

MEASURING
IS STRATEGIC ALIGNMENT
IN
SMALL FIRMS

A thesis
submitted in partial fulfilment
of the requirements for the degree
of
Master of Commerce in Accountancy,
Finance & Information Systems
in the
University of Canterbury
by

Andrea J. Hale

University of Canterbury
1995

To my father, Arthur Hale,
who provided both the desire
for knowledge and the
motivation to always make
the best possible effort.

TABLE OF CONTENTS

SECTION	PAGE
TABLE OF CONTENTS	iii
LIST OF TABLES	vi
LIST OF FIGURES	vi
ABSTRACT	1
 CHAPTER I. INTRODUCTION	 2
A. RESEARCH OBJECTIVE	2
B. VALUE OF THIS THESIS	4
C. STRUCTURE OF THE THESIS	5
 CHAPTER II. INFORMATION SYSTEMS ALIGNMENT	 7
A. INTRODUCTION	7
B. IS STRATEGIC PLANNING AND ALIGNMENT	8
C. THE IMPACT OF STRATEGIC ALIGNMENT ON PERFORMANCE	11
D. ACHIEVING STRATEGIC ALIGNMENT	12
1. FACTORS INFLUENCING ALIGNMENT	14
E. CONCLUSIONS	16
 CHAPTER III. MEASURING IS STRATEGIC ALIGNMENT	 18
A. INTRODUCTION	18
B. STRATEGY	19
1. STRATEGY IN ORGANISATIONS	19
2. BUSINESS STRATEGY	24
a) Definition	24
b) Evaluation	24
3. INFORMATION SYSTEMS STRATEGY	29
a) Definition	29
b) Evaluation	29
4. CONCLUSIONS	30
C. EVALUATING STRATEGIC ALIGNMENT	31
1. DIMENSIONALITY OF STRATEGIC ALIGNMENT	31
2. METHODS OF ASSESSING STRATEGIC ALIGNMENT	33
D. CONCLUSIONS	38
 CHAPTER IV. RESEARCH DESIGN	 40
A. INTRODUCTION	40
B. DEVELOPMENT OF CONSTRUCT MEASURES	40
C. STRATEGIC ALIGNMENT RESEARCH METHODS	43
D. CASE STUDY DESIGN	45
E. SUMMARY	47

CHAPTER V. MODELLING IS STRATEGIC ALIGNMENT	48
A. INTRODUCTION	48
B. CONCEPTUAL MODEL OF STRATEGIC ALIGNMENT	49
C. CONSTRUCT VALIDATION	54
D. DISCUSSION	62
E. CONCLUSIONS	65
CHAPTER VI. INSTRUMENT ASSESSMENT	67
A. INTRODUCTION	67
B. THE INSTRUMENTS AND CONSTRUCTS	67
1. AN INSTRUMENT TO MEASURE BUSINESS STRATEGY (STROBE)	68
2. AN INSTRUMENT TO MEASURE IS STRATEGY (STROIS)	70
3. MEASURING STRATEGIC ALIGNMENT	71
4. AN INSTRUMENT TO MEASURE IS EFFECTIVENESS	73
5. AN INSTRUMENT TO MEASURE PERFORMANCE	74
C. CONCLUSIONS	75
CHAPTER VII. CASE METHOD	77
A. INTRODUCTION	77
B. CASE STUDY EXECUTION	77
1. INSTRUMENT DEVELOPMENT	77
a) Initial Preparation	78
b) STROBE & STROIS Preliminary Development	79
c) IS Effectiveness Preliminary Development	80
d) Performance Preliminary Development	81
2. SAMPLE SELECTION	81
3. DATA COLLECTION VIA CASE VISITS	83
a) Initial Checking	83
b) First and Second Round Data Collection	83
c) Assessing the Instrument	84
d) Controls for Bias	85
4. DATA ANALYSIS	87
C. VALIDITY AND RELIABILITY	89
D. SUMMARY	94
CHAPTER VIII. RESULTS AND CASE ANALYSIS	95
A. OVERVIEW	95
1. SAMPLE CHARACTERISTICS	95
B. COMPARISON OF QUALITATIVE AND QUANTITATIVE DATA	97
1. ROUND 1 VERSUS ROUND 2	98
2. LITERAL REPLICATIONS	99
a) Professional Industry	99
b) Service Industry	102
c) Manufacturing	105
d) Retail	107
3. SUMMARY	110
C. VALIDATION	111

1. INTERNAL VALIDITY	112
2. EXTERNAL VALIDITY AND RELIABILITY	116
3. OTHER OBSERVATIONS	117
4. CONCLUSIONS	118
D. INSTRUMENT DEVELOPMENT	119
1. STROBE & STROIS SECOND ROUND DEVELOPMENT	119
2. IS EFFECTIVENESS SECOND ROUND DEVELOPMENT	120
3. PERFORMANCE SECOND ROUND DEVELOPMENT	121
E. COMPARISON OF METHODS OF DATA ANALYSIS	121
1. BIVARIATE VERSUS SYSTEMS	121
2. MATCHING VERSUS MODERATION	122
3. LIMITATIONS	123
4. SUMMARY	124
 CHAPTER IX. DISCUSSION	 125
 A. INTRODUCTION	 125
B. ALIGNMENT IN SMALL FIRMS	125
1. INDUSTRY CONSIDERATIONS	126
2. LEADERSHIP	127
3. INFORMATION SYSTEMS	128
4. ALIGNMENT	129
5. VENKATRAMAN'S (1991) TYPOLOGY	133
C. SUMMARY	135
 CHAPTER X. CONCLUSIONS	 136
 A. LIMITATIONS AND FUTURE RESEARCH	 136
B. CONCLUSIONS	138
 ACKNOWLEDGEMENTS	 142
 BIBLIOGRAPHY	 143
 CHAPTER XI. APPENDICES	 153
APPENDIX I: SUMMARY DATA OF ALL DIMENSIONS	154
APPENDIX II: CHAN'S FINAL MODEL AND SUBSEQUENT ALTERATIONS.....	155
APPENDIX III: FINAL QUESTIONNAIRES AND COVER LETTER	165
APPENDIX IV: INTERVIEW GUIDE.....	184

LIST OF TABLES

<i>Table III-1: Linkage Framework (Reich & Benbasat, 1991)</i>	32
<i>Table VII-1: Example STROBE Preliminary Alterations</i>	79
<i>Table VII-2: Example STROIS Preliminary Alterations</i>	80
<i>Table VII-3: Example Performance Preliminary Alterations</i>	81
<i>Table VIII-1: Demographics of Case Sites</i>	96
<i>Table VIII-2: Instrument Data from Professional Firms</i>	100
<i>Table VIII-3: Instrument Data from Service Firms</i>	103
<i>Table VIII-4: Instrument Data from Manufacturing Firms</i>	106
<i>Table VIII-5: Instrument Data from Retail Firms</i>	109
<i>Table VIII-6: Comparison of Methods of Assessing Alignment</i>	111
<i>Table VIII-7: Example STROBE Secondary Alterations</i>	120
<i>Table VIII-8: Example STROIS Secondary Alterations</i>	120
<i>Table VIII-9: Example IS Effectiveness Secondary Alterations</i>	120

LIST OF FIGURES

<i>Figure III-1: Strategy Continuum (Mintzberg & Waters, 1985)</i>	22
<i>Figure III-2: Impact of Alignment on Performance (Das, Zhara & Warkentin, 1991)</i>	34
<i>Figure III-3: Conceptual Model (Chan, 1992)</i>	37
<i>Figure IV-1: Research Method Continuum (Bonoma, 1985)</i>	44
<i>Figure V-1: Substantive Relationships and Construct Validation (Venkatraman, 1989a)</i>	49
<i>Figure V-2: Natural Selection Interpretation of Fit (Drazin & Van de Ven, 1985)</i>	51
<i>Figure V-3: Bivariate Interpretation of Fit (Drazin & Van de Ven, 1985)</i>	52
<i>Figure V-4: Systems Interpretation of Fit (Drazin & Van de Ven, 1985)</i>	53
<i>Figure V-5: Alternative Calculations of Fit</i>	56
<i>Figure V-6: Fit Calculated as Matching</i>	60
<i>Figure V-7: Fit Calculated as Moderation</i>	61
<i>Figure VI-1: Venkatraman's Model</i>	69
<i>Figure VI-2: The Conceptual Model (adapted from Chan, 1992)</i>	76

ABSTRACT

There is mixed evidence regarding the possible benefits available to organisations from the implementation of information systems (IS). Despite general acceptance of the benefit of aligning IS strategy with organisation strategy to obtain the maximum benefit, few attempts have been made to define and quantify this relationship. Before it is possible to quantify the effect of alignment on performance it is first necessary to be able to measure alignment itself. In particular, the past models have largely neglected the specific considerations of smaller business organisations. This thesis assesses the past research into business strategy, information systems strategy and alignment. It is determined which of the prior models is most appropriate as the basis for provision of a measure of strategic alignment in small firms with the aim of providing a solid base for further research in actually quantifying the effect of strategic alignment on performance.

The model selected from the assessment of past research involved a series of four instruments assessing business strategy, IS strategy, IS effectiveness and business performance. Churchill's (1979) recommended steps for the development and subsequent testing of construct measures were followed in adapting the chosen model and instruments to be used in small firms. The resulting instruments were tested via multiple cases, using firms from four different industries in order to provide a wider opportunity for interviewer assessment of the performance of the instruments. The quantitative results were consistently found to parallel the interviewers' qualitative assessments of the information systems alignment in each firm. Additionally, the instruments met the requirements for validity and reliability that were able to be tested with a case study approach. Overall therefore, the results of this thesis provide a significant step towards providing a method for the measurement of strategic alignment in small firms. Future development of these instruments will also provide opportunity for research into methods for determining the impact of strategic alignment on the performance of organisations.

Chapter I. INTRODUCTION

A. Research Objective

Organisational information systems (IS) are coming under increasing pressure to provide a return similar to that expected of any other capital investment. However, a major impediment to determining the impact of information systems on the business is that traditional measures of profitability and financial performance are considered to be inadequate. A need to determine alternative ways to measure the information systems of a business and their impact on business performance has therefore arisen.

Recent research suggests that improved performance from information systems is only obtained when those systems are aligned with the organisational strategy. An extensive array of literature exists, providing reasons why strategic alignment is a beneficial, listing the advantages from achieving strategic alignment, and specifying how to achieve strategic alignment. However, the majority of this literature is normative, and only a limited number of studies provide positive empirical evidence of any beneficial link between alignment and performance. Nevertheless, this normative literature is influencing management decisions. Recent surveys consistently indicate that aligning IS plans with organisational objectives is a primary management concern (Niederman, Brancheau & Wetherbe, 1991).

Until recently, identifying methods for quantifying the business gain attributable to the relationship between IS and performance is an issue which has largely been neglected in the literature. The lack of any accepted theory of IS and business strategic alignment and standardised measures for assessing the constructs involved has resulted in different measurement methods by researchers and thus results which are difficult to compare and replicate. Accordingly, there has been a recent focus on both confirming the effect of strategy alignment on performance as positive and standardising methods for assessing the impact from such alignment.

Previous research has largely been qualitative as the complexity of the strategy-performance link and the underlying constructs has hindered empirical research in this

area. The difficulty of confirming a link between alignment and performance and the lack of empirical support stems from an inability to adequately measure the constructs from which the relationship is comprised. Although it appears intuitive that an IS strategy which supports the business strategy will enhance performance, until appropriate and valid methods of measurement are developed, this intuition will remain unproven.

Despite widespread recognition of this measurement problem, few researchers have endeavoured to develop instruments suitable for quantifying the relationship. In order to assess the degree of influence that alignment has on performance, it is first necessary to be able to measure each of the constructs involved. Thus measurement of strategic alignment is the first step in solving the wider problem of actually quantifying the effect of strategic alignment on performance. Some researchers have attempted to provide measures for strategic alignment, however the quantity of this research is limited and the applicability of the proposed measures is generally restricted to the environments in which they were developed.

In particular, the prior attempts to provide a way of measuring strategic alignment and thus evaluating its impact on performance have largely been performed in the large firm environment. In contrast to large firms, evidence suggests that decision processes and strategy formulation in small firms remains inexplicit, informal and intuitive (Lefebvre, Langley, Harvey & Levebvre, 1992; Mintzberg 1988). This indicates that it may not be valid to extend the conclusions regarding large firms to the small firm environment without consideration of these characteristics.

Moreover, such an investigation is particularly pertinent in the New Zealand context as the majority of businesses are considered small by international standards. Thus, it appears to be beneficial to extend the work previously performed into the small firm environment.

The objective of this research is to develop an instrument (based on and adapted from the most suitable of those instruments presently available) to test and measure the degree of strategic alignment attained by small firms.

B. Value of this Thesis

The links between performance and other organisational factors are not well confirmed, and in many cases, mixed findings provide little positive evidence of any such links (Baets, 1992). Before these links can be confirmed to any great extent, the components themselves must be measurable. However, the present extent of research into the measurement of performance and strategic alignment is limited, with the few models that exist having only been validated in a single setting or context. Until research begins building on the models and instruments that already exist, this state of knowledge will not improve.

Churchill (1979) expresses concern at researchers developing their own definitions and providing measurements which are then not able to be compared to previous work. Similarly, problems are encountered when theoretical discussion of measurement models is then not carried through into the empirical part of a piece of research (Venkatraman, 1989a).

This thesis aims to extend the prior work into a different setting, that of small firms, in order to widen the applicability of that work. By building on the past research this can be confidently developed for use in a wider context. This research will avoid both of the above concerns by choosing a model and definition for modelling strategic alignment previously validated in another setting, and choosing the appropriate mathematical approach according to that model.

This thesis will then provide an instrument or set of instruments suitable for measuring the constructs of strategy and thus strategic alignment in small firms. Testing of the instruments will be conducted via a number of case studies with the aim of validating the instruments as far as possible with a qualitative approach. Once this has been tested on a larger scale in order to complete the validation of the instruments and refined, it will be possible for future studies to begin to evaluate the impact of strategic alignment on business performance in small firms.

It is hoped that the findings from the case studies may also provide some insights into strategic alignment in Canterbury that can be used by practitioners who may be struggling to align the strategies in their own business.

C. Structure of the Thesis

In Chapter II, the concept of strategic alignment itself is introduced and defined, along with the current state of the research attempting to find evidence of the links between alignment and performance.

Next the constructs of business strategy and information systems strategy are introduced and defined in Chapter III. The chapter then discusses methods of evaluating these constructs used in past research. Finally, the past methods used to assess strategic alignment are discussed. From this discussion, a selection of both the most suitable model and the domain of each of the constructs of business strategy and IS strategy are defined for the purposes of this thesis.

Once the main body of literature has been reviewed and discussed, the research design is introduced and outlined in Chapter IV. Churchill (1979) provides the basis for an approach to develop construct measures. This approach is used in this study to begin the process of providing a fully validated measure for strategic alignment in small firms. One of the first steps in this research approach involves determining the most appropriate relationship of fit between the business strategy and IS strategy. This is discussed in Chapter V along with the past research into each of the possible choices, culminating in a decision of the best perspective to be adopted for alignment in small firms. Chapter VI subsequently assesses the instruments from the chosen model and identifies areas of concern that need to be addressed to enable these instruments to be valid in the small firms environment.

Data collection and assessment of the instruments is detailed in Chapter VII. It was considered that an investigation into the applicability of the chosen methods would need to be conducted by more detailed assessment of the associated instruments in individual firms in order to assess their performance in context. Thus a multiple case study design

was used to assess the chosen instruments in a number of firms from different industries. The chapter goes on to discuss the specific methods of data collection used in this thesis, the initial changes made to the instruments before they were used in any case visits, and finally validity concerns as they apply to the chosen methods of qualitative research as well as the overall research design.

The results chapter, Chapter VIII, aims to provide some indications of the success of the instruments from the case studies conducted. The sample of cases is outlined, and a basic comparison of the results from each round of data collection are presented first. The results are presented by industry with descriptions of each firm and the level of alignment found in each, along with illustrations of problems encountered in the use of the instruments. The extent to which the instruments satisfy the various dimensions of validity and reliability are discussed and the solutions that were used to minimise problems which were encountered and changes made to the instruments are described. A comparison of the methods of assessing strategic alignment is made and finally the cases are summarised and recommendations regarding the future use of the instruments are made.

Chapter IX discusses the findings with respect to the achievement of strategic alignment in small firms. The findings from the literature are debated and some recommendations for future research are made. Finally, Chapter X explains the limitations inherent in this research, along with suggestions for future research and Chapter XI presents the conclusions from this thesis.

Chapter II. INFORMATION SYSTEMS ALIGNMENT

A. Introduction

Information systems and technology¹ have traditionally been considered a support function to improve the efficiency and effectiveness of the organisation, with the cost of such systems being considered an expense rather than a strategic investment (Venkatraman, 1991; McFarlan, McKenney & Pyburn, 1983). However, this situation has changed with the realisation that information systems can provide substantial benefits in the form of improved competitiveness and performance when integrated with the business strategy (Neo, 1988). It is now widely appreciated that the information systems resource can provide significant strategic opportunities and advantages. Nevertheless, these benefits are not always realised by firms despite large investments in IS.

The development of an IS strategy and planning for information systems have become the accepted ways to identify those areas in which an IS investment will provide the greatest benefit for the organisation. Additionally, as part of this process it is increasingly being stressed that the information systems strategy must be congruent with the strategy of the business as a whole, rather than being independent and unrelated (Venkatraman & Camillus, 1984).

This chapter introduces the concepts of strategic planning for information systems and strategic alignment. The presumed impact of alignment on performance is discussed, despite the lack of research conducted attempting to confirm or quantify this relationship. Finally, the benefits and problems associated with achieving strategic alignment are discussed along with the recent research into this area.

¹ For the purposes of this thesis, information systems (IS) and information technology (IT) are both considered to refer to the information systems and technology used in an organisation for the purposes of management information.

B. IS Strategic Planning and Alignment

As information technology resources have become increasingly indispensable to businesses, managing these investments efficiently and effectively has become a management priority. Information systems planning is widely recommended as a means of assisting an organisation to achieve the maximum benefits possible from their information systems resources. No agreement on the definition of IS planning is apparent in the literature (Baker, 1995), yet despite this lack of a common definition, academics and business executives alike are stressing the necessity for such planning. One general definition of IS planning is '*the process of deciding the objectives for organisational computing which the organisation should implement*' (Baets, 1992, at 205).

Recent studies have found a number of factors that are contributing to this heightened necessity to plan for IS. These include a wider management awareness of the strategic and competitive opportunities that information systems can provide, (McFarlan, et al., 1983; Porter, 1985; Boynton & Zmud, 1987) the desire for cost containment (Galliers, 1993b) and the increasing rate of technological change (McFarlan, et al., 1983; Pyburn, 1983; Atkinson, 1990).

Yet these influences may not be universally applicable. Smaller firms have less need for formal planning processes as entrepreneurs tend to rely on intuition and guess-work rather than information and formal models. They cannot usually afford planners and analysts for large projects that large organisations have, which results in decisions regarding information systems being made as gut feelings and intuition (Welsh & White, 1981). Blili & Raymond (1993) express such a view in discussing strategic planning in small firms:

The determinism and forward-looking nature of IT strategic management runs counter to the incrementalism and short-term management standpoint of small business (at 446).

Olson & Bokor (1995) suggest that such formal planning may be more suited to larger firms, indicating that the applicability of the above recommendations needs to be considered explicitly before they can be related to small firms (McFarlan, et al., 1983;

Blili & Raymond, 1993). Even if present in small firms, formal planning models can be redundant when the intuition and decisions of the owner/manager are still dominant. This can cause problems when attempting to provide strategic IS, as it contributes to the common situation in small organisations where motivation for information systems comes from the top, or not at all (Blili & Raymond, 1993).

Whether or not planning for IS is conducted formally, the importance of formulating a strategy to assist in the effective utilisation of this resource is also becoming commonly accepted, and the perceived importance of selecting IS strategies which maximise the strengths of an organisation has been escalating. This is illustrated by the number of researchers finding the linkage of IS plans with organisational objectives to be a primary organisational concern for firms of all sizes (Lederer & Mendelow, 1986; Thompson & Iacovou, 1993). Bakos & Treacy (1986) emphasise importance of this congruence in their review of studies investigating the impact of information technology on performance:

The mission and management of the information systems group should be consistent with the firm's dependency on technology and the opportunity for competitive advantage that the technology represents (at 108).

Despite an increased management focus on aligning IS and organisational objectives, evidence suggests that such congruency is not being achieved. Atkins' (1994) survey of large firms found that three quarters of the companies surveyed claimed to have an IS strategy, however on closer investigation, few of those strategies actually reflected the priorities or strengths of the organisation. Atkins (1994) asserts:

[M]any organisations' IT/IS 'strategy' statements more resemble 'shopping lists' of things to do or buy than reflect the way that business strategy can be delivered through technology (at 124).

Businesses are consequently being urged to recognise information technology as a means to acquire strategic advantage rather than an end in itself (Bakos & Treacy, 1986; Lin, Vassar & Clark, 1993; Galliers, 1993b). This concept is equally applicable to small firms. Lin, et al. argue that all competitors in the market have access to short term strategic gains from taking advantage of technological opportunities. However, for a small firm to obtain long term strategic benefits, the external opportunities need to be

linked to the resources of the small business via a comprehensive strategy, as simply applying IT is no guarantee of success.

Strategic planning for information technology thus recognises the need to identify those areas that are critical to the success of the organisation. It is necessary to develop a strategy for information systems in order to support those areas, rather than developing systems reactively and independently from the objectives and goals of the organisation. This co-development and integration of the information systems strategy and the business strategy is commonly referred to as strategic alignment.

The term *strategic alignment* in the management literature can be used to refer to the alignment or 'fit' between the business strategy and any critical aspect of an organisation, such as organisational structure, technology, long term planning or information systems which contributes to the success of that organisation. In this study, strategic alignment refers to the congruence between an organisation's business strategy and its information systems strategy.

This congruence has been called a number of different terms throughout the information systems and strategy literature including *strategic alignment* (Henderson & Venkatraman, 1992), *strategic fit* (Chan, 1992; Venkatraman, 1989b; Das, Zharra & Warkentin, 1991), *coordination* (Lederer & Mendelow, 1986) and *linkage* (Reich & Benbasat, 1994a). Each of these terms refers to substantially the same concept, which has been defined by Chan (1992) as:

the alignment between business unit strategic orientation (company 'posture' or 'personality') and IS strategic orientation (support of those postures)(at 5).

and by Reich & Benbasat (1994a) as:

the degree to which the information technology mission, objectives and plans support and are supported by the business mission, objectives and plans (at 4).

In this thesis, 'fit' and 'alignment' are used interchangeably, and each term is assumed to refer to the concept defined above as strategic alignment.

C. The Impact of Strategic Alignment on Performance

Implicit in most of what we do in MIS is the belief that information technology has an impact on the bottom line of the business. Surprisingly, we rarely know if this is true. It is very difficult to trace and measure the effects of information technology through a web of intermediate impacts upon enterprise level performance (Crowston & Treacy, 1986, at 299).

While researchers and consultants alike stress the importance of aligning of the IS strategy with the competitive strategy of a business (Galliers, 1993a), these recommendations implicitly rely on the purported impact of IT investment and strategic alignment on performance.

Actual evidence of the effect that IT investment has on organisational performance remains fragmented and contradictory (White, 1986). In an A. T. Kearney study reported by Lederer & Mendelow (1986) it was found that firms with integrated IS and business strategies financially outperformed those without integrated or aligned strategies by a factor of six to one. Thompson & Iacovou (1993) conducted a study on the alignment of IT use with critical success factors (CSFs) in small² firms. They concluded that there was a positive impact of this alignment on performance, and small firms should use CSFs to identify strategic uses for IT. However, Lucas (1975) found that the information systems of the organisations in his study provided little explanation of the variance in performance in those organisations. Similarly, Cragg & King (1992) found many negative and ambiguous correlations in their study investigating the relationship between IT utilisation and business performance.

A number of studies have found heavy investment in information systems and technology to be associated with both very high and very poor performance (e.g. Cron & Sobol, 1983). Despite this lack of consistency in the empirical evidence, a steady stream of literature on using information technology to improve organisational effectiveness and competitiveness continues. This testifies to the existence of a belief that information systems can have a major impact on business performance. Even more compelling is the

² Defined as less than 250 employees.

fact that up to fifty percent of new capital investment in businesses is in information technology (Earl, 1987).

In an attempt to explain the disparate results regarding the effect of IS investment on organisational performance, researchers have begun focusing on the impact of strategic alignment. The literature suggests that highly aligned IT and business strategies play a significant part in improving the effectiveness of information systems (Venkatraman & Camillus, 1984), and conversely, when strategic alignment is inadequate, performance may be impaired. The greater degree of IS strategic fit that is observed, or realised, the better company performance can be expected.

Additionally, it has been claimed that a lack of congruency between the IS and business strategies may mean that the IS strategy actually prevents achievement of the business strategy. Thus, implementation of the wrong IS strategy may actually hinder performance (White, 1986). This may partially explain the different conclusions of past studies into the impact of IT performance. Organisations which do not attempt to link their IS and business strategy may find that their expectations regarding the impact of their investments in IT are not realised.

D. Achieving Strategic Alignment

The American Airlines reservation system and the American Hospital Supply ordering system are two of many examples of the application of IT as part of an organisational strategy which resulted in significantly improved performance for that organisation (Benjamin, Rockart, Scott Morton & Wyman, 1984). Efforts to replicate the success of these organisations' integration of their IS and business strategies have led to the development of frameworks and models such as Rockart's CSFs (1979), the Porterian Value Chain (Porter, 1980, 1985), and Wiseman's Strategic Thrusts (1985).

Most of these frameworks aim to assist company executives to identify similar opportunities for gaining competitive advantage by formulating a strategy for IT which is aligned to the business strategy.³ However, these frameworks have been criticised for

³ For a more detailed summary of general alignment frameworks see Baets (1992).

their anecdotal nature and the fact that they neglect both the empirical and theoretical research on achieving alignment (Bakos & Treacy, 1986). Essentially such criticisms claim that opportunities cannot be generalised to be suitable for every organisation. For example, Venkatraman (1991) claims that:

[A]n organisation cannot just choose to implement, without any planning, a particular piece of technology. Research has shown that it must do so in context, that it must consciously align its business strategy and its organisation with its technology (at 122).

Recent research indicates that practitioners still struggle to achieve alignment (Baets, 1992) with reports of low success rates being common (Reich & Benbasat, 1994a). Empirical studies also reveal significant differences among organisations as to the degree of success of their integration of IS with business strategy (Lucas & Turner, 1982).

Philip, Gopalakrishnan & Mawalkar (1995) tested the strategic alignment of a number of large Canadian companies. Extensive use of information systems for internal and administrative purposes was found, but they failed to find a strong link between the businesses' information systems and their competitive strategy. It was concluded that for the majority of Canadian companies, IS has not yet become an integral part of corporate strategy, and that there was a mismatch between the IT systems and the external competitive forces faced by the business.

A similar result was found by Atkins (1994), who assessed the alignment of IS strategy with the competitive strategy of large businesses in a range of UK industries. Although some significant relationships were observed, Atkins found that while management was familiar with the strategy pursued by their organisation and businesses largely used IS for purposes consistent with that strategy, linking or aligning business and IS strategies remained a major challenge for many organisations. Atkins (1994) concluded that many organisations' claims of strategic information systems may be unfounded:

[T]he fact that a company has an IS strategy does not guarantee that it achieves competitive advantage thereby or uses IT in a strategic way. . . the strategy may well be internally focused and devoid of any external focus expected of a strategic information system (at 124).

Finally, Reich & Benbasat (1994a, 1994b) studied alignment in 10 business units from three large Canadian companies. They used qualitative techniques to assess both short and long term business and IS plans. A low association between long and short term alignment was found, indicating that the existence of one did not necessarily mean the other followed.

1. Factors Influencing Alignment

The consistently observed failure of businesses to successfully achieve strategic alignment has led many researchers to attempt to determine what factors are most influential in the process of attaining this alignment.

Kovacevic & Majluf (1993) conducted a survey of eight organisations investigating their IS planning. They found that IS planners were dissatisfied, planning required too many resources and only 24% of projects recommended were eventually implemented. The high cost of IS, the difficulty of measuring the benefits, the tendency for too much detail and the increasing rate of change in both business and technology which organisations have to overcome were all further obstacles frequently mentioned. However, as pointed out by McFarlan, et al. (1983) these are the exact reasons why IS planning and alignment with the business strategy has become so important.

