<th>No.</th>
<th>Strategy</th>
<th>Reaction to cost variances</th>
<th>Constitution of Performance Benchmarks</th>
<th>Perceptions of conflicting signals/integration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Predominantly Cost Leadership</td>
<td></td>
<td></td>
<td>13 - Problems with lack of integration between productivity and responsiveness - conflict TU664.8</td>
</tr>
<tr>
<td></td>
<td>Mixed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Predominantly Differentiation</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5.4 The findings - an overview of the structure of the next four chapters

The next four chapters examine the empirical findings from this study. The findings are organized around the three key themes of interest reflected in the hypotheses developed in Chapter 3:

1. Linking strategy with relative reliance on financial and non-financial performance measures
2. Linking strategy with the way performance measures are constituted to integrate multiple performance criteria.
3. Linking performance measurement system design attributes with performance measurement system effectiveness.

Chapter 6 examines the quantitative data linking strategy with relative reliance on financial and non-financial performance reports, and the performance measurement system effectiveness implications of achieving the hypothesized fit. Chapter 7 reports the results of qualitative analysis of elaborated responses which may either shed light on the results of these hypotheses tests, or enable the development of new propositions relating to the impact of strategy on performance measurement system design. Chapter 8 examines quantitatively and qualitatively the data linking strategy with the way performance measurement systems are constituted to achieve integration. Evidence of performance measurement system effectiveness implications from achieving the hypothesized match between strategy and the constitution of performance measures is examined also. Chapter 9 synthesizes the findings discussed under each of the three themes, attempting to identify the broader insights that emerge from this study.
CHAPTER 6

THE FINDINGS (1) - STRATEGY AND THE RELATIVE RELIANCE ON FINANCIAL AND NON-FINANCIAL PERFORMANCE MEASURES

6.1 Introduction

This chapter explores the hypotheses developed in Chapters 2 and 3 relating to the link between strategy and the relative reliance on financial and non-financial performance measures. More specifically, it explores the relationships between cost leadership, differentiation and mixed strategies, and the performance measurement system variables of reliance on cost variance reports and reliance on non-financial quantitative performance measures. The three hypotheses examining the relationships between these variables are as follows:

H1(a) The pursuit of cost leadership is associated positively with reliance on cost variance reports by profit centre managers in evaluating the overall performance of manufacturing subunits.

H1(b) The pursuit of strategic differentiation is associated positively with reliance on non-financial quantitative performance measures by profit centre managers in evaluating the overall performance of manufacturing subunits.

H1(c) The pursuit of mixed strategic priorities is associated positively with reliance on cost variance reports and non-financial quantitative performance measures by profit centre managers in evaluating the overall performance of manufacturing subunits.

In addition, the performance measurement system effectiveness implications of the fit between strategy and relative reliance on financial and non-financial performance measures are examined. The 'fit' hypothesis established in Chapter 3 is as follows:

H4(a) In the management control of manufacturing subunits, an appropriate match between strategy and the relative reliance on financial and non-financial performance measures results in greater performance measurement system effectiveness.
Support for these four hypotheses is evaluated using responses to scaled questionnaire items. In the following chapter, these findings are re-examined in the context of qualitative data that elaborate and extend the analysis of contingent links between strategy and performance measurement system design.

6.2 The variables

6.2.1 Reliance on cost variance reports and non-financial performance measures

As discussed in Chapter 4, reliance on cost variance reports and reliance on non-financial performance measures are both four-item measures. The psychometric properties of these scales were established in Chapter 4. Furthermore, responses on these scaled measures appeared consistent with the ranking of critical performance measures provided by respondents. Thus, the analysis reported here used scores for reliance on cost variance reports and reliance on non-financial performance measures computed as the average of the four items used to capture each construct. The rankings of critical performance measures by general manager respondents were used also in the analysis.

6.2.2 Strategy

Strategic commitments to cost leadership, quality and flexibility were measured on three independent scales. As discussed in Chapter 4, convergent validity tests on strategy were problematic. While the three independent scales were used initially for quantitative analysis, expanded responses were examined also for convergent validity with the scaled responses. This qualitative analysis is reported in Chapter 7.
6.2.3 Performance measurement system effectiveness

Performance measurement system effectiveness was derived from two scales measuring performance measurement system completeness and congruence. As established in Chapter 4, the responses on these scales are highly correlated, and for the following analysis they were averaged into a single measure of performance measurement system effectiveness.

6.3 Quantitative results - strategic commitment linked with reliance on cost variance reports and reliance on non-financial performance measures

To test for a relationship between the pursuit of cost leadership and reliance on cost variance reports (H1(a)) and between differentiation on the basis of quality or flexibility and reliance on non-financial performance measures (H1(b)), simple bivariate correlations were examined initially. Support for H1(a) would be reflected in a significant correlation between reliance on cost variance reports and cost leadership. Support for H1(b) would be reflected in significant correlations between reliance on non-financial performance measures and the two strategy variables, quality and flexibility. The results are presented in Table 6.1. The relationship between cost leadership and reliance on cost variance reports and between flexibility and reliance on non-financial performance measures are significant (p<0.05), and in the predicted direction. The correlation between commitment to quality and reliance on non-financial measures is not significant. Thus, there is support for H1(a) and partial support for H1(b).
Table 6.1
Correlations between strategic priorities, reliance on cost variance reports (RCVR) and reliance on non-financial performance measures (RNONFIN) (p* based on one-tailed test)

<table>
<thead>
<tr>
<th></th>
<th>Cost leadership</th>
<th>Quality</th>
<th>Flexibility</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>r</td>
<td>n</td>
<td>p*</td>
</tr>
<tr>
<td>RCVR</td>
<td>0.36</td>
<td>36</td>
<td>0.02</td>
</tr>
<tr>
<td>RNONFIN</td>
<td>-0.11</td>
<td>36</td>
<td>ns</td>
</tr>
</tbody>
</table>

To explore further these relationships, the strategy variables were dichotomized to create strategic groups (those ranking 'high' and those ranking 'low' on the strategic variable) and the differences between mean scores on the two performance measurement system variables examined. The single 'cost leadership' and two 'differentiation' scales were dichotomized at the median score. Mean ranking of reliance on cost variance reports and non-financial performance measures scores were compared for each group using a Mann-Whitney U-Test. Table 6.2 shows the results:

Table 6.2
Comparison of mean ranking of reliance on cost variance reports (RCVR) and reliance on non-financial performance measures (RNONFIN) between strategic groups (Mann-Whitney U-Test)

<table>
<thead>
<tr>
<th></th>
<th>Number of cases</th>
<th>Mean rank - RCVR</th>
<th>Mean rank - RNONFIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost leadership commitment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High (≥ median)</td>
<td>18</td>
<td>21.75*</td>
<td>18.92</td>
</tr>
<tr>
<td>Low (&lt; median)</td>
<td>18</td>
<td>15.25*</td>
<td>18.08</td>
</tr>
<tr>
<td>Differentiation commitment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High (≥ median)</td>
<td>18</td>
<td>17.61</td>
<td>17.56</td>
</tr>
<tr>
<td>Low (&lt; median)</td>
<td>18</td>
<td>19.39</td>
<td>19.44</td>
</tr>
<tr>
<td>Flexibility</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High (≥ median)</td>
<td>18</td>
<td>17.08</td>
<td>18.53</td>
</tr>
<tr>
<td>Low (&lt; median)</td>
<td>17</td>
<td>18.97</td>
<td>17.44</td>
</tr>
</tbody>
</table>

* Significant difference in mean rankings (p = 0.06)
As expected, those pursuing cost leadership more intensely show significantly higher ranking of reliance on cost variance reports. While those pursuing differentiation by flexibility more intensely show a slightly higher mean ranked reliance on non-financial performance measures than those firms pursuing flexibility less intensely, the difference is not significant. The results for differentiation by quality are not significant or in the predicted direction in relationship to reliance on non-financial performance measures.¹²

Further analysis conducted using the three most critical performance measures ranked in order supports this finding. The results reported in Table 6.3 show that those managers ranking cost variances as the most critical performance measure reflect significantly higher commitment to cost leadership than those ranking cost variances either second, third or not in the top three. However, there is no evidence that ranking non-financial measures as the most critical is related to the pursuit of differentiation through quality or flexibility.

¹² While non-parametric statistical tests are considered most appropriate given the small sample size and skewed distributions of variables in this study, parametric tests have been conducted also, and the results compared. In this case, parametric tests (i.e. t-tests) produced similar results (that is, there were significant differences between mean reliance on cost variance reports scores dependent on cost leadership commitment, but no significant differences in mean reliance on non-financial performance measures scores dependent on commitment to differentiation by quality or flexibility).
Table 6.3
Ranking of cost variance reports and non-financial measures in performance measurement, related to strategic commitment (Mann-Whitney U-Test)

<table>
<thead>
<tr>
<th></th>
<th>No. of cases</th>
<th>Mean rank-commitment to cost leadership</th>
<th>No. of cases</th>
<th>Mean rank-commitment to quality</th>
<th>No. of cases</th>
<th>Mean rank-commitment to flexibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost variances ranked 1</td>
<td>15</td>
<td>21.93*</td>
<td>15</td>
<td>18.87</td>
<td>15</td>
<td>17.03</td>
</tr>
<tr>
<td>Non-financial measures ranked 1</td>
<td>20</td>
<td>15.05*</td>
<td>20</td>
<td>17.35</td>
<td>19</td>
<td>17.87</td>
</tr>
</tbody>
</table>

* Mean rankings differ significantly between groups (p< 0.05)

These analyses suggest limited support for H1(a) and little support for H1(b). That is, there is evidence that reliance on cost variance reports is dependent on cost leadership commitment emerging consistently from three tests, but only limited evidence of correlation between the use of non-financial performance measures and differentiation.

6.4 Features of the data

Several features of the quantitative data on reliance on performance measures and strategy suggest that the strategy-contingent relationships reflected in H1(a) and/or H1(b) would be difficult to observe in the data. The scores on all strategy scales and both reliance scales are highly positively skewed. The reliance on cost variance reports, reliance on non-financial performance measures and differentiation scales are particularly skewed indicating that both cost variance reports and non-financial performance measures and commitment to differentiation by quality and/or flexibility are relatively high throughout the sample. The variables are measured on 7-point Likert-type scales. Expanded descriptive statistics on the 'strategy' and 'reliance' variables are given in Table 6.4.
Table 6.4
Descriptive statistics - Reliance on cost variance reports (RCVR), reliance on non-financial performance measures (RNONFIN) and strategy variables

<table>
<thead>
<tr>
<th></th>
<th>RCVR</th>
<th>RNONFIN</th>
<th>COST LEADERSHIP</th>
<th>QUALITY</th>
<th>FLEXIBILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theoretical Range</td>
<td>1-7</td>
<td>1-7</td>
<td>1-7</td>
<td>1-7</td>
<td>1-7</td>
</tr>
<tr>
<td>Actual Range</td>
<td>1-7</td>
<td>2-7</td>
<td>1-7</td>
<td>1-7</td>
<td>1-7</td>
</tr>
<tr>
<td>Mean</td>
<td>5.73</td>
<td>5.54</td>
<td>4.36</td>
<td>5.55</td>
<td>5.16</td>
</tr>
<tr>
<td>Median</td>
<td>6.00</td>
<td>5.75</td>
<td>4.00</td>
<td>6.00</td>
<td>5.50</td>
</tr>
<tr>
<td>Mode</td>
<td>6.25</td>
<td>7.00</td>
<td>4.00</td>
<td>5.50</td>
<td>6.00</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>1.13</td>
<td>1.30</td>
<td>1.72</td>
<td>1.37</td>
<td>1.52</td>
</tr>
</tbody>
</table>

There is little strategic variety reflected in the scaled responses on strategy. There are no 'pure' cost leaders in the sample. That is, there are no firms which scored more than four on the seven-point scale measuring commitment to cost leadership (indicating more than 'moderate' to 'intense' competition on cost) that didn’t also score more than four on at least one of the two differentiation scales. Yet many firms which score high (greater than four) on either flexibility or quality commitment scored low (four or less) on cost leadership. Table 6.5 provides a clearer view of the strategic profile of the sample by classifying firms by strategic orientation. With one exception (unshaded in Table 6.5), firms could be classified as pursuing either mixed cost leadership/differentiation strategies (light shaded) or pure differentiation (dark shaded). According to the profit centre managers' responses, 35 of the 36 firms in the sample seek to compete by differentiating their products more than 'moderately' through to 'intensely'.
Table 6.5
Cross-tabulation of firms pursuing cost leadership, quality and flexibility

<table>
<thead>
<tr>
<th>Commitment to cost leadership</th>
<th>HI QU, HI FL</th>
<th>HI QU, LO FL</th>
<th>LO QU, HI FL</th>
<th>LO QU, LO FL</th>
</tr>
</thead>
<tbody>
<tr>
<td>HI CL</td>
<td>11</td>
<td>3</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>LO CL</td>
<td>10</td>
<td>7</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Where HI is (> 4)
LO is (≤ 4)
CL = Commitment to cost leadership
QU = Commitment to quality
FL = Commitment to flexibility

The finding that virtually all firms in the sample seek to differentiate based on their manufacturing flexibility, quality or both is consistent with the high reliance on non-financial performance measures scores across the sample. In fact, the lack of support for H1(b) seems to reflect a lack of 'low' scores on both the differentiation and reliance on non-financial performance measures scales. Table 6.5 indicates that one half of the sample pursues both cost leadership and differentiation intensely. The incidence of mixed strategies alters expectations regarding performance measurement system attributes. A prevalence of mixed strategies would be consistent with highly skewed results on both reliance on cost variance reports and non-financial measures. The

[13] The lack of low scores on 'reliance on non-financial performance measures' may also reflect the influence of a confounding factor which emerged through the analysis of elaborated responses. The variety of non-financial measures used supported both differentiation and cost leadership. This issue is examined in Chapter 7 when elaborated responses relating to performance measurement system composition are analysed.
influence of strategic mix on performance measurement system design is examined in the next section.

6.5 The impact of strategic mix

The equivocal results discussed in Section 6.3 above may be consistent with the pursuit of mixed strategies. That is, to the extent that firms score high on both cost leadership and differentiation, a direct link between cost leadership and reliance on cost variance reports and between differentiation and reliance on non-financial performance measures will be difficult to observe in the data. In addition, the ranked performance measurement data would not be interpretable for mixed strategy cases. The highest ranked measure could be either cost variance reports or non-financial measures if strategic commitments to cost leadership and differentiation are both high. Similarly, if scores on both cost leadership and differentiation are high, then both reliance on cost variance reports and reliance on non-financial performance measures would be expected to be high and the mean rankings in Table 6.2 would be difficult to interpret. The results given in Tables 6.2 and 6.3 reflect some difference in scores for reliance on cost variance reports and in the criticality of cost variance reports between firms based on the commitment to cost leadership. These results, combined with insignificant differences between all firms on reliance on non-financial performance measures would be consistent with differentiation being strategically important to all firms in the sample, while the importance of cost leadership differs between firms. That is, firms would fall into either the category of 'mixed' strategy firms or differentiators. While mixed strategy firms would be expected to show higher reliance on cost variance
reports than the differentiating firms, a difference would not be expected between the groups on reliance on non-financial performance measures.

Hypothesis 1(c) suggests that those firms pursuing mixed strategies would reflect high reliance on both cost variance reports and non-financial performance measures. In contrast, those pursuing pure differentiation would be expected to reflect lower reliance on cost variance reports than the mixed strategy group because of their lower commitment to cost leadership. As all firms have high scores on differentiation, no difference in reliance on non-financial performance measures would be expected between the two groups. To test for differences in performance measurement system characteristics between firms classified as mixed or pure differentiators, a mid-scale split was used\textsuperscript{14}. Table 6.6 shows that those firms scoring high (greater than four) on both cost leadership and at least one of the two differentiation scales (ie. mixed strategy firms) show significantly higher reliance on cost variance reports than those scoring high (greater than four) only on differentiation. As expected, there was no difference in reliance on non-financial performance measures between the two groups as both groups score high on differentiation.