Reich & Benbasat (1994a) conducted a search of the alignment literature and combined the empirical findings with the prescriptive literature into a summary of all factors that had been found to influence alignment. The five main influences discovered were: (1) external influences; (2) characteristics of IT within the organisation; (3) connections between business and IT planning; (4) communication between business and IT executives; and (5) success in IT implementation.

It has been suggested that characteristics of the environment in which the organisation competes will also moderate the achievement of a high level of alignment. Such environmental factors include the type of industry and level of information intensity in that industry (Porter & Millar, 1985) as well as factors affecting the direction and pace of IT deployment such as the length of the life-cycle of the product or service involved and the pressure from industry rivals (Johnston & Carrico, 1988). The interaction of

each of these influences may make the integration of IT with the business strategy by the organisation essential for survival, unnecessary, or more difficult to achieve.

Chan & Huff (1992a) recommend the examination of organisational as well as environmental factors when attempting to explain the variance in IS alignment between organisations. Within the organisation, the capabilities and experience of the personnel involved as well as the priority given to various areas can contribute to the difficulty of achieving alignment.

Despite the ever widening applicability of information technology to business, the management problem does not appear to have altered significantly over time. More than a decade ago, McFarlan, et al. (1983) positioned firms on a strategic grid according to their IT applications and plans, and found that a gap often existed between where an organisation actually lay, and where senior management believed it to be. More recently, Gatian, Brown & Hicks (1995) conducted a study of large firms in America and confirmed the opinion that executives are still not fully aware of the potential for strategic use of IT.

Similarly, Thow-Yick (1993) observed a strategic gap between technology and senior management, which he attributed to the rapid growth of IT. Thow-Yick claimed that organisations are currently in an expansion stage where growth is '*contagious, unplanned and therefore unmanaged*' (Robson, 1994, at 134). His view of the lack of experience of today's senior management in employing IS strategically is supported by Benjamin et al. (1984):

Senior managers have little or no experience or background in managing information and telecommunications technologies...they do not have an experiential base to relate this new focus of strategic opportunity to their business (cited by Thow-Yick, 1994, at 330).

In particular, managers are required to think strategically about all investments, including information systems. However, the lack of IS training, education and experience of many of these managers means that they are ill-equipped to think strategically in this regard. This situation is particularly relevant in small firms, where information systems are commonly under the control of a single influence such as the CEO or

owner/manager. Thus, if that person lacks either knowledge or motivation to apply information technology strategically, this situation will remain static.

In addition to the preceding factors, the inherent characteristics of a small firms can introduce even greater complexity into achieving alignment. Welsh & White (1981) stress that a small business cannot be considered a 'little big business'. The typical small firm is weak with respect to planning and training due to the similarly weak financial position of most small firms (Blili & Raymond, 1993; Ein-Dor & Segev, 1982). This lack of resources in turn makes investment in IS a greater proportion of spending, and therefore more risky (Lin, et al., 1993).

Further, environmental factors will have a much greater effect on small firms, as they have less ability to either analyse the environment adequately or to influence their markets, thus resulting in higher environmental uncertainty (Bergeron & Raymond, 1992) and also making a small firm significantly more sensitive to seasonal sales (Welsh & White, 1981), all of which contribute to the difficulty experienced by many smaller organisations attempting to align their business and IS strategies.

This continued variance in success with strategic alignment has led to many researchers calling for the development of a more thorough, grounded theory from which to evaluate organisations, with less emphasis on the prolific frameworks and solutions developed without reference to any such theory.

E. Conclusions

The problems with achieving strategic alignment illustrate the necessity of improving our understanding of the concept, as well as the benefits that arise from achieving the optimal level of alignment in a firm. As discussed above, recent empirical studies indicate that the existence of frameworks and recommendations espousing the benefits of IS strategic alignment does not appear to be assisting organisations in actually achieving that alignment.

More importantly, the implicit assumption behind these frameworks is that alignment has a significant and positive effect on performance and strategic investment is generally

made in the blind faith that real returns will occur (Weill, 1990). However, none of the frameworks and few studies attempt to evaluate such a link. Furthermore, of the few empirical tests that have been conducted, a large proportion have failed to confirm any such relationship.

The problems faced by organisations in achieving strategic alignment make the formulation of some method to determine the impact of alignment on performance increasingly important. The ability to determine the benefits from such a link may provide the necessary motivation for organisations to consider the business strategy in formulating their IS strategy or before making significant investments in information systems. Such consideration would necessarily lead to greater alignment. Similarly, this ability would enable the maximum level of performance resulting from alignment to be determined, thereby indicating when the optimal business strategy, IS strategy and thus alignment between them had been attained.

However, before a measurement method for strategic alignment can be developed, it is necessary to define and measure the component constructs of business strategy and IS strategy. The next chapter defines these constructs, and goes on to discuss the previous methods employed to measure strategic alignment.

Chapter III. MEASURING IS STRATEGIC ALIGNMENT

A. Introduction

Until recently, identification of methods to quantify the business gain attributable to the relationship between IS and business strategy is an issue which has largely been neglected. Previous discussion has largely been qualitative as the complexity of the strategy–performance link, and the underlying constructs themselves, have hindered empirical research in this area. Additionally, past research has concentrated on management opinions and user surveys, which does not allow quantitative measures to be used (Cron & Sobol, 1983). Both performance and strategy are multi-dimensional constructs influenced by many factors simultaneously and this contributes to the difficulty of providing effective methods for measuring them. Chan (1992) expresses concern at this situation:

Given [strategic fit's] business performance implications, it is critical that researchers improve their ability to measure this concept (at 195).

The lack of an accepted theory and standardised measures for assessing the constructs has resulted in different measurement approaches by researchers and thus results which are difficult to compare and replicate. Accordingly, there has been a recent focus on confirming the effect of strategy alignment on performance as positive and standardising methods for assessing the impact from such alignment.

In order to assess the degree of influence that alignment has on performance, it is first necessary to be able to measure each of the constructs involved. This chapter firstly investigates the general nature of strategy and then defines the concepts of business strategy and IS strategy. This is followed by a review of past methods of evaluating and measuring these types of strategy. The two constructs are then brought together in a review of past methods for assessing strategic alignment. Finally, business and IS strategy are defined for the purposes of this research, and the most appropriate research for the basis of developing instruments for measuring IS strategic alignment in small firms is identified.

B. Strategy

1. Strategy in Organisations

The application of the term strategy to business is a relatively recent phenomenon. In the 1860s, strategy was defined by General Ulysses Grant as '*the deployment of one's resources in a manner which is most likely to defeat the enemy*' (Mintzberg, 1988 at 17). However, since then strategy has become a fundamental business concept (Mintzberg, 1988) and organisational strategy has developed into a subject of extensive research.

Quinn (1988) defines organisational strategy in the following manner:

A strategy is the pattern or plan that integrates an organisation's major goals, policies, and action sequences into a cohesive whole (at 3).

He goes on to elaborate:

[T]he essence of strategy—whether military, diplomatic, business, sports, (or) political . . . —is to build a posture that is so strong (and potentially flexible) in selective ways that the organisation can achieve its goals despite the unforeseeable ways external forces may actually interact when the time comes (at 8).

With the complex nature of both organisations themselves and the environment in which they exist, it has been widely recognised that there is no best strategy in a particular situation. This has given rise to the contingency perspective of organisational strategy which strategy assumes that the match between an organisation and its environment will determine that organisation's performance. Thus the level of performance is contingent on the interaction of the internal and external variables influencing that organisation. With the myriad of combinations possible, there is no best match for any organisation, but the match chosen will have varying effects on performance. This suggests a theoretical basis for the implicit benefits of alignment, as business and IS strategy will interact and their degree of congruence will have a varying impact on performance.

Strategy is a multi-dimensional construct and as such, operational measures of strategy cannot be provided without first defining the boundaries of the construct (Venkatraman,

1989a). The complex nature of any strategy requires that these boundaries must be determined, whether the particular strategy encompasses the entire organisation, or involves a component strategy such as the information systems strategy. Venkatraman identified four dimensions of strategy which must be examined to delineate the domain of this construct:

(1) *Scope*

Should the definition distinguish between 'means' and 'ends'?
(Venkatraman, 1989a, at 945).

This asks whether goals are to be included as part of the strategy, or whether they are to be separated. Some research explicitly separates *goals*, including goal structure and goal formulation from *strategies*, involving formulation, evaluation and implementation (Schendel & Hofer, 1979), whereas others consider strategy to be a complex construct encompassing both of these aspects (Andrews, 1980). The narrower view, not including 'ends' is more common in strategy research.

(2) *Hierarchical Level*

Should the construct be defined at a particular level of the organisational hierarchy, or should it be level-free? (Venkatraman, 1989a, at 945).

The multiple level view of strategy, where strategies are assumed to exist at many different levels within an organisation, is now widely accepted in business research (Morrison, 1990; Hofer & Schendel, 1978). Three different levels—corporate; business; and internal strategy—have been identified, each being concerned with a different type of match between the organisation and its external environment. The *corporate* strategy is concerned with the selection of what business (or businesses) that the organisation should be in. The *competitive* or *business* strategy outlines how the organisation is to compete in that chosen business, and thus how best to match external opportunities and threats with available resources (Venkatraman, 1989a). Finally, at the lowest level, the *internal* strategy determines how each operational unit, e.g. production, marketing, research and development (R&D), will achieve its goals in the most efficient and effective manner.

It is important to determine which level is appropriate for a particular study and maintaining this focus throughout that research, as interchanging will provide results that are not comparable. This is due to the different focus and types of influences on each level of strategy (Reich & Benbasat, 1994a).

Schendel & Hofer (1979), Rumelt (1974) and Venkatraman (1989a) considered the corporate level strategy to be too aggregated for determining either the effect of various aspects of the strategy or the cause of changes in performance. They also considered that the outcomes from the functional level strategy were relatively unimportant for the business as a whole. Consequently these researchers focussed on the business level strategy.

(3) Domain

Should the domain be restricted to some 'parts' (i.e. some functional focus) or cover a broader perspective? (Venkatraman, 1989a, at 945).

Some studies focus on a single aspect of strategy, such as market share or attitude to research and development, whereas others consider the entire business strategy as it affects the organisation in every respect.

(4) Intended versus Realized Strategy

Is the distinction between 'intended' and 'realized' strategies relevant for conceptualizing and measuring this construct? (Venkatraman, 1989a, at 945).

Mintzberg (1978) was the first to distinguish between intended strategy and realized strategy. Intended strategy encompasses the *plans* and intentions of the members of the organisation which have been formulated and possibly documented as the formal strategy. On the other hand, the realized strategy is a *pattern* of consistent actions observed through the history of the organisation. These actions need not necessarily be equivalent to those planned by the organisation, as it may be necessary to accommodate unforeseen changes in external influences such as pursuing opportunities that arise. Thus, the realized strategy is the actual or visible strategy as implemented by the company.

It has been considered that the realized strategy of an organisation is not achieved by random selection of the opportunities and threats facing the organisation at any time (Venkatraman, 1989a). Rather, any organisation has a particular strategic orientation that influences how they will compete, governs their choices in decision-making. This strategic orientation has been described as a form of '*company personality*' (Chan, Huff & Morrison, 1993) and is relatively stable across industries. On the whole, this strategic orientation remains consistent within that organisation and can thus be evaluated. This view is supported by Mintzberg (1987), who states:

*Most of the time [organisations] pursue a given **strategic orientation**. Change may seem continuous but it occurs in the context of that orientation : . . . and usually amounts to doing more of the same. . . . They. . . seek continuous improvement by using their distinctive competencies in established courses (at 72, emphasis added).*

The realized strategy that the organisation follows is a combination of the intentions of the organisation (*deliberate* strategy), and actions implemented as a result of spontaneous events (*emergent* strategy). This means that in many cases plans may not be realised, while in others, patterns may be observed that were not part of the prior plan.

These two views is can be portrayed as a continuum with purely deliberate strategies at one end, and purely emergent strategies at the other (Figure III-1). Realistically, strategies cannot be purely one or the other. Organisations will always be influenced to some degree by changes in external factors such as the environment, despite their best efforts at implementing the planned strategy. Similarly they will always have some intentions which influence their actions, despite a dearth of strategic planning or thinking.

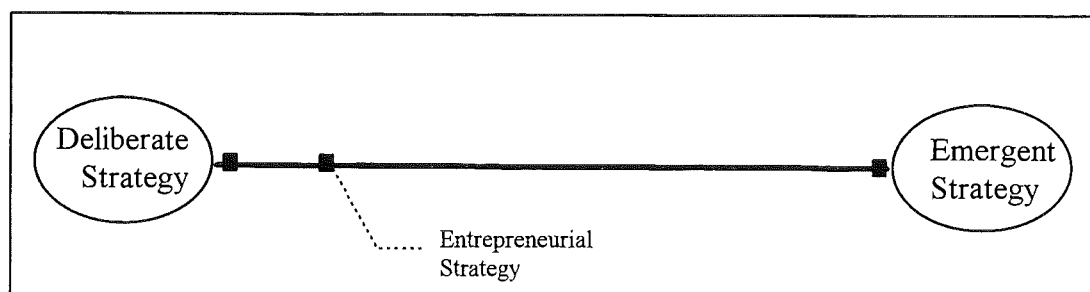


Figure III-1: Strategy Continuum (Mintzberg & Waters, 1985)

Mintzberg & Waters (1985) have found that organisations can be located in a number of different positions along this continuum. At the deliberate end, strategies are held under

tighter control and are thus closer to that which was intended. As this control loosens, strategies become more emergent.

One of these types is the entrepreneurial strategy, marked on Figure III-1, which falls closer to the purely deliberate pole. The entrepreneurial strategy is most often found in young or small organisations under the control of a single actor who is therefore able to control events in that organisation. Taylor & Banks (1992) found entrepreneurs and small business executives to have similar concerns and pressures in most cases and thus it was not necessary to differentiate between them.

The main influence on the realized strategy of this type of organisation is the vision of that individual and how they want their organisation to succeed. This ensures that the realized strategy is very close to that which was intended, however unless specifically articulated, identification of intended strategy can be difficult. The result is rather unique in that the intended strategy is extremely flexible due to this personal influence, and the organisation can react as quickly as the leader's vision changes.

In addition, the difficulty of measuring strategy in small firms has been emphasised by Mintzberg (1988) who states that strategy formation in such organisations tends to be informal, inexplicit, intuitive, and incremental. Lederer & Mendelow (1986) claim that detailed, written business plans are often not produced and it is submitted that this is even less likely in a small organisation. These characteristics make the identification of intended strategy particularly difficult in small firms.

(5) Process versus Content of Strategy

In defining the view of strategy that is the focus of this study, it is necessary to differentiate between the *process* of strategy and the *content* of strategy. The process of formulating and implementing the 'best' or most appropriate strategy is another large area of research, however this study is investigating the content of strategy, or the characteristics of the strategy that exists in an organisation at a particular point in time.

2. Business Strategy

a) Definition

Bakos & Treacy (1986) define an organisation's business or competitive strategy as a strategy which *'focuses on competitive moves within the industry in which the organisation does business'* (at 108). This level of strategy focuses on how the organisation wishes to compete in its chosen markets and how resources are allocated to achieve this activity.

As illustrated, any strategy is a very complex construct. Business strategy is more specific than the corporate strategy but also has to anticipate the multiple internal and external influences which affect the organisation at the competitive level. Due to both this complexity and the relative immaturity of the concept of strategy in business, much of this strategy research has been qualitative. However, whereas earlier researchers have used general comparisons and descriptive techniques, more recently some attempts have been made to provide more quantitative and comprehensive measures for business strategy.

b) Evaluation

Four general approaches dominate the literature on business strategy evaluation. Reviews by Hambrick (1980), Hambrick & Lei (1985) and Venkatraman (1989a) categorise these classes as:

1. Textual description or narrative approach;
2. Measurement of parts of strategies;
3. Classificatory approach; and
4. Comparative approach.

(1) Textual Description/Narrative Approach

The narrative approach assumes that each organisation's optimal strategy is unique and non-generalisable, otherwise no organisation would benefit (Lin, Vassar & Clark 1993). This uniqueness implies that any measurement scheme would be incomplete, as strategy

is different for every organisation and always changing. Thus, this approach involves describing each organisation individually, usually through descriptive case studies, and often over a long period of time (Chan & Huff, 1992a).

This approach obviously involves a lack of direct comparability between organisations' business strategies. However, it is still possible to determine the appropriateness of a strategy for the environment faced by an organisation. For example, Tilles (1963) provides a number of criteria for evaluating the effectiveness of a business's strategy. These include internal consistency, compatibility with the environment, appropriateness in the light of available resources, degree of risk, time horizon, and workability. Additional criteria identified by Christenson, Andrews & Bower (1978) include clarity, motivational impact and the degree of match with personal values of key figures.

While these are espoused as factors for evaluation, they focus only on qualitative factors, and rely on a subjective assessment of whether a strategy is suitable (as opposed to 'good') for that organisation. Therefore this approach, while useful in conceptual developments, is limited in its ability to test theories or compare organisations (Venkatraman, 1989a).

(2) Measurement of Parts of Strategies

Measuring part of a strategy involves focussing on one or a few key variables and their determinant aspect of strategy. Common variables used are market share or R&D, and these are assessed for their impact on a criterion, for example, profitability. Hambrick (1980) expresses doubt whether this procedure can actually be considered a method for operationalising strategy, but it has often been classified as such due to authors largely being from the strategy field.

The measures developed for the variables tend to be reliable as the research focusses on only a few, and often the researcher tends towards those which are more easily quantified, further improving the reliability of the measures. However, this approach is univariate, involving only a few variables, and thus lacks a overall view of the strategy of an organisation. Thus, in considering the wide decision areas that constitute strategy in an organisation it is apparent that this results in a measure of strategy which lacks significant depth.

(3) Classificatory Approach

The classificatory approach involves classifying organisations into their respective types according to criteria imposed by the researchers. The classes can be deducted either conceptually or empirically. Inductively derived classifications are called typologies, whereas those developed and validated empirically are called taxonomies (Morrison, 1990).

Miles & Snow (1978) suggest that firms in an industry can be divided into the following four distinct categories according to their competitive behaviour: Analyzers; Defenders; Prospectors; and Reactors. Defenders concentrate on cost-reduction in order to defend their current markets, whereas Prospectors focus on innovation and market opportunities and therefore require flexibility and fast response to opportunities. Analyzers tend to be more cautious in which approach to take, and respond with either a defensive or prospective approach according to the market. Finally, Reactors lack any coherent or consistent strategy and are much less likely to be successful. Studies which have used this classification with positive results include Atkins (1994), Das, Zhara & Warkentin (1991) and Hambrick (1983).

Another strategic typology is that developed by Porter (1980, 1985), who classifies competitive strategies in terms of how organisations attempt to position their products or services in order to compete. Classes include product/service differentiation, lowering cost or a niche focus. A number of studies have provided some support for this classification (Thompson & Iacovou, 1993) whereas others have not found it suitable (White, 1986; Bergeron, Buteau & Raymond, 1991). This classification has also found support in the context of small firms (Lefebvre, Langley, Levebvre & Harvey, 1992).

A third typology is Wiseman's (1985) Strategic Thrusts. Wiseman expanded past research by providing specific responses for each of Porter's five competitive forces. These were: differentiation, cost control and change/introduction of products or processes, growth support and alliance formation. The framework has found considerable support and is one of the most frequently employed (Gatian, Brown & Hicks, 1995; Bergeron, et al., 1991).

The classificatory approach also has a number of limitations. Grouping organisations into relevant classes provides a general division of a sample according to predetermined characteristics. However, with strategy involving so many dimensions, such grouping usually means differences which could provide a significant proportion of explanatory power are ignored or combined into a single category. Additionally, these classes can be industry specific, making further generalizations and replications difficult (Chan & Huff, 1992a).

Secondly, Kay (1993) disputes the usefulness of these classifications, asserting that there can be no generic strategies for success, otherwise there would be no competitive advantage, therefore no success.

Finally, some concerns have also been expressed regarding the use of these classifications for small firms. As the typologies have usually been developed and validated with samples of larger firms and the environments they face, the characteristics of smaller firms may mean that they need to be adapted before they are able to be used validly in that environment (Bergeron & Raymond, 1992). However, as indicated above, some studies have started this process of determining which may be suitable with positive results.

(4) Comparative Approach

Thompson & Iacovou (1993) attribute the past inability of researchers to provide empirical support for the relationship between IT and performance, particularly in small firms, to the lack of valid measures for the constructs involved. More recently, researchers have sought to provide more comprehensive measures of strategy that can be applied to any organisation.

The comparative approach involves assessing the strategy of each organisation according to the dimensions or key traits of the strategy construct (e.g. innovativeness, riskiness and futurity). This can be collected and combined into a measure of the subject organisation's strategy, resulting in much finer distinctions between a set of organisations than possible from the classificatory approach (Chan & Huff, 1992a).

While it is considered that this approach has the potential to provide comprehensive measures of strategy, researchers have been criticised for failing to provide adequate measures for the constructs they propose (Venkatraman & Grant, 1986). Venkatraman & Grant consider that there is a distinct lack of comparability between research in this field, and that it is essential that researchers begin to build on others work as opposed to proposing more theories that have inadequate measurement and testing schemes.

Venkatraman developed an instrument measuring the strategic orientation of business, based on the work of Miles & Snow (1978). The instrument assessed the '*strategic orientation of business enterprises*' (STROBE). It was considered that a strategic orientation while influencing product market choices, was more fundamental and thus more enduring than those product/market choices themselves. Therefore measures could be developed to assess this strategic orientation independent of market sector and industry.

After stating the perspective of strategy that would be apply in his research, the construct was conceptualised in terms of eight dimensions and items were generated from a review of the past literature. The instrument was tested in two stages, an initial survey of 250 business units, and a subsequent survey of 450 business units using a refined version of the instrument. Confirmatory factor analysis was used to analyse the dimensions and their impact on performance. The findings indicated that the dimensions of the construct were unique and distinct and satisfied the requirements of validity and reliability as far as possible from the first test of a new measure.

Each of the above approaches is useful for answering different types of research questions. Also, the use of multiple sources of measurement in strategy research has been strongly advocated in the literature (Venkatraman & Grant, 1986; Snow & Hambrick, 1980), indicating that use of more than one type in a study may be beneficial for improving triangulation and reliability of results obtained initially.

3. Information Systems Strategy

a) Definition

Wiseman (1985) defines strategic information systems as '*information systems used to support or shape the competitive strategy of the organisation*'. This definition illustrates the common practice that information systems are defined without actual reference to any IS strategy. The above definition and similar ones have been adopted in other studies (e.g. Reich & Benbasat, 1994a) indicating that this is a common view of strategic IS, and also that it is very rare for a definition of IS strategy to be used in studies of alignment or strategic information systems.

However it has also been established that it is important to plan for IS and develop a strategy for IS in order to define the priorities and goals of the organisation with respect to information systems and technology, and as such, this strategy needs to be formally recognised. The common recommendations for IS executives to be placed at the highest level of management indicates that independent development and consideration of IS is extremely important if it is to provide the maximum benefits for the organisation.

A specific IS strategy helps the appropriate emphasis to be placed on the activities which are in this domain, rather than being considered to be a subsection of the business strategy. This also helps ensure new opportunities in IS are not be overlooked because they are unrelated to the present business strategy. Therefore an IS strategy is one which focuses on providing appropriate information efficiently in order to assist the organisation in achieving its competitive goals. This may also involve identification of new methods of achieving these goals, in a proactive manner rather than merely being reactive within the boundaries of the business strategy.

b) Evaluation

While it is generally accepted that businesses need an IS strategy, and recommendations regarding the both the composition of such strategies and the benefits from having one are prolific, few studies have evaluated the strategy itself. It is rare for studies into strategic IS to specifically define IS strategy, or to develop measures for that strategy.

Any of the methods used to measure strategy described earlier could theoretically be used to measure the IS strategy, however most studies tend to assess the business strategy and then investigate strategic information systems for the degree of support that they provide for that business strategy. This results in a subjective assessment of strategic alignment based on the business strategy alone. Such a procedure restricts the method of evaluating the IS strategy to the less specific methods, i.e. narrative and classificatory approaches, as only very general assumptions regarding the nature of the IS strategy can be made.

Jarvenpaa & Ives' (1993) study of the fit between IT structure and decision making structure in global firms is one of the few that does involve an explicit assessment of IS strategy. The findings from interviews and the literature were condensed into a typology of IT configurations and appropriate measurements for each. These were structured into a questionnaire which empirically compared these alternative organisational designs with the strategic orientation of the business.

Bakos & Treacy (1986) attribute the lack of utilisation of technological opportunities to this lack of instruments available to measure benefits in any detail. This indicates the importance of improving the ability to measure the IS strategy and other related constructs in a comparative manner. Such measurements would enable an organisation to be able to measure the specific benefits from such opportunities and thus make more informed decisions regarding the investments that would provide the greatest impact on performance.

Chan (1992) developed an instrument based on the comparative approach to assess the realized IS strategy of organisations. This was modelled from Venkatraman's (1989a) STROBE instrument which assessed realised business strategy, and used the same dimensions. The instrument was designed to parallel Venkatraman's research, and measured the '*strategic orientation of information systems* (STROIS).

4. Conclusions

The concept of strategy in business has been a topic of much discussion and research, with the measurement of strategy traditionally being considered too difficult to provide a

global method suited to any organisation. The difficulty involved in measuring these constructs of strategy and alignment and their effect on the organisation is illustrated by White (1986) who states:

The fit between the internal organisation of an enterprise and its strategy is central to strategic management. . . this requires defining a precise concept of strategy and linking it to the set of organisational attributes that can be adjusted to facilitate the effective, low-cost implementation of the strategy. Add to this the problems of measurement. . . obtaining data and the dynamic nature of the phenomenon, and it is understandable that broad-based empirical demonstrations of the strategy-organisation-performance relationship are rare (at 218).

There has been a substantial amount of research into the evaluation of business strategies in large firms, with the comparative approach being utilised recently to provide more comprehensive methods for such measurement. A much smaller proportion of research has attempted to evaluate the IS strategy in any manner. In the context of small firms, methods for evaluating business and IS strategy have been largely restricted to the less specific narrative and classificatory approaches, however the sensitivity of small firms to changes in their environment and limited resources means that specific consideration must be given to identifying appropriate method of evaluating these different strategies, giving consideration to each of the possible methods.

Having outlined the various methods of evaluating the business and IS strategies, the next section looks at how past research has defined strategic alignment and the methods of assessing strategic alignment. Some of these are similar to the evaluation of strategy alone, whereas others involve independent evaluations of the business and IS strategies with a subsequent measurement of the congruence between them.

C. Evaluating Strategic Alignment

1. Dimensionality of Strategic alignment

Reich & Benbasat's (1994a, 1994b) investigation into the dimensions of strategic alignment distinguished between the *cause* and *outcome* views of alignment. They considered that many items used in surveys to assess strategy actually assessed the

process of achieving alignment (i.e. cause of alignment) whereas others examined the content of alignment, or the degree of coherence between the IS and business strategies (i.e. outcome of those activities). Reich & Benbasat considered that it was necessary to define which view was to be adopted in any study investigating strategic alignment. Venkatraman & Camillus (1984) also make this distinction, describing the process of fit as the method of arriving at that level of strategic alignment. This distinction is similar to the process and content views of strategy already discussed.

Reich & Benbasat extended the work of Horovitz (1984) by using his two dimensions of strategic business planning to define the following dimensions of strategic alignment:

1. The intellectual dimension, which is whether the content of the information technology and business plans and objectives are consistent and valid; and
2. The social dimension, which is whether the business and IS executives understand (and are committed to) each others objectives and plans.

Both of these aspects were viewed as necessary to achieving a high level of strategic alignment. For example, excellent plans (high intellectual) may be poorly executed due to lack of knowledge and agreement between executives (low social). Alternatively, perfect implementation of a poor plan (low intellectual and high social) will not have the desired effect and result in sub-optimal performance.

Reich & Benbasat then combined these dimensions of alignment with the cause/effect distinction to create a framework of four areas of possible research into strategic alignment.

DIMENSION	FACTORS (Causes)	LINKAGE (Effects)
INTELLECTUAL	I—The methodologies for formulation of IS and Business mission; Comprehensiveness of planning activities.	II—The degree to which the IS and business mission, objectives & plans are internally consistent and externally valid.
SOCIAL	III—Choice of actors, decision making and communication used in formulation of mission, objectives and plans for IS and the business.	IV—The levels of understanding of the business and IS mission, objectives & plans by business and IS executives.

Table III-1: Linkage Framework (Reich & Benbasat, 1994b)

This thesis builds on research in Quadrant II, involving the *effect* of the *intellectual dimension* (describing and measuring the result of linkage activities). It investigates the content of strategic alignment, and assumes that strategic alignment is a state (not necessarily static) of integration and mutual support between the IS and business strategy that can be attained to some degree, and therefore measured. It is recognised that factors such as planning and management support will influence the degree of strategic alignment achieved, however this thesis does not examine these factors as they are part of the process of attaining strategic alignment.

2. Methods of Assessing Strategic Alignment

Prior attempts to measure strategic alignment have generally been prescriptive with a smaller proportion of this research being qualitative. However, more recently attempts have been made to provide comprehensive quantitative measures. This has become increasingly necessary as practitioners consistently encounter difficulties in successfully aligning their business strategy with their IS strategy and calls for empirical confirmation of the prescriptive research become more frequent.

Qualitative studies have been largely based on the classificatory approach, although self reporting by managers and researcher assessment has also been employed to assess the degree of strategic alignment. Snow & Hambrick (1980) identify four methods of classifying firms in to groups by strategy: investigator inference; self-typing by subject firm; external assessments by experts; and the use of objective indicators.

Typologies designed to assess strategy such as Porter (1980, 1985) have been popular for classifying organisations into groups according to the level of strategic alignment attained. Most strategic typologies are grounded in the belief that firms following different strategies can prosper in most industries by properly aligning their internal characteristics with their market niche position (Simons, 1987), which illustrates the applicability of this method for applying to investigations into strategic IS and thus alignment.

Some typologies, such as McFarlan's (1984) strategic grid, have been developed specifically for identifying how firms use IT in their markets. Both of these types of

classification tend to be non-specific resulting in a general conclusion of whether IT is used strategically, and is therefore aligned or not aligned.

Philip, Gopalakrishnan & Mawalkar (1995) tested the strategic alignment of a number of large Canadian companies by assessing the correspondence of the information systems of each company with Porter & Millar's (1985) five forces. Firstly, each organisation ranked the five forces in order of significance with no reference to IS. Secondly they were asked to rate how well each of 13 potential IS applications (each of which corresponded to a particular competitive force) was used in the current systems of the organisation. The association between the information systems and the competitive forces faced by each company was found to be very low.

Gatian, et al. (1995) espoused the use of Wiseman's strategic thrusts framework in evaluating the use of strategic information systems in any firm. They developed a single item questionnaire and conducted a survey on 251 large publicly traded firms. They concluded that the Wiseman framework was suitable for assessing the IT investment strategies of companies.

Das, et al. (1991) developed a model relating business strategy, IS planning, strategic fit and the financial performance of organisations but did not test their model empirically. They considered that the Miles & Snow typology, described in Section 3 above, would be a suitable way to operationalise business strategy.

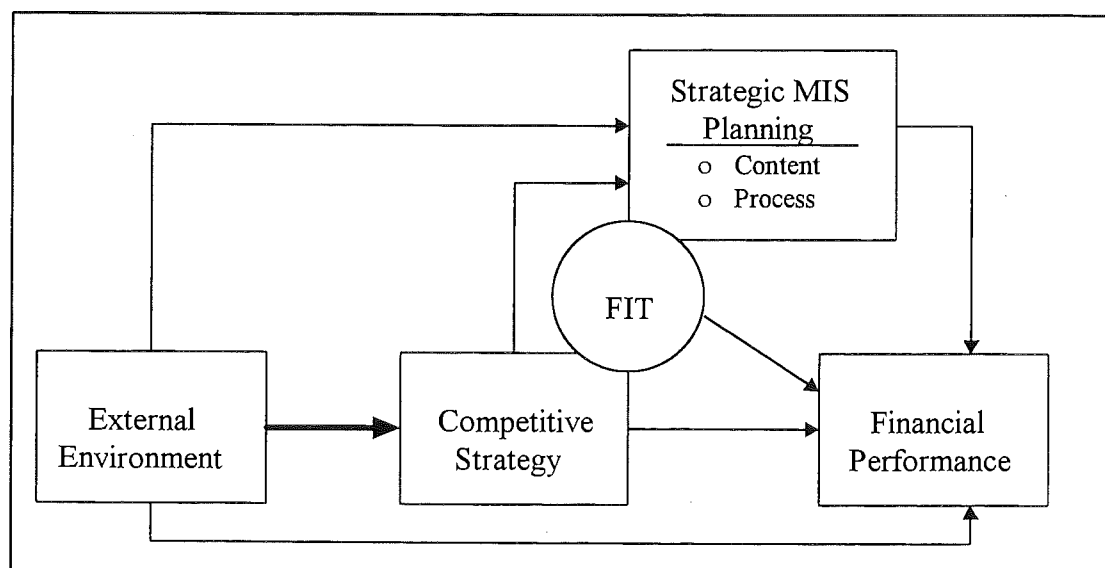


Figure III-2: Impact of Alignment on Performance (Das, Zhara & Warkentin, 1991)

Atkins (1994) developed a survey using three different models to measure strategy and assess alignment (McFarlan 1984; Ansoff, 1965; Miles & Snow, 1978). Firms were identified first in terms of positioning on McFarlan's strategic grid then in terms of positioning using the other two models, to determine whether this matched the initial positioning on McFarlan's grid. Some significant relationships were found, in particular, firms in the strategic quadrant were much more likely to be Prospectors. Generally however, evidence was mixed and Atkins recommended development of a more refined instrument.

Thompson & Iacovou (1993) used Porter's (1985) value chain model to test the hypothesis that the impact of IT utilization on small business performance was mediated by the effectiveness of business activities, as measured by the CSFs of the business. They developed a questionnaire to survey 27 small businesses in Vermont, USA and concluded that small businesses can gain from adoption of IT, but the application of IT needs to be focussed on areas with the most critical information needs for maximum benefit.

Lefebvre, et al. (1992) used Porter's typology to investigate the relationship between strategy and technology in small firms. They found encouraging evidence that this classification scheme was applicable to small firms, however they also concluded that small firms are not as strategically oriented as larger organisations, which makes the identification of strategy more difficult.

Jarvenpaa & Ives (1993) created their own typology of global business and IT strategies that resulted in four generic global strategies. As described above, it is one of the few studies that explicitly measure IS strategy in order to assess the alignment between IS and business. They found that there was a surprising mismatch between the IT configuration and the decision making structure of the organisations that they surveyed. Only slightly more than half of the organisations were found to have harnessed their business and IT structures to complementary strategic orientations.

Venkatraman (1991) suggests businesses are able to be stratified into the following three distinct levels of alignment:

- Type I: Operational Efficiency (least aligned);

- Type II: Supports Strategy (moderately aligned); and
- Type III: Integrated with Strategy (highly aligned).

In a Type I organisation IS only supports operations. A Type II organisation has evolved to where IS supports the business strategy in a reactive manner. In a Type III organisation, IS is integral to the business strategy, with both the business and IS strategy influencing the direction of the organisation. Any significant opportunities in IS are adopted with the business strategy being adapted accordingly. These levels of alignment have been used in the literature in a number of studies (Lucas & Turner, 1982; Johnston & Carrico, 1988). Few businesses have been found to have reached Type III alignment without considerable effort and understanding of the benefits of alignment, and Venkatraman thus concludes that a conscious effort needs to be made in any organisation in order to align the business strategy and the IS strategy.

Quantitative studies are more likely to follow the comparative approach to provide more specific measures for both business strategy and IS strategy. This enables a more comprehensive measurement for the alignment between the two strategies as the level of detail is much higher, enabling more informed comparisons. There are only a small number of studies using this approach, with the most comprehensive being Chan's (1992) investigation into strategic alignment and its effect on other variables in the organisation.

Chan (1992) empirically investigated strategic alignment by developing four quantitative survey instruments to measure business strategy, IS strategy, IS effectiveness and business performance. Three of the instruments were modified and validated from previous research into IS and business strategy. Venkatraman's (1989a) STROBE instrument was adapted for the business strategy instrument. The fourth instrument (STROIS) was developed by Chan and assessed IS strategy by parallelling STROBE. The data from the instruments assessing business strategy and IS strategy was used to measure strategic fit rather than creating a fifth instrument. Each instrument measured the same eight dimensions, allowing straightforward strategic fit computations.

Chan hypothesised that the effect of IS strategic alignment on performance and IS effectiveness would be greater than either the direct effect of IS strategy on IS

effectiveness or the direct effect of the business strategy on performance. Information systems strategy was not hypothesised to affect performance directly, rather it affected IS effectiveness which in turn impacted performance (see Figure III-3).

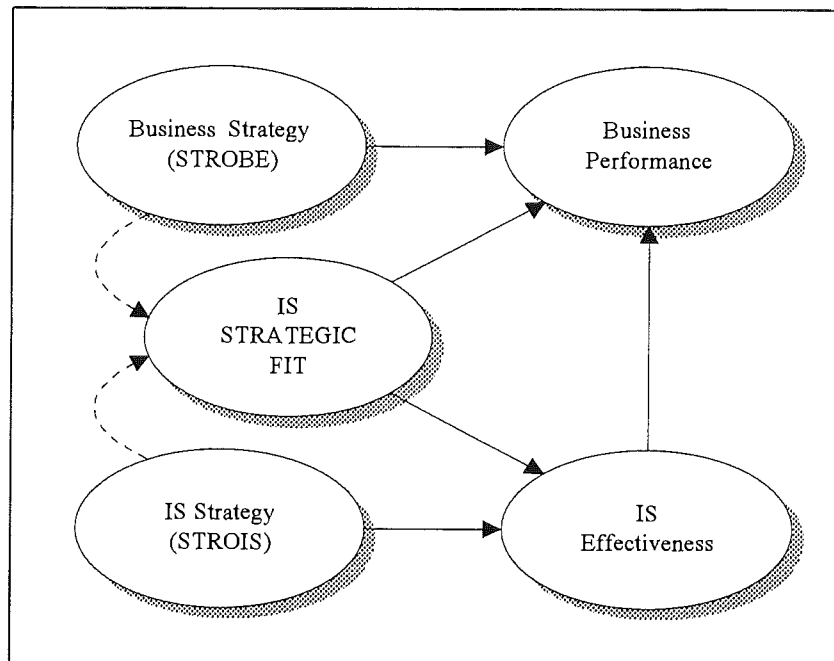


Figure III-3: Conceptual Model (Chan, 1992) ⁴

The questionnaires were sent to 904 firms, and 164 were returned. Multi-variate analytical techniques were used to analyse the results, and these showed the instruments to be reliable and valid. The postulated relationships between business strategy, IS strategy, IS strategic alignment, IS effectiveness and business performance were found to be statistically significant in most cases. In particular, Chan found that alignment was a better predictor of performance than the individual measures of strategy and thereby clearly demonstrated a positive relationship between strategic alignment and business performance. Thus, as well as giving researchers empirical evidence of the impact of strategic alignment on performance, the instruments provide valuable recommendations for practitioners individually in prioritising their IS investments to provide the maximum benefit to the organisation.

⁴ The solid lines depict the hypothesized relationships between research constructs. The dotted lines merely represent the fact that alignment is calculated based on the Business and IS strategic orientation information provided.

Chan's instruments exist as a validated method of quantifying strategic alignment. However, her recommendations for future research include the use of the instruments in different contexts and different samples of businesses in order to widen the validity of the instruments and as such, Chan's work provides a solid comparative study able to be used as a base for further research.

D. Conclusions

From the discussion above, it can be seen that a number of perspectives of alignment exist. Examples of these include focusing on either the process or content of strategic alignment, deciding to investigate either external or internal factors influencing strategic alignment (Chan, 1992), as well as the conceptualization of strategy to be used to assess the strategic alignment of organisations investigated. The number of different perspectives that are possible make it necessary to specify the domain of strategic alignment for the purposes of this research.

The previous attempts at measuring strategic alignment and thus evaluating its impact on performance have largely been performed in the large firm environment, and the different characteristics of small firms indicate that it may not be valid to extend the conclusions regarding large firms to a different environment without explicit consideration of these.

As the aim of this thesis is to provide a valid comprehensive and precise measure of strategic alignment for small firms, it appears that a comparative approach would be most valuable. A number of the studies that have been performed using other types of assessment (i.e. textual and classificatory) have focussed on small and medium sized firms (Raymond, Paré & Bergeron, 1993; Thompson & Iacovou, 1993; Hagmann & McCahon, 1993), however none have addressed the topic of strategic alignment in a comparative manner. Chan did employ this method, but targeted only large firms. Thus, the application of a comparative approach in evaluating strategic alignment in small firms has yet to be considered.

The STROBE instrument has been validated more widely, due to its prior development and use by Venkatraman. Adoption of the STROIS instrument verbatim

would be unlikely to be adequate, however, as a large proportion of small businesses do not have a segregated or developed information systems department. This means that it may be considerably more difficult to assess much of the IS strategy and utilisation, as it may not have been considered or formally implemented, due to the limitations often experienced by small firms. Overall however, the past research indicates that Chan's instruments are well validated and appear to measure the items they purport to measure with an acceptable degree of accuracy, indicating that her instruments would be the most suitable for adapting for small firms.

The next step is to identify the conceptualization of business and IS strategy to be used in this study. As the literature provides adequate justification for each of the following stances with respect to small firms, the end result is similar to that used by Chan and Venkatraman. The information systems and business strategy studied in this thesis are therefore defined as follows:

1. *Scope*: In both the conceptualizations of business strategy and IS strategy, the strategy will be defined as the 'means' only, as separate from goals.
2. *Hierarchical Level*: Similar to Venkatraman and Chan, the construct of strategy is to be defined at the business level.
3. *Domain*: For this study, the construct of business strategy will include the broader, complete strategy of the organisation. Similarly the IS strategy, while being restricted to information systems and technology, will be considered as a whole.
4. *Intended versus Realized Strategy*: As the aim of this study is to measure the degree of strategic alignment that is actually attained by a particular firm, the existing strategy that is implemented appears to be more relevant than what was intended, whether informally or formally in a written statement. It is thus assumed that realised strategy should be the focus of the study.

The comparative approach of measuring the degree of alignment involves assessing both the business strategy and IS strategy quantitatively and making a comparison between them. Having decided to use Chan's model as a starting point, it is now necessary to determine the best way of developing a measure for the constructs of business strategy and information systems strategy and thus alignment for small firms. The next chapter thus outlines the research design followed in this thesis.

Chapter IV. RESEARCH DESIGN

A. Introduction

Having outlined the past research into strategic alignment it is apparent that there is only one major study involving a comparative approach that could provide an adequate measure for strategic alignment in small firms. However it is not possible to test this model verbatim without considering the characteristics of small firms or the common principles for the development of new construct measures. Thus it is necessary to outline firstly the approach employed in this thesis to develop a model suitable for further testing, then the method of empirical research used to begin the testing of the model's validity in the chosen context.

This chapter initially describes the overall research approach in developing construct measures and the extent to which the requirements for a valid measure can be satisfied in this thesis. The second section describes the stages of knowledge in research and the appropriate research methods to be used at certain stages. Finally, this is applied to the current state of knowledge of strategic alignment and the chosen research design is justified.

B. Development of Construct Measures

This study follows the eight step approach recommended by Churchill (1979) for the development of construct measures. While it was not possible to complete all eight steps in this thesis, it was intended that the results will provide adequate background for further research to complete the last steps and thereby develop a fully validated measure of strategic alignment for use in small firms.

The steps as recommended by Churchill are:

1. *Specify the domain of the construct.* Identify the domain of the constructs involved, both substantively and operationally. A substantive definition defines the construct in terms of other constructs, whereas an operational definition specifies the activities or operations necessary to measure it.

Problems can arise from the many ways in which a construct can be defined (and thus measured), which is why the substantive definition is necessary to preserve the meaning of the construct. Defining the construct explicitly enables other researchers to adopt the same meaning and composition and this provides improved comparability of results (Venkatraman 1989a).

2. *Generate a sample of items.* Use past literature to derive dimensions and a set of items which represent each dimension. This helps to conserve the substantive definition, as the reference to past literature ensures that choices can be justified from other research. Usually, a number of items is required, as single items are considered to be too simplistic in most cases (Sethi & King, 1991).
3. *Collect Data.* Collect data via laboratory experiments, field experiments, field studies or survey research.
4. *Purify the Measure.* Empirically examine the extent of measurement error, or reliability associated with the measurement scheme. Internal consistency is most important. This may result in going back to Step 2 if results are not found to be satisfactory.
5. *Collect New Data.*
6. *Assess Reliability with New Data.* This is to eliminate the possibility that the previous findings were due to chance. Results should be subjected to the same examination as in Step 4.
7. *Assess Validity.* The prior steps will produce an internally consistent set of items, however internal consistency is not sufficient for construct validity. Convergent validity, discriminant validity, predictive validity and nomological validity all need to be tested.
8. *Develop Norms.* This involves combining scores and developing benchmarks.

Churchill specifically states that it may not be possible to execute all eight steps in a single study, and that it is possible to complete Steps 1 – 4 with only a single set of

cross-sectional data. This thesis completes Steps 1 – 4 to provide a measure for the construct of strategic alignment in small firms. A second set of case studies were used for Steps 5 – 8. However, the nature of case studies prevented the validation of the instruments to the extent that is desirable for a complex construct. The results from the study are designed to facilitate further research to complete the remaining steps via large scale survey data.

(1) Specify the Domain of the Construct

Churchill identifies the thorough specification of the domain of the construct as the first step towards the development of valid measures. Specifying the domain involves deciding exactly what is, and is not, encompassed by that construct. Consulting the prior literature is recommended, as the failure to do so has often hindered progress in the conceptualisation of constructs in the past. When new definitions are provided comparability between researchers is reduced, and so retaining past definitions where appropriate is advised. A thorough discussion of the business and IS strategy constructs was conducted in Chapter III. Following this discussion it was considered appropriate to conceptualise these constructs in an equivalent manner to that employed by both Venkatraman (1989b) and Chan (1992).

As there are a number of methods of modelling alignment in past research, it is also necessary to determine which of these is most appropriate for this thesis. The choices and the decision of how to model and thus actually calculate alignment from the strategy data collected is discussed in Chapter V.

(2) Generate a Sample of Items

The initial sample of items originated from the set of final items employed in Chan's instruments. However some alterations to the dimensions and items used in the instruments were necessary where Chan's questions were found to be inappropriate for the current study. The changes are described in Chapter VI and a full set of the original items from Chan's final model with each subsequent round of adaption is detailed in Appendix 2.

(3) Collect Data

A small number of case studies of firms in the Canterbury region were then conducted as part of Stage 3. Firms from within the same industry as well as some in a different industry were chosen in order to provide as wide a range of data as possible in this first round. Both quantitative data from the instruments and qualitative data from interviews with respondents was collected. The data was used to calculate the alignment in each firm, and this was then compared with the qualitative assessments.

(4) Purify the Measure

Based on the initial case results, further review or 'purification' of the instrument was conducted as part of Stage 4. The details of the findings from the cases and also the process by which changes were made are described in Chapter VIII.

(5) Collect New Data

The second set of case studies were then conducted in order to enable partial validation of the instruments in Stages 5 – 8. The same types of data were collected, enabling comparisons between the first and second rounds.

Based on the aims of this research and the current state of knowledge of the topic, a multiple case study approach was chosen as the method of data collection in Stages 3 and 5. The following section describes the reasons for this choice, and outlines the advantages and disadvantages that were encountered in using case studies.

C. Strategic Alignment Research Methods

Different types of research are needed at different stages of knowledge (Benbasat, Goldstein & Mead, 1987) and the selection of a research method depends on the state of current knowledge of the topic under investigation. Bonoma (1985) lists a hierarchy or types along a continuum, along which it is assumed that preceding types have been undertaken in prior research (see Figure IV-1). For example, it is unlikely that research into the cause and effect of a set of variables would be attempted without prior evidence of their association, nor would it be possible to classify phenomena without first

describing them. As the state of current knowledge progresses along this continuum, the emphasis on data integrity (i.e. internal validity and reliability) increases, aiming to establish confidence in prior findings.

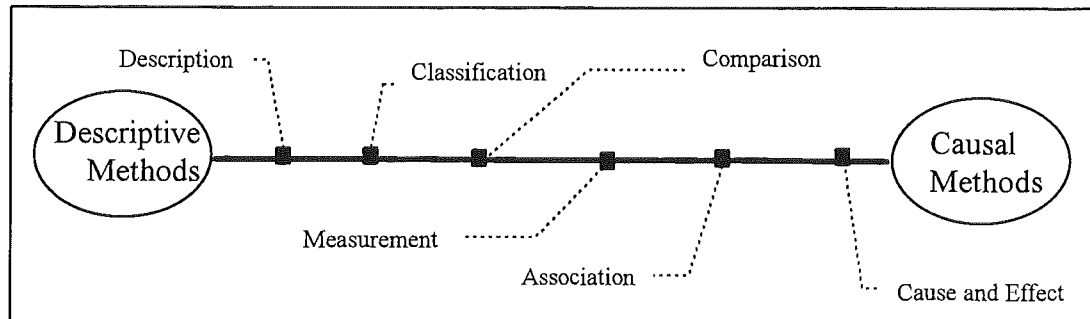


Figure IV-1: Research Method Continuum (Bonoma, 1985)

The research into strategic alignment in large firms is well along this continuum, with recent attempts at measurement and preliminary investigations into cause and effect, usually employing quantitative methods of analysis in order to provide the necessary levels of data integrity. However, in the small firm research, the evidence is not as conclusive, due to the much smaller number of studies that have investigated strategic alignment. This means that while methods exist to measure and test for the effect of strategic alignment, it is not possible to extend these to small firms directly.

As established from the small firm literature discussed previously, small firms have their own unique qualities in terms of their environment, structure, management and IS usage (Raymond, 1985) and it is considered to be an oversimplification to assume that the computing environment in large firms is equivalent to that of small organisations (Cooley, Walz & Walz, 1987). It is therefore necessary to provide evidence establishing the validity of extending the current theory to small firms.

Construct measurement usually involves numerical analysis and can also require complex calculations. Questionnaires are well suited to data manipulation and analysis and are thus the most common method of data collection for construct measurement. In addition, the use of a questionnaire facilitates validity checks and triangulation. With particular respect to the current research, these instruments have been used with previous success. The instruments under investigation are designed as questionnaires, and have been tested by large scale mail-surveys in each of their prior applications (Venkatraman,

1989a; Chan, 1992; Lefebvre, Lefebvre & Harvey, 1993; Ives, Olson & Baroudi, 1983).

However, questionnaires assume that the characteristics of the constructs under investigation (e.g. in this case, strategy) are such that they can be '*described or measured accurately through self-report*' (Marshall & Rossman, 1989, at 83). Thus it becomes necessary to rely on the honesty and accuracy of participants responses as well as the 'goodness' of the initial research question (Marshall & Rossman, 1989). This also illustrates a similar weakness, the inability of questionnaires to investigate context (Yin, 1989) which will occur even if their accuracy and reliability of self-assessment could be guaranteed. In a large scale mail survey, without any knowledge of the organisation that a questionnaire is received from, the accuracy of the figures obtained from that questionnaire cannot be determined.

These concerns all pointed to the fact that the validity of Chan's instruments in small New Zealand firms could not be assumed, ruling out the possibility of a large scale mail-out as the first stage of data collection. It was therefore considered necessary to test the suitability of the instruments at the individual organisation level. This would provide more thorough knowledge of the level of alignment at each organisation and allow feedback on the instruments before any attempt to collect large quantities of data for quantitative analysis was made. As stated by Van Maanen (1983):

[S]uch contextual understanding and empathetic objectives are unlikely to be achieved without direct, firsthand, more or less intimate knowledge of a research setting. . . (at 10, cited by Gable (1994, at 114)).

Therefore, it was decided that a detailed qualitative approach, or more specifically case study based approach, would be more informative than a large scale survey as a first step for testing the instruments.

D. Case Study Design

Yin (1989) supports case studies as an appropriate research strategy when the objective is to study contemporary events in their natural settings, and when it is not necessary to control behavioural events. Firstly, the construct of strategic alignment can be

considered a contemporary event due to its dynamic nature. Any attempt to measure the construct can only be considered relevant for that particular firm at that particular time. This is supported by Benbasat, et al. (1987) who assert that research in the information systems field is particularly suited to case research due to the rapid rate of change in the field, despite the fact that the method is not commonly utilised. Secondly, it is not necessary to control behavioural events as the focus is on the content of strategic alignment at the time, as opposed to the processes involved in attaining strategic alignment.

A number of other factors indicated that a multiple case approach would be suitable for data collection. In particular, multiple cases allow for the development of a richer theoretical framework by comparing phenomena both within the same population as well as from different populations (Yin, 1989). Case sites within populations are called *literal replications* and should provide similar results, confirming the research propositions. Case sites in a different populations are called *theoretical replications* and may give contrary results, but these should be for predictable reasons. These theoretical replications provide additional corroboration of the initial propositions.

It is necessary to state the conditions which would result in a literal replication, with cases providing similar results, and those not likely to provide the same result, i.e. a theoretical replication. In this thesis it was expected that there would be some consistency in the effectiveness of the instruments in measuring alignment between firms in the same industry, but this would not necessarily hold for firms in different industries. The choices involved in selecting firms are outlined in the last section of this chapter.

In this thesis, multiple cases facilitate the collection of a number of comparable results, which enables the assessment of the instruments in as wide a setting as practical, but with enough depth to allow an independent assessment of the level of alignment in each individual firm visited. From comparing the results from the instrument with the independent assessment in each firm, a conclusion regarding the accuracy of the instruments was sought to provide evidence of the suitability of the instruments in small firms.

E. Summary

Having reviewed the literature regarding IS alignment and small firms it has been determined that a comparative approach to measuring the business strategy and IS strategy of organisations would be most informative, and that Chan (1992) provided a model suitable for use as a starting point in developing a similar measure for small firms. In order to test the model, Churchill's (1979) recommendations for development of construct measures will be followed. The need to gain insight into strategic alignment in the firms visited in order to be able to assess the measurement scheme indicated that a multiple case approach would be most suitable for the data collection stage of Churchill's recommendations.

The first of Churchill's steps thus involves the definition of the fit relationship between business strategy and IS strategy in small firms. Chan stresses the importance of defining the constructs to be measured, before attempting to provide instruments to measure those constructs (Chan & Huff, 1992b). Various alternatives for defining the relationship of alignment have been used in past research, and it is necessary to determine which is the most representative of the relationship between business and IS strategy and specifically outlining the conceptual model to be used in this thesis. The next chapter outlines some of the choices in selecting such a model.

Chapter V. MODELLING IS STRATEGIC ALIGNMENT

A. Introduction

Having evaluated the prior research into the measurement of IS alignment, it was concluded that Chan's (1992) method for measuring alignment had the potential for adaption into small firms. As described, her approach involved assessing both the business strategy and the IS strategy and quantifying the level of congruence between them. However, in any new study, researchers must explicitly justify their specification of the alignment relationship within the chosen research context (Venkatraman, 1989b). Thus, before these strategies or the alignment between them can be assessed, there are two essential decisions to be made.

First, it is necessary to identify the most appropriate way of defining the relationship of alignment in the context of this thesis. The hypothesised relationships, termed *substantive* relationships linking each construct, form the model on which this study will be based (Venkatraman, 1989a) (see Figure V-1). The definition of the relationship of alignment is a major consideration, which affects all stages of development of any method of measurement, including the development of theory, the collection of data and the measurement itself. The model chosen will therefore have an important effect on the results obtained (Chan & Huff, 1993). A number of alternative definitions have been used in past research, and this chapter reviews those alternatives to determine which is most representative of the relationship between business and IS strategy.

Second, the theoretical relationships must be represented by the appropriate measurement scheme. This is termed *construct validation* and requires a determination of the method by which empirical results will be assessed to test the model (see Figure V-1). While investigation into substantive relationships is prevalent in the strategy literature, past research has generally neglected to consider the aspect of construct validation in developing measures for complex constructs. This weakens the links between the substantive domain and the empirical results obtained because if the appropriate measurement scheme is not used, it is difficult to determine the validity of the measures used in a study (Emory & Cooper, 1991).