\textsuperscript{14} In testing the impact of mixed strategies, the strategy variables were dichotomized at the scale midpoint rather than the median. A median split would, by definition, result in one half of any sample of differentiating firms being defined as 'mixed' strategy cases. In this study, only those cases that score higher than 'moderate commitment' on both cost leadership and differentiation are classified as 'mixed' strategy cases. This approach allows, theoretically, either all firms or no firms in a sample to be classified as mixed strategy cases. In this study it emerges incidentally that approximately one half of the sample falls into the mixed strategy classification. In fact a median split on the cost leadership scale makes no difference to the dichotomization as the median is 4.25. A median split would, however, have resulted in one quarter of the firms being classified as high on cost leadership and low on differentiation. This appears to be an inaccurate representation of the strategic orientations of the firms in the sample. The dichotomization used here is consistent also with that used in the cross-tabulation in Table 7.5.
Table 6.6
Comparison of reliance on cost variance reports (RCVR) and reliance on non-financial performance measures (RNONFIN) between mixed strategy firms and pure differentiators\textsuperscript{15} - (Mann-Whitney U-Test)

<table>
<thead>
<tr>
<th></th>
<th>No. of cases</th>
<th>Mean rank - RCVR</th>
<th>Mean rank - RNONFIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixed strategy firms</td>
<td>18</td>
<td>20.75*</td>
<td>17.94</td>
</tr>
<tr>
<td>(cost leadership score $&gt; 4$,</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>differentiation score $&gt; 4$)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pure differentiators</td>
<td>17</td>
<td>15.09*</td>
<td>18.06</td>
</tr>
<tr>
<td>(cost leadership score $\leq 4$,</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>differentiation score $&gt; 4$)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\* Mean rankings differ significantly between groups (p= 0.10)

The results in Table 6.6 support the argument that an emphasis on cost leadership is related to reliance on cost variance reports. The results also support the proposition that the pursuit of mixed strategies impacts on the design of performance measurement systems. Reliance on cost variance reports appears to vary with the pursuit of cost leadership strategies. In mixed strategy cases, such reports will almost invariably be part of a complex system of financial and non-financial measures. There is no \textit{prima facie} reason to suggest that cost variance reports will be more important than other measures in such contexts. The prevalence of differentiation strategies, whether in conjunction with cost leadership or as a clear priority, results in the design of complex performance measurement systems as firms try to pursue multiple, potentially

\textsuperscript{15} It would be of interest to compare reliance on cost variance reports and reliance on non-financial performance measures between different kinds of mixed strategy groups. For example, those pursuing cost leadership and quality intensely and those pursuing just quality could be compared. Similar comparisons could be made between those pursuing cost leadership and flexibility and those pursuing just flexibility, and between other combinations of mixed and focused strategic groups. However such an analysis requires the formation of six groups representing different combinations of mixed and differentiating strategies, and the cell sizes are too small to make such comparisons.
conflicting strategies. The results also support the proposition that such strategy-contingent performance measurement system designs may be difficult to observe in data that focus only on strategic archetypes. That is, prior research providing evidence of emphasis on financial controls in differentiating contexts may reflect unrecognized mixed strategic commitments in these studies. Simons (1987) and Sim and Teoh (1997) interpret an emphasis on financial controls as supporting differentiation while the evidence presented here suggests that it may be a response to the importance of cost competition in those firms. The influence of intense cost competition in differentiating contexts (interpreted here as 'mixed' strategies) is missed where control system attributes are examined for firms forced into archetypal categories for analysis.

More broadly, the findings suggest that the importance of cost variance reports does not necessarily diminish for differentiating firms. Many firms pursue intensely cost leadership as well as differentiation, resulting in the need to balance cost with other performance signals. Yet, to the extent that performance measurement through variance reports tends to promote efficiency, standardization and production for inventory, it may be antithetical to the pursuit of strategic advantage in flexibility or quality. The question of whether such combinations of strategy and performance measurement systems designs are effective is explored in the 'fit' hypothesis, which is discussed in the next section.

6.6 Effectiveness implications of the fit between reliance on cost variance reports, reliance on non-financial performance measures and strategy

To test whether the match between strategic priorities and the design of performance measurement systems influences perceived performance measurement system
effectiveness, ideally a 'fit' test should be conducted. Conventionally, such a fit test involves fitting regression equations to matched strategy and performance measurement system design variables, and examining the interaction effect on an outcome variable (e.g. Brownell, 1982; Hirst, 1983; Govindarajan, 1988). Given the highly skewed distributions on the strategy variables and both the reliance on cost variance reports and non-financial measures, the interaction test is not considered appropriate. In effect, the procedure would seek performance effects from matching marginal differences in reliance on performance measures with marginal differences in strategy scores, where most of the variation is at the high end of the scales. The expectations underlying the hypotheses in this study suggest that firms rating relatively high on commitment to cost leadership and relatively high on reliance on financial performance measures would be expected to show the performance effects of a 'fit'. The same would be true of those rating relatively high on differentiation and relatively high on reliance on non-financial performance measures. It is argued here that this applies to all firms rating higher than the scale mid-point. The scale midpoints reflect 'moderate' competition on a particular criterion, and 'moderate' reliance on particular performance measures. The hypotheses in this study are consistent with a comparison of cases grouped into 'matched' and 'mismatched' quadrants dependent on strategy and performance measurement system characteristics. These quadrants are reflected in Figure 6.1.

---

16 For completeness, the interaction test was conducted. Three regression equations were used to test the interaction between:
1. Reliance on cost variance reports and commitment to cost leadership
2. Reliance on non-financial performance measures and commitment to quality
3. Reliance on non-financial performance measures and commitment to flexibility
with performance measurement completeness, congruence and overall effectiveness as the dependent variables. The equations were of the same form as that used by Brownell (1982) and Govindarajan (1988). The test produced a marginally significant (p=0.10) effect on overall performance measurement system effectiveness associated with the interaction of commitment to flexibility and reliance on non-financial measures. No other effects were significant.
On the basis of the argument just presented, the analysis was performed with 'high' and 'low' classifications determined by the scale midpoints. The results are reported in Table 6.7. For the first section of Table 6.7, those firms with performance measurement system characteristics to 'match' their commitment to cost leadership, are compared with those that reflect a 'mismatch'. For the second section of Table 6.7, firms were classified by commitment to differentiation, rather than quality or flexibility.
separately, as reliance on non-financial performance measures would be expected to be high for firms scoring high on either commitment to quality or flexibility. Thus, firms were classified as 'high' on commitment to differentiation if they scored higher than four on either commitment to quality or flexibility. Those firms with performance measurement system characteristics to 'match' their commitment to differentiation are compared with those that reflect a 'mismatch'.

A comparison of the mean ranked completeness, congruence and overall effectiveness scores between matched and mismatched cases reflects no significant differences\textsuperscript{17}. The results indicate that there are no significant performance implications from getting the 'fit' right. The numbers of cases in the 'matched' quadrants (shaded) reflects the tendency of firms to adopt performance measures which are broadly aligned with strategy, but the comparison of mean ranked effectiveness scores between the matched and unmatched cases reflects little difference.

6.7 Summary of the findings from the quantitative analysis

The quantitative analysis reported above supports the following findings:

- With one exception, all firms in the sample differentiate 'more than moderately' on the basis of either quality or flexibility. There are no pure 'cost leadership' firms in the sample. Approximately one half pursue both cost leadership and differentiation more than moderately (mixed strategy firms) while the other half pursue only

\textsuperscript{17} Parametric t-tests produced similar results with no significant differences in mean congruence, completeness or overall performance measurement system effectiveness between those cases with 'matched' strategy and reliance scores, and 'mismatched' cases. In fact, the differences in mean ranks which appear quite large in Table 6.7 are not evident in the differences between mean scores used in the t-test.
differentiation more than moderately.

Table 6.7
Effects on perceived performance measurement system (PMS) effectiveness of a match between performance measures and strategy - a comparison of matched and mismatched cases (Mann-Whitney U-Test)

<table>
<thead>
<tr>
<th>GROUP CHARACTERISTICS*</th>
<th>No of cases</th>
<th>PMS completeness mean rank</th>
<th>PMS congruence mean rank</th>
<th>Overall PMS effectiveness mean rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Matched cases:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High CL and High RCVR or Low CL and Low RCVR</td>
<td>20</td>
<td>16.30</td>
<td>17.27</td>
<td>18.38</td>
</tr>
<tr>
<td>Mismatched cases:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High CL and Low RCVR or Low CL and High RCVR</td>
<td>14</td>
<td>19.18</td>
<td>17.82</td>
<td>16.25</td>
</tr>
<tr>
<td>TOTAL CASES</td>
<td>34</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Matched cases</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Diff and High RNONFIN or Low Diff and Low RNONFIN</td>
<td>31</td>
<td>16.76</td>
<td>17.03</td>
<td>18.16</td>
</tr>
<tr>
<td>Mismatched cases:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Diff and Low RNONFIN or Low Diff and High RNONFIN</td>
<td>3</td>
<td>25.17</td>
<td>22.33</td>
<td>10.67</td>
</tr>
<tr>
<td>TOTAL CASES</td>
<td>34</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* 'High' and 'Low' are determined by the scale mid-point on all scales.  
High > 4. Low ≤ 4  
CL = Commitment to Cost Leadership  
Diff = Commitment to Differentiation  
RCVR = Reliance on Cost Variance Reports  
RNONFIN = Reliance on Non-financial Performance Measures
• Reliance on non-financial performance measures is universally high in the sample. This is clearly consistent with the prevalence of differentiation strategies in these firms. In addition, reliance on cost variance reports is high for those firms pursuing intensely cost leadership as well as differentiation and significantly lower for those pursuing cost leadership less intensely.

• There is no evidence of increased performance measurement system effectiveness from matching the reliance on cost variance reports or non-financial performance measures with strategic commitments\(^8\).

These findings raise several questions, which lend themselves to more qualitative analysis. Firstly, the prevalence of non-financial performance measures in all strategic contexts warrants a more micro analysis of the actual measures in use, and their links with strategy. The analysis of elaborated responses on measures used is discussed in the following chapter. Secondly, the strategic orientations of the sample do not conform to Porter's (1980) strategic typology in that Porter did not consider a mix of cost leadership and differentiation strategies to be viable. However, Porter (1980) did accept that differentiators would be 'cost conscious'. The next chapter seeks also to find explanations within the qualitative data for the strategic profile of the sample, and to reconcile the findings with Porter (1980; 1985). Thirdly, the strategic characteristics of the sample appear to result in the development of complex performance measurement systems where both financial and non-financial measures may vie for importance in mixed strategic contexts. Given the potential conflicts between such measures,

\(^8\) With the exception of a significant interaction between commitment to flexibility and reliance on non-financial measures reflected in the analysis reported in footnote 16.
performance measurement system integration becomes a critical issue. The issue of performance measurement integration is dealt with in Chapter 8.

Finally, the equivocal results concerning the effectiveness implications of matching strategy with performance measures are discussed more fully in Chapter 8 as the effectiveness of performance measurement system design is likely to be influenced by integration. As discussed in Chapter 2, the modification of cost targets to integrate quality and/or responsiveness measures may reduce the potential dysfunctional consequences of high reliance on cost variance reports in differentiation contexts. Furthermore, the importance of integrating multiple measures in establishing workable strategy-contingent performance measurement systems in mixed strategy cases may be evident in 'fit' tests based on integration and strategy. Thus, where critical performance measures include both cost variances and non-financial measures, integration may be at least as important as matching strategy with performance measurement system composition in determining performance measurement system effectiveness.

The next chapter explores elaborated responses on specific combinations of performance measures used, and the contextual influences on the strategic profile of the sample. This qualitative analysis is used to re-evaluate links between strategy and performance measures used and to seek explanations for the prevalence of differentiation and mixed strategies and the absence of pure cost leadership.
CHAPTER 7

THE FINDINGS (2) - STRATEGY AND PERFORMANCE MEASUREMENT COMPOSITION- QUALITATIVE ANALYSIS

7.1 Introduction

This chapter extends the analysis of the link between strategy and performance measurement system composition through the analysis of qualitative data. Elaborated responses on performance measures used and strategy are tested for consistency with the scaled responses used in the analysis in the prior chapter. In addition, the findings from the initial quantitative analysis, reported in the previous chapter, are re-examined in the context of the insights provided by the qualitative data. The aim of this analysis is to shed light on observed relationships or the absence of relationships between strategy and performance measurement system design, and to provide a basis for the development of further theoretical propositions regarding these relationships.

7.2 Qualitative analysis of skewed results on performance measurement system composition and strategy

The results reported in the previous chapter showed highly skewed strategic and performance measurement system design characteristics. Reliance on cost variance reports, reliance on non-financial performance measures and strategic commitment to differentiation were all relatively high across the sample. Such skewed sample characteristics may be viewed from two perspectives. On one hand the representativeness of the sample may be questioned. On the other hand, the findings may reflect the prevalence of differentiation in Australian manufacturing firms and a continued emphasis on cost variance reports as well as non-financial measures in
management control. If so, then these findings raise questions of potentially widespread practical interest regarding the juggling of performance criteria in complex strategic contexts. An analysis of expanded responses collected during the interviews sheds light on these issues. The next section examines elaborated responses on performance measures used and includes further analysis of the hypotheses based on that qualitative data. Section 7.2.2 examines elaborated responses on strategy and attempts to explain the strategic profile of the sample.

7.2.1 Reliance on financial and non-financial performance measures and elaborated responses on specific measures used.

Elaborated responses on performance measures used were tested firstly for consistency with responses on reliance on financial and non-financial performance measures used in the quantitative analysis presented in Chapter 6. Participating profit centre managers were asked questions about the nature of performance measures used to evaluate the overall performance of manufacturing subunits. The matrix used for the analysis of elaborated responses was a simple case-by-case identification of measures actively used by profit centre managers and classified by categories. The matrix structure is given in Table 7.1.

Non-financial measures of efficiency or productivity included, for example, wastage, rejects and throughput. Items classified as quality measures reflected 'external' quality, for example, first-graded versus down-graded product, customer complaints,
Table 7.1
Case-by-case matrix of classified measures used to evaluate overall manufacturing performance

<table>
<thead>
<tr>
<th>Case</th>
<th>Financial measures</th>
<th>Non-financial measures</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cost variance reports</td>
<td>Other financial measures</td>
</tr>
<tr>
<td>01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>03</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

and returns. Items classified as responsiveness measures included delivery performance, customer ratings of manufacturing and lead time.

Broad frequency statistics giving an overview of the performance measurement system characteristics of the firms in the study are given in Table 7.2.

Table 7.2
Components of performance measurement systems (frequency table)

<table>
<thead>
<tr>
<th>Manufacturing performance measures</th>
<th>No. of firms using</th>
<th>% using</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial measures:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Cost variance reports</td>
<td>34</td>
<td>94%</td>
</tr>
<tr>
<td>• Other(^{19})</td>
<td>2</td>
<td>6%</td>
</tr>
<tr>
<td>Non-financial measures:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Non-financial efficiency/productivity statistics</td>
<td>34</td>
<td>94%</td>
</tr>
<tr>
<td>• Quality statistics</td>
<td>27</td>
<td>75%</td>
</tr>
<tr>
<td>• Measures of customer responsiveness</td>
<td>25</td>
<td>69%</td>
</tr>
</tbody>
</table>

\(^{19}\) The two 'other financial' measures were a 'value-added' measure and a 'cost to manufacture index'. The managers using these measures were both also using cost variance reports.
It is notable that 94 percent (34) of the profit centre managers in the sample use cost variance reports in the evaluation of manufacturing performance. Of the 6 percent (2) remaining managers, one was in the process of developing such reporting systems, and one had abandoned routine performance measures totally. This latter manager argued that all critical performance parameters such as productivity and wastage were under control and not requiring monitoring ("you don't get up and take your temperature each morning to see if you're OK!"). The management focus in this firm was on searching for opportunities for continual improvement.

Apart from the extensive reliance on cost variance reports as indicated above, 94 percent (34) of the 36 firms in the sample used non-financial productivity and/or efficiency measures at the profit centre manager level\textsuperscript{20}. This indicates that there is still a strong tendency to evaluate manufacturing performance on cost variances and other productivity and efficiency measures despite the potential that such measures may be dysfunctional to the pursuit of quality and flexibility.

It is evident also that the majority of firms have attempted to develop comprehensive performance measurement systems encompassing broader strategic priorities. The data provided in Table 7.2 indicate that 75 percent (27) evaluate quality, and 69 percent (25) evaluate customer responsiveness in the form of delivery performance, lead times or customer ratings. Furthermore, expanded responses indicate that with the exception of one firm, just commencing to use standard costing and variance

\textsuperscript{20} These were not necessarily the same 34 firms using actual/budget comparisons. However, 33 of the firms used both.
reports, virtually all development work on performance measurement system design is focused on the expansion and refinement of non-financial performance measurement systems.