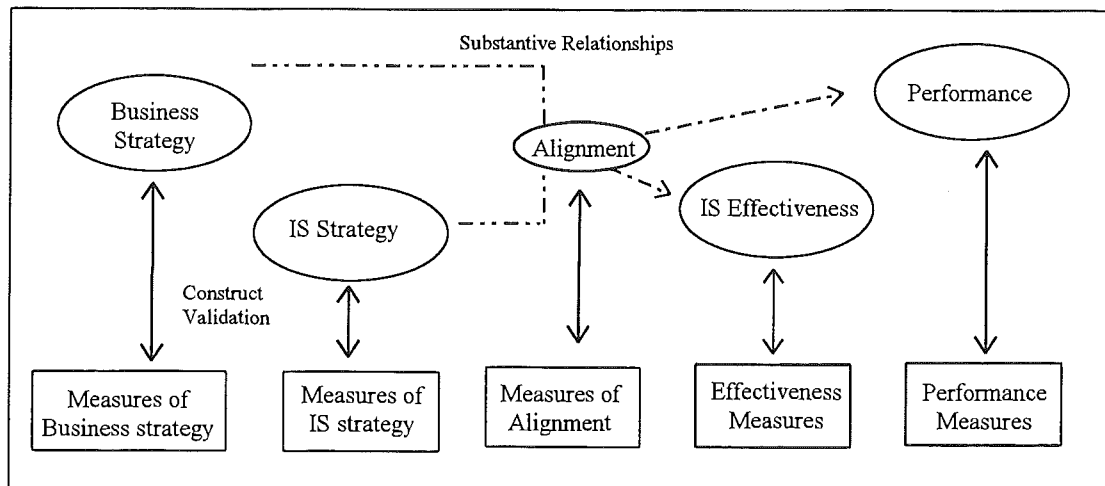


Figure V-1: Substantive Relationships and Construct Validation (Venkatraman, 1989a)

It is therefore essential to consider both substantive and construct validation issues before developing the instruments to assess strategic alignment in the context of small firms.

B. Conceptual Model of Strategic Alignment

Any research model consists of a number of hypothetical relationships existing between the constructs which are the subject of study. In the early stages of development, these relationships are theoretical and are not necessarily supported by empirical attempts to determine their actual existence or magnitude. However, the basis for the substantive hypotheses in a model are commonly '*inferred through empirically observed relationships*' (Venkatraman, 1989a, at 945).

In organisational contingency theory, it is assumed that organisational performance depends on the degree of alignment between the context (characteristics of the organisation such as culture, environment, technology) and the structure and processes of that organisation. This relationship has been investigated in many studies, using different approaches to model the actual alignment between the constructs involved.

In this thesis, the substantive relationships are those that are theorised to exist between business strategy, IS strategy, performance and IS effectiveness. It is assumed that the alignment between business strategy and IS strategy will impact on both IS effectiveness and performance, with the degree of fit affecting the magnitude of this impact. However,

various interpretations of fit have been used by different authors, and it is necessary to determine which is the most representative of the relationship between business and IS strategy. The importance of this definition is highlighted by Drazin & Van de Ven (1985) who state:

the definition of fit that is adopted is central to the development of the theory, to the collection of data, and to the statistical analysis of the proposition . . . each [interpretation] significantly alters the essential meaning of a contingency theory and the expected empirical results (at 515).

Drazin & Van de Ven (1985) identified three different interpretations of fit from historical structural contingency theory: *natural selection*; *bivariate fit*; and *systems*. All interpretations assume that context and structure must relate in some way for the organisation to perform well, although each provides a different perspective of how the constructs under investigation are aligned by making different assumptions regarding the underlying relationship between them.

Although their initial application was in the context–structure–performance relationship, it is emphasised that these interpretations of the measurement of alignment are applicable in any contingency theory (Van de Ven & Drazin, 1985). Since Drazin & Van de Ven's studies, each of these interpretations have been further investigated and tested in many other contexts where the measurement of the relationship between two complex constructs is considered important.

(1) Natural Selection

The natural selection interpretation hypothesises that two organisational factors have congruence, without making any predictions regarding the impact or effect of this congruence or alignment on any other variables. That is, it was assumed that there must be a match, or equilibrium, between the environment and the organisation in order for the organisation to survive (Aldrich, 1979; Van de Ven & Drazin, 1985). It was assumed that organisations would adopt structures and characteristics according to their context or environment, else they could not continue to be effective. Under natural selection, only the relationship between business strategy and IS strategy would be

investigated, as no effects on a criterion such as IS effectiveness or performance are hypothesised (Figure V-2).

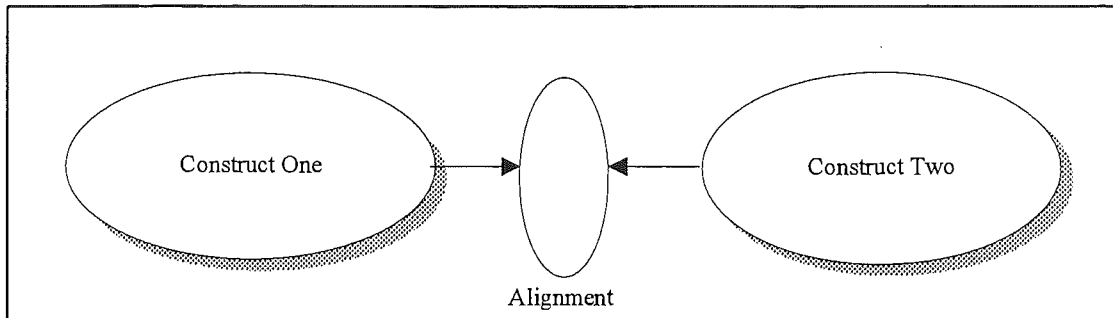


Figure V-2: Natural Selection Interpretation of Fit (Drazin & Van de Ven, 1985)

This interpretation has found some limited support (Drazin & Van de Ven, 1985). In the current context, a natural selection interpretation would assume that business strategy and IS strategy should be congruent, but no assumptions regarding performance or any other dependent variable would be made.

(2) Bivariate Fit

This interpretation looks at the interaction between pairs of components of two constructs or variables and the effect that interaction has on organisational performance. Each of the constructs is conceptualised as having a number of dimensions which are able to be measured using one or more items (for example, questions in a questionnaire). The interaction is calculated by determining the relationship between a dimension from the first construct with each dimension of the second construct (see Figure V-3). The diagram depicts each dimension from Construct One being modelled as parallel to a dimension from Construct Two. However, depending on the hypotheses of the model, relationships between any pair of dimensions can be tested for their impact on the chosen criterion variable.

As can be seen in Figure V-3, this interpretation assumes that it is valid and meaningful to consider each pair of components individually for the impact that their interaction has on performance. The most significant relationships detected indicate the most critical aspects of fit. This provides a means of determining priorities for resource allocation

since those critical aspects should be considered first in allocating limited resources (Miller, 1981).

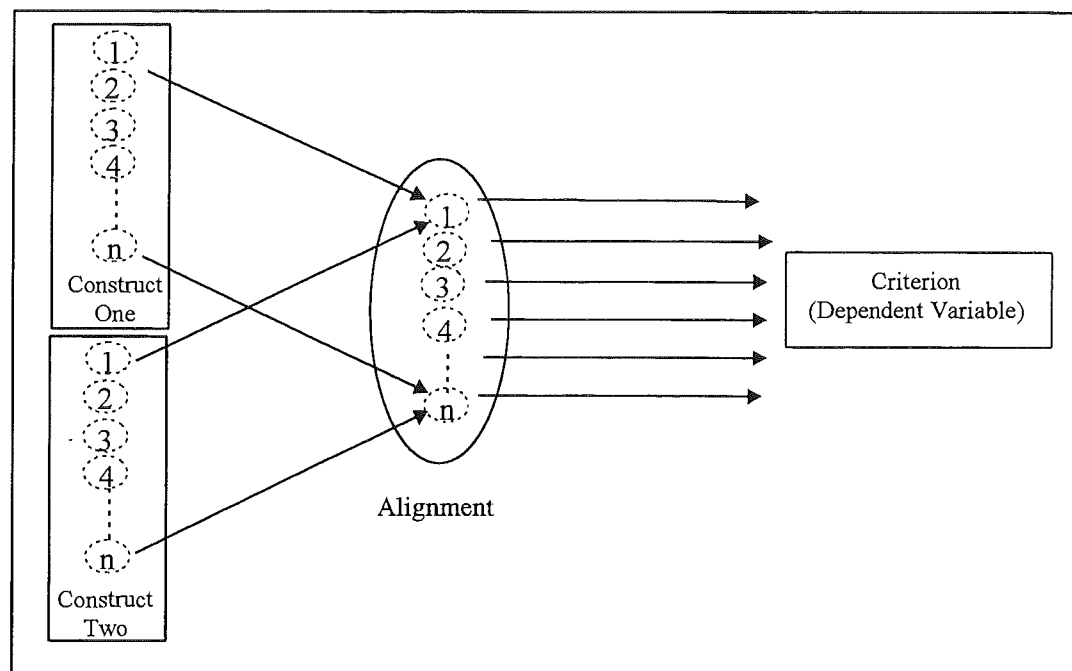


Figure V-3: Bivariate Interpretation of Fit (Drazin & Van de Ven, 1985)

In the context of this thesis, a bivariate interpretation would assume that each dimension of the business strategy would be associated independently with the relevant dimension of the IS strategy, and that each of these relationships could be measured for their impact on performance.

To date, this interpretation has been the most commonly utilised in past research into fit relationships. It has however, had mixed results in empirical studies. A number of these studies have tested more than one interpretation and concluded that bivariate fit was the least suitable (Chan, 1992; Raymond, Paré & Bergeron, 1995). For example, Raymond, et al. (1993) conducted an empirical study of 108 small and medium manufacturing firms using an instrument to measure IT sophistication. They used Drazin & Van de Ven's bivariate fit interpretation for investigating the technology–structure fit. Successful organisations were found to have a significantly closer relationship between IT sophistication and formal structural sophistication, and it was concluded that matching IT sophistication with an appropriately formalized and differentiated organisational structure would contribute positively to performance. However, a number of limitations with the bivariate interpretation were encountered, such as the existence of many

insignificant relationships between the many combinations of dimensions, and it was concluded that the systems model would have been more representative of the fit relationship in that context.

(3) *Systems*

In contrast to bivariate fit, the systems interpretation assumes that it is not valid to examine the effect of each interaction between dimensions independently (Child, 1977; Van de Ven & Ferry, 1980). The complex nature of each strategy construct means that there are many different components whose interactions dictate the resultant effect of alignment on performance. It may therefore be difficult to distinguish the effect of a single component out of context. Thus, some effects of alignment may not be apparent at the interaction level and information may be lost in considering each component independently (Miller, 1981). For this reason Venkatraman (1989b) considers that examining isolated components of strategy and performance (i.e. use of the bivariate interpretation) can be misleading.

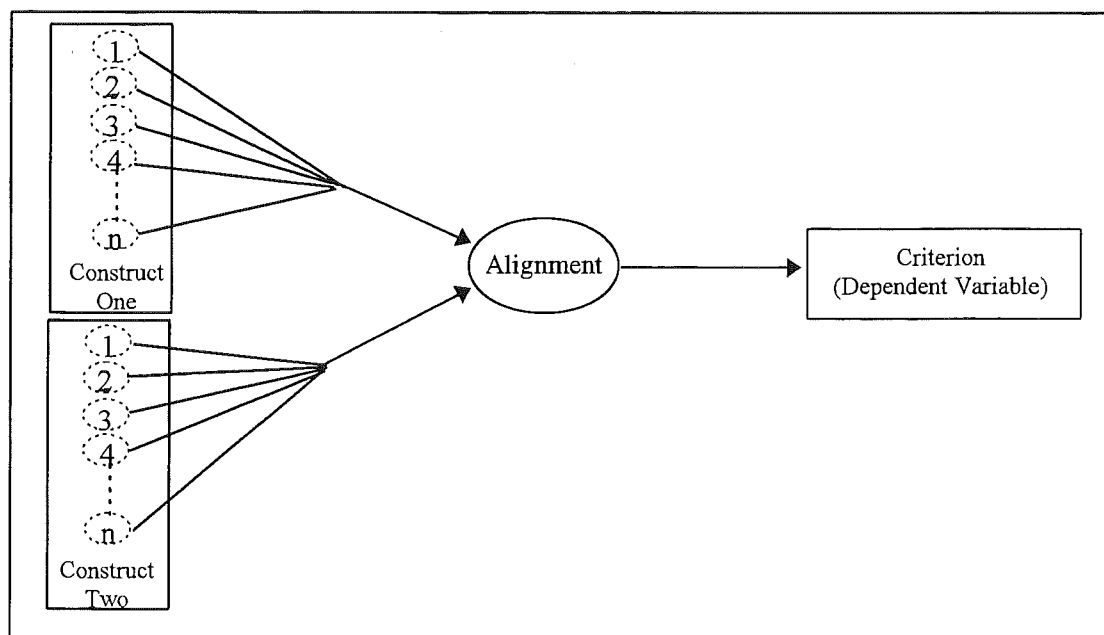


Figure V-4: Systems Interpretation of Fit (Drazin & Van de Ven, 1985)

Figure V-4 illustrates the relationship between business and IS strategy under the systems perspective. It can be seen that there is no direct consideration of the effect of an individual component pair on performance, rather the value of each construct as

whole is determined and then they are compared for their combined impact on performance.

The systems view assumes that each component contributes to the combined effect on performance and there may be many combinations of these components which will benefit the organisation to the same extent. Moreover, there is no restriction that only one combination of components can maximise this benefit, rather a number of such combinations may have an equivalent effect on performance.

In the context of this thesis, the systems perspective would not assume the independence of each dimension to be a valid assumption. Rather, this interpretation assumes that business strategy and IS strategy are higher-order constructs and each dimension contributes to the relevant construct and these can only be measured validly as a whole. An assessment of each complete construct would be necessary, with a subsequent evaluation of alignment from the results of each.

To date, multi-variate analysis has been used to examine patterns of consistency between the dimensions of each variable under examination, however as Van de Ven & Drazin (1985) have noted, analytic procedures for examining these multiple combinations are in the early stages. One of their final recommendations was that future research emphasised the development of the systems interpretation in order to provide an alternative when bivariate relationships were found to be insignificant. The systems view has found support from Chan (1992), Raymond, et al. (1993) and Drazin & Van de Ven (1985) each of whom recommended use of the systems interpretation in future research into IS strategic fit relationships.

C. Construct Validation

The second important issue with respect to developing measures for IS and business strategy is construct validation. While researchers have concentrated on the substantive relationships, they have tended to neglect the measurement issues. As Venkatraman (1989a) suggests:

This could be partly attributed to the fact that most researchers trade-off their efforts in favor of theoretical relationships among their constructs with an implicit belief in the adequacy of their measures (at 945).

Venkatraman goes on to prescribe a more stringent attitude towards construct validation in future research. This involves ensuring that the items measuring each of these constructs actually measure what they purport to measure. Venkatraman (1989b) identifies six alternative methods for validating the measures which purport to quantify the particular constructs. These alternatives are: *matching*; *moderation*; *mediation*; *gestalts*; *profile deviation*; and *covariation*.

Venkatraman argues that the conceptual model must be defined and the appropriate interpretation to be used in a study identified *before* choosing the method of data collection. This is because each alternative implies a different set of theoretical relationships and requires the use of a specific method of measurement, or testing scheme. Venkatraman claims that there has been a lack of consistent research results from past empirical studies which have used these perspectives to test the fit relationship between constructs. He attributes this to the fact that each of the perspectives and their testing schemes have been used interchangeably, which weakens the links between theory development and testing. Venkatraman therefore considers it necessary to provide an explicit link between the model discussed in theory and the method used in testing it (Venkatraman & Grant 1986; Emory & Cooper, 1991).

The six perspectives are differentiated in three ways:

1. The number of variables that are involved;
2. Whether the relationship is *criterion-specific*, i.e. the calculations involved require predictions about a criterion or dependent variable, often performance, or *criterion-free*, i.e. making no predictions regarding any dependent variable; and
3. Whether it is possible to be specific regarding the effect on that criterion (the degree of specificity possible). Generally, the less variables involved, the more specific it is possible to be regarding the impact of those variables on the criterion.

Each of these perspectives are depicted in Figure V-5. A brief outline of each perspective and the appropriate statistical tests follow. A number of the methods have been used by researchers since their initial development, and some of this recent research

is described to provide some insights into the suitability of these methods in certain environments.

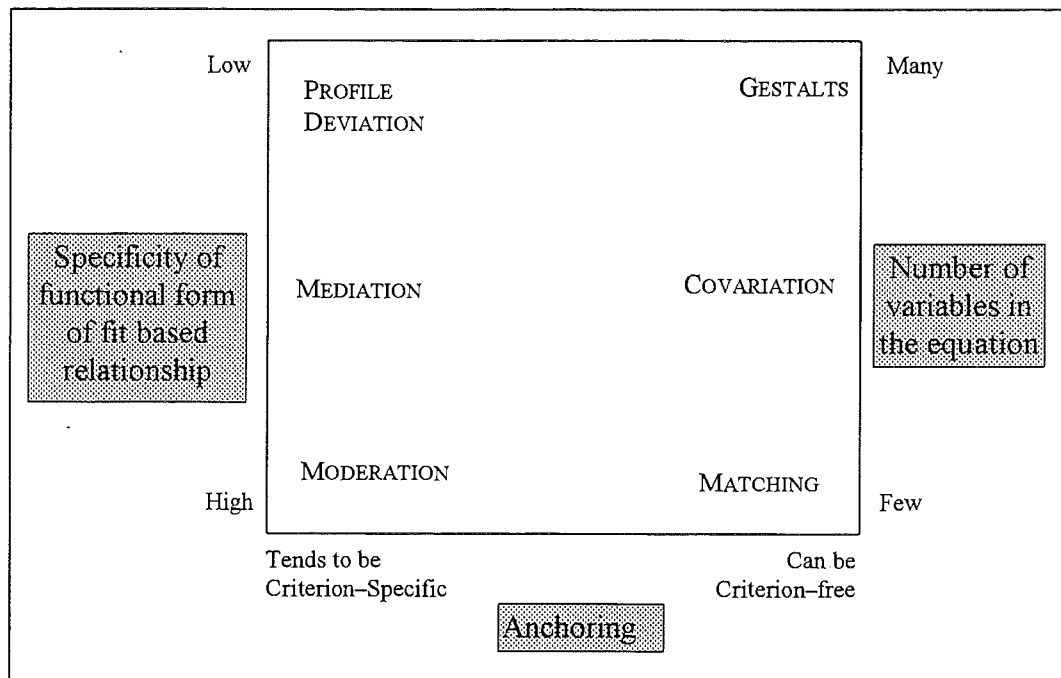


Figure V-5: Alternative Calculations of Fit

(1) Gestalts

The gestalts model measures fit according to the internal coherence between two or more variables such as IS strategy and business strategy (Miller, 1981). This is performed by comparing a number of firms with related strategies through grouping observations of a number of variables. Each set of variables found together in the same combination in a number of firms is termed a 'gestalt'. As the gestalts perspective is criterion-free and suitable for use with multiple variables, the model is much more general than others and therefore involves a lower level of precision with respect to determining the effect of individual variables on performance.

Statistical methods used to test this model include cluster analysis and Q-factor analysis. The gestalts model is currently only in its exploratory stages and the links between theory and data collection are not yet well developed. Nevertheless, some studies have employed this perspective to model the effect of fit on performance.

One of the earliest investigations into the gestalts perspective was conducted by Miller (1981). Miller related business strategy, environment and performance, looking at a number of past empirical studies using these variables. He argued that the bivariate view used in most of these studies was too common and restricted investigation to only two variables impacting on an organisation and its performance. From this literature and a review of testing methods, Miller concluded that relatively few gestalts were able to be identified from the research and were very different from one another, indicating that this perspective offered a valuable method for comparing the fit in a sample of organisations.

(2) Profile Deviation

The profile deviation perspective involves defining the ideal profile or levels for each variable involved and determining how well an organisation conforms to this profile. Thus, the ideal IS strategy for an actual business strategy would be developed and then individual firms would be assessed to determine how well they conform to these profiles. Pattern analysis is then used to determine the differences in performance between firms with different levels of congruence to the profile, and in theory, observed deviations should be negatively related to performance.

Studies using the profile deviation interpretation have been conducted by Venkatraman & Prescott (1990). They assert that this perspective is the model which best reflects the theoretical proposition that the coalignment between strategy and other elements affects performance. However, the validity of these studies has been questioned (Edwards, 1993). Additionally, the development of a profile and specification of an appropriate model profile is difficult and time consuming, and there currently exist few tests to measure the method.

Both the gestalts and profile deviation perspectives involve more than two variables. Consequently, the degree of specificity of the fit relationship that is possible is reduced. As the ultimate objective of this research is to allow specific predictions regarding the effects of the relationship on performance to be made, these perspectives are not considered suitable for this thesis. The lack of development of suitable testing methods for them also precludes their use in this thesis.

(3) Covariation

In the covariance model, fit is assumed to reflect a pattern of covariation between a set of related variables (Chan & Huff, 1993). Factor analysis is used to test the relationship by grouping attributes based on observations (as opposed to grouping observations based on attributes as in gestalts).

This perspective was used by Venkatraman (1989a) to validate his STROBE instrument which was designed to measure the business strategy of an organisation. He provided evidence that the criteria for unidimensionality and convergent, discriminant and predictive validity were satisfied by the instrument.

However, this perspective is not suitable for use in this thesis as the effect on performance is not specified and the perspective is criterion-free.

(4) Mediation

The mediation model assumes that there is an intervening variable between the dependent and independent variables which influences the degree of impact on the independent variable. Thus, in this case the IS strategy would intervene between the business strategy and IS effectiveness, meaning that the IS strategy would account for a significant proportion of the relationship between the other two variables (Chan & Huff, 1993). The better that the IS strategy supports the business strategy, the greater the positive impact on performance will be.

It is necessary to determine whether the model under consideration is to be a partial or a complete mediational model. Under a complete mediational model, the mediator would play a critical role in providing support for the independent variable, assuming that a low level of the mediator would prevent effective implementation of the independent variable. On the other hand, a partial model assumes that there are both direct and indirect effects and thus the mediator is not the single influence on the dependent variable as there is a direct impact of the independent variable on the dependent variable.

A path analytic framework is used to test for such a relationship. More than two variables may be incorporated into the model, however this reduces the level of precision

possible in quantifying the relationship as it becomes increasingly difficult to quantify the influence of the individual mediating variables. Although the perspective is criterion-specific and involves determining the effect that the mediation has on performance, the tests for those effects are particularly complicated.

Prescott, Kohli & Venkatraman (1986) adopted the mediation perspective using market share as the mediator between strategy and performance. They performed complex statistics to quantify the effects of fit and distinguished distinct direct effects from spurious effects in their analysis.

Thompson & Iacovou (1993) used also this perspective to test the impact of IT utilisation on the performance of small businesses. They hypothesised that the relationship would be a complete mediational model with the level of alignment between IT utilization and the business CSFs, i.e. IT utilization would have no direct effects. However, they found that the relationship was only a partial mediational model, indicating that there were some direct effects.

The mediation perspective would be interesting and informative for the current study, however as mentioned above, the testing scheme involves particularly difficult statistical tests. As discussed in Chapter IV, a case study investigation has been determined to be the most appropriate approach for the initial stages of this research, which precludes the use of statistical techniques which require large numbers of data points. In future research however, this perspective would be interesting to test in the current context in addition to the perspectives chosen for this stage.

(5) Matching

The matching perspective involves measuring the degree of equivalence between two measures to determine whether they correspond. Alignment is the level of similarity between the measures, and a high correspondence is purported to result in improved performance. The deviation score model is most commonly used to represent the matching perspective and is based on difference scores between the two measures. The less difference between them, the better fit that is said to exist. This perspective is technically criterion-free, but an examination of dependent variables is often

incorporated into studies. This is shown in Figure V-6 which hypothesises that there is an impact of performance from both the business strategy (STROBE) and IS alignment, calculated as the difference between STROBE and STROIS.

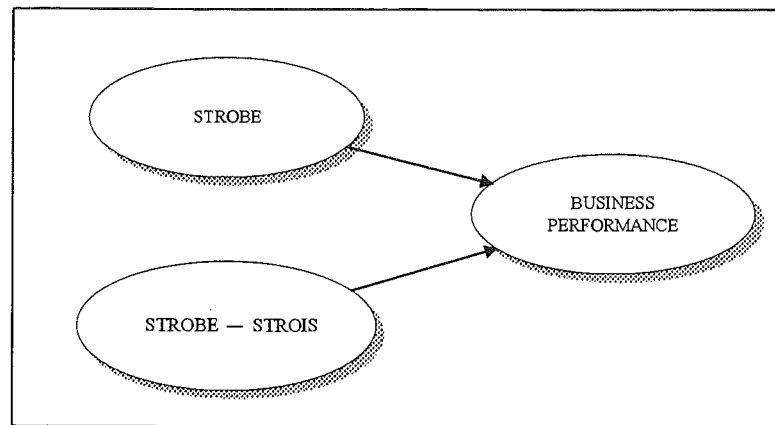


Figure V-6: Fit Calculated as Matching

A bivariate matching model would involve considering each dimension of business strategy with its corresponding dimension of IS strategy independently and determining the level of alignment and its impact on performance. On the other hand a systems matching model would involve determining a weighted index of alignment involving all dimensions for each of business strategy and IS strategy, and determining the effect on performance from the single measure.

The methods used to investigate alignment under a matching perspective include deviation score analysis, residual analysis or analysis of variance (ANOVA). Each of these has limitations that need to be addressed before employing the method in a study, particularly due to the use of difference scores.

Chakravarthy (1987) used the matching perspective to test his proposition that fit existed when the planning systems of an organisation matched the required ideal system for that organisation. The proposition was tested by examining performance at different levels of this fit and it was concluded that there was no impact on performance from aligning strategic planning systems to their context.

(6) Moderation

The moderation perspective consists of a criterion variable, a moderator variable and a predictor variable. The perspective assumes that the fit between the predictor and the moderator is the primary determinant of the criterion or dependent variable. The impact of the moderator variable is not the same across all possible values of the dependent variable, and this difference affects the criterion variable. Interactions are symmetrical therefore either can serve as the catalyst for the other, depending on the theoretical arguments (Hofacker, 1992).

One aspect of this theory is depicted in Figure V-7 where the alignment is calculated as the interaction between the business strategy (STROBE) and IS strategy (STROIS). In this example, the IS strategy (moderator) will have a different impact on a high value for the business strategy (predictor) than a low value. Although it is not shown in the diagram, the same effect is assumed to occur between IS strategy and IS effectiveness. In that case, the business strategy would be the moderator, affecting the impact of the IS strategy (predictor) on IS effectiveness (dependent criterion). Thus the interaction can be tested for either its impact on performance or its impact on IS effectiveness.

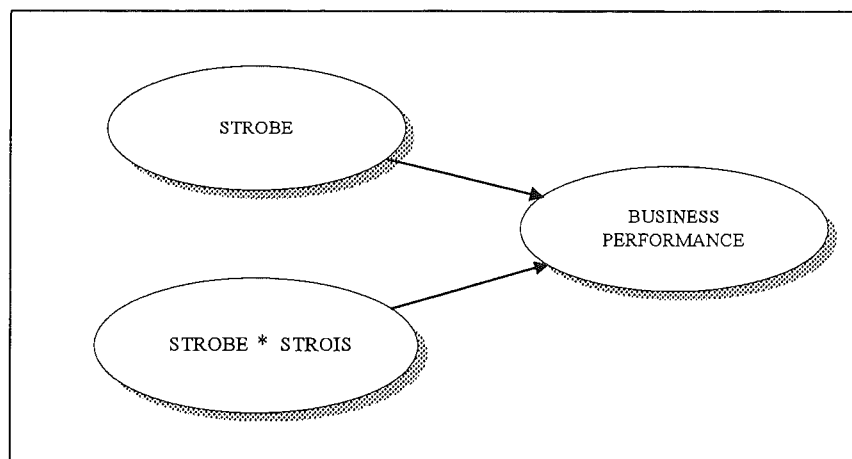


Figure V-7: Fit Calculated as Moderation

Fit is again the correspondence between two constructs, however it is measured as interaction by the product terms of the two variables. Unlike matching, the equivalence or parallel between the measures is not as important, as the greater the value of the moderator, the higher the effect of the predictor on the criterion should be.

A bivariate moderation model involves evaluating the product terms for each dimension independently and testing the effect of each on performance. The bivariate model assumes that it is valid to compare the effect of a single aspect of strategy with performance. The systems moderation model however, assumes that strategy is a complex multi-dimensional construct and involves determining a single weighted index from the product terms of all dimensions and comparing the results against performance.