The picture of performance measurement system composition that emerges is one of widespread use of traditional financial and non-financial performance measures. The elaborated responses relating to specific measures used are consistent with the highly skewed performance measurement data used in the analysis in the prior chapter. What is observed in these firms is an array of financial and operational measures, which promote, at the same time, productivity, efficiency, quality and improvement in customer service levels. Common measures that are used in various combinations include

- actual output compared with target output,
- actual labour hours compared with standard hours allowed,
- spoilage and reject rates as additional efficiency measures,
- complaints and returns as measures of external quality,
- 'in full on time delivery' and lead time as customer service measures, and
- monthly reports of actual costs against budget.

The analysis of elaborated responses relating to performance measurement system composition highlights a potential confounding factor in the measurement of reliance on non-financial performance measures that may have affected the quantitative analyses reported in the previous chapter. While reliance on non-financial performance measures was hypothesized to be aligned with the pursuit of
differentiation, the reliance on non-financial performance measures variable was not limited to non-financial measures that support differentiation. It would have included, for example, non-financial measures of efficiency and productivity such as wastage and throughput that would be expected to be more consistent with a cost leadership strategy\textsuperscript{21}. The elaborated responses on actual measures used provide the potential for a more refined classification of performance measurement system composition and analysis of strategy matching.

In order to test whether strategy is reflected in performance measurement system composition, firms were classified by performance measurement system composition and strategic commitments compared. For the analysis reported in Table 7.3, cases were classified according to whether three major performance measurement system components were used or not used. The components of performance measurement systems were defined as efficiency/productivity measures, quality and responsiveness measures. Given that 33/36 firms use both cost accounting-based efficiency measures and other efficiency/productivity measures, these were not distinguished in the analysis. From a practical point of view, it would make no difference to the analysis to distinguish them, and from a theoretical point of view, it can be argued that the performance signals provided by both sets of measures are consistently directed at efficiency and throughput. Thus, while in the prior quantitative analysis, non-financial measures of efficiency and productivity were perhaps inappropriately classified with measures of quality and responsiveness in an overall measure of

\textsuperscript{21}This cannot be corrected in the prior analysis as the scaled responses reflected overall reliance on non-financial measures, not reliance on specific measures.
reliance on non-financial performance measures, for this analysis they were combined with cost-based measures of efficiency.

For this analysis, all firms were classified three times into 'yes'/no' groups depending on their use of efficiency/productivity measures, quality measures, and responsiveness measures in evaluating overall manufacturing performance. The firms using efficiency/productivity measures were then compared with those not using efficiency/productivity measures and tested for differences in commitment to a cost leadership strategy. Similar analyses were conducted for the use of quality measures and commitment to a quality strategy, and use of responsiveness measures and commitment to a flexibility strategy. The results are presented in Table 7.3.

<table>
<thead>
<tr>
<th></th>
<th>Number of cases</th>
<th>Commitment to cost leadership - mean rank #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of efficiency/productivity measures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>2</td>
<td>21.75</td>
</tr>
<tr>
<td>Yes</td>
<td>34</td>
<td>18.31</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Use of quality measures</th>
<th></th>
<th>Commitment to quality strategy - mean rank #</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>8</td>
<td>18.44</td>
</tr>
<tr>
<td>Yes</td>
<td>28</td>
<td>18.52</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Use of responsiveness measures</th>
<th></th>
<th>Commitment to flexibility - mean rank #</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>10</td>
<td>15.60</td>
</tr>
<tr>
<td>Yes</td>
<td>25</td>
<td>18.96</td>
</tr>
</tbody>
</table>

# None of the differences between mean ranks are significant.
Statistically, there is no clear relationship between strategy and the components of the performance measurement systems in the firms under study. The significant majority of profit centre managers have adopted relatively comprehensive performance measurement systems including efficiency/productivity, quality and responsiveness measures. From the data presented in Table 7.3, there appears to be no relationship between competitive strategy and the adoption of specific performance measures\textsuperscript{22}.

In order to determine whether a match between strategy and performance measurement system components is associated with perceptions of performance measurement system effectiveness, each case was classified according to whether the performance measurement system components were 'strategy-matched'. Table 6.5 (Chapter 6) classified cases by strategic commitment based on high scores on each of the cost leadership, quality and flexibility variables. That classification forms the basis of the analysis reported in Table 7.4. If a firm was classified Table 6.5 as pursuing a mix of cost leadership and quality strategies, and using both efficiency/productivity measures and quality measures, then it would qualify as a strategy-matched case. If either of those measures were not used, then it would be classified as an unmatched case. A Mann-Whitney U-Test was used to assess if performance measurement system effectiveness was greater in the matched cases compared with the unmatched cases. The results are in Table 7.4.

\textsuperscript{22} Parametric (t-test) results were similar with no significant differences in mean commitment to any of the three strategy types associated with the adoption of specific performance measures.
Table 7.4  
Matching performance measurement system components with strategy-implications for perceived performance measurement system (PMS) effectiveness (Mann-Whitney U-Test)

<table>
<thead>
<tr>
<th></th>
<th>No. of cases</th>
<th>PMS completeness mean rank #</th>
<th>No. of cases</th>
<th>PMS congruence mean rank #</th>
<th>No. of cases</th>
<th>PMS effectiveness mean rank #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategy-matched performance measurement system components</td>
<td>21</td>
<td>17.33</td>
<td>21</td>
<td>17.17</td>
<td>21</td>
<td>17.38</td>
</tr>
<tr>
<td>Unmatched performance measurement system Components</td>
<td>12</td>
<td>16.42</td>
<td>12</td>
<td>16.71</td>
<td>12</td>
<td>16.33</td>
</tr>
</tbody>
</table>

# None of the differences between mean ranks are significant.

The results in Table 7.4 indicate that there is no significant difference in perceived performance measurement system effectiveness (or the sub-components of completeness or congruence) between those cases with strategy-matched performance measurement systems, and those without. To meet the 'match' test for Table 7.4, the manager had to measure strategically important criteria. 'Excess' measures were not penalized. The combination of results in Tables 7.3 and 7.4 indicates that as firms adopt a battery of relatively generic measures (Table 7.3), the majority (i.e. 21/33) at least tend to include those measures that are strategically important (Table 7.4). So, while performance measurement systems appear to encompass strategically important criteria in the majority of cases, this is, to some extent, the incidental result of generalized comprehensiveness. There is some evidence here that managers at the profit centre level use relatively standard, comprehensive systems that encompass a range of criteria. This comprehensive range includes criteria that are valued
strategically, but may also include a common range of criteria that are not readily
linked with the specific firm strategy.

There is no evidence in these cases that strategic differences are reflected in
differences in the performance measurement system components used, or that
matching strategy and performance measurement system components improves
perceived performance measurement system effectiveness. This analysis of
qualitative data on specific measures used and their link with strategy is, in general
terms, consistent with the earlier findings reported on the link between reliance on
financial and non-financial performance measures and strategy. The general structure
of performance measurement systems is consistent in both analyses, with widespread
use of cost variance reports as well as non-financial measures of performance. While
the initial analysis reflected higher reliance on cost variance reports for those firms
pursuing cost leadership, analysis of elaborated responses indicates that overall
performance measurement system composition tends to be relatively standard and
comprehensive across the sample. There is no evidence in the analysed qualitative
data of clear links between composition and strategy, or effectiveness implications
from matching strategy with performance measurement system composition.

7.2.2 Strategy and context - the thematic conceptual matrix

The following qualitative analysis attempts to explore the competitive contexts that
contribute to the 'skewed' strategy ratings observed in the quantitative data. The aim
of this analysis is to understand why all firms in the sample differentiate at least to a
moderate extent. This will enhance interpretation of the findings both in
understanding the performance measurement implications of extensive differentiation and in evaluating generalizability of the findings. The analytical method used is based on the thematic conceptual matrices described in Chapter 5.

In order to conduct the analysis, firms were grouped into those pursuing mixed strategies (scores greater than four on the cost leadership and differentiation scaled responses) and those pursuing differentiation (scores greater than four on differentiation scales but less than or equal to four on cost leadership). The second step was to determine the themes that would be the focus of the qualitative analysis. In the semi-structured interview framework, managers were asked several questions that could be used both to validate the scaled response data on strategy and provide elaborated contextual information about strategic priorities. As established in Chapter 4, elaborated responses were collected around the themes of the firm’s competitive edge, availability of market price premiums on the firm’s products, and managerial response to product variation requests. These themes focus on the critical distinctions between cost leadership and differentiation in manufacturing.

Elaborated responses on these issues provide further insight into the individual firm's strategic choices, relationship with competitors, market conditions and the way the firms deal with the trade-off between flexibility and efficiency. In order to observe patterns in these responses and their alignment with strategic responses the thematic conceptual matrix in Table 7.5 was constructed. On the vertical dimension, the firms were dichotomized according to their strategic orientations - mixed strategies and differentiation. The horizontal dimension reflects the three themes explored across
the firms - their competitive edge, whether the firm's products sustain a price premium relative to competitors, and the way requests for product variations are managed.

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Competitive edge</th>
<th>Market price premiums relative to competitors</th>
<th>Attitudes to product variation requests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost leadership &gt; 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Differentiation &gt; 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Differentiation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost leadership ≤ 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Differentiation &gt; 4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The next three subsections explore, consecutively, each of the columns of the matrix in Table 7.5

7.2.2.1 Strategy and competitive edge

Table 7.6 categorizes the managers' responses on the question of competitive edge.

<table>
<thead>
<tr>
<th>Competitive edge</th>
<th>No. reporting*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality</td>
<td>14</td>
</tr>
<tr>
<td>Delivery reliability</td>
<td>12</td>
</tr>
<tr>
<td>Service</td>
<td>9</td>
</tr>
<tr>
<td>Quick response</td>
<td>8</td>
</tr>
<tr>
<td>Technological superiority</td>
<td>7</td>
</tr>
<tr>
<td>Product features / design</td>
<td>7</td>
</tr>
<tr>
<td>Brand names</td>
<td>5</td>
</tr>
<tr>
<td>Low cost</td>
<td>5</td>
</tr>
<tr>
<td>Diversity of product range</td>
<td>2</td>
</tr>
</tbody>
</table>

* Most respondents reported more than one competitive edge criterion
Responses to questions on competitive edge support earlier findings relating to the importance of differentiation in the sample, and the relatively low strategic importance attached to cost. Only five firms identified low cost as a competitive edge. In two cases, both of which are suppliers to the motor vehicle industry, cost leadership was stated to be the primary competitive edge. In the remaining three cases, cost leadership was expressed as a competitive edge in a mix of priorities including technical expertise, reliability, brand names and product styling. The remaining thirty firms identified only differentiating features as their competitive edge. All firms reporting low cost as a significant competitive edge criterion are in the 'mixed' strategy group. Thus, these responses are consistent with scaled responses reflecting the importance of cost for those firms. Given that approximately one half of the firms in the sample indicated that they competed 'more than moderately' on cost, the lack of emphasis on cost as a competitive edge is perhaps surprising. The following two subsections explore the question of why cost competition is so important to so many firms that do not rate cost as strategically important. As all of the other competitive edge criteria in Table 7.6 are differentiating criteria, there are no prior expectations about the distribution of these criteria between the mixed strategy and differentiating groups, and no further analysis of this distribution was undertaken. Overall, the results in Table 7.6 simply reinforce the overwhelming importance of differentiation.

The prevalence of differentiating characteristics is consistent with expanded responses which suggest that Australian manufacturers, facing limited local markets and intense competition from Asia, have to rely on quality, response time, innovation and product
features to establish a competitive edge. Thus, there is evidence that the limited strategic variety in the sample may be consistent with generalizable market characteristics. Clearly, virtually all firms in the sample see their competitive edge in differentiating criteria. Recall, however, from the previous chapter (Table 6.5) that nearly one half of the firms are competing relatively intensely on cost also. The explanation for the apparent mix of cost-based and differentiation strategies seems to lie in the nature of the markets within which the firms operate. According to Porter (1985), the sustainability of a competitive advantage in differentiation rests in the preparedness of the market to pay a price premium at least equivalent to the costs of differentiation. Market limits on such premiums restrict the sustainability of differentiation strategies. It is possible that in this sample, the apparent cost consciousness of many of the differentiating firms reflects a market price sensitivity that undermines the viability of pure differentiating strategies. Such pressure would be evident both in a lack of market price premiums and in a reluctance to incur 'costs' of differentiating in for example, flexibility. These issues are explored in turn in the next two subsections.

7.2.2.2 Strategy and market conditions

According to elaborated responses from the profit centre managers in this sample, it would appear that the two groups (mixed strategy and differentiating firms) seem to differ significantly in the market conditions within which they operate. In particular, they seem to differ in their ability to charge a price premium commensurate with their differentiation strategies. Of the 17 firms in the mixed strategy group commenting on market conditions, 13 stressed the importance of cost or price competitiveness.
Common reasons related to the nature of the product and the fact that the product was being sold through chain stores or supplied to the motor vehicle industry. It is notable that all of these firms did not see low cost as their source of sustainable competitive advantage. The following descriptions of market characteristics demonstrate the strategic dilemma:

- Fierce price competition in end product markets affected manufacturers supplying, for example, the motor vehicle industry or chain stores. Yet the firms supplying the motor vehicle industry tended to see their sustainable competitive advantage in technological superiority, service and response time. Those supplying chain stores tend to see their sustainable competitive advantage in brand names, product range, reliability and quick response.

- The threat of product substitution can produce intense price competition even for an apparent local monopoly on a product that is expensive to import. The threat of substitution of aluminium cans or plastic bottles for glass threatened a single local glass producer. The sustainable competitive advantage for this producer was in product range, design and supply reliability.

- A duopoly in the manufacture of unbranded merchandise, such as packaging, provides intense competition on all fronts. Often short lead times (quick response) gave an edge in contract acquisition, but not a price premium.

Of the 15 managers in the differentiating group that commented on market factors, eight stressed the importance of cost. Six of these eight firms were marginal in their classification as firms with low importance on cost leadership (cost leadership score equal to 4). In one of the remaining two cases, cost was still not an issue as the profit
centre manager claimed the firm to be a price leader and that their production costs were known to be significantly lower than competitors. The remaining seven managers in the differentiating group claimed lack of local competitors and tariff protection as insulating them from cost pressures. Thus, product market conditions seem to be a source of significant cost pressure in the 'mixed strategy' firms, forcing the juggling of mixed strategic priorities rather than an emphasis on either cost leadership or differentiation.

It appears that market price pressure may be a significant influence on the propensity of firms in the sample to indicate that they compete intensely on both cost and differentiation. In prior analysis (Table 6.6) scaled responses were used to categorize the firms as pursuing 'mixed' strategies. It could be argued that these firms are not, in fact, pursuing mixed strategies, but that they are differentiators seeking to manage costs within the proximity of competitors. Such a proposition would be consistent with Porter's (1980 and 1985) strategic framework. It would not, however, detract from the contribution of the findings of this study as it offers an alternative, but consistent rationale for the persistent reliance on accounting performance measures in differentiation contexts. Differentiators in Porter's framework manage costs in order to manage the 'price' charged for differentiation. Many of the firms in this sample seem limited in their capacity to charge for differentiation. Regardless of whether these firms are actually pursuing mixed strategies or they are differentiators under pressure to establish cost proximity, the qualitative evidence reported here indicates that the result would be similar. Cost leadership or proximity, whether as a strategic commitment or a result of market pressure, will tend to increase the importance of
accounting performance measures such as cost variance reports. Such performance measures will remain important in differentiating contexts where mixed strategies or market pressures are present.

This section has sought insights into the prevalence of mixed cost leadership and differentiation strategies by examining market conditions that limit the availability of price premiums. The related question of whether the firms in the sample are prepared to incur costs to support differentiation can also provide insight into the nature and form of their strategic focus. The following section seeks insights from the way the firms manage the trade-off between efficient run sizes and product variations as a clear example of 'costly' differentiation.

7.2.2.3 Strategy and attitudes to product variation requests

In order to gain insight into the balance between cost leadership and differentiation, managers were asked questions about their attitudes and responses to product variation requests. Such flexibility may imply loss of manufacturing efficiency compared with 'most efficient' run sizes. For those firms pursuing differentiation by flexibility, attitudes to these requests would be expected to reflect the willingness of the firm to incur 'costs' of differentiation.

Of the 23 general managers who commented on the response to product variation requests, 14 scored high (greater than four) on the commitment to flexibility scale. Thus, these 14 managers claimed to be pursuing 'more than moderately' differentiation by flexibility. It is notable that only two of these managers demonstrated acceptance
of the cost implications of flexibility. One suggested that flexibility was imperative and that they would sacrifice cost to achieve flexibility. The other firm was investing in flexible technology to manage the high level of 'optioning' that was demanded. The remaining 13 firms seemed to wrestle with the trade-offs between efficiency and flexibility. It is notable that all of the managers expressing the following trade-offs scored high (greater than four) on flexibility:

- trying to become market-oriented, wants to understand cost implications, but still manufacturing-driven at the moment
- have to become market-driven and shorten turnaround times despite resistance from manufacturing
- tries, within reason, to accept variation requests but tends to go for productivity
- lays down minimum run sizes for each product range
- encourages large volume through favourable pricing
- process is 'built' on standardization
- relying on inventory to limit manufacturing changes
- market-driven for 'reasonable' variation requests. Relying on rigid schedule adherence for efficiencies
- plant resists customization but accepts it
- needs sufficient quantity in order for it to be worthwhile
- using inventories to enhance flexibility
- old machines limit capacity to be even moderately efficient with short runs

These descriptions of management priorities reflect significant reluctance to incur and attempt to pass on costs associated with the high commitment to flexibility in these firms. The majority (11/14) of these firms fall into the group that has been described as pursuing mixed strategies. Again it is apparent that the tendency to appear to pursue mixed strategies is a function of market factors which limit the extent to which the firm can pass on costs of differentiation in the form of market price premiums.
7.3 Summary

The analysis presented in the previous chapter set up a scenario where reliance on cost variance reports appeared to be related to commitment to cost leadership, but that reliance on non-accounting performance measures was universally high. Many firms pursuing cost leadership intensely are also pursuing differentiation on the basis of quality or flexibility. There was no evidence of performance implications from the 'fit' between strategy, reliance on cost variance reports and reliance on non-financial performance measures. The qualitative data discussed in this chapter provides support for

- the plausibility of skewed results for reliance on cost variance reports and reliance on non-financial performance measures
- the limited evidence of a link between strategy and performance measurement system design
- the plausibility of the skewed strategic orientations reflected in the sample
- the prevalence of mixed strategies
- the relevance of market conditions in determining the importance of competing on cost in differentiating contexts.

The general picture to emerge is that cost leadership or proximity may be critically important to a majority of Australian manufacturers because market conditions restrict the capacity of these firms to pass on the costs of differentiation in the form of price premiums. Such conditions appear to promote cost consciousness and enhance the importance of cost variance reports and other measures of efficiency and productivity. The lack of general significant performance measurement system effectiveness
implications arising from reliance on cost variance reports or the matching of strategy and specific performance measures may reflect the failure of such variance analyses to assist in the juggling act of managing differentiation under intense market pressure. The analyses presented in this chapter raise the question of how performance criteria focused on potentially conflicting strategies such as cost reduction, flexibility and quality can be balanced or integrated. The integration of multiple performance criteria into a mutually reinforcing system may potentially alleviate this conflict where multiple criteria need to be juggled. The experience of performance measurement system integration in these firms is discussed in Chapter 8.
CHAPTER 8

THE FINDINGS (3) - STRATEGY AND THE CONSTITUTION OF PERFORMANCE BENCHMARKS

8.1 Introduction

The previous two chapters examined evidence of relationships between strategy and the relative reliance on financial and non-financial performance measures. Evidence of relationships between strategy and the composition of performance measurement systems in terms of specific measures was examined also. While limited evidence of such associations was found, the general picture to emerge from the analysis is described as follows:

- virtually all firms in the sample differentiate 'more than moderately'
- many (approximately half) also compete on cost 'more than moderately'
- reliance on both cost variance reports and non-financial performance measures are quite high across the sample
- most profit centre managers in the sample adopt relatively comprehensive performance measurement systems encompassing measures of efficiency, productivity, quality and responsiveness.

The evidence that managers are juggling a mix of strategic priorities and a mix of performance measures highlights the potential importance of 'integrating' performance measures so that they are consistent and mutually reinforcing. It was argued in Chapter 2 that where firms pursue strategic advantage in quality or flexibility, and continue to rely on cost variance reports in performance measurement, it would be expected that
cost targets would be 'modified' to encapsulate the cost implications of differentiation. It was argued that such modifications could avoid the potential dysfunctional consequences that may arise when pursuit of performance against cost targets implies compromising performance on quality or responsiveness. For example, the modification of cost benchmarks may be used to allow for 'less efficient' performance choices in the interests of quality or customer responsiveness. Cost targets based on incremental adjustments to internal, efficiency-focused historical data may be dysfunctional to quality improvement, inventory reduction or flexibility. Alternatively, it is feasible that cost benchmarks could be developed to reflect the anticipated cost of multiple goal achievements. Cost targets, which look superficially 'simple', may take into account quality improvements, technological changes, manufacturing flexibility and shortened cycle times. All of these process changes have cost implications and those implications can, at least theoretically, be embodied in standards. These 'modified' standards would be potentially both congruent with new manufacturing priorities and a relevant tool for monitoring strategy implementation. Such modified cost benchmarks may be described as integrated with measures of quality and responsiveness because they are consistent and mutually reinforcing.

The following hypotheses were established:

H2(a) The pursuit of cost leadership is associated positively with the use of 'traditional' budgeted cost benchmarks in cost variance reports.

H2(b) The pursuit of strategic differentiation is associated positively with the use of 'modified' cost benchmarks in cost variance reports.

H2(c) The pursuit of mixed strategic priorities is associated positively with the use of 'modified' cost benchmarks in cost variance reports.

and the relevant 'fit' hypothesis:
H4(b) In the management control of manufacturing subunits, an appropriate match between manufacturing strategy and the constitution of financial benchmarks used in cost variance reports results in greater performance measurement system effectiveness.

In exploring the integration of multiple measures, this study examines empirical evidence of the composition of performance measurement systems and the ways in which quality, customer responsiveness and cost targets are integrated within performance measurement systems through the modification of cost benchmarks. It emerged from prior analysis (Chapter 6) that there were no firms in the sample pursuing cost leadership without also pursuing differentiation at least 'more than moderately'. Thus all firms in the sample were classified as either differentiators or pursuing mixed strategies. Following the hypotheses restated above, all firms in the sample would be expected to modify cost targets if they are using them in performance measurement. The absence of a 'cost leadership' group renders it impossible to examine a link between strategy and constitution of benchmarks. Instead, all firms in the sample are examined for the performance measurement system characteristics that support differentiation. The issue of integration of multiple measures, as outlined below, is examined in all firms that seek to manage multiple criteria including cost variances. Such an analytical approach is consistent with the overwhelming prevalence of differentiation.

The remainder of this chapter is organized as follows. The next section examines the empirical evidence of 'integration' of multiple performance measures by examining the extent of use of 'modified' cost targets. Elaborated responses are used to examine the characteristics of cases where modified benchmarks are used and not used. Section 8.3
examines cases where cost targets are not modified for evidence of alternative integrative mechanisms. These observations form the basis for further theoretical propositions relating to integration of multiple performance measures (Section 8.4). In Section 8.5 the propositions emerging from this analysis are tested for support in scaled response data. This is not to be construed as hypothesis testing, but as a test of further support for the induction of emergent propositions.

8.2 Integration of cost targets with non-financial targets relating to quality and/or responsiveness

8.2.1 The cases used in analysis of integration

To capture elaborated responses on themes relating to performance measurement system composition and integration, participating profit centre managers in this study were asked open-ended questions about

- the performance measures used to evaluate the overall performance of manufacturing, and the three most critical measures used,

- the way standards and other expectations underlying those performance measures are established, and

- their perceptions of the extent of integration of multiple performance measures and conflict in the signals from the performance measurement system.

To analyse the integrative quality of 'mixed' performance measurement systems the following analysis attempts to classify firms as to whether they are using 'integrated' or 'non-integrated' performance measurement systems. Following the theoretical arguments established in Chapter 2, and summarized above, cost benchmarks would be expected to be modified where
• multiple performance measures are used,
• cost variances are part of the performance measurement system, and
• quality or responsiveness measures are also part of the performance measurement system.

Furthermore, it is likely that the need to integrate measures would be greater if multiple measures are of relatively equal and high importance. Thus, for example, if a manager uses two measures of performance, it becomes less critical to integrate the two measures if one is recognized as being of significantly lower importance. In such a case, it would be expected that performance on the lower level criterion would be sacrificed to achieve the higher-rated performance requirement. However, if two measures are critically important, it becomes problematic if they produce inconsistent signals, as it may not be accepted that one will be compromised in favour of the other. Thus, in order to examine the prevalence of benchmark modifications and other integrative methods, in the first instance, the cases used in analysis are those where profit centre managers attach critical importance to both cost variances and non-financial, potentially conflicting measures\textsuperscript{23}. Subsequent analyses examine mixed strategy and differentiating cases where potentially conflicting mixed measures are not rated as critically important. In avoiding conflicting performance measures, such cases may potentially exhibit innovative approaches to performance measurement system design.

\textsuperscript{23} Recall (Section 4.4.1) that problems of incomparable aggregation levels in responses led to the changing of the questionnaire relating to this ranking, following the first 15 interviews. It was stated that all cases potentially affected by this would be excluded in subsequent analysis. For this analysis, all cases from the first 15 interviews that reflected disaggregated responses (such as three different types of cost variances) are excluded by the criterion used. Any cases of mixed measures are included.
8.2.2 The incidence of modified benchmarks

The following initial analysis focuses on those cases in which performance measurement systems reflect the inclusion of cost variance reports as well as potentially conflicting quality and responsiveness measures in the three most critical performance measures used. There are 21 firms in this category. These firms were classified by their use of 'modified' cost benchmarks to integrate other performance criteria. Those classified as cases using 'modified' benchmarks indicated that cost targets used in variance analysis were adjusted for the expected costs of meeting quality and/or responsiveness goals. Those classified as cases using 'non-modified' cost benchmarks indicated that cost targets were not developed to reflect the anticipated cost of performing on other criteria. Such firms indicated that standard product cost was developed to reflect the minimum unit cost under standard, efficient operating conditions without reference to the costs of changeovers and short runs implicit in flexibility, or the costs of special design features inherent in differentiation by quality.

Based on this classification, seven of the 21 firms used 'modified' cost benchmarks while 14 did not. These results do not support the expectation that all firms in this group would modify cost targets as they pursue competitive advantage in differentiation. Analysis of elaborated responses indicates that all seven using 'modified' targets have modified cost benchmarks for quality requirements but, in fact, there are no instances of modifications relating to responsiveness. These results prompt further analysis of the qualitative data to shed light on the nature and process of integrating multiple measures. Given that so few firms using these mixed measures modify cost targets, it is of interest to examine the managers' perceptions of integration.
and conflict arising from performance measurement systems. It may be that other integrative techniques are used, or that the failure to modify cost targets results in performance conflict. In addition, the findings suggest that modifications may be used for particular combinations of measures but not for others. The next section pursues these issues through a more detailed analysis of elaborated responses on the themes of integration and conflict between multiple performance measures.

8.2.3 Perceptions of integration and conflict

For the following analysis firms were classified by the combinations of performance measures used, their experience of internally consistent signals from the combined measures, and the nature of conflicts, if any. These characteristics provided the basis for the classification given in Table 8.1.

The analysis in Table 8.1 reflects a relatively low experience of 'integrated' performance measures among the firms in the sample, with the majority (12/21) of managers reporting inconsistent performance signals from mixed measures. In addition, this initial classification suggests that the combination of quality measures and cost variance reports is not a significant source of inconsistent performance signals (0/12). In contrast, the combination of responsiveness measures and cost variance reports may be significantly more problematic (a source of conflict in 10/12 cases).
Table 8.1
Firms with multiple performance measures, classified by performance measurement system composition, perceived internal consistency and nature of conflicting signals

<table>
<thead>
<tr>
<th>PMS composition</th>
<th>No. of cases</th>
<th>No. perceiving internally consistent signals</th>
<th>No. not perceiving internally consistent signals</th>
<th>Sources of perceived conflicts for those not perceiving internally consistent signals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Cost variances vs responsiveness</td>
</tr>
<tr>
<td>C + Q</td>
<td>7</td>
<td>4</td>
<td>3*</td>
<td>3</td>
</tr>
<tr>
<td>C + R</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>C + Q + R</td>
<td>9</td>
<td>2</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>21</td>
<td>9</td>
<td>12</td>
<td>10</td>
</tr>
</tbody>
</table>

where: C = Cost variance reports
Q = Quality measures
R = Responsiveness measures
in the three most critical measures used.

*Although these managers focus on measuring performance on quality and efficiency criteria, they report perceiving conflict between efficiency and responsiveness, as is evident in the right-hand side of Table 8.1.*
Viewed in combination, the findings relating to the modification of benchmarks and the experience of integration and conflict begin to expose patterns. The first analysis suggested that where modifications to cost targets were made, they were used to integrate quality and efficiency targets, but not responsiveness targets. This suggests that in more general terms, the combination of quality and efficiency measures is not as problematic as the combination of responsiveness and efficiency measures. The second analysis suggests that the failure to integrate responsiveness and efficiency criteria through modification of benchmarks may be a persistent source of performance conflict. These issues relating to particular performance measurement system combinations, integrative techniques and the perception of conflict are elaborated in the next section.

The following sections examine respectively the integration of quality measures and cost targets and the integration of responsiveness measures and cost targets. Elaborated responses are examined for evidence of the modification of cost benchmarks to accommodate quality and responsiveness criteria to determine whether perceptions of internal consistency reflect deliberate attempts at integration. The characteristics of systems with inherent inconsistencies are examined also for patterns in the sources of conflict.

8.2.3 Integrating quality and cost targets

It is notable that no firm in the group reporting inconsistent performance signals discussed conflict between quality requirements and cost measures. It emerges from an
examination of the elaborated responses that it is relatively simple to design
performance measurement systems that integrate quality and cost targets (see also
Milgrom and Roberts, 1995). Quality and product reliability improvements can be
incorporated in product specifications and then costed. Thus quality can be
incorporated into cost standards and not necessarily compromised in the pursuit of
those cost standards. The modification of cost benchmarks is an effective integrative
technique for these firms. The following anecdotes elaborate this link:

*JIT encourages removal of questionable quality and fixing and restarting rather than
continual repetition of low quality, which might have occurred traditionally.*

*The performance measurement system is output-oriented, but it only values 'good'
output.*

*We have taken a cost increase ...[to] upgrade the standards of the packs on shelf.*

*Quality problems are charged back so there is no incentive to compromise on quality.*

The two firms that identified circumstances in which quality was sacrificed associated
the problem with a conflict between customer responsiveness and quality:

*There is a misplaced attitude that work must go out on time even if it comes back.*

*We cheat too often on quality to meet urgent deliveries.*

No managers expressed any concern that a focus on cost targets would induce
dysfunctional compromises on quality. Generally, it was apparent that cost targets
reflect (or integrate) quality requirements and thus are not even potentially in conflict.
Cost targets are modified when quality requirements change.
8.2.4 Integrating responsiveness and cost targets

The demand for customer responsiveness was a widespread source of unresolved performance conflict. Apart from the two cases illustrated above, 10 out of 12 managers reporting inconsistent signals attributed the conflict to the failure to integrate customer responsiveness requirements into cost targets:

We are in the throes of moving from a manufacturing dominated organization to a marketing dominated organization. To be customer responsive, you should produce [the product as demanded rather than the most efficient mix to manufacture]. That means that you are going to lose efficiency cutting and you are going to lose efficiency in fabric usage. In a traditional manufacturing environment that does create real conflict and that's something we are slowly coming to terms with.

We are a process manufacturing house trying to do job orders... There's a hell of a lot of conflict between wanting to mass produce long runs and being able to support our customers who are demanding instantaneous jobs that are specific to them.