Methods used to test the moderation model include subgroup analysis for testing the strength of the relationship, or moderated regression analysis for testing the form of the relationship.

Prescott (1986) conducted a study investigating the environment as a moderator of the relationship between the business strategy and performance. He used data from 1,638 business units in the PIMS database and collected data on the strategy, environment and performance of each of those business units. A number of strategy variables were chosen to measure parts of the strategy in the business unit (Hambrick, 1980), and the business unit was classified into one of eight environmental categories. Prescott found evidence that environment did act as a moderator in the strength of the impact of business strategy on performance, but not the form of that relationship.

Fiedler, Grover & Teng (1995) tested whether the relationship between corporate strategy and business process re-engineering (BPR) was moderated by the level of IS-Business strategy integration. They found that the higher the integration between IS strategy and business strategy, the stronger the relationship between the BPR efforts and the competitive strategy.

With respect to IS strategic alignment, the moderation perspective has been favoured by both Thompson & Iacovou (1993) and Chan (1992) for conceptualizing the relationship between IS strategy and business strategy.

D. Discussion

The matching and moderation perspectives have been used by a number of researchers, whereas other perspectives are still in their exploratory stages and require further

development. More than one perspective may be suitable for representing any particular construct, but the characteristics of the constructs involved and the intended method of data collection will influence the ultimate choice in any particular study. Having excluded a number of the other alternatives, some of the prior findings using these two better developed perspectives gives further insight into the applicability of each.

A number of researchers have stated that triangulation in this type of research is preferable wherever possible. Van de Ven & Drazin (1985) conclude: '*Studies should be designed to permit comparative evaluation of as many forms of fit as possible*' (at 358). In that case, more than one alternative is chosen and both would be tested with the statistical techniques appropriate for that technique, in order to determine which is best representative of the relationship of fit under investigation.

Chan adopted this view in her investigation into strategic alignment. A number of combinations from both Drazin & Van de Ven's models of fit and Venkatraman's alternatives were investigated in her study using the data from the two individual strategy instruments. The findings showed that HIGHSTROBE*HIGHSTROIS values were associated with peak performance, whereas the LOWSTROBE*LOWSTROIS had a significantly different impact on performance. This result supported the moderation model, as under the matching model it would be expected that these two values would have equivalent effects on performance because there would be a good match between the business and IS strategies.

In addition, it was found that the systems model provided more useful information than the bivariate model. Chan concluded that systems combined with moderation provided the greatest explanation and more accurately predicted the data.

The bivariate model involved many different comparisons of each lower-order construct which provided many weak or insignificant relationships. A number of significant relationships were detected between the individual constructs. However as already described, the bivariate perspective has a number of limitations and therefore definitive conclusions are unable to be made regarding these relationships. In contrast, the systems model integrates all of the values and provides an overall view of the effect of the higher-order multidimensional constructs that were being measured (i.e. business

strategy, IS strategy, business performance, IS effectiveness). The complexity of the constructs under investigation appeared to require an integrated method of measuring the impact of all components as a single effect, as opposed to breaking them down into individual relationships.

Both the matching and moderational approaches are suitable for use in conjunction with the bivariate perspective, and while it has been stated that only the mediational model is suitable for extending to the larger systems outlook (Venkatraman, 1989b), moderation and matching are both able to be incorporated in a systems view on the condition that there are more than two variables involved (Chan & Huff, 1993). As outlined above, Chan (1992) has done so and tested matching and moderation with both the bivariate and systems perspectives, and found that with respect to strategic alignment, the moderation perspective is best supported by a systems interpretation. Her research concluded that the systems/moderation interpretation was best representative of the relationship of fit between business and IS strategy, however plans to test each of the remaining combinations were mentioned.

In another study investigating the differences between matching and moderation, Hoffman, Cullen, Carter & Hofacker (1992) tested both of these perspectives in a model investigating the effect of the structure–technology fit on performance. They found the moderation model to be the least ambiguous and most widely applicable. While both matching and moderation provided results in the same direction, only moderation provided a significant result. They concluded that the matching perspective using deviation scores lacked the power to detect the impact of fit, due to the specificity of the hypotheses that had been tested. This empirically confirmed the conclusions of Drazin & Van de Ven (1985) and Venkatraman (1989b) that the results from these two methods are not interchangeable, and are not consistent across different testing schemes. This implies that some fit relationships are not suited to one or the other perspective. Hoffman et al. (1992) also reiterated Venkatraman's emphasis on the need to use and interpret these tests properly.

An example of the possible utility of triangulation is found in a study by Chakravarthy (1987) in which he uses the matching perspective but failed to find any performance impacts from the fit relationship. Although there were no performance effects found

under that perspective, another perspective may have given different results, given that matching often fails to provide significant results at the bivariate level.

Thus matching has generally been found to be inadequate and simplistic, particularly where moderation has also been tested as a comparison (Edwards, 1994; Chan, 1992; Venkatraman, 1989a; Hoffman, et al., 1992). Moreover, moderation has substantial support, especially where a systems interpretation has been taken at the same time (Raymond, et al., 1993; Chan, 1992). Venkatraman (1989b) identified matching and moderation as the two methods best suited to models containing a fit equation with two variables. He further concluded that of the two, where performance is determined jointly by the interaction of both the contributing variables, moderation is a better measure of fit than matching.

Each of the models provide a way of determining the impact that the factors are likely to have on performance, however they have limitations in that they have been devised for a certain sample, and the instruments need to be tested on different types of firms in order to be considered extendible. It is the objective of this research to provide a method for evaluating strategic alignment in small firms which tests and extends the applicability of prior work.

E. Conclusions

Evidence suggests that strategic alignment is not a simple relationship suited to using the matching model. It appears that there is greater impact resulting from congruence between more strategic values of IS and business strategy than congruence between low values, which confirms the intuitive but largely unproven opinions that a higher degree of strategic alignment will have a higher impact on business performance.

This supports the moderation perspective, with a systems view as the favoured approach for calculating alignment in this study. This combination has been tested in the context of strategic alignment before, and also has the advantage of being the most developed model of fit. Building on prior research provides some comparability with past findings which is also important in developing construct measures (Venkatraman & Grant, 1986; more generally Churchill, 1979).

In addition, a number of researchers have claimed that the systems interpretation is a better way to represent the effects of complex constructs such as strategy. However, this same evidence seems to suggest that the study would benefit from attempting to measure the alignment relationship in more than one way. This would be particularly useful in this study particularly as a large proportion of the evidence has stemmed from studies using large firms and thus the applicability of the above conclusions to small firms is less conclusive. This is further supported by Aldrich (1979) who claims that the nature of fit may be dependent on size and maturity of the organisation or the rate of change experienced by organisations.

Thus, after evaluating theory and past research relevant to each approach, a comparison between moderation and matching was selected as the most informative for this research. These perspectives will each be compared in conjunction with both the bivariate and systems approach, however the statistical nature of the tests for bivariate versus systems and the small quantity of data to be collected at this stage of the research means they cannot be compared in this thesis.

The next chapter discusses the instruments to be used in data collection. The method of assessing alignment provides the guide-lines for the instruments to be developed, and as the model of fit has been chosen, it is possible to make recommendations regarding the suitability of instruments for their use in small firms.

Chapter VI. INSTRUMENT ASSESSMENT

A. Introduction

After determining the most appropriate models for testing strategic alignment in small firms, the next step in developing measures for IS alignment involves selecting the most appropriate instruments for measuring the constructs. Chan's method for assessing alignment was found to be a suitable starting point for this study, and this chapter looks at the instruments used in her model in the context of small firms.

As Chan's model and instruments had been validated in a different environment, it was necessary to actively determine whether each part of the chosen model was suitable for use in small firms. Each of the four instruments had been developed along Churchill's (1979) principles for developing construct measures, providing a sound basis for adapting them for small firms.

The first section describes how the constructs of business strategy, IS strategy, IS effectiveness and performance are operationalised. The next sections deal with each instrument individually, providing the background literature and illustrating any concerns regarding their application in small firms. Finally, conclusions regarding the instruments are made, and a summary of the final model for this thesis is presented.

B. The Instruments and Constructs

Each construct to be operationalised has been modelled with a number of dimensions. A dimension represents a critical aspect of the second-order construct; for example, profitability has been specified as a dimension of performance and aggressiveness has been specified as a dimension of both business strategy and IS strategy. The dimensionality of a construct can be derived *a priori* by developing measures of dimensions from relevant literature, or *a posteriori* by uncovering 'dormant' dimensions through statistical data analysis (Venkatraman, 1989a).

In this research, alignment is specified as a second-order construct with the first-order factors representing the dimensions to be coaligned, i.e. dimensions of business strategy and corresponding dimensions of IS strategy. The alignment between these dimensions is an unobservable theoretical construct existing at a higher plane than the individual functional dimensions. This means that the higher-order construct has no directly observable indicators so its content is derived from operationalising first-order factors that are able to be observed (Chan, 1992; Venkatraman, 1989a).

Each dimension in turn is represented by a number of items, providing multi-item measures for each of the higher-order constructs. There is significant support for multi-item measures being superior to single item measures, as this enhances the reliability of those measures (Nunnally, 1978). In particular, measures which are sums or averages tend to be more reliable than single item measures (Prescott, 1986).

A review of relevant literature from the disciplines of business strategy, small firms and construct measurement follows, describing their prior applications and also illustrates some areas that needed to be addressed for the instruments to be effective in small firms.

1. An Instrument to Measure Business Strategy (STROBE)

Venkatraman's (1989a) STROBE instrument originally consisted of eight dimensions which were considered to conceptualise business or competitive strategy: *Aggressiveness*; *Analysis*; *Defensiveness*; *Futurity*; *Proactiveness*; *Innovativeness*; *Riskiness*; and *Uniqueness*. These were developed *a priori* from a search of the relevant literature, and in particular, correspond to dimensions used in research by Miles & Cameron (1982), Miller & Friesen (1984) and Grant & King (1982). However, during the research, Uniqueness was eliminated and Defensiveness was split into Internal and External Defensiveness. Twenty-nine items were used as indicators for these eight dimensions and were found to achieve appropriate levels of reliability, unidimensionality, convergent validity, discriminant validity, and also provided tentative support for predictive validity (with respect to performance as the criterion). However, it was

acknowledged that a single study did not provide ‘valid measures’ and further work to refine the instrument and dimensions was necessary to prove its success.

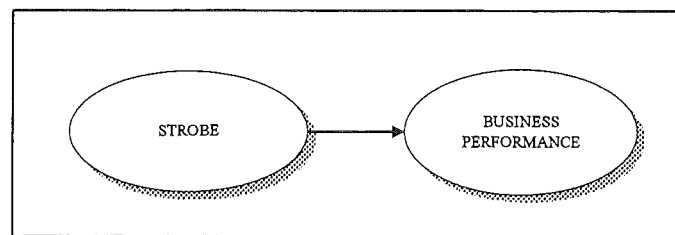


Figure VI-1: Venkatraman's Model

Chan adopted the same dimensions from Venkatraman's final model in her research into strategic alignment but altered and extended the items used to measure each of those dimensions. Chan conducted tests *a posteriori* in order to confirm the dimensionality of the instruments used. The results from her study showed items from the same dimension largely grouping together, but also found a single Defensiveness factor emerging as Venkatraman had originally theorised, encompassing items from both Internal and External Defensiveness.

Chan's final model however, retained the same eight dimensions as the original. This final model of eight dimensions (*Aggressiveness; Analysis; Internal Defensiveness; External Defensiveness; Futurity; Proactiveness; Innovativeness; Riskiness*) contained each of the items that had loaded highly on their relevant dimension.

Lefebvre, Lefebvre & Harvey (1993) also tested Venkatraman's STROBE instrument on 86 small⁵ firms in Canada. They included the dimensions of *Aggressiveness; Analysis; Defensiveness; Futurity; Proactiveness; and Riskiness*, each of which were tested for discriminant validity and found to be unique and distinct from each other. The Riskiness and Defensiveness dimensions caused some concern, however they were still well within the acceptable limits of construct reliability. They concluded that STROBE appeared to be most appropriate for the manufacturing sector, and considered that it would be most beneficial for further studies to retain the same dimensions and remove any that were found to be inadequate *a posteriori*.

⁵ Defined as less than 200 employees.

This research indicates that there has been support for Venkatraman's instrument since its development, and it has also been shown to have some support in the context of small firms.

2. An Instrument to Measure IS Strategy (STROIS)

Chan's STROIS instrument assessed realized IS strategy by determining whether IT in the business enabled that firm to be aggressive, analytical, future-oriented, proactive, risk-averse, innovative and internally and externally defensive.

The instrument thus consisted of the same dimensions as STROBE, with each item being developed as a parallel to the item in that position in STROBE. This was designed to allow straight-forward calculations of fit by assessing the similarity between the two responses.

In the development of Chan's final model for STROBE and STROIS, items from each were taken into consideration in order to maintain that parallelism. Therefore if one item caused problems and was deleted, the partner was also eliminated from the corresponding instrument. Chan's final models and more detailed changes can be found in Appendix 2.

No other research has tested this instrument. However the results from Chan's research provided evidence that the instrument performed reliably, similar to the STROBE instrument used in her model. The refinements made during the development of the instruments increased the results of the reliability tests to levels above the benchmark set by Nunnally (1978) for instruments used in exploratory research.

Chan found that STROIS could have been modelled with fewer than eight dimensions. However, as the aim was to measure strategic alignment, the eight dimension structure was retained for comparability.

3. Measuring Strategic Alignment

Chan (1992) modelled strategic alignment as both a multi-dimensional and uni-dimensional construct and tested each in her research. It was found that there was no significant difference in the variance explained by either method. This indicated that the results from modelling it as a complex construct, like business strategy for example, provided the same results and in either case, it was found that the predictive ability of IS strategic fit was significantly greater than business strategy or IS strategy individually. Thus it was concluded that the simpler approach was adequate and in this thesis, strategic alignment is also modelled as a uni-dimensional construct.

Calculating Strategic Alignment

(1) Matching

Under a matching approach, the difference between the scores of two items in STROBE and STROIS (termed the 'difference score') is used to assess the degree of mis-match between that dimension in the two instruments. Thus, in calculating the alignment between STROBE and STROIS, the larger the difference, the worse two scores are matched, with a maximum mis-match between any two items of $(5 - 1) = 4$, and a perfect match having a difference score of 0.

A number of alternative ways of calculating the score have been used in the past, including absolute differences, sum of differences and sum of squared differences. Edwards (1993) illustrates the problems in the use of various difference scores. He recommends a number of ways of avoiding these problems including the use of multiple items, normative measures and making comparisons by dimension rather than aggregating results into a single profile similarity index. Chan tested numerous ways of calculating difference scores and, following Edwards (1993) recommendations, found the sum of squared differences consistently exhibited reduced collinearity between IS strategic alignment and STROIS.

In this thesis, matching is approached by calculating the mean squared error of each dimension. This involves taking the difference between STROBE and STROIS at the

item level and then squaring this difference. The squared difference was used in order to eliminate the directionality from having $(5 - 1)$ as opposed to $(1 - 5)$. The results are then summed within the dimension and divided by the number of items to produce the mean squared difference for that dimension. This procedure allows for a differing number of questions per dimension and makes the maximum difference for any dimension 16.⁶

For ease of comprehension for practitioners when the results were presented in the feedback interviews, the square root of this number was then taken to produce a final result out of 4, maintaining the difference of the original numbers. As the maximum difference for any particular item is 4, this was considered easier to describe with 0 as a perfect match and 4 the worst match possible.

This approach resulted in one measure of alignment for each dimension, and the firms overall alignment can be described as a single, unidimensional index comprised of the eight different measures. These scores for each dimension would be used in determining the impact of alignment on performance.

For a systems interpretation it is necessary to weight each dimensions' averaged difference score according to that dimensions value in the STROBE instrument. Thus, if aggressiveness was assigned an average STROBE value of 4.5 whereas internal defensiveness was only given a 2.5, the aggressiveness dimension is apparently of higher strategic value to the organisation and theoretically this dimension's match (or otherwise) will have a greater impact on the performance of the organisation. After weighting, the values for the match of each dimension were then summed and averaged to produce an overall match between STROBE and STROIS for that organisation.

(2) Moderation

Under the moderation perspective, values are calculated using an interaction or multiplicative model. The values for STROBE and STROIS are multiplied to produce a maximum of $(5 * 5) = 25$ and a minimum of $(1 * 1) = 1$ for each item. For a dimension,

⁶ Maximum difference of $(5 - 1)$ or $(1 - 5) = 4^2 = 16$ in every question producing an average of 16.

the values are merely averaged to provide the mean value out of 25 for each dimension as a whole. The moderation approach assumes that the higher values have a higher impact on performance, unlike matching which would assign both of the prior calculations a value of 0, i.e. a perfect match, indicating that they have an equivalent impact on performance.

Again the system approach involves taking each dimension and weighting the moderated score by the value of STROBE. This provides a value out of 25 for the whole organisation.

4. An Instrument to Measure IS Effectiveness

The IS Effectiveness instrument was compiled by Chan, but consisted of prior methods of assessing IS effectiveness. The instrument used both user information satisfaction (UIS) measures developed by Baroudi & Orlikowski (1988) as well as measures assessing IS strategic contributions from Downs (1988). The final instrument consisted of three UIS dimensions (*Satisfaction with IS Staff and Services*, *Satisfaction with the Information Product* and *Satisfaction with End User Involvement and Knowledge*) and four Strategic Contribution dimensions (*IS Contribution to Operational Efficiency*, *IS Contribution to Management Effectiveness*, *IS Contribution to Establishment of Market Linkages* and *IS Contribution to Products and Services*). The instrument was found to perform satisfactorily in Chan's research, with items from the UIS research emerging as clearly separate from those measuring strategic contributions.

The literature suggests that IS effectiveness differs in small firms. Raymond (1992) states that small firms begin to use computers for a number of reasons, and although the ultimate aim is to increase effectiveness, the reasons for computer adoption are not always able to be justified from either an economic or strategic point of view. Thus effectiveness can not always be measured in financial terms. This lack of consideration of financial and strategic factors can cause difficulty for the organisation as the systems will not be meeting the information needs of the business and will therefore be under-utilised and have little impact on performance (Raymond, 1992).

In the initial stages of an organisation's life, the aim is to increase efficiency by reducing variables such as operating costs, whereas later as they develop and become more sophisticated, organisations aim to increase effectiveness by providing more relevant and useful information (Hayen, 1982). This indicates that assessing certain aspects of IS effectiveness may not be appropriate where the organisation is only at the stage of attempting to gain efficiency from their IS investments.

This evidence suggests that some additional items and perhaps dimensions need to be developed for testing IS effectiveness in small firms, however these were not investigated in detail as the focus of the study was on alignment. In later stages it will be necessary to develop and test this instrument further, however this was not considered necessary for the current stage of development.

5. An Instrument to Measure Performance

Venkatraman's research assessed the impact of the strategic orientation of a business on that organisation's performance. Performance was modelled as two dimensions: *Profitability* and *Market Growth*. Chan extended this view of performance to include non-financial measures. She added two further dimensions; *Product-service Innovation* and *Company Reputation*. Each dimension was modelled as a multi-item scale.

Chan's instrument measured responses to all questions via a 5-point Likert scale and relative to competitors' performance, i.e. 'Much Better than the Competition' through to 'Much Worse than the Competition'. This was to obtain an indication of where the organisation stood within its own market, as absolute values regarding net profits and return on investment would have little meaning without industry data.

Lefebvre, Lefebvre & Roy (1995) similarly recommend the measurement of performance relative to competitors in their study into small firms, as this gives an indication of whether members are satisfied with their organisation's performance. It was considered that respondents' own opinion of their performance was more important in this study, as no statistical analysis of the impact of alignment on performance would be conducted at this stage. Similarly, Thompson & Iacovou (1993) used two subjective

measures: 'Satisfaction with Sales' and 'Satisfaction with Profits' to allow business owner/managers to indicate the importance of these aspects to their business and goals.

Chan's addition of non-financial dimensions was appropriate for small firms, as these types of measures are considered important by small firms, often more so than actual financial data. Many small organisations' goals and objectives are in fact quite different than the traditional objective of maximising return on investment (Thompson & Iacovou, 1993). Thus, measures of performance needed to reflect the likely goals and objectives of the firms in the sample.

C. Conclusions

Having determined that most aspects of Chan's instruments appear suitable for adapting for use in small firms, it is appropriate to outline the entire model to be used in this thesis prior to commencing with adaption of the instruments and data collection.

This chapter has investigated the suitability of the STROBE and STROIS instruments in significantly more detail than the IS effectiveness and performance instruments. In this research it is assumed that the relationship between the business strategy and IS strategy, i.e. level of alignment, does impact IS effectiveness and performance. This assumption is necessary as the current stage of research is not aimed at determining whether or not the dependent variables are actually affected by the alignment between the two, rather it aims to determine the best way to measure the relationship between them.

The model used in this thesis is depicted in Figure VI-2. The calculations used to determine the level of strategic alignment are shown by the broken arrows from STROBE and STROIS to IS strategic alignment. This indicates that the data given in both instruments is used to determine the value of the strategic alignment in that firm.⁷

⁷ Although the moderation approach has been selected as the most suitable for modeling strategic alignment in small firms, as discussed in Chapter V, the data will be used to test both moderation and matching, with both bivariate and systems perspectives.

According to the model, the business strategy impacts performance directly but there is also an impact via the strategic alignment. The same applies for the impact of the IS strategy on IS effectiveness. Under moderation, the impact of the business strategy on performance is therefore said to be *moderated* by the IS strategy, and the impact of the IS strategy on IS effectiveness would be *moderated* by the business strategy (see Figure VI-2). The full set of relationships between each higher-order construct is shown in the figure, however this thesis involves modelling the dotted lines only.

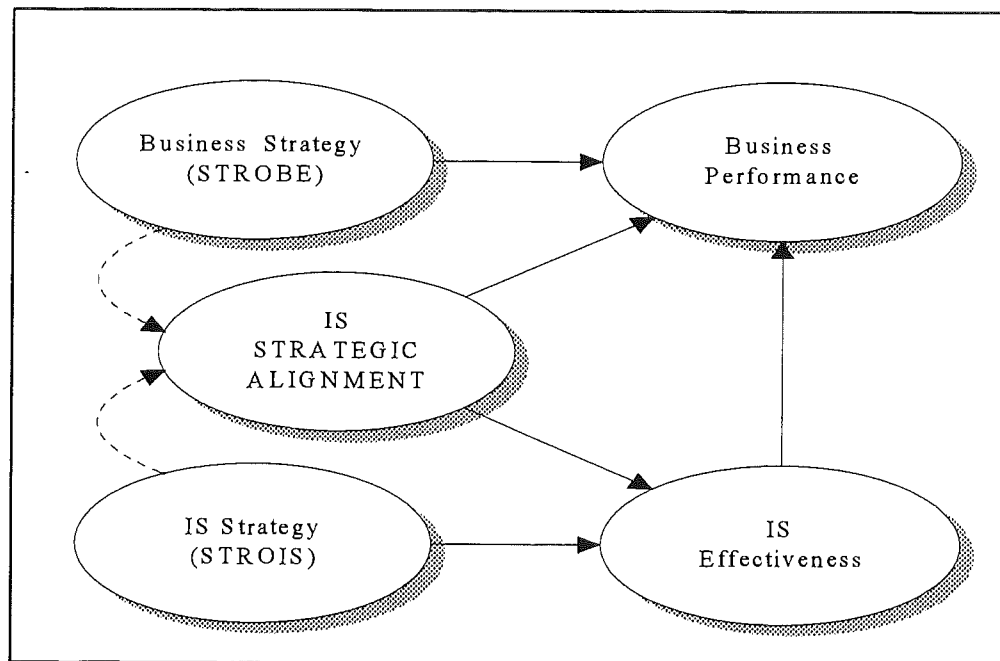


Figure VI-2: The Conceptual Model (adapted from Chan, 1992).

The last two chapters have used the past literature to determine how alignment will be measured in this thesis. The next chapter describes the process of data collection and how these measurements were carried out in practice.

Chapter VII. CASE METHOD

A. Introduction

This chapter describes the empirical research method employed within this thesis. The prior chapters concerned Churchill's preliminary steps of defining the domain of strategy and generating dimensions and items (Steps 1 and 2). Thus, having decided how alignment is to be assessed and the instruments to be adapted to small firms, this chapter completes Step 2 involving the adaption of the items in the instruments and also describes how data was collected to test the instruments empirically (Steps 3 and 5). Checks that have been built into the research design in order to ensure the maximum validity and reliability of the information received are also described in the validity section.

The first section outlines the stages in the instrument development process, describing the specific changes that were made to Chan's original instruments. The second section details the method of sample selection used to identify the sites for the multiple case studies. The execution of the cases themselves, including instrument administration and the interviews is described, along with consideration of the sources of possible bias. The process of data analysis is described using findings from the instruments, respondents and researchers. Finally the concerns with validity and reliability of the research design and the instruments are addressed.

B. Case Study Execution

1. Instrument Development

It was necessary to make some alterations to Chan's instruments before they were considered appropriate for use within this study. Beginning with the full set of items from Chan's (1992) instruments, the questionnaires progressed through a number of iterations, both before the first set of case studies and again before the second set. This section details the changes made to each of the instruments in the preliminary development, before they were used in the first set of case studies.

a) Initial Preparation

An initial concern was expressed at the combined length of Chan's four questionnaires. Each was stated to take between 30 to 45 minutes when completed properly (Chan, 1992). Although there is inconclusive evidence that questionnaire length affects response rate (Dillman, 1978), two criteria for planning for qualitative research include efficiency, being whether data is collected with the least cost in time and effort for participants (Zelditch, 1962), and ethics, being whether the procedures cause the minimum disruption to participants' normal activities (Marshall & Rossman, 1989). Small firms often have a very small management team. It was suspected that it would be difficult to find four suitable respondents and therefore it was considered necessary to combine some questionnaires. However, this resulted in questionnaires which would require in excess of an hour for an owner/manager to complete which was again considered excessive, particularly as interviews were also planned. Thus, the questionnaires were required to be shortened.

Chan identified which items from her initial model were found to be significant in the instruments. It was decided to include only those items in her final model as the starting set of items for this research. Although there was no guarantee that the same items would prove equally significant in the small firm environment, this process was considered to involve less risk than making random selections to reduce the length of each instrument.

Other minor changes were made to the instruments. The term 'business unit' was replaced by terms more suitable for small firms, such as 'organisation' or 'business'. Additionally, headings were changed, adequate spacing was provided, and leader dots were included to ensure the respondent answered on the correct row, in accordance with the principles of questionnaire design and layout as outlined in Department of Statistics (1992).

Covering letters were attached to each questionnaire to explain the nature of the study, based on Chan (1992). The final questionnaires including the covering letter are provided in Appendix 3.

The development of the items contained in each instrument is detailed individually below with examples of changes made. All items and the subsequent wording changes and eliminations are detailed in Appendix 2.

b) STROBE & STROIS Preliminary Development

Chan designed the instruments with the aim of determining the effect of alignment on performance and IS effectiveness. In contrast, this research concentrates on the alignment and thus primary focus was placed on retaining appropriate aspects of the instruments (i.e. the business and IS strategy sections in STROBE and STROIS). Another focus was on ensuring that as far as possible items were applicable to any type of organisation. This meant that terms specific to manufacturing firms for example, were changed to more general phrases.

With the STROBE and STROIS being based on parallel questions, both instruments needed to be considered together. If one item appeared unsuitable for the purposes of this research, the suitability of the question in the other instrument often influenced the decision to retain both for the first round of data collection.

The majority of items in STROBE were retained until evidence from the first round of data collection indicated that their retention was considered inappropriate. Some example changes from STROBE are shown in Table VII-1:

Original Item	Alteration
We regularly are on the look-out for business units to acquire	We regularly are on the look-out for organisations to acquire
We generally expand capacity, ahead of our competitors	We generally try to be the first to move in our markets (e.g. expand capacity, adopt innovations), ahead of our competitors
Innovative and imaginative solutions for most business problems	We attempt to provide innovative and imaginative solutions for most business problems

Table VII-1: Example STROBE Preliminary Alterations

A small number of items appeared to be inappropriate for small firms, but it was decided that most of these would be retained for at least the first round of data collection. If they caused any further concern they would be eliminated at the review after the first round.

Similarly, a small number of changes were made to STROIS items, whilst the majority were left for the first round (Table VII–2):

Original Item	Alteration
The systems used in the business unit assist in the identification of new business opportunities	The systems used in the organisation assist in the identification of new business opportunities
Systems for strategic business planning	The organisation uses systems for strategic business planning

Table VII–2: Example STROIS Preliminary Alterations

c) IS Effectiveness Preliminary Development

The instrument to measure IS effectiveness in this thesis was significantly shorter than the instrument used by Chan (1992) as, unlike her research, the primary focus of this research was on the evaluation of the measurement of strategic alignment rather than the impact of alignment on effectiveness and performance. Similar to the STROBE and STROIS instruments, only items which had proved significant in Chan's study were included in the first round of this research.

It was decided not to include the dimensions assessing UIS, as these had been of limited success in Chan's study. In general UIS has been found to be of limited success in determining the effectiveness of information systems because the end user holds only one view of that system. As well as considering end-users, a system must also fulfil the purposes for which it was implemented and support the chosen priorities of that organisation, such as adding value, profitability or innovative capability (Kay, 1993).

Chan concluded that in today's environment, where information systems play an important role in attaining competitive advantage, UIS measures may not provide an adequate measure of information systems success (Chan, Huff & Morrison, 1993). While exclusion of the UIS measures may not be satisfactory in later studies which aim to quantify the impact of information systems on all aspects of IS effectiveness, the inclusion of measures assessing the strategic contribution of information systems was considered adequate for this study.

The final instrument consisted of four dimensions which assessed strategic contribution. No major alterations to the items themselves were deemed to be required for the initial round of data collection.

d) Performance Preliminary Development

The instrument used in this research only included a minimal section to assess each of the performance dimensions for equivalent reasons that the IS effectiveness instrument was restricted. The items were mainly only altered where wording was inappropriate for small firms, such as use of the term 'shareholder value' or 'business unit'. Table VII-3 gives an example of these changes.

In addition, perceptual measures are often preferred in small firms, as owners tend to be reluctant to disclose factual financial data (Sapienz, Smith & Gannon, 1988; Thompson & Iacovou, 1993). Consequently, the specific questions regarding profits were eliminated, and the remainder involved the choice of a revenue bracket (e.g. \$1-10M) rather than specification of actual dollar values.

Original Item	Alteration
The business unit's revenues in the 1995 fiscal year	The firm's revenues in the 1995 fiscal year

Table VII-3: Example Performance Preliminary Alterations

2. Sample Selection

Benbasat, Goldstein & Mead (1987) stress the necessity of choosing sites carefully in case studies in order to provide the opportunity to extend and revise the initial propositions of the study. *Theoretical* sampling is the term given to samples which are chosen according to the type of firms desired in a study, or theoretical, as opposed to statistical, concerns (Eisenhardt, 1989). This is a common feature of case research, as indicated by Gable (1994):

[O]ne should study firms across a spectrum – the center and extremes; the least and most successful as well as some typical firms. . . (at 119).

The choice of extremes allows for extension of the theory being investigated, while the choice of similar firms provides for replication of results. In this research the entire

sample was not selected at the beginning of the study; rather sampling was part of an ongoing search for varying levels of alignment. Variability was viewed as being desirable as it was necessary to be able to demonstrate how the instruments performed at different levels of strategic focus, information systems sophistication and alignment.

Unlike quantitative research, the sample used in qualitative research does not have to be random or selected according to rules of probability. Use of a non-probabilistic method of sampling means that it is not possible to calculate sampling error or to make generalisations about the population. However, this thesis does not attempt to make such generalisations, nor to determine the likelihood of a small firm having a certain level of IS strategic alignment (e.g. via statistical methods), and so it was not necessary to ensure random selection of organisations.

This thesis involved two separate sets of case visits as the data collection for steps 3 and 5 of Churchill's process of construct validation. Each set consisted of two firms from each of two industries, resulting in eight case studies from a total of four different industries. This number fell within Eisenhardt's (1989) recommended range of 4 – 10 sites for a multiple case design. In order to provide as wide an assessment of the applicability of the instruments as possible, four specific industries were chosen (one from each of the retail, service, manufacturing and professional sectors). The firms within each industry provided a literal replication, with different industries representing theoretical replications (Yin, 1989).

Once the initial case studies of firms within each industry were underway, it was necessary to identify a suitable second member of that industry. Members of the first case site were asked to identify others with the required characteristics. This is called a *snowball sample* (Emory & Cooper, 1991). Determining participants based on recommendations also meant that it was possible to get an initial indication of their suitability, in order to obtain as wide a sample as possible with respect to experience with information systems and also alignment.

Firms had to be profit-oriented and sell a product or service. Information systems had to be used in the business for purposes other than purely accounting functions and

preferably enabling the firm to enhance their core business, although a range of sophistication of information systems was sought.

In many overseas studies, an commonly adopted definition of small firms is one which has an upper limit of 200 employees (Stanworth, Westrip, Watkins & Lewis, 1982). However, this was considered too large for New Zealand firms. This thesis therefore imposed an upper limit of 100 employees, as in Bollard (1989) and Boyle & Desai (1991).

3. Data Collection via Case Visits

a) Initial Checking

A copy of the first version of the instruments were given to a number of academics at the university, and also a practitioner, an accountant who dealt with a large proportion of small firms, for perusal before commencing with the cases. Their comments were incorporated before the initial round of case studies.

b) First and Second Round Data Collection

The data collection involved a similar approach to that used by Weill (1990) and Horne, Lloyd, Pay & Roe (1992). Interviews were conducted with one member of the organisation and questionnaires were left to be filled out by the appropriate people. On return to the organisation, a second person was interviewed, and the instruments collected. Two interviewers were present at every first interview and also at most second and third interviews, and every interview was taped. Additional information was obtained by examining written material where permitted. A case study protocol was used as a guide for data collection in the interviews in order to ensure that parallel information was collected at different sites to facilitate later analysis purposes (Zinatelli & Cavaye, 1992).

The third and final interview involved presenting a report of the findings, but also provided a chance to probe and test the relevance of the questionnaire structure. The

results were discussed with the respondents to see whether they intuitively agreed with the findings as another validity check (Scott, 1995).

c) Assessing the Instrument

In order to assess the validity of the measurements of each instrument in each firm, it was necessary to be able to make independent assessments of the level of alignment in each firm. Thus, an alternative method for evaluating the level of alignment in a firm was needed to compare with the values provided by the instruments.

Interviews provide a useful way of getting large amounts of data quickly and also allow immediate follow-up of questions. Additionally, interviewing more than one person at each organisation provides for validity checks and triangulation between participants (Marshall & Rossman, 1989) which in turn increases reliability (Benbasat, et al., 1987). These benefits made interviews an appropriate method of obtaining data to corroborate the findings of the instruments.

However, the use of interviews also requires care in a number of areas. Subsequent attempts at replicating interview findings can be difficult, particularly with such dynamic constructs as strategy and strategic alignment which are unlikely to occur in a consistent manner at the same site at different times. Bias can arise from a number of sources including the interviewee, the interviewer, and the questions asked. Thus, it is necessary to be able to depend on both the honesty of those providing the data and the ability of the researchers to control bias (Marshall & Rossman, 1989).

A series of three semi-structured face-to-face interviews were used to collect information regarding the business, the strategy and information systems used in that organisation. Questions were also framed to assess the dimensions of business strategy and IS strategy without referring to the dimensions themselves, as it was considered that terms such as 'aggressiveness' and 'proactiveness' may not be clearly understood by managers. This also avoided the problem of respondents remembering their specific responses when the questionnaires were filled out at a later time.

Separate interviews were conducted with at least two members of each organisation. One interview focused on the business strategy and the other on information systems in the business and the IS strategy. These did not have to be the same person that filled out each instrument. Although the effectiveness instrument was filled out by a third person, this was not deemed significant to the evaluation of the alignment of the organisation and they were rarely interviewed.

An interview guide was developed partly from adapting questions used in Reich & Benbasat (1994a). The main topics were outlined with initial questions phrased individually. An example of the interview guide for a first interview is included in Appendix 4. The use of an interview guide ensured that adequate and similar information was collected at each interview. After the first interview for each case, the transcription of that interview was re-read and the second interview guide altered to include areas which had not been covered in the first interview, or needed clarifying. The third interview was conducted after the results of the instruments had been calculated for that organisation, in order to discuss these results with the respondents and obtain feedback.

d) Controls for Bias

How can we be sure that the findings are reflective of the subjects and the inquiry itself, rather than the product of the researchers biases or prejudices? (Lincoln & Guba, 1985, cited in Marshall & Rossman, 1989, at 146).

There are a number of major causes of error in research, and the error cannot be reduced unless those causes are controlled. The main types which apply to this thesis are questionnaire design error and respondent error (Emory & Cooper, 1991). The other main types, i.e. sampling error and administration error, are less significant for this study as the sampling method was non-probabilistic and the sample was so small that administration was performed directly by the researchers.

Respondent error refers mainly to bias from either the respondent or the researcher themselves in interviewing. Emory & Cooper (1991) and McKinnon (1988) provide a number of main sources of bias in qualitative research:

1. *Limitations of Human Mind*—the respondents may forget details, be biased in some manner, or not understand;
2. *Situational Factors or Observer Threats*—where the presence of the researcher affects observed actions;
3. *Observer Bias*—concerning distorted perception or interpretation. This can happen at either the registering, interpreting or the recording levels, and can be minimised but not avoided. In particular, interviewer bias is a specific type of observer bias which refers to researchers phrasing questions in a way that implies a certain answer, for example using leading questions, encouraging agreement or paraphrasing. These can all influence the answers of a respondent;
4. *The Instrument*—confusion and ambiguity can result due to wording or the type of questions asked, or the questions may not accurately assess all the potentially important issues; and
5. *Data Access Limitations*—these may be imposed on researchers themselves such as limitations of time, or by other members of the organisation, or even when data collection occurs over a short period of time meaning that observed events may not be typical.

Marshall & Rossman (1989) identify a number of checks that can be used to minimise the biases described above, each of which has been utilised in this thesis. These include: (1) the use of a research partner or 'devil's advocate'; (2) a constant search for negative instances; (3) active testing of rival hypotheses; and (4) re-checking and confirming data.

McKinnon (1988) also provides a number of techniques which were taken into consideration, including: (1) the length of time spent in the field, where more than one interview was conducted at each site; (2) appropriate social behaviour such as establishing a rapport and offering helpful diagnostic advice; (3) note taking and making records during interviews; (4) team research where both interviewers were present at same interviews, requiring agreement between the observations of each person; and (5) the use of probing questions in order to actively determine whether respondents actually understood the meanings of words and concepts.

The most important method of reducing bias however, is the use of multiple methods and observations (McKinnon, 1988; Benbasat, et al., 1987; Marshall & Rossman, 1989). In qualitative methods of research, the researcher is the measurement instrument and thus the data cannot be purely valid (i.e. some bias will exist, whether the method is observation, interview or any other) (McKinnon, 1988). Multiple methods enable

comparison and thus reduces the potential for bias as any source may become clear and can then be compensated for.

In this research, more than one interviewer was used as often as possible, the results from the interviews of each member of an organisation were compared for consistency, and the results from the interviews were compared with both the instruments and the respondents own opinions.

Bias such as the leniency effect and extremity bias are more difficult to control. The leniency effect is where respondents have a different scale to others and thus score higher or lower on average, whereas extremity bias is where respondents avoid using the extremes of the scale. These types of bias lead to unrealistic inconsistency between STROBE and STROIS when completed by different members of the organisation which in turn affects the degree of parallelism between them. The problem also extends to comparing results between firms, as such a comparison may be affected by a lenient rater giving a high score for one firm, while raters in a second firm give the same phenomenon a much lower score. Careful comparison of interview data with responses along with consideration of common questionnaire design principles were employed to control these biases as far as possible.

4. Data Analysis

The instruments were analysed by entering the data into an EXCEL spreadsheet that calculated: (1) the averages for each dimension; (2) the alignment of each dimension under both matching and moderation; and (3) final matching and moderation scores using the weighted approach for the systems score, all via the methods described in Chapter VI. Checks to avoid data processing bias were incorporated into the spreadsheet as totals and results were compared with the original questionnaires. The mathematics behind the calculations used for each perspective was also assessed by a member of the Statistics Department at Canterbury University.

With respect to analysis of the interview data, interviews were transcribed and subsequently analyzed using techniques described by Miles & Huberman (1984). To ensure accurate recollection of the interviewees comments, all interviews were recorded

and transcribed. Independent assessments were obtained of each of the eight dimensions for the business strategy and the IS strategy of the firm from each researcher, and then these were compared and anomalies resolved. The transcripts were referred to where necessary for clarification or areas of disagreement. This process resulted in a qualitative conclusion regarding first the business strategy and information systems strategy, and finally the results from each were used to determine the alignment of the organisation. Only then was the data from the questionnaires entered into the spreadsheet and the quantitative results compared to the researchers qualitative assessment of those constructs.

Self reports were used both in providing scores in each of the instruments and more directly in the interviews, to provide another perspective on the firm's strategy and alignment. This was used as a further validity check during interviews and involved respondents assessing their own alignment. This was usually done at the end of the last interview after respondents understood the concept of alignment. After being given a definition of alignment, they were asked to assess their own level of alignment and then the reasons for this rating were discussed. This provided a second subjective rating of alignment and also the respondent's ideas of what *constitutes* alignment. These results were then compared with the specific question in the STROIS instrument regarding alignment, and also with the interview assessment. This method was used by both Simons (1987)—who used the perceptions of executives as a second method of rating and this was used to cross validate the external assessment—and Reich & Benbasat (1994b)—who used each respondent's rating to find an average over all firms.

The use of self reports has been a topic of much discussion in the literature. Chan & Huff (1992) claim that different types of information, including self reports should be used to form a more complete picture of an organisation. Reich & Benbasat (1992) however, found self-reports to be inaccurate in a number of cases. This appears to indicate that self reports are useful in conjunction with other methods but cannot be considered to be reliable on their own.

Empirical findings support the use of subjective measures, claiming that they are frequently correlated with their objective counterparts (Thompson & Iacovou, 1993; Dess & Robinson, 1984). In particular, the difficulty in obtaining objective measures in

studies of small firms has led to number of researchers actually arguing that it is necessary, as opposed to merely valid, to collect subjective as well as objective measures.

In this thesis the business strategy of the firm illustrates the way they compete in their chosen markets, and thus the way they answer the questions in the instruments should confirm what they discuss as important in the interviews. The values given in the instruments are the opinions of the respondents themselves and thus if they consider aggressiveness important and neglect future considerations, that is the information that should be acted on in providing information systems to support the business.

However, when the concept to be measured is not well understood, such as alignment, it becomes more difficult to reliably use measures involving self-reports. Thus, in order to minimise the chance of being misunderstood, the interview questions regarding alignment were conducted at the end. Additionally as mentioned, the respondents were asked for the reasons that they gave a particular response. This illustrated the basis on which the alignment assessment was made and it was possible to question further if the definition seemed inaccurate.

C. Validity and Reliability

Confidence in a measuring instrument depends on its reliability and its validity (Scott, 1995, at 44).

Broadly speaking, validity involves whether a researcher is measuring what they purport to measure (McKinnon, 1988). More specifically, there are a number of types of validity that need to be considered. The choice of methods in research is often influenced by the desire to maximise one type of validity over the other, as qualitative and quantitative methods have different strengths with respect to each type of validity. The research question to be answered or purpose of the research also influences the emphasis of one over another. Reliability is slightly different to validity concerns, however each must be considered.

Each of the main concerns is defined next, following Yin (1989), with ways of evaluating these in qualitative research detailed in the following discussion.

1. *Internal Validity* involves establishing a causal relationship whereby certain conditions are shown to lead to other conditions, as distinguished from spurious relationships. It is necessary to determine whether the hypothesized relationships in the model actually exist and are those being measured. The need to establish internal validity applies to explanatory or causal studies only.
2. *External Validity* involves establishing the domain to which a study's findings can be generalized to other samples.
3. *Reliability* involves demonstrating that the operations of a study—such as the data collection procedures—can be repeated, with the same results.

Marshall & Rossman (1989) claim that positivist terms of internal validity, external validity, reliability and objectivity are inappropriate to qualitative inquiry. Many of the investigations into validity and reliability can traditionally only be accurately assessed using statistical techniques requiring many data points. As a response to the calls to improve the standing of qualitative research, researchers have identified validity measures suitable for use in qualitative research. These are discussed below.

(1) Internal Validity

How truthful are the particular findings of the study? By what criteria can we judge them? (Marshall & Rossman, 1989, at 144).

Emory & Cooper describe internal validity as the extent to which the variation in the dependent variables (i.e. IS effectiveness and performance) are caused by variations in the independent variables (i.e. business strategy, IS strategy and alignment). The possible degree of internal validity in any field research, including case studies, is very low due to the study variables being beyond the control of the researchers (Birnberg, Shields & Young, 1990). In response to this, Marshall & Rossman use the term *credibility* which involves ensuring that parameters within which the study is valid are stated. Three main types of internal validity exist: Methods of improving internal validity in qualitative studies include pattern-matching, explanation building and time-series analysis (Yin, 1989), which are conducted at the data analysis stage.

1. *Construct Validity*—involves establishing correct measures for the concepts being studied and assessing the quality of that correspondence between a theoretically based construct and its operationalised measures. The purpose of construct validity is to substantiate the theory behind the construct (Scott, 1995).

Methods of construct validation are often statistical, such as using correlation, and factor analysis, however in qualitative studies, more judgemental methods are used (Emory & Cooper, 1991). Yin (1989) recommends the use of multiple sources of evidence, establishing a chain of evidence, and getting the case draft reviewed by key informants.

2. *Content Validity*—concerns the robustness of the hypothesised relationships between independent and dependent variables and the underlying logic of the measurement methods (Scott, 1995).
3. *Criterion-Related Validity*—involves how well measures estimate a behaviour or condition. In turn, this type of validity consists of two categories: *Predictive validity*, which assesses how well the predictor or variable measured provides a forecast of the criterion; and *Concurrent validity*, which classifies observations correctly according to the chosen variable.

In this thesis, the construct validation has been discussed in detail in Chapter V. The choice of methods for testing the theoretical propositions has been confirmed as appropriate in order to ensure the correct measures are used.

Assessing the content validity of these instruments involves determining how well the modelled dimensions are suited to the characteristics of small firms. The process is usually subjective, involving a careful definition of the topic, items and scales to be used in measuring the construct, or perhaps a panel of persons determining items that may or may not be suitable in a refining process (Emory & Cooper, 1991). The content validity of the model is to be assessed by the results from the analysis, and is discussed in more detail in Chapter VIII.

It has been stated that this thesis is focussing on the measurement of alignment itself, as opposed to the degree of impact that the alignment has on performance and IS effectiveness and thus no assessment of either predictive validity or concurrent validity were made. Additionally, predictive validity cannot be assessed via this type of analysis. Concurrent validity is not particularly relevant for this study as the ultimate aim is to be able to measure the predictive capability of business and IS strategy on IS effectiveness and performance. These types of validity are therefore not able to be assessed in this study as the impact on performance and IS effectiveness is outside the domain of this thesis.

Generally, triangulation increases internal validity and interpretation of qualitative findings (Gable, 1994). Triangulation from multiple data collection methods provides

stronger substantiation of constructs and hypotheses (Eisenhardt, 1989). Triangulation in this research has been employed in the form of interviews, assessment of each firm according to Venkatraman's three types and asking respondents for their own assessment.

(2) External Validity

How applicable are these findings to another setting or group of people?
(Marshall & Rossman, 1989, at 145).

A trade-off exists between increased precision in measurement and reduced currency. Thus, in quantitative methods, the internal validity is high as the measurements can be tested for their precision, whereas the external validity is low as the context cannot be ascertained from the results. Removing research from its context as in large surveys can therefore limit the validity of the results. A case study on the other hand, improves external validity as the context is apparent and the validity can be more easily determined. (Bonoma, 1985).

Field research therefore has high external validity but it remains difficult to make causal inferences as there is not usually sufficient evidence to support any such conclusions. In this thesis, the use of a multiple case design aimed to improve the external validity of the research findings, as it can be compared amongst four different industries as well as within those industries. The value of increased context possible from use of the case study method was one of the major benefits of the chosen research design, as outlined in Chapter IV.

(3) Reliability

How can we be sure that the findings would be replicated if the study were conducted with the same participants in the same context? (Marshall & Rossman, 1989, at 145).

Reliability involves determining whether a researcher can rely on the data collected (McKinnon, 1988) and ideally involves the achievement of consistent results from repeated measures. Reliability aims to minimise errors and biases, and is a necessary but not sufficient condition for valid research (Emory & Cooper, 1991). Marshall &

Rossmann separate reliability concerns into *dependability*, which allows for a changing social setting, and *confirmability*, which involves determining whether another researcher could find the same results. Statistical methods are used to determine the reliability of a study (Scott, 1995), however these cannot be used in qualitative research.

Replicability is an important part of establishing reliability. However, this causes problems in qualitative research due to the contemporary nature of these studies. It is highly unlikely that the same combinations and levels of each of the constructs being investigated would be observed again at a different time. Lee (1989) contends that replicability of a particular case study is not possible. Instead, it is suggested that replicability can be allowed for by testing the same theory in a different organisation.

In this thesis, although each particular case study is likely to be non-replicable, predictions according to the underlying theory can still be tested in a new case study, and should prove to be accurate if the theory holds. This provides replicability of the *findings* of the case study, with different initial conditions (Lee, 1989). The multiple case design allows this replicability to be tested amongst the eight different cases.

Other qualitative methods of improving reliability involve providing adequate documentation so that another researcher could follow the same steps to arrive at the same conclusions. Procedures for this include the use of a case study protocol and case study data base (Yin, 1989). As mentioned, an interview guide was used for each interview and both transcripts and notes were taken. Considerations such as designing the questionnaires so that accidental incorrect responses due to lack of concern or error are minimised all help improve the reliance able to be put on the findings of a study. The instruments included the use of a 0 option so that items which were inapplicable could be indicated as such, the length of each questionnaire was specifically considered before the cases began, and some questions were reversed to lessen the likelihood of 'end piling'.

D. Summary

Having described the data collection stage of Churchill's steps as well as the steps taken to minimise bias and improve the validity and reliability of the research design, the two sets of case visits were conducted over a period of approximately three months. The results from the interviews and instruments are described and discussed in the next chapter.

Chapter VIII. RESULTS AND CASE ANALYSIS

A. Overview

In this chapter, the results of the case visits are assessed with respect to two different areas. The first involves the validity and reliability of the instruments and thus how well they measure the construct of alignment. The second concerns evaluation of the methods of analysis (i.e. matching or moderation with a bivariate or systems approach) and an assessment of which combination of these perspectives most accurately reflects the firms' level of alignment.

The first section provides the characteristics of the sample of cases. The following section compares the results from: (i) the two separate rounds of case studies; (ii) the cases within their industry; and (iii) the entire eight cases.

The third section uses the findings from the cases to assess the first major area, that of the instruments' validity and reliability. As discussed previously, no statistical analysis can be performed, however some indication of the success of the instruments can nevertheless be derived from the findings. Areas of concern which were identified and subsequently addressed in the instrument 'purification' stage are also described.

Finally, the method of data analysis is discussed, culminating in recommendations regarding the value of the instruments in assessing strategic alignment in small firms, and suggestions for areas that may be of concern in future applications.

1. Sample Characteristics

All eight cases involved New Zealand organisations that use IS in some manner within their organisation. Two cases from each of four industries (retail, manufacturing, service and professional sectors) were selected as described in Chapter VI and a range in age, size and IS sophistication was deliberately obtained.

The degree of IS sophistication observed ranged from a single computer used for accounting and inventory management functions, to fully integrated systems including

accounting, budgeting, messaging, client database and quoting systems. Several of the organisations requested anonymity and therefore none are identified apart from their general industry sector and some demographic details.

Table VIII-1 summarises the organisations and the position of each respondent in that organisation for each questionnaire. The two main instruments, STROBE and STROIS were filled out by different members of the organisation in every case. The STROBE questionnaire, which also contained the performance sections, was left with the CEO or other person with highest responsibility for the organisation. This usually involved one senior executive (as close to the position of CEO as the firm structure enabled) (eg one firm consisted of eight partners as top management).

None of the firms had an executive dedicated to information systems, so the most suitable person to fill out the STROIS instrument was sought, and this was preferably another member of top management. In some cases the person with the most extensive knowledge of the IS strategy was not part of top management, however this did not preclude them from filling in STROIS.

As STROBE and STROIS were based on parallel questions, it was necessary to ensure that the questionnaires were answered independently from each other as far as possible, which is why different people were required to fill out each questionnaire (Moser & Kalton, 1972).

	Organisation	STROBE	STROIS	IS Effectiveness	Staff	Age
1	Professional 1	Partner	Office Manager	Solicitor	21-50	71-100
2	Professional 2	Partner	Accountant	Associate	51-100	51-70
3	Service 1	Owner/Manager	Owner/Manager	Sales Co-ordinator	11-25	51-70
4	Service 2	Partner 1	Partner 2	Clerical Assistant	11-25	21-50
5	Retail 1	Owner/Manager	Retail Manager	Secretary	11-25	11-20
6	Retail 2	Owner/Manager	Manager & Secretary	Secretary	6-10	11-20
7	Manufacturing 1	Managing Director	Operations Manager	Sales Manager	51-100	21-50
8	Manufacturing 2	Managing Director	Finance Controller	Production Manager	51-100	0-5

Table VIII-1: Demographics of Case Sites

In three instances, an owner/manager had the sole responsibility for all decisions in the business including information systems. In these cases, one person (Service 1) completed both STROBE and STROIS, another (Retail 1) had a manager who was knowledgeable about the directions of the information systems of that business who

therefore completed STROIS, and the third (Retail 2) completed STROBE alone and then filled out STROIS in discussion with the secretary, who was the principal user of the systems in that organisation. The IS effectiveness instrument was filled out by either an accountant or clerical person who used the information systems extensively. Further details regarding this sample and the respondents concerned are provided in Section C below.

B. Comparison of Qualitative and Quantitative Data

The case studies were conducted in two separate rounds in order to provide an opportunity to alter or 'purify' the instruments as recommended by Churchill in Steps 4 and 6. The first round of data collection from the first four firms commenced with interviews and the version of the instruments as they existed after the initial round of development as detailed in Chapter VI. Two firms from two industries were visited in the first round, alterations were made to the instruments after analysing the results and comments from the respondents, then two firms from two different industries were visited for the second round. Further recommendations for alterations to the instruments subsequent to the final round of data collection are included in the future research section of the discussion chapter, Chapter IX.

In the interviews, the objective was to gather sufficient information to be able make an independent evaluation and thus confirm or refute the information given in the instruments. Respondents were assessed on what aspects of the business were important, for example, whether they were innovative in their field of business, or whether they were aggressive in attempting to gain market share. From the answers, it was possible to establish how they competed in their markets. The information systems of the business were then investigated, along with functions providing support for each aspect of the initial discussion. From these interviews an indication of the competitive stance of the business, its use of information systems and the congruence between the two was established.

These findings were compared with the results from the analysis of the instruments. A number of problems with the administration of the instruments, some items and

dimensions and also the types of information that needed to be collected by the researchers in the interviews were identified. These were discussed and solved where possible for the second round of cases. The instruments were updated to reflect the comments of respondents and researchers. The concerns that were less easily solved are discussed in the validity section below.

1. Round 1 versus Round 2

Each firm in the first set of cases turned out to be highly successful in their industry and three of the four made extensive use of information systems and technology. The high levels of IS competency resulted in a high understanding of how information systems could benefit their business which in turn resulted in greater alignment. The industries chosen in the first set of cases indicated that they considered IS more critical to their success, there was a higher necessity to invest in IT, systems were integral to their strategy and were thus more aligned, and there was more CEO support than in the firms in the second round of cases.

This was reflected in the generally higher scores from the instruments. These firms gave higher STROBE and STROIS values which resulted in the first group gaining better alignment ratings (ranking 1st, 2nd, 4th) than the second group overall (3rd). The instruments appeared to be providing assessments of the alignment in each firm which corresponded to the assessments made by the researchers. The alterations were largely cosmetic, acting on the opinions of both the respondents as well as the researchers. These changes are outlined in Section D.

The second set of cases used the updated instruments. These four firms were much wider in range than the first four and generally speaking, the second set of cases did not appear to be as highly aligned as their predecessors. This result was not due to a lack of information technology, as two of the firms appeared to use information technology as a major part of their business and subsequently scored quite highly on the IS effectiveness. The average score for STROIS over all four firms was much lower than the firms from the first round (2.57 vs 3.29) providing further evidence of the differences between the two groups. Both the impressions from the interviews and the information from the

instruments themselves indicated this lesser alignment, which suggests that the accuracy of the results from the instruments had not been adversely affected by the alterations. The major differences between the levels of alignment achieved in the groups of firms and possible reasons for these differences are discussed in Chapter IX.