Historically we have got a culture where people have been measured by productivity out of a certain section or a cell or off a machine. [That compares with] a KANBAN philosophy coming in saying smaller quantities, don't worry too about the long runs to achieve maximum efficiency. Just concentrate on being flexible. The trouble is that the day to day pressures on you force you to make decisions that will influence negatively or positively some of these elements. There is always a trade off.

Three years ago we were probably producing 25 different lines and now we are producing 75 or 80 different lines because we are chasing different tender business...

Very simplistically, we've set most of our costs up on the basis of 25 product lines rather than 75 product lines.

Production is so intent on meeting their weekly targets, if a special order comes in they tend to say, "Oh no, what a nuisance", rather than [looking at] the opportunity presented. And that's fair enough, that's where they're valued at. ..That's their whole reward system. Yes [the special order does get done], but it takes a lot of management effort to tell people that you are going to do it.

The trouble is we have far too many long serving employees and they know that they have to get 25,000 products off that line this shift. They will do it and that's their performance measure and they'll believe that they have done a good job. There may be even some of the management mechanisms that tell them they're doing a good job to do that but it might not match the customer service angle and that's what wrong.
Thus, the majority of managers reporting conflict and a failure to integrate multiple performance criteria referred to the failure to integrate cost targets and responsiveness criteria. Furthermore, even those firms reporting internally consistent performance signals in Table 8.1 demonstrated little actual integration of responsiveness and efficiency criteria. Rather, they have adopted other means of managing inherent conflicts. Five firms reported that the combination of cost targets and responsiveness criteria did not give rise to conflict. Four were aware of the inherent conflicts but coped with them. For example, the following anecdote indicates that a less stringent reaction to variances is a potential means of conflict management:

_The standard costs are basically put up like a benchmark cost more than anything else. And what drives the business basically is the commercial realities rather than the benchmark costs.... When we review the results it will always be tempered by our knowledge of what has happened in the month rather than simply saying “oh, you have made a loss of $10,000 this month or whatever the case may be”._

Only one firm in the group took deliberate 'integrative' steps and these were outside the performance measurement system. The firm adopted structural mechanisms to integrate sales and marketing into small strategic business units within the factory.

This analysis of elaborated responses raises several alternative integrative approaches being used in these firms. These alternative approaches including the reaction to variances, structural integration and innovative performance measurement system designs are discussed further in Chapter 9.
8.2.5 Integrating multiple criteria - a synthesis

It is notable that the 21 firms which were classified according to whether their systems were integrated or not, all used multiple measures of performance, including cost-based efficiency measures as well as quality and/or responsiveness measures. Such performance measurement systems with their mix of financial and non-financial criteria may reflect an attempt to manage the link between the performance measurement system composition and strategy by capturing strategically important criteria. However, this in itself does not achieve integration, as there is evidence that such combinations simply result in a mix of conflicting measures. In particular, it is evident that while firms readily adjust cost or efficiency targets for changes in quality, there is a lack of accepted means of modifying efficiency and productivity criteria to recognize the increased costs of short runs and quick changeovers associated with customer responsiveness.

Thus, it remains apparent that few firms focusing intensely on cost variances have developed satisfactory methods of integrating performance criteria so that the 'cost of responsiveness' is built into cost standards. This is the approach taken in practice to integrate quality and cost targets, but there appear to be significant practical difficulties in applying the same approach to customer responsiveness. The failure of traditional management accounting systems to quantify costs and benefits of customization, coordination or the effects of multiple goals have been noted in the literature (Hergert and Morris, 1989; Fisher 1992). The accountants' role in developing and monitoring the costs of product and process characteristics also has been highlighted (Bromwich,
1990), but there are few documented models for identifying customization costs and managing inherent trade-offs (Srinidhi, (1992) and Leitch et al., (1995) are examples).

8.3 Integration and conflict in the cases not using cost variance reports and multiple measures

There were 15 cases excluded from the above discussion. The integration of their performance measurement systems was not evaluated, as they either did not report using cost variances or did not report using mixed measures in the three most critical performance measures used. The potential for inconsistency between mixed measures may lead firms to seek innovative ways of managing performance in contexts of differentiation or mixed strategies. While this chapter focuses on the integration of cost targets and other performance criteria, the avoidance of multiple, potentially conflicting measures in some cases may be enlightening. The performance measurement systems in these firms were examined also for innovative ways of promoting the pursuit of differentiation and mixed strategies.

Three of these fifteen firms relied heavily on cost variances only, but this was apparently ineffective:

*The system shows big variances all the time - variances as a result of producing completely different products.*

*This plant has a history of being productivity driven... so when something's not going quite right with the machine, they just continue to produce. We've got to somehow dent their self-satisfaction for their productivity measures.*

Four firms combined *non-financial* measures of efficiency and productivity with measures of responsiveness. All of these firms reported conflicts similar to those.
described by the firms combining cost variance reports and responsiveness measures\textsuperscript{24}. This suggests that it is the \textit{efficiency} focus of cost variance reports, rather than the cost focus \textit{per se} which is potentially in conflict with the pursuit of responsiveness.

The remaining eight firms deliberately avoided the use of cost variances in performance measurement, and some developed innovative solutions. One argued that a comprehensive activity-based costing system enabled them to incorporate the cost of any customer-responsive activities undertaken in the plant. The potential of activity-based costing to capture the costs of responsiveness is an important result which supports the feasibility of modifying cost targets to incorporate multiple performance expectations. This particular case was not included in the prior analysis because the manager did not rely on cost variances in performance measurement even though product costs were developed using activity-based costing. The second case involved the use of a value added system which the profit centre manager argued was a totally integrated measure that could evaluate all the trade-offs within a single measure. The third case had moved to team-based criteria, and reduced the emphasis on rigid output targets so that teams would stop production and focus on process improvement when the target was met. The fourth was 'reengineering towards a quick-change-logic' using flexible manufacturing technology to reduce the cost effects associated with customer responsiveness. The fifth used a battery of measures associated with MRP II and argued that rigid schedule adherence removed inconsistencies. The three remaining in this group did not identify any particular characteristics of their performance

\textsuperscript{24} Following the argument in Chapter 7 regarding similar performance signals from cost variance reports and non-financial measures of efficiency and productivity, this result is consistent with expectations. However, it was not appropriate to include these firms in the prior analysis as that analysis focused specifically on the modification of \textit{cost} benchmarks.
measurement systems. One was simply unaware of any trade-offs and the second perceived conflict associated with product 'variety' and believed that a move to an increased number of measures would remove such conflicts. Based on the evidence presented in the previous section, this may not achieve a satisfactory solution for this firm. The last firm claimed to use only responsiveness measures but at the same time suggested that cost is a driving factor, and that the factory was obsessed by cost. However standards were set at minimum run sizes and variances tended to be favourable. This case remains difficult to interpret in the framework established for this study.

It seems clear from this analysis that the firms that have been most successful at eliminating the inherent conflict between efficiency and responsiveness have sought solutions which have invariably steered away from reliance on cost variance reports. Such solutions included the use of integrative structural mechanisms such as teams and the development of value added measures. Of course it could also be argued that champions of 'innovative solutions' would naturally tend to report favourable outcomes such as the absence of conflict. Without an independent measure of the presence or absence of performance conflict or further research focused specifically on the implementation of these techniques, it is impossible to discount such possibilities. It is, however, notable that innovative approaches do not seem to be required to integrate quality and efficiency. Cost targets may be modified to accommodate quality requirements, diminishing the need for innovative, integrative solutions. Theoretically, such adjustments must be possible to incorporate the costs of schedule alterations, overtime and other activities associated with 'responsive' manufacturing. There was
only one case of such modifications being attempted by the firms in this sample. The firm using activity-based costing demonstrated its capacity to capture the costs of responsiveness, but still did not use this to establish ‘integrated’ cost benchmarks for performance measurement.

8.4 Emergent propositions

Two propositions emerge from this qualitative analysis. Where integration is interpreted as the capacity for multiple measures to blend and produce internally consistent signals:

1. Quality and cost targets may be relatively easily integrated through the modification of cost benchmarks
2. The integration of customer responsiveness and cost targets is problematic.

These propositions have been induced from the analysis of qualitative data. If these propositions reflect accurately the underlying patterns in the data, it would be expected that they would be reflected in scaled response data from the structured questionnaire. The next section reports the results of analysing the link between performance measurement system composition and scaled response data on performance measurement system effectiveness to determine whether the above propositions were supported in the participant-rated data.

8.5 Quantitative analysis - performance measurement system composition and integration.

The qualitative analysis reported in the prior sections of this chapter suggested that it might be more difficult to establish internal consistency between responsiveness and
efficiency/productivity measures than between quality and efficiency/productivity measures. To test this proposition in the quantitative data, cases with these combinations were examined for differences in perceived performance measurement system effectiveness and firm performance. Cases were formed into groups based on the constitution of their performance measurement systems. All profit centre managers using multiple measures were included in the analysis. It was not limited to those cases using multiple measures in the three most critical, or to those using cost variance reports. Firms using non-financial measures of efficiency and productivity were categorized with those using cost variance reports, as the potential for inconsistencies was expected to be similar. Overall, this analysis provides a more general test of whether performance measurement system effectiveness implications are related to particular combinations of performance measures.

Cases were classified as to whether they combined quality and efficiency/productivity measures or not, and whether they combined responsiveness and efficiency/productivity measures or not. Scores for performance measurement system completeness, congruence and overall effectiveness were calculated and compared across the groups. The results are reported in Table 8.2.

The first analysis compares cases that combined quality and efficiency/productivity measures, and those that did not. The results suggest no significant differences between groups on performance measurement system completeness, congruence or overall effectiveness. The second analysis compares cases that combined customer
Table 8.2

Performance measurement system (PMS) components and perceived performance measurement system effectiveness (Mann-Whitney U-Test)

<table>
<thead>
<tr>
<th>PMS components</th>
<th>No. of cases</th>
<th>PMS completeness mean rank</th>
<th>PMS congruence mean rank</th>
<th>PMS effectiveness mean rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cases combining efficiency/productivity and quality measures</td>
<td>25</td>
<td>17.94</td>
<td>18.28</td>
<td>18.20</td>
</tr>
<tr>
<td>Cases not combining efficiency/productivity and quality measures</td>
<td>10</td>
<td>18.15</td>
<td>17.30</td>
<td>17.50</td>
</tr>
<tr>
<td>Cases combining efficiency/productivity and customer responsiveness measures</td>
<td>24</td>
<td>19.21</td>
<td>20.17**</td>
<td>19.81*</td>
</tr>
<tr>
<td>Cases not combining efficiency/productivity and customer responsiveness measures</td>
<td>11</td>
<td>15.36</td>
<td>13.27**</td>
<td>14.05*</td>
</tr>
</tbody>
</table>

** Significant differences between groups (corrected for ties - p = .06)
* Difference between groups approaching significance (p = 0.12)

responsiveness with efficiency/productivity measures and those that did not. The results suggest no significant difference between the two groups on completeness. However, the group that combined efficiency/productivity measures with customer responsiveness measures shows significantly lower congruence scores than those firms that did not combine these measures. This result supports the proposition that while combining efficiency/productivity measures with customer responsiveness measures may enhance perceptions of completeness it does not resolve issues of congruence and integration. These results combine to show a difference between groups on overall perception of performance measurement system effectiveness approaching
significance\textsuperscript{25}. The combination of customer responsiveness and efficiency/productivity measures again appears to be problematic compared with the combination of quality and efficiency/productivity measures.

This analysis offers support for the proposition that completeness or comprehensiveness in performance measurement system design does not guarantee integration. Furthermore, the expansion of performance measurement systems to include responsiveness measures alongside efficiency/productivity measures may do little to alleviate the inherent performance conflict between efficiency and responsiveness.

\textsuperscript{25}Parametric (T-test) results were similar. There were no significant differences in performance measurement system effectiveness dependent on the combination of quality and efficiency/productivity criteria. However, performance measurement system congruence (p<0.05) and overall effectiveness (p<0.10) were significantly lower for those cases combining responsiveness and efficiency/productivity criteria.
CHAPTER 9

FINDINGS (4): A SYNTHESIS

This chapter reviews and attempts to synthesize the findings reported in the last three chapters. The chapter commences with a review of both the research issue as established at the commencement of the study, and the motivation for the study. The findings are then reviewed in the context established by the research issue and motivation. An integrative framework is proposed to synthesize the findings from the study.

9.1 Review of the research issue

In Chapter 1 the research issue under study was stated as follows:

*This study explores the link between strategy and the use and design of manufacturing subunit performance measures by profit centre managers. More specifically, it examines the relationship between manufacturing competitive strategy and*

1. relative reliance on financial and non-financial performance measures for manufacturing management control

2. the way cost benchmarks used in financial performance measures are constituted to integrate non-financial dimensions of performance.

*These links between manufacturing strategy, reliance on performance measures and constitution of financial benchmarks are examined also for implications on performance measurement system effectiveness.*
The study was set at the profit centre management level. Consistent with the established information requirements at this level of management, reliance on financial reports of manufacturing performance was captured in this study by focusing on the use of cost variance reports by profit centre managers. It was argued that cost variance reports support critical corroborative and expenditure control functions over monthly time frames at the profit centre manager level. However, there is evidence that the use of such information for performance evaluation may be potentially dysfunctional in strategic contexts where firms pursue competitive advantage in differentiation of, for example, quality or manufacturing flexibility. The potential dysfunctionality arises from the emphasis on efficiency, volume and standardization to generate performance improvements against standard costs. Such emphases may be consistent with commitments to cost leadership but are unlikely to be consistent with an emphasis on quality or flexibility. On this basis it was hypothesized that reliance on cost variance reports by profit centre managers would be expected to be lower in firms pursuing differentiation than those in firms pursuing cost leadership.

Alternatively, it was argued that the potential dysfunctionality of cost variance reports might be reduced if cost targets were 'modified' to integrate the cost implications of quality and flexibility performance dimensions. Such modifications would reduce the propensity for cost variance reports to lead to displacement of quality and flexibility goals, and could support their continued use in differentiation contexts. On this basis, it was hypothesized that differentiating firms continuing to use cost variance reports would modify cost targets to incorporate quality and/or flexibility expectations.
In summary, it was established that this study would seek insights into contingent links between manufacturing strategy and the relative reliance on financial and non-financial performance measures by profit centre managers. Secondly, the constitution of cost benchmarks would be examined to determine whether adjustments to cost targets are used to render cost variance reports less dysfunctional in differentiating contexts. Finally, both the relative reliance on financial and non-financial performance measures and the constitution of cost targets would be tested for implications for performance measurement system effectiveness in different strategic contexts.

This study attempts to add to the literature in two ways. Firstly, hypotheses relating strategy and performance measurement system design were developed from the existing literature, and these were tested in Chapters 6 and 8. In addition, this study relies on the analyses of rich qualitative data both to interpret the results of hypotheses tests and, potentially, to build new theory. These qualitative data were utilized extensively in Chapters 7 and 8.

9.2 The motivation

The motivation for the study forms the background for a review of the findings. It was argued in Chapter 1 that the motivation arises out of the convergence of three issues - the current attention focused on performance measurement in manufacturing industry, the traditionally significant role of accounting in performance measurement, and strategic changes in manufacturing which have changed the performance measurement agenda.
There is a substantial literature suggesting that the global competitive context of manufacturing industry has changed and that traditional accounting measures of manufacturing performance inhibit effective management in the new manufacturing environment. The changing competitive context of manufacturing has prompted the development of solutions to the performance measurement problem. These solutions are strategic in orientation. They balance many dimensions of performance and shift the emphasis away from efficiency and productivity towards quality, flexibility and customization. Two examples are integrated performance measurement systems (Nanni et al., 1992) and the balanced scorecard (Kaplan and Norton, 1992, 1996(a); 1996(b); 1996(c)). While the solutions proposed embody accounting elements in the form of, for example, 'aggregate cost results', these measures are expected to integrate with non-financial, operational performance measures. The nature of these aggregate cost results, the way they integrate with other dimensions of manufacturing performance, and the way these multiple dimensions are evaluated and balanced by profit centre managers in different strategic contexts remains unresolved in this literature.

This chapter draws together the findings from this study, and examines those findings in the context of three motivating issues:

1. the performance measurement solutions proposed in the literature (e.g. integrated performance measurement and the balanced scorecard),

2. the empirical literature regarding the significance of the role of accounting in performance measurement at the profit centre manager level, and

3. the evidence in the literature of strategic change in manufacturing industry and its potential effect on the role of accounting
9.3 The findings - summary

9.3.1 Strategy and relative reliance on financial and non-financial performance measures

9.3.1.1 Review of findings

The hypotheses tested were as follows:

H1(a) The pursuit of cost leadership is associated positively with reliance on cost variance reports by profit centre managers in evaluating the overall performance of manufacturing subunits.

H1(b) The pursuit of strategic differentiation is associated positively with reliance on non-financial quantitative performance measures by profit centre managers in evaluating the overall performance of manufacturing subunits.

H1(c) The pursuit of mixed strategic priorities is associated positively with reliance on cost variance reports and non-financial quantitative performance measures by profit centre managers in evaluating the overall performance of manufacturing subunits.

The findings can be summarized as follows:

- There is a positive and significant relationship between the pursuit of cost leadership and use of cost variance reports. Firms pursuing cost leadership more intensely also tend to rank cost variance reports significantly higher among the most critical measures used. H1(a) is supported.

- There is limited evidence of a significant relationship between the pursuit of differentiation by flexibility and reliance on non-financial performance measures, but no evidence of a significant relationship between the pursuit of differentiation by quality and reliance on non-financial measures. H1(b) is partially supported.
Those firms pursuing mixed strategies (cost leadership and differentiation) show significantly higher reliance on cost variance reports than those pursuing only differentiation. H1(c) is supported\textsuperscript{26}.

A 'fit' hypothesis was established also:

H4(a) In the management control of manufacturing subunits, an appropriate match between manufacturing strategy and the relative reliance on financial and non-financial performance measures results in greater performance measurement system effectiveness.

- There is no evidence that the association between the pursuit of cost leadership and reliance on cost variance reports enhances the perceived effectiveness of the performance measurement system.

- There is no evidence that an association between the pursuit of quality or flexibility and reliance on non-financial performance measures enhances performance measurement system effectiveness.

9.3.1.2 Discussion

Several contextual factors relating to the sample provide useful insights into these findings. Firstly, commitment to differentiation is universally high in the sample, and commitment to cost leadership is high also in approximately one half of the sample. There were no pure cost leaders in the sample. Thus the firms were classified as either differentiators or mixed strategy firms. Such a profile is consistent with the observation of variation in reliance on cost variance reports being linked to cost leadership, but a

\textsuperscript{26} This is only a partial test of H1(c). A full test would require an additional comparison of mixed strategy firms with those pursuing cost leadership. As there were no 'cost leadership' firms in the sample, such a test is not possible.
lack of variation and consistently high scores on reliance on non-financial performance measures. The findings are, in fact, fully consistent with hypothesized contingent relationships, given the strategic profile of the sample.

While such a strategic profile is perhaps extraordinary in the context of Porter's (1980) framework, it is supported by the qualitative data collected in the course of this study. Elaborated responses suggest that Australian manufacturers, facing limited local markets and intense competition from Asia have to rely on quality, response time, innovation and product features to establish a competitive edge. This finding is consistent also with findings in the strategic management literature that a generalized shift in demand for customized product features, more variety and higher quality encourages the pursuit of competitive advantage in strategic flexibility (Kotha, 1995). It is evident that many of these firms also 'appear' to pursue cost leadership intensely because of fierce price competition in end-product markets. In general terms, the strategic profile of the firms emerging from both the scaled and elaborated responses reflects widespread pursuit of competitive advantage in differentiation. In addition, however, many of these firms are unable to pass on the higher costs generally associated with differentiation by quality or flexibility. Thus, commitment to differentiation is combined with an emphasis on cost reduction in the context of significant price competition. The need to compete flexibly in manufacturing at low cost has been referred to as mass customization (Pine, 1993). While flexible manufacturing technology reduces the need for trade-offs between efficiency and flexibility (Kotha and Orme, 1989), Australian manufacturing firms are limited by size and scale in their ability to take up such technology. Thus, they are left with the trade-
offs. It would appear that significant market price pressures influence the design of performance measurement systems and increase the importance of efficiency measures in a variety of strategic contexts.

Both the strategic profile of the firms in this study, and the influence of market pressure are highly consistent with the findings of Schroeder et al. (1995). In interpreting their findings in the context of Porter (1980), Schroeder et al. draw on Murray (1988) to suggest that differentiation and cost leadership archetypes are less likely to be found in the fragmented industries which constituted the setting for their study. This may also be the case for the relatively small (by international standards) Australian manufacturers that are studied here. As discussed in Chapter 10, the more generalized incidence of this strategic profile remains to be tested in future studies in other international contexts.

The apparent pursuit of joint strategies of cost leadership and differentiation by approximately one half of the firms in the sample raises interesting performance measurement design issues. As hypothesized, such firms would be expected to continue to rely extensively on cost variance reports to promote efficiency and productivity and to establish expenditure control. However, they would be expected to supplement cost variance reports with measures of quality, responsiveness and/or other dimensions of strategically important criteria. These patterns in performance measurement system design were evident in the firms pursuing mixed strategies.
The prevalence of such mixed priorities and the evidence of performance measurement systems implications potentially shed light on some of the confounding findings from prior contingency studies. The findings here indicate that accounting performance measures such as cost variance reports may remain important in a variety of strategic contexts. Unrecognized mixed strategic commitments in prior studies may explain the prevalence of accounting performance measures in differentiating contexts. In their study of archetypes, some prior studies have explained the use of accounting performance measures as supporting differentiation or innovation (e.g. Miller and Friesen, 1982; Simons, 1987). Other studies have found significantly less use of accounting performance measures in differentiating contexts (e.g. Govindarajan, 1988). Both findings and explanations have been inconsistent and difficult to reconcile across studies. Market price pressures and the consequential appearance of mixed strategic commitments offers a potential explanation for the prevalence of cost variance reports and similar measures in a variety of strategic contexts. This interpretation is consistent with Khandwalla's (1972) finding that reliance on formal controls increased with intensity of competition. While Khandwalla focused on competition intensity rather than strategy, the findings reported here help to link Khandwalla's findings with the broader literature on strategy and management control system design by setting the experience of competitive intensity within a strategic framework.

The strategic characteristics of the firms in this study reflect universal importance of differentiation and differential importance of cost. The implications of these strategic characteristics on performance measurement would include an expectation of universally high reliance on non-financial performance measures to support
differentiation by quality and flexibility, but also high reliance on financial performance measures for those firms under intense market price pressure. The findings are consistent with this. In fact, elaborated responses reflect more widespread general reliance on cost variance reports than is captured in the scaled responses. The vast majority (34/36) of profit centre managers in the sample claim to use cost variance reports in the evaluation of overall performance of manufacturing. In fact, when elaborated responses are examined relating to specific measures in use, rather than 'reliance' scales, there is no apparent link between performance measurement system composition and strategy. The majority of profit centre managers seem to rely on a range of relatively comprehensive performance criteria measuring performance in efficiency and productivity, quality and responsiveness.

These findings are consistent with the literature in several ways. Firstly, there is evidence in this sample of the widespread establishment of 'new' competitive priorities in manufacturing, focused on quality and flexibility. The declining focus of efficient mass production is evident also in the sample. There is evidence of development in performance measurement system design to encompass new competitive priorities, with the widespread use of non-financial measures of quality and customer responsiveness in performance evaluation. On face value, such systems seem to be consistent with emergent themes in the strategic management accounting literature. The continued reliance on cost variance reports at the profit centre manager level is more paradoxical. Differential reliance on cost variance reports can be explained strategically by intensity of market price pressures facing a subset of those firms that compete by differentiation. It is consistent also with prior studies regarding the empirical role of accounting
performance data (McKinnon and Bruns, 1992). It is less easily reconciled with the recent literature on strategic performance measurement that criticizes the potential dysfunctional consequences of such measures. On the one hand, it may be argued that the 'comprehensive' measurement systems observed in this study are broadly consistent with this literature because they seek to capture the range of performance dimensions that are valued strategically, and embrace financial and non-financial performance dimensions. It is notable, however, that there was no evidence that the adoption of comprehensive performance measurement systems contributed to performance measurement system effectiveness. The failure of such systems to perform effectively may, in fact, support the literature that argues for the redundancy of cost variance analysis in performance measurement. In other words, it may be the prevalence of such techniques that is the problem. This was not, however, evident in elaborated responses that consistently explained the focus on cost-based performance reporting in terms of the market pressure imposed by cost-based competition. Alternatively, there was some evidence that comprehensiveness in itself was not the key to effective performance measurement system design. This issue is reviewed in the next subsection.

9.3.2 Strategy and constitution of cost benchmarks

9.3.2.1 Review of findings

The observed combination of multiple performance measures supporting a range of performance dimensions that are valued strategically raises interesting questions about the relationship between measures. If a mix of strategic imperatives renders important a range of potentially conflicting performance measures, promoting, at the same time, efficiency, productivity, quality and customer responsiveness, are attempts being made
to 'integrate' these measures into a consistent mutually reinforcing system? In Chapter 8 it was argued that it is theoretically possible to modify cost benchmarks to encompass the anticipated cost of multiple goal achievements. To the extent that these modifications are effective, the potential for dysfunctional displacement of quality and responsiveness goals could be avoided. The following hypotheses were developed:

H2(a) The pursuit of cost leadership is associated positively with the use of 'traditional' budgeted cost benchmarks in cost variance reports.

H2(b) The pursuit of strategic differentiation is associated positively with the use of 'modified' cost benchmarks in cost variance reports.

H2(c) The pursuit of mixed strategic priorities is associated positively with the use of 'modified' cost benchmarks in cost variance reports.

It was not possible to test H2(a), as there were no firms pursuing cost leadership intensely that were not also pursuing differentiation. Thus all firms were classified as either differentiators or mixed strategy cases. Following H2(b) and (c), all firms in the sample were hypothesized to use 'modified' cost benchmarks in cost variance reports. To test these hypotheses in cases where both cost variance reports and other performance dimensions were relatively important in the evaluations made by profit centre managers, analysis focused on those cases using cost variance reports and quality or responsiveness measures, within the three most critical measures used. Twenty-one cases fitted this classification and initial analysis indicated that very few firms used modified benchmarks. Furthermore, all modifications observed in this study focused on the integration of quality and efficiency criteria. There were no cases of cost benchmarks used in cost variance reports being modified to adjust for the costs associated with responsiveness. One profit centre manager reported that an extensive activity-based costing system was capable of incorporating the 'costs of flexibility' into
product cost in a similar way to that achieved by those firms integrating quality and
cost targets. However, the cost benchmarks established in this case were not used in
performance measurement. The fact that there was only one such case prompted
further analysis of whether the firms had adopted other techniques for integrating
multiple performance measures, or whether the failure to integrate multiple measures
was reflected in perceptions of performance conflict.

It was found that the majority of the profit centre managers perceived inconsistent
performance signals from their performance measurement systems. Furthermore, it was
evident that the inconsistencies were almost universally associated with the friction
between the use of cost variance reports in management control and the requirement to
be customer responsive. In contrast, there was no apparent friction between the use of
cost variance reports and quality expectations. Elaborated responses indicated that the
modification of cost benchmarks was an effective means of integrating quality with cost
variance reports. Quality adjustments were simply costed into products and there was
no incentive to compromise on quality to meet cost targets. Integrative mechanisms
were not, however, limited to the modification of cost targets. The use of alternative
integrative mechanisms was evident particularly in attempts to integrate customer
responsiveness and cost targets. While many managers reported internally consistent
performance signals, only one effectively attributed this to 'modified' cost targets. This
single case was the firm using activity-based costing. Others attributed their
'integration' to alternative approaches such as less stringent reactions to variances and
the use of cross-functional teams within the factory.
Thus, there was limited support for H2(b) and (c). The firms pursuing differentiation or mixed strategies used modified cost benchmarks, but these modifications were used only to integrate quality and cost targets. Alternative approaches were being used to integrate responsiveness and cost targets. It is notable also that those firms trying to measure both responsiveness and cost variances, without modifying cost benchmarks appeared to be less satisfied with the effectiveness of their performance measurement systems as they were inclined to report the experience of conflicting or inconsistent signals from these systems. This provides some tentative evidence in support of H4(b):

H4(b) In the management control of manufacturing subunits, an appropriate match between manufacturing strategy and the constitution of financial benchmarks used in cost variance analysis results in greater performance measurement system effectiveness.

The proposition that modification of cost targets may relate to particular combinations of performance measures and not others was not hypothesized and was an unexpected result of the analysis of qualitative data from the study. The proposition that the combination of efficiency/productivity and responsiveness criteria is significantly more problematic than the combination of quality and efficiency/productivity criteria was subjected to further analysis to determine whether it was evident also in scaled response data. The further analysis supports this proposition, indicating that managers combining efficiency/productivity criteria and responsiveness criteria perceive significantly less performance measurement system congruence than those not using that combination. No such difference was evident in the combination of efficiency/productivity and quality criteria. This latter combination does not affect managers’ perceptions of performance measurement system congruence or effectiveness. This provides an additional, quantitative test of H4(b).
While it was intended to test H4(b) in relation to those firms with modified benchmarks and those without, the qualitative analysis undertaken seemed to suggest that particular combinations of measures (efficiency/productivity measures and responsiveness measures) did not lend themselves to 'integration' through the modification of benchmarks. It was these particular combinations rather than the lack of modified benchmarks that reduced perceived performance measurement system effectiveness.

9.4 An integrative framework - horizontal and vertical integration

The findings from this study, summarized above, suggest that performance measurement system composition is likely to be linked with strategy. This is evident both in increasing reliance on cost variance reports in the cases where competing on cost is more critical, and in the expansion of performance measurement systems to encompass strategically important measures of quality and responsiveness. It is evident also that where multiple dimensions of performance are strategically important, a failure to integrate measures may result in goal displacement and a failure to perform on all criteria. Thus, the general contingent link between strategy and effective performance measurement system design is more complex and multidimensional than a simple and observable link between strategy and performance measurement system composition. In particular, this study identifies two clear strategy-contingent dimensions, and suggests the existence of more. The two dimensions of the contingent link between strategy and management control system design that are evident in the findings of this study are usefully classified as vertical and horizontal dimensions of integration. The vertical dimension refers to the measurement of strategically important
criteria (Euske et al., 1993; Kaplan and Norton, 1996(b)). The horizontal dimension refers to the extent to which multiple criteria are internally consistent and mutually reinforcing. These dimensions of the contingent link between strategy and performance measurement system design are elaborated in the next two subsections.

9.4.1 Vertical integration - strategy and performance measurement system composition

It was proposed at the outset of this study that effective performance measurement systems would link the composition of the performance measurement system with strategy. It was expected that the association between strategy and performance measurement system composition would be evident in the measurement of strategically important criteria. The findings from this study indicate that all the profit centre managers in the sample measure a range of performance criteria. The extensive reliance on non-financial measures across the sample is consistent with the universal pursuit of differentiation, and there is evidence of differential reliance on financial performance measures dependent on commitment to cost leadership. The general support for H1(a) -(c) offers support for the existence of a vertical strategy-contingent link with performance measurement system design. In addition, the link is strengthened by the recognition of the performance measurement system design implications of 'jointness' in the strategic dimension. When joint commitments to cost leadership and differentiation are admitted into the model, performance measurement systems observed emerge as highly consistent with strategic orientations. The strategic profile of this sample, if generalizable to the wider population of manufacturers, suggests that many firms will be pursuing differentiation under intense cost pressure and juggling competing performance criteria. In such circumstances, it emerges that
the matching of strategy and performance measurement system composition is not sufficient for effective performance measurement system design. While firms may develop 'comprehensive' performance measurement systems measuring all strategically important criteria, these criteria are potentially in conflict and will not necessarily promote the achievement of multiple goals simultaneously.

9.4.2 Horizontal integration - performance measurement system composition and internal consistency

Where performance measurement systems encapsulate the range of strategic priorities, effective performance measurement system designs also may require a horizontal element of integration. The measurement of efficiency, productivity, quality and customer responsiveness establishes breadth but is it possible to encapsulate these apparently conflicting priorities into an integrated set which are internally consistent?