2. Literal Replications

The next section describes the cases by industry, comparing the firms in each industry. These provide an impression of the parallels between the results from the instruments and the assessments of the researchers. According to Yin (1989), these literal replications should provide similar results within each industry and this provides further evidence of the external validity of the instruments' findings. Comparisons between industries (theoretical replications) can only be suggested in this research as the industry factors are not known and the number of firms in each industry is too small for statistical analysis. These are discussed in Chapter IX.

a) Professional Industry

(1) General

The professional cases were the first undertaken and the firms chosen were direct competitors each operating as a partnership. Both indicated a very high sophistication of systems as well as a strong desire to be first in their field.

Both of the firms expressed similar areas of strategic importance, indicating a similar approach to competitive methods. Quality of service and looking after the current clients was of utmost importance to both firms. Additionally, both firms indicated a strong aversion to risk. According to responses in the performance instrument, Professional 1 considered themselves to be better than the competition on average (4.0), whereas Professional 2 only rated themselves as average (3.10). Both firms however, had income in the same bracket (\$1–10M) and were two of the largest such partnerships in the area.

The type of business that these firms run is critically dependent on information and the smooth flow of the systems in their firms. This necessity for information is illustrated by

the high sophistication of IS exhibited in both firms. This was also confirmed by their responses in the demographic section where they indicated that information systems were critical for their success (4 & 5) and that the systems of their business were continually being enhanced (5 & 5).

However in Professional 1, it appeared that the partners supported new information systems developments on a more active basis than in Professional 2. This was evidenced by the fact that approximately only one third of the partners in Professional 2 used the computer on a regular basis whereas all partners did to some degree in Professional 1. Additionally, Professional 1 discussed a number of developments to be implemented in the near future. The IS effectiveness results however, indicated that Professional 2 considered the information systems of their business to be slightly better than did Professional 1 (3.94 & 3.47). Both of the firms considered the contribution to operational efficiency to be the most successful aspect of their information systems.

DIMENSION	Professional 1				Professional 2			
	STROBE ⁸	STROIS	ALIGNMENT		STROBE	STROIS	ALIGNMENT	
			Match ⁹	Moderation ¹⁰			Match	Moderation
Aggressiveness	3.67	3.67	0.00	17.00	3.00	3.67	0.82	11.00
Proactiveness	4.50	2.25	2.96	9.75	2.75	2.50	0.87	7.00
Innovativeness	4.25	3.75	1.58	16.25	3.25	3.25	0.71	10.50
Ext'l Defensiveness	5.00	4.25	0.87	21.25	3.00	3.25	0.50	10.00
Analysis	4.67	4.67	0.816	21.67	3.33	4.00	1.41	13.33
Futurity	3.17	3.17	0.58	11.17	3.00	3.00	1.00	9.33
Riskiness	1.75	2.25	0.71	4.00	2.25	2.75	0.71	6.25
Int'l Defensiveness	4.67	4.67	0.00	22.00	4.00	3.67	0.58	14.67
Overall	3.96	3.58	0.99	16.66	3.07	3.26	0.82	10.64

Table VIII-2: Instrument Data from Professional Firms

⁸ Both STROBE and STROIS were assessed on a five point Likert scale, meaning that 5 was extremely important and 1 was extremely unimportant to their business

⁹ Matching values range from 0 to 4, with 0 indicating a perfect match, and 4 the worst possible match (i.e. 5-1 for every item)

¹⁰ Moderation values on the other hand, range from 1 to 25, with 1 indicating a minimal impact on performance, and 25 indicating the maximum impact on performance (i.e. 5*5 for every item)

(2) Level of Alignment

The instruments from Professional 1 indicated a very high level of alignment, and this corresponded to our own evaluation. From the interviews, it was clear that Professional 1 had a significantly greater understanding of the benefits of aligned IS and business strategies than Professional 2. For example, the partner of Professional 1 stated: *'Well, I think if you ever stop and say you're where you're at, then you are out of your mind—because you've got to know, especially with technology, you have to keep up'*. Professional 1 also indicated that they considered their information systems strategy was very well aligned with their business strategy (5.0). This greater understanding may also have affected the results from the IS effectiveness instrument, as Professional 1 had higher expectations from their systems and thus may have considered that the future developments which were planned would provide even more significant contributions.

Analysis of the instruments suggested high levels of alignment in many important dimensions for Professional 1, but the lack of fit in some others reduced the overall alignment result. The high values given to some dimensions of STROBE indicated the areas which were of greatest concern for the firm, and these were indicated as being well supported by information systems. On the other hand, Professional 2 indicated a lower range of importance for STROBE. These dimensions were well supported by STROIS but the lower scores overall resulted in a significantly lower level of alignment.

(3) Other Observations

The values from the two STROBE instruments differed markedly in their range as Professional 1 scored between 1.75 and 5.0, whereas Professional 2 scored only between 2.25 and 4.0. The respondents from Professional 2 subsequently disagreed with these low scores for STROBE in their third feedback interview, and this concern coincided with our assessment of the firm's strategic orientation. The respondent who had filled out that questionnaire said: *'I didn't want to blow our trumpet'*, and had provided very average scores for the questions. Having examined the results for the performance dimensions during the feedback interview, that respondent realised that they had underestimated the appropriate scores. As the questionnaire concerned also contained the performance section, this firm ended up with mediocre performance values for the

same reasons, and these were confirmed as being inaccurate by the respondent in the feedback session.

There was strong evidence to suggest that their type of industry was particularly suited to provision of specialised items and/or benchmarks, and less emphasis on areas such as suppliers, distributors and other aspects often associated with a manufacturing outlook. Both firms commented on the inappropriateness of some questions and also that some scores would be very unlikely to be achieved in their business. The significance of this is discussed in Chapter IX.

b) Service Industry

(1) General

The firms chosen from this industry differed dramatically in their approach to competition, despite being competitors. Service 1 focussed on internal efficiency and cost cutting in order to adapt to increasingly tight profit margins. It also sought opportunities to diversify from their main service area, but made decisions based on short-term factors which would give them immediate benefits, rather than considering the future. Service 2 was much more aggressive, having acquired three other companies in the last three years, and had almost monopolised their subsidiary activity, distribution of a product to retailers in the South Island. However, both firms indicated that quality of service (i.e. relationships with customers and suppliers) was their main focus and each stated that they would be within the top five firms in their industry. Service 1 appeared to be less satisfied with their performance (3.40) than Service 2 (4.30). Both firms indicated a range of values for their dimensions although Service 2 had a generally higher average for each, resulting in a higher STROBE result overall.

Service 1 used information systems to achieve their goals in many ways, including on-line transactions for banking and computerised quoting. On the other hand, Service 2 relied significantly on excellence of service and aggressive behaviour. Information systems were almost non-existent apart from accounting and office functions and minimal inventory management functions. This was reflected in the STROIS scores (averages 3.53 & 2.78 respectively) but not in the IS effectiveness instrument (4.08 &

4.60). Service 2 indicated a much higher contribution in most areas resulting in a higher average over all dimensions.

DIMENSION	Service 1				Service 2			
	STROBE	STROIS	ALIGNMENT		STROBE	STROIS	ALIGNMENT	
			Match	Moderation			Match	Moderation
Aggressiveness	4.33	4.00	1.00	17.33	5.00	3.00	2.16	15.00
Proactiveness	3.50	3.00	1.00	11.00	4.50	3.25	1.50	14.50
Innovativeness	3.75	3.50	0.75	13.00	4.75	2.25	2.74	10.50
Ext'l Defensiveness	4.50	4.00	0.50	18.00	5.00	2.50	2.55	12.50
Analysis	3.67	4.00	0.33	14.67	4.67	3.33	1.41	15.67
Futurity	2.83	3.00	0.17	8.67	4.17	2.00	2.55	8.17
Riskiness	1.75	2.75	2.00	4.75	1.50	3.25	2.18	4.50
Int'l Defensiveness	4.00	4.00	0.67	16.00	4.33	2.67	1.73	12.00
Overall	3.54	3.53	0.82	13.91	4.24	2.78	2.10	12.34

Table VIII-3: Instrument Data from Service Firms

(2) Level of Alignment

The service firms indicated very different levels of emphasis on information systems, and consequently levels of integration with the business strategy. They both indicated that information technology was critical to the success of their organisation (4 & 5), but that there was only a low necessity for investing in information technology (2 & 3). This suggests that the firms had made individual choices to make information technology important although it was not essential in their industry.

This was confirmed by the fact that Service 1 had very high levels of computerisation and IS sophistication in the business, as they competed on the basis of cost cutting and efficiency. The owner stated the opinion in one interview that *'usually the quickest way to halve the overheads is to unfortunately get rid of half the people'* and later on described how the company was *'... just consolidating, just continually trying to keep our overheads down ...'*. Furthermore, Service 2 had lower alignment and yet enjoyed very high performance relative to competitors, indicating that it was possible to be competitive without high alignment of information systems. It seemed contradictory however, that Service 2 indicated information systems were essential to their success, yet only had minimal use of systems within their business.

Service 1 indicated high scores for STROIS and management appeared very satisfied with the information systems of the business. The firm had a high level of alignment in all dimensions and this resulted in a satisfactory score overall, as the dimensions that were important in STROBE were supported the most. Service 2 had a much lower level of alignment in most dimensions, indicating that there were many opportunities for information systems to help their firm achieve their goals. This difference in success with alignment was recognised in their own opinion, as Service 1 scored 4 for alignment whereas Service 2 indicated a very low score of 1. The overall impact on the alignment of Service 2 however was only slightly less, as under moderation the higher STROBE scores enabled a higher multiplicative score to be obtained.

(3) Other Observations

As with Professional 2 the scoring of the respondents indicated that extremity bias may have existed. The owner/manager from Service 1 completed both STROBE and STROIS. The firm was one of the smallest of the sample, and also had the most autocratic leadership. This made it very difficult to find two people with sufficient knowledge of the position and direction of the business to fill out instruments separately. The fact that the same respondent completed both main instruments involved a greater risk of end-piling and bias from non-independent responses for the two instruments. These risks are discussed in Section C below.

Service 2 had the highest average STROBE and performance of all the firms in the sample but the firm ended up with a very poor match between dimensions. While this high scoring may have affected their alignment scores, it was confirmed in the interviews that the existing information systems of the business were minimal, with both partners realising that there were many opportunities for them to use information better, without knowing where to start.

c) Manufacturing

(1) General

The firms chosen from this industry were not in direct competition with each other, rather each had a significant share of the small markets they were involved with, indicating a niche approach to competition. Weill (1990) excluded IT which was embedded in machine tools, i.e. not contributing to the information management of the firm. This excludes things such as robotics but includes things such as MRP systems and other production planning systems. A similar approach was taken in this thesis, as the IT that was used in business was excluded. This applies mainly to the manufacturing firms, and also Retail 1 below.

Manufacturing 1 focussed on producing specialised, high value products, and invested heavily in research and development: *'we are more comfortable in the high spec[ification] end of the market with higher prices and higher profitability'*. This was also illustrated by their high scores for proactiveness and external defensiveness (4.67 & 5.0) and above average score for innovativeness (3.50). Two extensive but completely independent systems were maintained, one for production, and the other for management information and communications. This inefficiency was confirmed by a low 2.0 for internal defensiveness and statement that: *'rightly or wrongly, we are looking at the market for growth and profits more than internal operation'*.

Manufacturing 2 concentrated on supplying a few large customers, producing large runs of specialised products they requested on demand. Their focus was thus on both external and internal defensiveness as it was essential to retain the present customers, yet they had to be internally efficient to continue to be viable suppliers (4.0 & 3.67). Growth had been phenomenal over the last two years, indicated by the high aggressiveness score (4.67) and the organisation was experiencing difficulties associated with rapid expansion. In particular, the information systems needed major reorganisation and upgrading to cope with the requirements of staff. The firm had recently undergone a major reshuffle of management as the founding CEO decided to devolve the responsibility for day-to-day management by installing a complete management team.

Overall, Manufacturing 1 considered themselves to be more successful in terms of performance (relative to competitors) than Manufacturing 2 (3.90 & 3.20). This difference resulted solely from the Company Innovation response where Manufacturing 1 scored 4.5 while Manufacturing 2 scored only 3.5. Every other dimension was exactly the same. This appeared to be an accurate reflection as Manufacturing 1 concentrated on new products and R&D whereas Manufacturing 2 produced large runs of other companies' products.

DIMENSION	Manufacturing 1				Manufacturing 2			
	STROBE	STROIS	ALIGNMENT		STROBE	STROIS	ALIGNMENT	
			Match	Moderation			Match	Moderation
Aggressiveness	4.33	3.00	1.41	13.00	4.67	1.33	3.37	6.33
Proactiveness	4.67	3.00	1.73	14.00	4.33	1.67	2.83	7.00
Innovativeness	3.50	3.75	0.87	13.50	3.50	1.00	2.55	3.50
Ext'l Defensiveness	5.00	2.75	2.40	13.75	4.00	1.00	3.00	4.00
Analysis	3.33	3.67	1.29	12.00	3.67	1.00	2.94	3.67
Futurity	4.17	3.17	1.29	13.33	3.67	1.67	2.45	6.33
Riskiness	4.00	2.50	1.87	10.00	3.75	4.00	1.12	16.00
Int'l Defensiveness	2.00	3.67	1.73	7.33	3.67	2.00	2.08	7.67
Overall	3.88	3.19	1.61	12.51	3.91	1.71	2.58	6.81

Table VIII-4: Instrument Data from Manufacturing Firms

(2) Level of Alignment

Both firms employed extensive information technology in their business however the use of information was less sophisticated. Both firms indicated that information technology was critical to the success of their particular business (5 & 4) but that there was slightly less need to invest in information systems and technology to survive in their industry (4 & 3).

Manufacturing 1 had a much higher degree of support for their business strategy than Manufacturing 2, who was only beginning to stabilise after the restructuring and major expansion over the last two years. Both manufacturing firms demonstrated this difference in their responses to the integration of their systems with strategy (4 & 1) and their systems' use of unique strengths of the organisation (3 & 1).

The systems of Manufacturing 2's business were over-utilised and tended to be problematic due to the reactive approach that had been adopted to stretch the available

resources. The financial controller indicated a high dissatisfaction with the systems, resulting in a low overall alignment as the respondent recognised that the information systems were not providing the information that was needed in both the instrument and the interviews: *“the quality product includes the relationship, the price, delivery on time, all those sorts of things; you’ve got to have good information to do it and a high level of integrity. . . basically our information system doesn’t give us enough information or good enough information because we haven’t got any integrity in it”*. This was confirmed by a very low 2.24 for IS effectiveness from Manufacturing 2.

The STROIS score from Manufacturing 1 scored significantly greater than that from Manufacturing 2, as it had adequate support for most important areas of their business strategy. Additionally, this difference between Manufacturing 1 and Manufacturing 2 was supported by their responses for successful alignment of 3 and 1 respectively. Manufacturing 1’s external defensiveness however, was very poorly supported with it being indicated as extremely important on STROBE (5.0) but below average in STROIS (2.75). This indicated that improvements in this area could provide significant benefits to the business.

d) Retail

(1) General

The firms chosen from this industry primarily had a retail focus, but a large proportion of their product was produced on site. Despite being direct competitors both firms had decided to focus on different areas of their business in order to survive in an extremely competitive industry. Both firms had a single owner/manager who made all major decisions and placed primary reliance on themselves for the information to make those decisions. Each firm had a similar production and retail set-up with more than one site for each function although Retail 1 had a greater number of retail outlets and employees than Retail 2.

Retail 1 was in the process of shifting focus to other related markets. Significant technology was to produce their products, however this did not extend to the information systems. The organisation was innovative (4.25) and always striving for new

developments where possible, which was reflected in the high aggressiveness and proactiveness scores (4.67 & 4.67). However, an inability to consider the benefits from improving the information available to members of the organisation was making the transition from the old methods to the new particularly difficult. There was less emphasis on analysis before making decisions (3.33), and even less on efficiency (internal defensiveness = 2.67). As the owner stated, *'You just get a lead and you follow it. . . [Analysis] is very difficult to do because you can't assess the market'*. With respect to efficiency and internal operations it was stated: *'I am preoccupied with moving in the new directions that we are wanting to go in . . . in a real world it would be good to do everything'* and *'if you are being extremely tight and picky about things it comes through and it will affect your marketing strategy . . . we have no idea whether we are making improvements at the other end and that is a worry.'*

In Retail 2, the primary focus involved consolidating the existing strengths of the organisation and internal defensiveness issues. Again aggressiveness and proactiveness scored highly (4.67 & 4.0), however relationships with customers and suppliers were also viewed as important (4.0). A new information system had been installed in the last 2 years and was proving increasingly successful as teething problems were eliminated. Additionally, the recent relocation of two shops to a single site was resulting in opportunities for improved efficiency with large decreases in overheads such as rent and inventory.

Despite the difference in competitive focus, the IS effectiveness and performance scores were largely equivalent. Every performance dimension for performance was essentially the same with a resulting average of 3.80 and 3.70, and the results for IS effectiveness were also very similar (3.70 & 3.68) but with emphasis on different dimensions within that instrument.

DIMENSION	Retail 1				Retail 2			
	STROBE	STROIS	ALIGNMENT		STROBE	STROIS	ALIGNMENT	
			Match	Moderation			Match	Moderation
Aggressiveness	4.67	2.00	2.71	9.33	4.67	2.67	2.16	12.33
Proactiveness	4.67	3.00	1.73	14.33	4.00	3.33	1.41	13.00
Innovativeness	4.25	2.75	1.58	11.75	3.25	2.25	1.22	7.50
Ext'l Defensiveness	4.00	1.5	2.74	2.75	4.00	4.00	0.00	16.00
Analysis	3.33	1.33	2.45	4.00	2.33	3.67	1.41	8.67
Futurity	3.00	2.00	2.00	5.67	2.00	2.83	1.58	6.00
Riskiness	3.00	3.50	1.22	10.75	3.00	2.50	1.22	7.50
Int'l Defensiveness	2.67	2.00	0.82	5.33	3.67	3.67	0.82	14.00
Overall	3.70	2.26	1.97	8.80	3.36	3.11	1.22	11.29

Table VIII-5: Instrument Data from Retail Firms

(2) Level of Alignment

While both firms had areas which required better support from their information systems, Retail 2 had a significantly better alignment score overall due to the recently installed system. This provided much more accurate product information, including past prices and exact cost, which enabled staff to make quick pricing decisions in situations where price competitiveness governs sales. Additionally, the point-of-sale (POS) system provided real-time inventory information and linked the two sites together.

Retail 1 had allowed the business' information systems degrade significantly over the last few years. The owner was a visionary leader with many ideas for future developments, but tended to neglect the basic day-to-day needs of the business. This was illustrated in both the instrument scores, where analysis and internal defensiveness scored low in STROBE and the corresponding alignment was also very low, and in the interviews, where it was stated that the information systems *'would probably be the worst thing in my company and probably comes from the fact that I don't want to know anything about it.'*

This comment explained the frustration of the retail manager who completed STROIS. One of her major problems was not knowing how successful new products were proving, due to a total lack of information on basic figures such as gross profit, profit margins and cost of each item: *"I would like to know just what our profit is in different areas, whether or not we are actually making money, how much time we are spending on it . .*

.but at the moment I do not see a break-down performance month, or performance six months”. There were no computerised links between any of the sites or the central administrative office making the provision of any information even more difficult. This is similar to the situation described by McFarlan, et al. (1983) who claim there is often a gap between where an organisation is and where management believes it to be. The lack of information being given to the rest of the management team was quite insufficient but the leader did not realise and thus had made the improvement of information flows very low priority.

3. Summary

Prima facie, the instruments appeared to accurately assess the importance of each dimension of each firm's strategy, and to provide an assessment of alignment that concurred with the impression formed by the interviewers. The questionnaires accurately illustrated what was important to the organisation by showing those dimensions as the highest scores, and vice versa. For example Professional 1 had a strong emphasis on external defensiveness (5.0) whereas Service 2 had high aggressiveness (5.0). Similarly, Retail 1 had little concern regarding internal defensiveness (2.67) and Professional 1 avoided risky projects (1.75).

The results from each type of assessment are summarised in Table VIII-6 which compares the instrument results (under the systems perspective, i.e. one figure for the whole firm), the respondents assessment of their firm's alignment (which was via a Likert scale of 1 – 5; 5 being very well aligned) and the interview results. The table is sorted by the alignment results from the instruments under moderation, and the rankings are given in brackets in each case.

As can be seen from Table VIII-6, the ranking of organisations according to each method of assessment (other than matching) is very similar, particularly in the highest and lowest scoring firms. Surprisingly, firms themselves appeared to have a relatively good understanding of how well they were aligned – the placings were very similar to the interview results (column 5).

Organisation	Instruments		Respondents	
	Matching	Moderation	Own Opinion	Interviews
Professional 1	0.99 (3)	16.66 (1)	5 (1)	20 (1)
Service 1	0.82 (1=)	13.91 (2)	4 (2)	18 (2)
Manufacturing 1	1.61 (5)	12.51 (3)	3 (3=)	17 (3)
Service 2	2.10 (7)	12.34 (4)	1 ¹¹ (7=)	8 (7)
Retail 2	1.22 (4)	11.29 (5)	3 (3=)	13 (5)
Professional 2	0.82 (1=)	10.64 (6)	3 (3=)	15 (4)
Retail 1	1.97 (6)	8.80 (7)	2 (6)	6 (8)
Manufacturing 2	2.58 (8)	6.81 (8)	1 (7=)	10 (6)
Averages	1.51	11.62		13.38

Table VIII-6: Comparison of Methods of Assessing Alignment

The major discrepancy is Service 2 where it can be seen that the impressions of the interviewers and the respondent from the firm were much poorer than indicated in the instruments. As discussed in the individual firm's results above, this was due to the very high scoring of the respondent in STROBE, which when combined with average to low STROIS scores, resulted in a possibly unrealistically high moderation score. This actual lack of correspondence between STROBE and STROIS is demonstrated by the poor matching score of 2.10, indicating that STROIS is considerably lower than STROBE overall.

On a less obvious scale, the instruments placing of Professional 2 was also different to the interviewers' opinions. The respondent had scored STROBE very low, and thus in the opposite situation to Service 2, gained a low moderation score overall. These two cases along with other problems which occurred during data collection are discussed further in Section C below.

C. Validation

Although the method of assessing the instruments in this thesis was via case studies as opposed to a large scale survey, certain types of validity were able to be considered. The findings are detailed according to each different type of validity in turn as they appeared

¹¹ This was assumed to be a 1, i.e. not aligned rather than N/A as indicated (See Section C-1-(3) for discussion on inclusion of the N/A option).

during the collection of the case data as well as the analysis of the results. Each validity type was defined in Chapter VII. Whereas that chapter focussed on validity and reliability as it applied to the research design used in this thesis, this chapter focusses on the results from the cases in order to assess the validity of the instruments and thus not all types are assessed.

1. Internal Validity

As discussed previously, if the observed alignment corresponds with the instruments assessment of alignment, the instruments will be considered to have greater internal validity. The observed alignment was determined through interviews with the appropriate members of each firm. Qualitative assessments of the construct and content validity of the instruments were made and are reported below.

(1) Construct Validity

The method of assessing the data was chosen according to Venkatraman's (1989a) recommendations that the appropriate measurement scheme be used for each underlying model of fit, however, this is mainly relevant where statistical analysis is concerned. These issues were largely addressed in Chapter V, however the next section discusses the method of calculating strategic alignment using the evidence from this research to determine which appears most appropriate at this stage of the analysis.

It was considered that *prima facie*, the instruments had high construct validity as this had been tested during the prior development by Chan and Venkatraman. Additionally, the use of multiple techniques to assess the alignment improved this measure of validity. However, this needs to be confirmed by later analysis of results from large scale data collection using the instruments.

(2) Content Validity

Adequate content validity ensures that the measures provide adequate coverage of each dimension of the construct under investigation and this is the major type of validity that needs to be assessed with respect to the results from the instruments.

The topic, or domain of strategy and alignment, used for this thesis was assessed by Venkatraman and Chan in their respective stages of development of these instruments and is discussed in Chapters III and V. Similarly, the suitability of the dimensions and items has been assessed prior to this thesis (Chapters V and VI). In particular, Chan included non-financial measures for performance. This is especially relevant in small firms where performance is often judged on aspects other than purely financial results (Raymond, 1992). The dimensions of STROBE were found to be suitable by Lefebvre, Levebvre & Harvey (1993).

Some respondents queried the meanings of the dimensions. The dimensions were not presented to the respondents in any way before they filled out the questionnaire. Only in the feedback interview were these dimensions defined and respondents were asked whether the ranking of dimensions with respect to STROBE seemed accurate. In the ideal interview it would have been preferable to define the dimensions and ask the respondents to rank them. However, this procedure was considered too difficult for completing on the spot, and so the STROBE results were presented first, with no discussion of alignment until later on in the interview. The comments therefore only eventuated in the feedback interviews when the respondents were given the results for each dimension with their definitions and the worded definition did not have the same meaning as assumed by the respondent. Any such confusion would not be obvious in a large scale mail survey since the respondents would not become aware of any difference between the perceived and actual definitions. This therefore needs to be considered, especially if the instruments are to be used as a diagnostic tool in individual firms.

One comment related to the definition provided for internal defensiveness, i.e. 'emphasis on cost cutting and efficiency' where it was pointed out that the questions used did not actually contain any reference to cost cutting, only efficiency alone. Two other firms indicated some confusion between proactiveness (defined as 'first to introduce new products') and innovativeness (defined as 'creativity and experimentation'), indicating that clearer definitions for these two dimensions should be provided to ensure that the questions would be answered accurately.

These comments should be addressed in the final review of the instruments before they are used again. In the case of the STROBE and STROIS instruments, it is considered

that more items would correct the imbalance in the case of internal defensiveness, and generally provide greater validity and reliability, since some dimensions do not cover every aspect. However a trade-off occurs in terms of the instruments' length and subsequent risks of respondents not having sufficient time or interest to accurately respond to the questions. It is necessary to determine what benefits would accrue from more questions as opposed to the extra length.

With respect to individual items, these were screened prior to their first application by independent assessors and by the researchers (detailed in Chapter VII). Furthermore, the respondents were asked for feedback regarding the instruments generally, which often resulted in specific comments about certain items of concern to them. These items were reviewed by the researchers before the second round of cases (detailed in section D below), and again, members of that group were asked for comment.

Some respondents commented that particular questions appeared to be of minimal relevance to their particular business (Professional 1 and 2 particularly). Although this concern was considered, it was decided that measures of business and IS strategy must cover all possible combinations of strategic focus in order to be universally applicable and maintain high content validity. For example, a professional firm must minimise risk, and very rarely is 'on the look-out for firms to acquire'.¹² However, for Service 2, this item was highly applicable as they exhibited a strongly aggressive stance with respect to competitors. Another area of concern involved terminology. In particular, the terms 'distributors' and 'suppliers' gave the instruments a manufacturing air. For the professional firms however, there were no such roles of significance. However, again it was considered important to retain these terms for organisations to which they did apply.

The scale used was a 5 point Likert scale that also had a 0 or Not Applicable (N/A) option (see Appendix 3). Some firms were found to indicate items as 'N/A' where they should have been scoring low (e.g. '1', indicating that the business was not competing on the basis of that particular dimension). This was solved by stressing the meaning of the scores and also clarifying instances where the 0 option was applicable. However this

¹² An item measuring Aggressiveness.

emphasis would not be possible in a large scale survey, which makes the use of the option questionable in a situation where it cannot be determined if a respondent actually meant '1', 'Strongly Disagree'.

Chan (1992) added the N/A option at the suggestion of firms involved in the pre-testing of the instruments. However, it is suggested that for the STROBE and STROIS instruments, the items can be all applied to any organisation in some degree. Each firm will compete on the basis of certain dimensions rather than others, and this is identified by the responses given for each item, from 1 to 5. With the availability of the '0', respondents in the current firms tended to assume that a situation that did not apply to their organisation because their systems did not support that aspect of strategy, and thus responded with N/A, i.e. '0', where in fact, it was more accurate to respond with '1'.