This study suggests that profit centre managers using multiple performance measures use a range of integrative approaches to avoid goal displacement and to promote the achievement of multiple performance dimensions simultaneously. The modification of cost benchmarks seems to be used to integrate 'horizontally' quality and cost requirements, but appears to be less suited to the integration of responsiveness and cost. While the cost of quality change is generally readily measurable and easily incorporated into cost targets, the same is not true of responsiveness requirements. The 'modifications' to cost targets required to accommodate the costs of schedule interruptions and variations in run sizes associated with responsiveness are much more complex and less subject to formula-based approaches.
The absence of accepted means of integrating horizontally cost and other efficiency measures with responsiveness measures may be a significant impediment to the development of effective strategy-contingent performance measurement systems. Such impediments have not attracted significant attention in the literature.

Recent literature on performance measurement system design in manufacturing has focused on integrated performance measurement (Nanni et al. 1992), the notion of a balanced scorecard (Kaplan and Norton, 1992, 1996(a), (b) and (c)) or the attempt to define critical performance variables that represent important dimensions of a given strategy (Simons, 1995). While this literature clearly promotes the design of performance measurement systems that measure progress on strategic initiatives, the contribution of this literature in terms of the integration between measures (the horizontal dimension) is less clear. Kaplan and Norton (1996(b)) refer to the need for multiple measures on a properly constructed balanced scorecard to be both "consistent and mutually reinforcing". Nanni et al. (1992) also imply a horizontal dimension in defining integrated performance measurement as "strategically-driven performance management systems that integrate actions across functional boundaries and focus on strategic results". Thus, they imply that effective performance measurement systems will integrate performance expectations across functional boundaries. However, these authors do not deal with the means by which multiple, potentially conflicting goals are integrated. Nor do they highlight the differential integrative difficulties with particular combinations of measures.
The findings of this study highlight the existence and importance of the horizontal dimension of performance measurement system integration and identify also the contextual factors that may complicate this integration. In addition, the findings suggest how firms in practice satisfy the horizontal dimension of integration in the problematic context where they pursue a strategy focused on flexibility and responsiveness while under intense market pressure to minimize costs. Several techniques were argued convincingly by profit centre managers to possess a horizontally integrative capacity. Less stringent reaction to variances, the use of integrative structural mechanisms, and innovative non-accounting performance measurement system designs were used in the firms in this study. These alternative integrative techniques are discussed below.

9.5 Horizontal integration - mechanisms other than modification of cost benchmarks

9.5.1 Less stringent reactions to variances

Several firms in this study suggested that less stringent, more flexible interpretation of variances reduced the potential dysfunctionality of cost variance reports when performance on potentially conflicting criteria such as customer responsiveness was required also. Less stringent reactions to variances reduces pressure to achieve cost targets and, in turn, reduces plant resistance to the off-standard requests inherent in responsiveness. The observation of such reactions is clearly not new. For example, such flexibility in the interpretation of variances is consistent with Hopwood's (1972) 'profit conscious' style of leadership. This study offers a strategic-contextual explanation for the adoption of flexibility in the interpretation of variances. Flexible, less stringent reactions to variances are cited in this study as a means of avoiding goal
displacement in situations where firms pursue differentiation but face cost pressure at
the same time.

There are precedents for the suggestion that the managerial response to budget
variances is likely to be linked to strategy. Govindarajan (1988) argues that
differentiation-type firms tend to develop a broad product base and focus on product
innovation, both of which result in greater uncertainty. Furthermore, strategic
commitments to quality, rapid delivery and flexibility are difficult to encapsulate in short-
term budget goals. Govindarajan argues that "the greater the uncertainty the more
difficult it is for superiors to regard their subordinates' budget targets as firm
commitments and consider unfavourable budget variances as clear indicators of poor
performance" (Govindarajan, 1988: 832). Following this reasoning, as uncertainty
increases through the pursuit of differentiation-type strategies focusing on quality and/or
flexibility, cost variance reports are less likely to be used to stimulate remedial action
because there would be less management faith in the ability of the accounting control
system to encapsulate strategic goals. The findings from the current study indicate that
loose control may be a specific response to the need to combine performance
dimensions of customer responsiveness and cost efficiency because of the difficulty of
integrating the targets numerically. These findings offer some anecdotal support for
Govindarajan (1988) in relating strategy to reaction to variances.

9.5.2 Integrative structural mechanisms

Two profit centre managers in the sample discussed the use of structural arrangements
to facilitate integration. The first discussed the use of team-based performance criteria
with 'softened' output targets. Teams were designed to be multi-functional, cooperative and product-focused. The traditional emphasis on productivity was softened with the introduction of teams by requiring teams to stop production and focus on process improvement when output targets were met. The combination of the cross-functional teams and the softened output targets was designed to enhance both responsiveness and efficiency simultaneously without focusing effort on output per se. The second firm adopted a similar structural approach with the integration of sales and marketing into small strategic business units within the factory. The introduction of sales and marketing functions into the factory was seen as a means of increasing the factory focus on responsiveness and developing cross-functional performance solutions. This approach is consistent with that observed by Abernethy and Lillis (1995) where the pursuit of flexibility increased the extent to which firms used integrative liaison devices to manage functional interdependencies. These integrative liaison devices included both formal and informal structural mechanisms such as cross-functional teams and task forces. In that study, there was evidence also of reduced reliance on efficiency-based measures for firms pursuing flexibility. The current study suggests that the use of such measures may remain high where firms pursue mixed strategic priorities, but that the use of integrative structural mechanisms can be used to enhance responsiveness and avoid dysfunctional consequences when the performance measurement system is geared to promoting efficiency.

It is notable that the structural responses identified in this study were observed in only two firms. As it was not part of the hypotheses of this study there was no systematic attempt to capture data relating to this variable. While this structural response was
cited by two firms as the means of integrating responsiveness and efficiency performance criteria there may have been other firms adopting similar solutions.

9.5.3 Innovative performance measurement system designs

In addition to less stringent reactions to variances and integrative structural mechanisms, there was limited evidence of the use of innovative performance measurement system designs that were argued to be integrative. This was surprising given the innovative developments in costing and performance measurement systems during the last decade. Only one innovative design was argued convincingly in terms of its integrative capacity. This was the case of adoption of 'value-added management'. The manager of this firm argued that the use of 'value added per employee' as the critical performance dimension, has the capacity to draw all trade-offs together into a single evaluative measure and avoid conflicting performance signals. The capacity of the value added measure to draw in potentially competing performance goals is illustrated in the following anecdote:

"At one stage in April we didn't have a satisfied customer in the world... Despite the fact that our financial numbers were brilliant, our value-added numbers have been telling us we have a problem. ... It wasn't the factory. It was scheduling and planning. ...Now fill rate is one of their crucial [value-added] measures.

Detailed evaluations of the integrative benefits of value added measures and other innovative systems are beyond the scope of this thesis, but remain fruitful areas for further research.

9.6 Concluding comments

This chapter has drawn together the qualitative and quantitative findings reported in the three prior chapters, and considered the emergent insights against the motivation for the
study. Evidence has been presented regarding the link between manufacturing strategy and performance measurement system design. The findings suggest that the recognition of jointness in the strategic dimension enhances the interpretation of empirical strategy-contingent links with performance measurement system composition. The empirical prevalence of differentiation and mixed strategic priorities, and the widespread use of cost variance reporting, led to an expectation that firms would use integrative techniques to manage multiple, potentially conflicting performance criteria. More specifically, it was hypothesized that cost benchmarks would be modified in these strategic contexts to reflect the expected cost of multiple goal achievements. Modifications were observed, but only for a subset of firms and performance measurement systems. Such numerical integration appeared to be used to integrate quality and cost targets, but not responsiveness and cost targets. This latter observation was not hypothesized, but emerged from elaborated responses in the process of studying contextual explanations about strategy-contingent linkages. The firms in this study used a variety of techniques to integrate responsiveness and efficiency requirements. Less stringent reactions to variances, integrative structural arrangements and innovative performance measurement system designs were all evident, but in only few cases. For many firms attempting to pursue responsiveness under relatively intense cost pressure, there was evidence of performance conflict and goal displacement as the performance measurement system failed to produce consistent performance signals on multiple criteria. The majority of firms pursuing this mix of strategic imperatives had not resolved the problem of horizontal integration.
These findings offer insight into the strategic changes occurring in manufacturing and the performance measurement system implications of these changes. They shed light also on strategic reasons for the prevalence of accounting controls such as cost variance reports in performance measurement, and the need to minimize dysfunctional affects by integrating such measures with measures supporting other strategic performance dimensions such as quality and responsiveness.

The identification of vertical and horizontal dimensions to integration offers an expanded framework to explain the link between strategy and effective performance measurement system designs. Effective designs should not only measure strategically important criteria, but should also combine multiple measures into mutually reinforcing systems. The evidence cited here indicates that firms are experimenting with a variety of approaches to manage horizontal integration of multiple performance criteria but that it is an unresolved issue for the majority. These findings suggest that frameworks developed in the literature may be enhanced by considering the horizontal integration of multiple, potentially conflicting performance criteria, and the differential friction created by particular combinations of criteria.

In conclusion, this study contributes to the existing literature by

1. exploring the impact of joint manufacturing strategies on performance measurement system composition, and

2. establishing the existence of additional parameters in the search for effective performance measurement systems in the current manufacturing strategic environment.
It emerges from this study that the inclusion of strategically important criteria is a necessary but not sufficient condition in the design of effective performance measurement systems. Effective performance measurement system designs should not only incorporate financial and non-financial elements, but should seek also to implement mechanisms to avoid potential goal displacement by sending mutually reinforcing rather than conflicting performance signals. Most critically, the emerging culture of mass customization that seeks to balance strategic commitments to low cost and manufacturing flexibility carries implications for performance measurement system design. Both traditional and expanded performance measurement systems seem to suffer from the inability to integrate the two potentially conflicting priorities. While firms have adopted a variety of integrative mechanisms, these have tended to occur outside the performance measurement system. The associated evidence examined here of dissatisfaction, conflict and goal displacement suggests that genuinely 'integrated' performance measurement systems (both horizontally and vertically) may be regarded as more effective, strategic performance measurement systems. The design of such systems represents a challenge for both practising and academic management accountants.
CHAPTER 10

LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

"Could everything be done twice, everything would be done better"
(German proverb)

It would be a rare empirical study, particularly one conducted over an extended time frame, that would not be conducted differently if it was to be done again. This study is no exception. It is subject to both limits imposed by the boundaries of the research question and design as well as limitations in design and execution. This chapter identifies both the limits and limitations of the current study that are evident to me as the researcher. I recognize that many more limitations are likely to be evident to the reader. Following the discussion of limits and limitations, this chapter addresses potential directions for future research.

10.1 Limits and limitations

The overarching limitation of any study is the limit or boundary imposed on its scope, and the lens that governs the researcher's study design, execution and interpretation of results. This study is limited to the particular design features of performance measurement systems used by profit centre managers in the evaluation of performance of manufacturing subunits. It deals only with the functional role of performance information. Thus, it specifically excludes other aspects of performance evaluation as well as other elements of a management control system. It does not deal with other levels of management, or the management of non-manufacturing functions.
Furthermore, the data are drawn from Australian manufacturing firms, which operate on a relatively small scale by international standards. These limits influence the generality of the findings. However, it is hoped that the extensive use of elaborated responses relating to the competitive and strategic context of the firms in this study will stimulate reconsideration of the dimensions of the strategy/management control system design link, and stimulate further research in other contexts. These opportunities are discussed more extensively in the next section.

Limitations of study design and execution are more controllable or correctable than the imposition of limits on the scope of the study. Of course, these limitations are evident with the benefit of hindsight. This study suffered from management and researcher problems similar to those identified in the very candid account by Young and Selto (1993). The study is heavily reliant on verbal reports from managers. The written documentation collected is patchy and inconsistent between sites. This is largely a function of a research question that was not likely to be answered by documented processes. However, the resultant verbal data are likely to reflect 'strategic' answering of questions (Young and Selto, 1993) and the influence of the researcher on the respondent (Snow and Thomas, 1994).

Responses might not only be 'strategic', they may suffer also from limited introspection. The study attempted to validate data in a variety of ways but the method involved at best 'within-method' triangulation (Snow and Thomas, 1994). That is, the sources of evidence to support emergent propositions were derived from multiple cases, multiple respondents within some cases, and also convergence of scaled and elaborated
responses collected from individual respondents. These multiple sources are likely to
share common flaws, which could be avoided by the use of triangulation with
alternative methods applied to similar research questions (Snow and Thomas, 1994).
Triangulation across methods was not feasible within the scope of this study, but it does
raise opportunities for further research. Laboratory studies, simulations, and extended
grounded theory analyses are proposed in the next section as significant opportunities
for further research which were well beyond the scope of this study.

The findings reported here are heavily reliant on interpretations of qualitative data that
are potentially affected by analytical or interpretive bias. However, the use of a
structured analytical method (as described in Chapter 5) established a disciplined
approach to data extraction and analysis that at least promotes completeness and
impartiality. In the absence of such a protocol it is too easy to use less than all relevant
data, and for the selective extraction of data to be driven by the researcher's established
frame of reference. Of course, it would have been possible to significantly improve the
reliability and validity of this process through the use of multiple independent data
coders. However, reliable independent coders are expensive and hard to come by, and
the cost/benefit trade-off needs to be determined in the context of the study and its
aims. For exploratory studies where qualitative data are used in theory building it is
arguably less important to invest in such validation than for studies where qualitative
data are used in theory testing. While the study reported here contains elements of both
theory testing and theory building, the qualitative data were used primarily in theory
building and the limited validation processes are probably appropriate in that context.
The research reported here suffers all of the limitations inherent in relying on cross-sectional data collected during relatively short visits to firms in dynamic environments. For the individual case, the variables are studied as a snapshot in time whereas all are part of a dynamic system (Euske et al., 1993). Elements of these systems not only evolve over time, but emphases within the systems can shift quite dramatically over short periods of time. The snapshot fails to consider these dynamic properties of strategy, performance measurement and short-term changes in managerial perspective.

In keeping with other studies of contextual influences on management control system design, this study draws out a 'big picture' of general patterns across cases. The 'big picture' is very sensitive to changes in circumstances, and it has been suggested that such approaches are limited in the extent to which they can inform practice or future research (Selto et al., 1995). To some extent the use of elaborated interview data in this study sheds more light on the specific circumstances that influence performance measurement system design, than would be expected to emerge from, say, a cross-sectional survey. These insights may contribute to both practice and future research. However, in common with any cross-sectional study, a deeper understanding of patterns of causality and interrelationships will come through longitudinal studies which can monitor the dynamics of both the implementation and effectiveness of strategic and control system change.

Several more specific limitations are evident also with hindsight. Firstly, a multidimensional classification of firms into strategic types may have been more effective than the unidimensional approach used here (e.g. see Rajagopalan, 1997). The
use of elaborated responses on variables related to strategy corrects for this limitation to some extent, but the use of unidimensional scales affects the analyses significantly.

The absence of an objective performance measure, while justified in the study design, is a limitation in the analysis and interpretation of results. Evaluating the 'performance' implications of accounting system design has been an ongoing problem for accounting researchers. There is little evidence of a solution to the problems of obtaining objective measures of subunit performance, and of establishing links with the design of accounting information systems even when such measures are available. The decision taken in this study was to focus on a more micro measure of performance measurement system effectiveness. This approach does, however, leave unresolved the question of the true 'value' to the firm of establishing effective performance measurement systems along the dimensions of completeness and congruence used here.

Several other limitations that became apparent during the execution of the study have been addressed within the body of the thesis and are simply referred to here. These were the changes made to the research instruments after the data collection had commenced, the problems with particular scales in the original instrument, and the lack of agreement between profit centre and manufacturing manager respondents.

Finally, the most controllable or correctable limitations are imposed only by the forces of time, and the need to call an end to a particular study and begin the next. In this study, for these reasons, the data remain underanalysed. The data collected from profit centre managers are marginally underanalysed as they were the focus of the study.
However, the data collected from manufacturing managers remains highly underanalysed.

On balance, these limitations need to be viewed in the context of a study that is focused on theory refinement and informing future work rather than producing conclusive findings. While the many evident limitations may inhibit the contribution of the study, the rigorous qualitative analysis of data enables future researchers to choose elements or findings which can contribute to their work, without having to accept the whole package of findings, influenced as it is by limitations of design and execution.

10.2 Directions for future research

"Not a having and a resting, but a growing and a becoming, is the character of perfection as culture conceives it" (Matthew Arnold, Sweetness and Light, Culture and Anarchy (1869))

Many opportunities for future research emerge from this study. Most notably, the issue of joint strategic orientations and their implications for control system design, and the integration of multiple performance measures are explored in some depth, but by no means exhaustively in this study. There are significant opportunities to explore further strategic profiles of manufacturing and non-manufacturing firms to test the prevalence of joint strategic orientations. This study also raises particular contextual issues that contribute to the strategic profile of Australian manufacturing firms. It remains to be tested whether such characteristics are evident in other international contexts, and particularly in the larger firms that are not prevalent in Australia. The potential implications of the changing strategic profile in industry on the design of many
elements of information and control systems and the use of integrative devices have received little attention in the literature to date. While the prevalence of joint strategies lends itself to empirical study, the implications suggested here might be subject to laboratory or analytical study. For example, the link between strategic mix and the choice of performance measures, and the management of multiple performance signals are potential studies that could be undertaken using a variety of methodologies.

In addition, this study identifies particular tensions in the integration of multiple performance criteria that have not featured in the recent literature on strategic approaches to performance measurement. As a significant, yet unhypothesized finding of this study, the differential integrative difficulties imposed by particular combinations of performance measures remains a highly fruitful area for further research (see also Chenhall, 1997). This study has done little more than raise the proposition that such a differential exists. Not only can future research examine the empirical experience of integration and differential integrative difficulties with particular combinations of measures, the results reported here lead directly into laboratory or simulation studies of potential integrative devices. For example, analytical studies may be used to identify the dimensions of flexibility and the costing of those dimensions into performance benchmarks. The failure of traditional management accounting systems to quantify the costs and benefits of customization was identified in Chapter 8. Future analytical research could be directed towards modelling solutions or applying models such as those proposed by Srinidhi (1992) or Leitch et al., (1995) to the reduction of conflict in the context of multiple performance measures. Alternatively, at the opposite end of the spectrum, the broader issues associated with the pursuit of multiple strategies and the
use of integrative devices in managing conflicting performance expectations could be
examined using a grounded theory approach with theoretical sampling to test emergent
propositions. Longitudinal studies in the field may focus on the influence of
technology on the cost/flexibility trade-off (Schroeder et al., 1995) and its
consequent influence on performance measurement system design.

10.3 Concluding comments

In conclusion, this study set out to utilize data from the field to interpret and gain
insight into the complexity of performance measurement system design characteristics
in particular strategic contexts. It is evident that the study achieved its aims in several
ways. Elaborated responses were a rich source of contextual information about the
empirical manifestation of the variables under study. The elaborated responses exposed
also an interesting and paradoxical aspect of manufacturing performance measurement
that was not hypothesized, and represents potentially, a significant contribution to the
literature. There are limitations, some of which could be avoided if the study was to be
repeated. However, this study has produced findings that can both stimulate and inform
future work. The necessary limits in scope will hopefully stimulate future research in
other settings and focused on similar issues at different management levels or different
control system elements. In turn, the findings may inform future work by identifying
elements of effective performance measurement system design which have received
little attention in the literature. Specific opportunities have been discussed in the prior
section. At a broad level, several of the areas highlighted by Atkinson et al. (1997) as
representing management accounting research topics for the 1990s and beyond would
be informed by the findings reported here. More specifically,
the differential ways in which cost benchmarks can be established, and the influence of such differences in stimulating change

- links between financial performance and non-financial performance indicators
- implementation issues associated with the balanced scorecard, and
- the interaction between management accounting techniques and the implementation of competitive strategies

are among the areas cited by Atkinson et al. (1997) as worthy of pursuit. All would find insights in this study.

It is hoped that the limitations of this study are viewed as less important than its capacity to contribute to the 'conversation' (Mahoney, 1993) of a developing research endeavour in management accounting.
REFERENCES


APPENDIX A

Personally addressed to
General Manager or
Managing Director

Dear

I am writing to request your participation in a project examining performance measurement in manufacturing. This project forms part of my study towards a Ph.D. in the Department of Accounting and Finance at the University of Melbourne.

The project is motivated by a desire to both update and improve our understanding and teaching of management accounting practices, especially those that seem to work in organizations. Very little qualitative research has been done on the development and use of performance measurement systems in practice. More specifically, the project aims to examine the relationship between competitive pressures and the way cost accounting information is used in performance measurement.

I would greatly appreciate your assistance in this study. I would be happy to discuss the way you use manufacturing performance measurement. I would expect to require no more than one and a half hours of your time for an interview.

The issues to be discussed during the interview will be sensitive. They focus on managerial style and the design of systems. No specific accounting data will be obtained. However, all information collected will be

1. ANONYMOUS: Your name and company name must be unknown to the researcher but will never be mentioned in the report of the research. Your completed transcript will be code-numbered, and the report between your firm and the code number used will be the principal investigator.

2. CONFIDENTIAL: You will not be able to be identified in any way. All information that is written in the text of this paper.
Ultimately, I am interested in the broad patterns of information use that I observe rather than particular cases. Thus all information collected will be written up and reported in aggregate form, and not associated with individual participants. On the other hand, I would be pleased to list participating companies as contributors to the research, but I would do so only with permission.

Again, I would be most grateful for the opportunity to speak with you. I will contact you within one week and, if you agree, arrange a mutually convenient time for an interview. Alternatively, my supervisor or I can be contacted on the telephone numbers given below.

Yours sincerely,

ANNE M. LILLIS  
(Doctoral student)  
Senior Lecturer in Accounting  
Deakin University  
Ph: 244 6372

DR MARGARET A. ABERNETHY  
(Supervisor)  
Reader in Accounting  
University of Melbourne  
Ph: 344 5305
APPENDIX B

INTERVIEW SCHEDULE

INTRODUCTION

1. General introduction to researcher, affiliation etc.

2. Technical Introduction

This study focuses on the way manufacturing performance is measured. More specifically, questions will probe
- the ways performance standards are established
- your relative reliance on financial and non-financial performance measures
- competitive priorities in manufacturing
- what happens when you observe discrepancies between actual and expected performance, and
- your satisfaction with the performance measurement system.

The interview comprises a mixture of questions requiring a scaled response (which you have in front of you) and open-ended questions designed to ensure that I gain a full understanding of the measures you use and how you use them.

Would you have any objections to the interview being tape-recorded? This would enable me to listen carefully and gain the greatest benefit from the interview. It also ensures that the accuracy of the data collected is preserved. As explained in my letter, confidentiality is assured to all participants. No data will be associated with any individual or organisation. Ultimately, my research interest is in underlying patterns across different organisations, and not in particular cases.
BACKGROUND

COULD YOU PLEASE DESCRIBE THE SIZE AND STRUCTURE OF THE ORGANIZATION

SIZE: NO OF EMPLOYEES........................
      TURNOVER..............................

STRUCTURE: WOULD YOU HAVE AN ORGANIZATION CHART THAT I COULD LOOK AT?

Identify whether the general manager (interviewee) is the lowest "genuine" profit centre level (i.e. not including artificial profit centres).

If so, proceed. If not, then try to arrange interviews with product line, profit centre managers

DO YOU DIRECTLY EVALUATE THE PERFORMANCE OF THE MANUFACTURING PLANT?

PART 1 - CONSTITUTION OF AND RELIANCE ON PERFORMANCE TARGETS

Q1 Do you use comparisons of actual and budgeted costs in evaluating the performance of the manufacturing plant?

Do you have such a performance report that I could look at and use as a focus for discussion during the interview?

Q2 Do you use non-financial, quantitative performance measures in evaluating the performance of the manufacturing plant?

Probe for types of measures:

Q2.1 What are the important measures that you use?
Q3 Focusing for a moment on the budget / actual cost comparisons, how do you develop cost targets for use in these performance reports?

Probe for use of internal / external data, historical / "best practice" standards:

Q3.1 a Are cost targets developed from internal data such as trends, plant estimates of e.g. material usage and productivity?

b Can you describe how this is done?

Q3.2 a Do you have access to external information about performance in e.g. other plants within your organisation or competitor plants?

b Do you use this external information in developing cost targets?

c Can you describe how this done?

Q4 If respondent indicates positive responses to Q1 and Q2:

Are cost targets and non-financial targets (identify particular measures used) integrated or are they separate performance measurement systems?

Probe: Are they built up as separate targets by financial people (cost targets) and engineers (quantitative targets) or are they developed together as an integrated exercise?

Probe for detail:

Q4.1 a How are they integrated?

Q4.1 b Can you describe how you operate separate systems?
Q5 Do you perceive any conflicts between different types of performance standards?

Probe on particular measures used (identified in response to Q2):

Q5.1  

| Q5.1 | a | e.g. Is there any conflict between efficiency and quality standards? |

Q6 What is the first (lowest) management level that reports on performance against cost targets stated in dollar terms?

Q6.1 Does he/she also report on performance against non-financial targets?

Q6.2 Can you describe the form of performance reporting below that level of management?

Q7 THE FOLLOWING QUESTION ASKS YOU TO MARK ON A SCALE THE EXTENT TO WHICH YOU USE COST AND NON-FINANCIAL PERFORMANCE INDICATORS IN EVALUATING THE PERFORMANCE OF THE MANUFACTURING PLANT......OVER TO Q1 IN STRUCTURED QUESTIONNAIRE.
PART 2 - CONSEQUENCES OF PERFORMANCE VARIANCES.

Q8 What happens when you become aware that cost performance is not on target (awareness may come from formal performance reports or prior discussion)?

Probe for example:

Q8.1 Could you track through an example (pick one off performance report if provided in first part of the interview).

Probe for typicality:

Q8.1 a Do you sometimes respond to unfavourable variances in other ways?

Examples of potential responses:
- enforce standards by correcting "out-of-line" processes
- change standards
- ignore variance information

Q8.1 b In what circumstances do you respond in xxx way?

Q8.1 c In what circumstances do you respond in yyy way?

Q8.1 d What is your most typical response?

THE FOLLOWING QUESTION ASKS YOU TO INDICATE THE FREQUENCY WITH WHICH YOU HAVE TO INITIATE CORRECTIVE ACTION AS A RESULT OF A COST VARIANCE REPORTED TO YOU......OVER TO Q2 ON STRUCTURED QUESTIONNAIRE.

Q9 What other roles do these performance reports have for you, other than as a basis for corrective action?

Probe for major role:

Q9.1 What do you see as the major role(s) of these reports to you?
PART 3 - COMPETITIVE PRIORITIES

Q10 What do you see as your competitive edge?

Q11 What does this mean for the manufacturing subunit?

Q12 Do your products attract a premium price in the market place relative to competitors?

**IF YES**

**Q12.1 Probe:** Is this because of quality? manufacturing flexibility? reliability of supply? after sales service? Other?

**IF NO**

**Q12.2 Probe:** Is this because of competitors relative product quality? manufacturing flexibility? reliability? after sales service? other?

Q13 Do you get customer requests for significant variations on your standard products?

**Probe for detail:**

**Q13.1** How are these requests dealt with?

**Q13.2** Do responses to these requests tend to be manufacturing-driven or market-driven?

**Q13.3** How involved is the manufacturing subunit in the delivery of customer service?
THE FOLLOWING QUESTIONS ASK YOU FOR SCALED RESPONSES ABOUT THE COMPETITIVE PRIORITIES PURSUED IN MANUFACTURING IN THIS FIRM....OVER TO Q3 AND Q4 IN STRUCTURED QUESTIONNAIRE.

PART 4 - PMS EFFECTIVENESS

THE FINAL SET OF QUESTIONS RELATE TO YOUR SATISFACTION WITH THE PERFORMANCE MEASUREMENT SYSTEM YOU HAVE DESCRIBED:

Q14 Can you identify particular strengths in your performance measurement in manufacturing?

Probe for detail:

Q14.1 What parts of the system? Why are the strengths?

Q15 Have you identified any aspects of the system used to measure manufacturing performance which need to be changed or improved?

Probe for detail:

Q15.1 What parts of the system? What sorts of improvements? What would you like to see included in the system?
Q16 Are you aware of any potential adverse consequences of the way you measure performance in manufacturing?

Probe for detail:

Q16.1a What sorts of consequences? How significant are they?

b Do they occur? How likely are they to occur? Why?

THE FOLLOWING QUESTION ASKS YOU TO RATE YOUR LEVEL OF AGREEMENT WITH SEVERAL EVALUATIVE STATEMENTS ABOUT THE PERFORMANCE MEASUREMENT SYSTEM YOU USE AND ABOUT THE OVERALL PERFORMANCE OF THE FIRM.....OVER TO Q5 AND Q6 IN STRUCTURED QUESTIONNAIRE.

DEMOGRAPHIC INFORMATION RE RESPONDENT

MANAGEMENT TITLE.................................

LENGTH OF SERVICE WITH FIRM....................

LENGTH OF TIME IN CURRENT POSITION.............

AGE.....................................................
APPENDIX C

STRUCTURED QUESTIONNAIRE - General Manager

Question 1:

In evaluating the performance of the manufacturing plant, indicate the extent to which you:

(a) Measure the performance of the manufacturing plant using actual compared with budgeted cost:

(b) Place importance on meeting the cost budget:

(c) Hold manufacturing management personally accountable for variances between actual and budgeted costs:

(d) Require explanations concerning variances between actual and budgeted costs:

(e) Evaluate the manufacturing plant on quantitative (non-financial) performance indicators; (e.g. delivery performance, quality statistics):

(f) Place importance on meeting quantitative (non-financial) targets:

(g) Hold manufacturing management personally accountable for quantitative (non-financial) production results:

(h) Require explanations concerning variances between actual and expected performance on quantitative (non-financial) targets:

(Ref: surv4.doc)
(i) Identify and rate, in order of importance, the three most critical manufacturing performance measures you use:
(1 = most critical)

Cost variances
Quality statistics
Productivity statistics
Schedule Performance
Production cycle times
Lead Times (order to supply)
Customer ratings of manufacturing performance

Other? 1. (most critical) ____________________________
2.
3. ____________________________

Question 2:

How often is corrective action taken as a result of apparent variances between actual and standard costs

<table>
<thead>
<tr>
<th>Cannot Answer</th>
<th>Never</th>
<th>Sometimes</th>
<th>Very often</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
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</tbody>
</table>

200
Question 3:

The following questions focus on the way you compete in manufacturing through low cost and product/service differentiation relative to your competitors.

(a) The focus on 'low cost' refers to the extent to which manufacturing strives to achieve low cost relative to competitors. Rate the degree of focus on 'low cost' on the following scale:

- 1: We do not compete on cost
- 2: We compete on cost to a moderate extent
- 3: We compete on the basis of cost
- 4: Cannot rate focus on 'low cost'

(b) The focus on 'differentiation' refers to the extent to which manufacturing strives to produce something that is perceived as unique or superior to competitors in product quality or manufacturing flexibility.

Rate the degree to which manufacturing strives to differentiate product quality relative to competitors on the following scale:

- 1: We do not compete by differentiating the quality of our product
- 2: We compete by differentiating the quality of our product to a moderate extent
- 3: We compete strongly on the basis of differentiating the quality of our product
- 4: Cannot rate differentiation by quality

(c) Rate the degree to which manufacturing strives to differentiate flexibility relative to competitors on the following scale:

- 1: We do not compete by differentiating the manufacturing flexibility we offer
- 2: We compete by differentiating the manufacturing flexibility we offer to a moderate extent
- 3: We compete intensely on the basis of differentiating the manufacturing flexibility we offer
- 4: Cannot rate differentiation by flexibility
Question 4:

(a) What proportion of your manufactured product is:
   produced to stock
   produced to order

(b) What proportion of your manufactured product is:
   standardized
   non-standardized

(c) To what extent does the manufacturing process:
   (i) Provide flexibility to accommodate significant customer-requested product variations
   (ii) Restrict the product features that are made available to your market

(d) How important is off-the-shelf product availability?
Question 5:

Indicate your level of agreement with the following descriptions of the performance measurement system.

(a) The performance measurement system is complete in that it includes all significant manufacturing performance criteria.

(b) The performance measurement system for manufacturing actually encourages behaviour which is consistent with organisational goals.

Question 6:

Please rate your perception of the current position of the manufacturing plant relative to competitors on the following dimensions:

(a) Production cost:

(b) Product quality:

(c) Flexibility/Customer Service:

(d) Product features:
Author/s:
Lillis, Anne M.

Title:
Manufacturing strategy and performance measurement system design

Date:
1998

Citation:

Publication Status:
Unpublished

Persistent Link:
http://hdl.handle.net/11343/35560

File Description:
Manufacturing strategy and performance measurement system design

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