(3) Criterion-Related Validity

As discussed, this aspect of validity cannot be assessed in this thesis. However, precautions against certain criterion-related problems can be adopted, such as ensuring freedom from bias by being assured that every respondent firm has been given an equal opportunity to score well. In future applications of the instruments it would be beneficial to make adjustments for differences in firms such as competitive conditions or industry factors. It is also advisable to avoid comparing the quality of alignment in firms from different industries until it is possible to be certain that there is no inequality due to industry factors. This has also been controlled by making certain sensitive or specific questions relative to the industry, for example, income or revenue questions, as relative comparisons avoid the necessity of specifying dollar figures. As more firms are tested, benchmarks can also be set so that each industry can use the same questionnaires and know that the expectations for that firm are set accordingly. This appeared to be particularly applicable in the professional firms as low risk was imposed for any firm in that industry.

(4) Summary

In general, the instruments have shown high internal validity in this round of development and testing. The original instruments had already shown good results in

this area but this could not be assumed in small firms directly. The comparison of results from the interviews and the numerical results from the instruments demonstrated that the alignment observed by the researchers was very close to that measured by the instruments indicating good convergent validity, and the numerical tests used were chosen according to the underlying relationship of fit, indicating good construct validity overall. A number of other factors helped to provide more support for the instruments internal validity, such as the use of multiple methods of data collection and using questions relative to the competition in order to control for industry bias. Future tests should concentrate on predictive validity and on providing benchmarks or customised instruments for different industries. Any large scale data collection should use the appropriate mathematical tests to correspond with the underlying theory, ensuring construct validity is maintained.

2. External Validity and Reliability

Neither external validity nor reliability can be tested conclusively in this stage of the research. However, the decision to use multiple case sites, including both literal and theoretical replications by choosing organisations within the same industry as well as some from different industries, improved the evidence of both the instruments' external validity. As the instruments provided an accurate reflection of the alignment in most firms studied, this indicated that the instruments could be used successfully to measure alignment in more than just one industry, thus providing a wider base for recommendations for further testing.

Similarly for reliability, a number of precautions have been taken to ensure the reliability of the instruments is maximised, by minimising possible external influences. Adequate reliability ensures that consistent results are obtained from multiple testings of the instruments. Thus when the comparisons of the quantitative results repeatedly coincides with the qualitative assessments, this provides *prima facie* evidence of the instruments' reliability.

The difficulty in providing evidence of reliability is that the strategy of a business is constantly changing and any subsequent test may reflect changes in the strategy rather

than low reliability of the instruments. Thus, in this thesis, testing for reliability involved checking equivalence of the measures via an inter-rater method, being a comparison of results from two different observers and then with the results from the instruments.

Additionally, multiple items were used for each dimension. This is recommended by many researchers as measures which are sums or averages tend to be more reliable than single item measures (Prescott, 1986). Some items were very similar, providing more evidence to support the stability of the respondent's answers in providing equivalent scores for the same phenomenon (See Appendix 2 for examples).

3. Other Observations

As stated in Chapter VII, the problem with extremity bias that was encountered with Professional 2 and its low scoring for STROBE and performance was considered to be difficult to control for despite the concern that they had the potential to make a significant difference in results. This is due to the characteristics of each method in that with (1) matching if the different respondents had different scoring styles, it takes less effort to match an average score of '3' than of '4' for example, and with (2) moderation, the multiplicative approach means that if both respondents scored high compared to another firm, the high scores gained higher results and vice versa.

Thus for these reasons, the underestimation in Professional 2 resulted in mediocre STROBE values which led to low moderation values but a good match. In contrast, the interviews suggested that the alignment was somewhat higher than the quantitative results indicated. The low values given for STROBE resulted in a lower multiplicative result, making it harder to score well even in the dimensions indicated as most important. This illustrates the risk and error introduced from extremity bias, where respondents are reluctant to choose the very high and low values.

Conversely, the respondent from Service 2 was found to be a consistently high scorer with (80%) of responses being '4'. This resulted in the opposite situation from Professional 2, with resulting moderation values being higher with high scorers. This problem was extenuated by the fact that the same respondent completed both questionnaires.

While having the same respondent complete both instruments has both benefits and problems, in this case the narrowness of the responses implied a strong tendency towards end-piling. However, this high level of STROIS and IS effectiveness was confirmed by the second interviewee, indicating that the scores from the owner/manger were within the boundaries of a realistic response.

In order to assess firms relative to others, often ranking would be more appropriate for these cases. The request for scores 'relative to the competition' was also aimed at reducing that problem, as firms usually know where they stand in relation to their major competitors. Nevertheless, this problem can still occur, as seen with Service 1 and 2, and overall, the problems encountered with respondents in the sample indicates that it is necessary to ensure that each instrument is filled out by different members of the organisation.

4. Conclusions

Venkatraman (1989a) specified the minimum types of validation for his development of the STROBE instrument. These included internal consistency (reliability and unidimensionality) convergent validity, discriminant validity and predictive validity. Of these, both unidimensionality and predictive validity cannot be adequately assessed until more data is collected. Of the remaining types, convergent and discriminant validity and reliability have been discussed above and there is adequate evidence to suggest that these have been satisfactorily achieved.

The remaining problems of different scoring from respondents can only be minimised as far as possible. Questionnaire design can help, and this aspect of the instruments may need to be looked at further, however the biases encountered are a risk of any self-administered questionnaire. One method of minimising the risks was repeating sections in different instruments to gain a second opinion. Chan used this method in her original instruments. Her final instruments contained replicated sections between the performance instrument, STROBE and STROIS which provided a comparison between scoring and enabled greater confidence in the responses. These sections were not duplicated in the current research as the length of the questionnaire was of primary

concern, and the interviews were used to pick up any such problems. It is strongly recommended however, that such sections are repeated in any large scale data collection.

After each type of validity was assessed, it was necessary to determine what changes were possible to improve the issues already outlined. Some indication of possible solutions have been made in the above discussion, however the actual changes that were made to the instruments are detailed next.

D. Instrument Development

1. STROBE & STROIS Second Round Development

After the first set of case studies, the items were reviewed, taking into consideration the comments of the participants in each organisation as well as the initial findings of the instruments as compared to our own assessment of alignment. The assessment with respect to the validity of the instruments discussed above was also taken into account. This section details the purification of the instruments identified earlier as Stage 4 of Churchill's recommendations for validation of construct measurements

It was considered from the comments that certain items were not applicable to small firms. One item in particular had been considered of minimal relevance to small firms (see Table VIII-7), and this was subsequently deleted from the instruments for the second round of cases. This item was again reviewed in the light of comments in the second round and it was seen to be applicable to some firms despite their size, and should be included in future studies.

There was concern regarding 'end-piling' where respondents answer a questionnaire by circling down one side of the responses (Barclay, 1991), and 'extremity bias' where respondents are unwilling to mark the extremes of the questionnaire (Emory & Cooper, 1991), in both responses from Service 1 and Service 2. This suggested that reversal of some items would be appropriate. The initial instruments had one or more negatively scored items in the Riskiness and Futurity dimensions, but no others. Examples of these reverse-scored and deleted questions from STROBE (Table VIII-7) and STROIS (Table VIII-8) follow:

Original Item	Action	Alteration
When confronted with major decisions, we typically develop comprehensive analyses of the business situations faced	Reverse Scored	When confronted with major decisions, we rarely develop comprehensive analyses of the business situations faced
We regularly are on the look-out for organisations to acquire	Deleted	

Table VIII-7: Example STROBE Secondary Alterations

Original Item	Action	Alteration
The systems used in the organisation assist in the identification of new business opportunities	Reverse Scored	The systems used in the organisation do little to assist in the identification of new business opportunities
The organisation uses systems for strategic business planning	Matched to STROBE better	The organisation uses systems to assist with strategic business planning
The systems used in the organisation, by allowing us to keep track of our competitors, assist us in pre-empting them if necessary	Simplified	The systems used in the organisation assist us in pre-empting competitors

Table VIII-8: Example STROIS Secondary Alterations

It was necessary to ensure that changing the wording to negative did not change the meaning of the question, and that it still paralleled the other instrument. It was also considered that replying to a negative on a Likert scale would confuse participants (Department of Statistics, 1992). This restricted alterations to those items where it was possible to frame a negative that did not involve the use of the word 'not'.

2. IS Effectiveness Second Round Development

Similar problems as in STROBE and STROIS with respect to end-piling and extremity bias were encountered during the first round of data collection and so a number of questions were reverse scored for the second set of cases. Apart from this problem, the instrument appeared to be giving adequate information for our needs.

Original Item	Alteration
Allow us to serve a wide variety of customers	Do little in allowing us to serve a wide variety of customers
Result in significant time savings	Rarely result in significant time savings

Table VIII-9: Example IS Effectiveness Secondary Alterations

Again, if it was necessary to use this instrument for actually quantifying the impact of alignment on IS effectiveness, then it would be important to look at this instrument more thoroughly.

3. Performance Second Round Development

No further alterations were made as the level of information provided from the short instrument was adequate for our analysis.

E. Comparison of Methods of Data Analysis

The data from each questionnaire was used to calculate alignment via a number of different methods in order to determine which was most representative of the relationship between business and IS strategy in small firms. The results from each method were compared with the assessment made by the researchers from interviews and observations. Additionally, the opinions of the respondents themselves were sought in the feedback interview, where they were given the opportunity to discuss the results.

1. Bivariate versus Systems

Under a bivariate view, each dimension indicator is calculated independently and remains separate. In an impact study they would then each be used to determine the impact of that dimension on performance and IS effectiveness. In this study however, they were only compared as an indication of the areas that were lacking in systems support. If the STROBE value for a dimension was very high, but the matching or moderation value was very poor, this indicated that the area needed attention.

Under the systems view, a weighted index comprised of the STROBE value for each dimension was used to collapse each dimension into a single figure measuring the alignment of that firm. Thus, if the STROBE value was high for aggressiveness but low for risk, the alignment value (whether calculated by matching or moderation) for aggressiveness would have proportionately more impact on the final result.

While this view is considered to lose much diagnostic value, in that it is not possible to determine areas that contributed to a low score for example, it enables a group of organisations to be compared and provides a single figure of their alignment. Systems has been found to provide more explanation of variance in statistical tests in past studies which have compared the two approaches. Despite this higher theoretical value of systems, bivariate is particularly useful for practitioners looking for levers to help with managing IS as it identifies areas which are most important and provides valuable information regarding how well they are supported at the time of assessment. However, this distinction was not tested in this thesis, and needs to be investigated in future research.

2. Matching versus Moderation

As can be seen in Table VIII–6 (Section B–3), the ranking of dimensions is significantly different between matching and moderation. Matching assumes that the perfect alignment is reflected by exact match in strategic orientation and thus any excess resources should be discarded. Moderation on the other hand implies that the most resources should be allocated to the most strategic dimensions as they will provide the biggest impact on performance. Thus, a match between STROBE and STROIS is not the most ideal situation. Extra IS resources should still be utilised as they will still provide a better impact on performance, even if allocated to less important dimensions. This is also consistent with the findings of Chan & Huff (1992b) who showed that LOWSTROIS*HIGHSTROBE gave similar middle effects as LOWSTROBE*HIGHSTROIS. It is thus best to apply IS to strategic areas first to obtain the maximum benefit.

This effect can be seen most clearly in Professional 1 and Manufacturing 1. In Professional 1, the alignment under moderation ranked that firm as the highest of all eight cases. Under matching, there were two other firms, Service 1 and Professional 2, who were found to have better matched business and IS strategies. Under moderation however, these were ranked only second and sixth. With Manufacturing 1, both moderation and interview assessments ranked that firm third overall, while matching only ranked it as fifth.

While matching has been found to be less accurate in this thesis, the results from these calculations can still provide some valuable information, particularly when used in a bivariate manner, retaining separate results from each dimension. Where a firm has many low matching scores, i.e. many dimensions are well matched, this can indicate that the organisation has allocated their resources well. A good match indicates that dimensions which are of low strategic value have been given less priority whereas those which are more important have been given higher priority. Thus, while the combinations may not provide the maximum impact of performance under the moderation perspective, it can be seen that the organisation is on the right track by providing IS to the areas which are most beneficial to that organisation.

However, the data indicates that the ranking given under moderation agreed with the findings of the interviews significantly more satisfactorily than the matching scores overall. Similarly, the respondents own opinions largely concurred with these two assessments. While matching can provide some valuable information, the premises behind the moderation perspective appear to be more representative of the situation faced by a firm looking for areas to invest in IS, i.e. that more strategic areas will provide greater benefits to the organisation. In this situation, the model is particularly appropriate to small firms, which can be said to have a more urgent need than larger organisations to be able to identify the most beneficial applications in order to gain satisfactory returns from their investments in IS.

3. Limitations

Although the evidence points quite strongly towards the use of the moderation approach, as mentioned, it is not possible to actually confirm which combination of approaches is most appropriate as the impact on performance has not yet been assessed using these instruments. Additionally, the analysis in this thesis indicates that each has some advantages and these can be considered before any single approach is chosen for use as a diagnostic type tool within individual organisations.

The use of values 'out of 25' and 'out of 4' are not recommended in future studies which begin the process of statistical analysis and validation. However for the purposes of this

thesis it was considered more practical to be able to discuss these figures on a relative basis between dimensions for practitioners and between firms for the researchers analysis.

The problems with difference scores and possible solutions are well documented (Edwards 1993, 1994). The next stages of the research will need to take these into consideration and decide how to operationalise the matching approach before any statistical analysis.

There are a number of limitations regarding the use of interactions, such as the difference between 5:1 and 1:5. In some situations, it may be assumed that a 5 for STROBE and a 1 for STROIS (i.e. the dimension being under supported by the IS strategy) is 'worse' than a 1 for STROBE and a 5 for STROIS (i.e. that dimension being over supported). These have been discussed in more detail in Chan (1992) and Chan & Huff (1993b) but for this thesis, the method of calculation makes the assumption that there is no such difference, and a non-directional multiplicative model is used.

4. Summary

The perspectives which were used in calculating the results each offer some advantages in forming an opinion of the level of alignment attained by a particular firm. The bivariate results are best used for diagnostic purposes, whereas the systems results are only useful for providing an overview. Matching can indicate areas that are significantly lacking in IS support, whereas the results using the moderation provide a more accurate indication of the congruence between the two strategies and the impact of this relationship on performance. The major limitation on these results is that they cannot be purported to be conclusive at this stage, as many of the limitations associated with these calculations may only become apparent after statistical analysis of a large sample of data. Overall however, the results from this analysis indicate that the moderation perspective provides the most representative and informative method of modelling the relationship between IS and business strategy in these small firms.

The next chapter looks at the findings from the eight cases overall and provides some comparisons with the small firm and alignment literature discussed earlier.

Chapter IX. DISCUSSION

A. Introduction

The results indicated that the firms studied had a wide range of characteristics, including size, age, type of management, IS sophistication, success in performance and degree of alignment. This chapter examines the patterns found within the eight cases, and while it is not possible to make any generalisations given the small sample size, the eight firms are discussed with respect to the alignment literature.

B. Alignment in Small Firms

This discussion looks at the levels of alignment achieved by the firms in the sample and characteristics of those organisations in order to determine any similarities between them. As such, the level of alignment shown by the results from the instruments is assumed to be accurate for the purposes of this discussion.

While some interesting observations are made below about the organisations visited in light of the literature on small firms discussed in Chapters II – VI, it is first necessary to state that these observations apply only to the specific organisations studied in this thesis and cannot be considered the basis of a generalisation without further research.

Reich & Benbasat (1994a) found that organisations can exist quite satisfactorily without linkage (i.e. alignment). This finding was supported in the present research as Service 2 claimed their performance was extremely good relative to competitors, despite their poor alignment. Similarly, Manufacturing 2 had very poor information systems, yet managed to achieve very high growth and appeared to be successful in maintaining their customers and sales. As McFarlan, McKenney & Pyburn (1983) state:

Understanding this linkage is more important in organisations in which it is integral to the corporate strategy than where IS plays a supporting role (at 148).

If it is found, as suggested by some researchers (Raymond, 1992), that many small firms have no desire or need for strategic IS and consequently alignment, it may not be

necessary to develop measures for strategic alignment suitable for small firms. However, from the firms in the current study, it is submitted that many were attempting to use IS strategically, and while it may not be necessary for all firms, many required assistance in identifying areas in which support from IS will prove most beneficial.

1. Industry Considerations

In general, it is considered that changes in the external environment will have a greater effect on smaller businesses (Taylor & Banks, 1992). More specifically, it has been found by a number of studies on small firms that technology adoption strategies may be strongly influenced by the firm's competitive environment, a factor which varies from industry to industry (Lefebvre, Langley, Levebvre & Harvey, 1992; Chakrabarti, 1990; Williams & Novak, 1990). Further studies suggest that the external environment has a significant influence on computing in small firms (Baker, 1987; Raymond, 1990) which indicates that the evaluation of IS strategy may be particularly sensitive to the industry that the firm operates within. Similarly, Olson & Bokor (1995) state the need to take into account the industry performance levels before making any such comparisons, as differing levels will affect results if one is significantly higher than another.

In the current research, the industry differences were one area of concern that became apparent as various respondents indicated that some items seemed irrelevant to them and their business. In particular, information appeared to be a more significant part of some industries than others. As discussed in Chapter VIII, some firms indicated a much higher necessity to invest in IT than others. Where referring to industry factors in these questions, the responses between firms in the same industry only ever differed by a maximum of 1 and so the responses were considered to be a relatively accurate reflection of the situation faced by firms in each industry.

In response to this problem, Thompson & Iacovou (1993) customised the constructs and measures in their study for a single industry to reduce the potential for bias. Their recommendation for customising the instruments could be implemented for future studies that aim to concentrate on a specific industry. At the very least, as already mentioned in Section B-2 (Chapter VIII), it would be essential to provide benchmarks of what levels

of various strategic focus and/or systems support would be 'normal' (Chan & Huff, 1992).

2. Leadership

The benefits from having a leader who instigates, or at a minimum supports, developments in IS and has visionary leadership are well documented. These are particularly pertinent in small firms where the control of the organisation lies with one or a few members. DeLone (1988) claimed that the CEO's involvement is the key to realising the potential beneficial impact of IT investment and Thompson & Iacovou (1993) found conclusively that an IT 'champion' (i.e. leader) made IT more successful in that organisation. Additionally, the top heaviness of decision making in small firms contributes to the common observation that motivation for IS either comes from the top or not at all. This results in leaders who are more inclined towards supporting IS having more successful systems in their firm than leaders who are not convinced that IS will benefit them.

From the firms studied in this thesis, a number had leaders who were highly interested in IT and IS, and it appeared that these firms were much more likely to have sophisticated information systems in their business. Examples of this include the leaders of Professional 1 and Service 1 who all considered IS to be an integral part of the way they competed, while the partners of Service 2 had almost non-existent experience with IS and thus had little idea of the benefits that it could bring to the business.

However, this link between IS interest/vision and IS sophistication in the business did not necessarily indicate a similarly positive link with alignment. The firms with highly sophisticated IT, i.e. Professional 2, Retail 1 and Manufacturing 1, did not exhibit high alignment as well. Thus, within the group of firms studied, it appeared that the firms with leaders involved with IS were more likely to have highly sophisticated information systems but it did not follow that the same organisation also managed to use the information strategically. Conversely however, of the organisations that used their information systems strategically and thus achieved good alignment scores, each had a supportive or involved leader.

This is congruent with the findings of Lefebvre, Lefebvre & Harvey (1993) who argued that beyond investments in information systems, small firms must rely on CEOs who have the vision necessary to support these efforts through coherent and appropriate business and information systems strategies. Thus it appeared that mere investment in IS would not guarantee success in alignment and therefore investment did not necessarily provide improved performance¹³.

3. Information Systems

Studies have found that IS in small firms is usually subordinate to the accounting or finance functions, and there tends to be few people experienced with IS (Blili & Raymond, 1993). This was the case in all firms visited in this study. No firm had an employee dedicated to IS alone, or a separate IS department or function. The larger partnerships had a partner responsible for IS, however this was an assigned role (changed annually) in order to ensure that someone kept up with the developments in the market and how they could assist the firm.

Information systems used in small firms are often transaction oriented, package type applications which tend to be under-utilized as IS often applies only to support activities. Strategic applications, on the other hand are linked to key activities with the intent of a direct impact on performance (Blili & Raymond, 1993). Most firms studied had some type of strategic application, although some concentrated mainly on support activities which would result in less benefits in performance. This was confirmed by the lower average overall of STROIS as compared to STROBE. All STROIS dimension averages were less than 4.0 and some went under 3.0, indicating those aspects of STROIS were less important for most firms. This may be contrasted with the STROBE dimensions in which no average was below 3.0 and some were higher than 4.0.

The higher risk faced by small firms also means that investing in IS is more risky than for larger organisations (Lin, Vassar & Clark, 1993). This was shown in the case of three

¹³ Although the connection between alignment and performance was not investigated in this thesis, it is an assumption that successful alignment will bring improvements to performance. Thus the above conclusion holds only under that assumption.

firms who had made investments in IS only to find that they could not get the after sales support that they needed or that the system did not adequately perform the tasks that it was purchased to do. Understandably, two of these firms had yet to make a second attempt to invest in IS and were reluctant to do so.

Small firms' fewer resources, staff and knowledge means development of information systems needs to be more simple and flexible than for large organisations. Pyburn (1983) asserts that there is less need for IS planning where management and IS are comfortable, however as firms increase in size and complexity, formal planning becomes increasingly important. In the firms in this research, only Professional 1 conducted any type of formal planning, and only those firms which indicated average to high alignment had a clearly defined and documented IS strategy.

4. Alignment

Venkatraman (1991) claims there is a need to identify high-leverage activities that have higher scope for 'exploitation'. He states:

...the realization of effectiveness (or strategic benefits) requires a careful analysis of competitive and organisational conditions and the articulation of strategic thrusts (at 131).

Each firm's strategic priorities will differ, and thus each firm will have aspects of their strategy that can be identified as able to be leveraged. However, Venkatraman states that some aspects are much more easily leveraged than others. This was apparent in the firms in the current research, as they all utilised their IS in administration and product inventory where applicable. However, only a subset of those had extended their applications to include things such as external links with clients or real-time inventory maintenance.

Similar to Venkatraman, Thompson & Iacovou (1993) claim that firms should identify business areas that have the most critical information needs and the most promising opportunities. Small businesses should therefore be concerned with how and where to invest as well as how much. As seen in the results from the firms studied, there was a variation in the degree of support given to the most strategic dimensions in each firm.

Lederer & Mendelow (1986) found prioritisation for information technology resources to be a primary concern for organisations. The method employed in this thesis of assessing the importance of various aspects of strategy as well as the same areas in information systems strategy via independent instruments provides valuable information for practitioners regarding what kind of investments would bring the largest benefits to an organisation. The feedback interviews also indicated significant interest from respondents in this type of information.

Additionally, this view of supporting the most strategic dimensions with IS first in order to gain the maximum benefit for the organisation also appears to favour the moderation approach over matching. The moderation approach was selected as being the most appropriate in modelling this fit relationship after analysis of the results, which implicitly supports the above opinions.

The STROBE instrument identifies the key activities which are most likely to provide benefits in performance. The small firm literature claims that common positions on a number of these strategic dimensions will be found in most smaller organisations. For example, the literature suggests that firms concentrating on cost containment and/or growth are more conservative and are therefore less likely to invest in strategic IS (Gatian, Brown & Hicks, 1995). Some of Wiseman's (1985) Strategic Thrusts, namely those related to innovation and alliances were found to be more aggressive than those involving cost containment or support for growth. Similarly, Weill (1990) found that firms that held either growth or cost minimization important were least likely to invest in strategic IT.

While these findings are too specific to be able to be ascertained in this study with such a small group of case sites, these combinations of strategic orientations can be assessed in future research using the instruments, and as they become more refined, certain combinations using frameworks such as Wiseman's Strategic Thrusts and Miles & Snow's typology may become apparent. The position of the firms with respect to individual dimensions in this study are compared with the literature below. The data discussed along with the maximum, minimum and averages for STROBE, STROIS and alignment of each of the dimensions is included in Appendix 1.

(1) Futurity

The decision cycle or horizon in small firms is often short term, i.e. relying on reaction as opposed to anticipation (Blili & Raymond, 1993). Tilles (1963) asserts that the larger the organisation, the further its strategic time horizon must extend.

In general, the futurity values given by the firms in this sample were low. The average for this dimension (3.25 across all firms) was the second lowest average of all dimensions. It was relatively well matched to STROIS but rarely made any significant contribution due to the low strategic importance given by most firms. This appears to be of lower significance than firms from Chan's (1992) study, where the futurity alignment was found to be about fifth out of the eight which indicated it was of average importance, as opposed to almost inconsequential in the current study.

(2) External Defensiveness

The quality of customer service was found to be extremely important to many firms in the sample. This was expected as smaller firms have traditionally competed on this dimension (Meredith, 1987). A number of organisations gave external defensiveness straight 5's, indicating that this dimension, including relationships with customers, distributors and suppliers can be very important to organisations in the way they compete. The average overall was 4.31, being the highest of all eight dimensions, and no individual firms scored below 3.00.

The IS values for the dimension were not so high with an average of only 2.91. This indicates that some firms could gain significant improvements in performance from supporting this dimension of strategy. External defensiveness could be improved for many by installing external communication lines (e.g. e-mail) with clients, banks and/or suppliers. A number of firms indicated that they were intending to install such connections with other parties, but only Manufacturing 1 and Service 1 had actually done so.

(3) Riskiness

Small firms are generally assumed to face higher risk. They are unable to control environmental factors and these will have a greater effect on a small organisation than a large one. A small firm will often have less knowledge of future events and is less well prepared for changes in environmental factors. The frequent lack of human resources means outsourcing is more common (e.g. suppliers, consultants, installation of new equipment) and this also means less control thus increased risk (Blili & Raymond, 1993). Taylor & Banks (1992) found entrepreneurs to generally score higher in propensity for risktaking amongst other factors.

The risk dimension was found to be low in all cases with an average value of only 2.63. Although risk may be inherent to a certain extent, and small firms are traditionally considered to face higher risk, this emphasis on minimising risk may be due to recognition that a small firm cannot afford to take further risks. In this thesis the firms studied generally indicated that they were very risk averse with the manufacturing firms being the only firms with an above average willingness to take risks, scoring an average of 3.88 between them. The average over all firms was the lowest of all dimensions (2.83) suggesting that the greater risk faced by these firms means that they are unwilling to take on more.

The dimension was usually over supported by STROIS, which scored an average of 2.94, indicating that systems are utilised for this purpose, enabling the firms in the sample to assess the risk of projects before they make decisions. Under the moderation assumptions however, this dimensions did not make much contribution to performance due to the extremely low scores given for STROBE.

(4) Analysis

The lack of planning in small firms can cause problems as leaders often rely on intuition or guess-work rather than information and formal models (Blili & Raymond, 1993). From the firms in the sample, analysis tended to be of above average importance (average 3.63) but there was a very distinct difference between firms with sophisticated IS and those without, resulting in the average score overall. The firms which were well

aligned generally over supported analysis, whereas poorly aligned firms tended to provide little support for analysis. This indicated that the firms that used IS successfully tended to require concrete and reliable information before making a decision, whereas leaders of firms without sophisticated IS did no such analysis, relying on themselves to make decisions without this type of information.

The range of values for these dimensions indicates that many of the findings from previous studies into strategy and information systems in small firms have been similarly observed in the current research. More research into strategy and alignment in small firms is possible with an adequate measurement instrument, and the results from this thesis suggest that the STROBE and STROIS instruments can be used to assess each strategy and then calculate the alignment adequately and accurately, providing more data which can be used to test many of these hypotheses and past findings.

5. Venkatraman's (1991) Typology

The assessment of each firm using the criteria specified by Venkatraman for his three types¹⁴ indicates that the firms studied were at different stages of IS development. Professional 1 was the closest to being a Type III organisation. The members of that firm considered IT to be integral to their business strategy with new IT innovations regularly being introduced and their business strategy being adapted accordingly rather than being merely reactive in their use of information systems and technology. On the other hand, Professional 2 was closer to a Type II organisation as they used information systems and technology to support their strategy but made little effort to find applications for new innovations in their business.

Service 1 appeared to be a very high Type II organisation as it used information systems for supporting their business strategy and was very quick to adopt new technology where useful. However, they appeared to lack the ability to identify new methods of competing from developments in information systems. Service 2 on the other hand was clearly only a Type I. Its minimal business information systems were solely adequate for their

¹⁴ Section C-2, Chapter III.

administration purposes. There were no additional applications designed to support the business in competition and a distinct lack of consideration of information technology for its business. This is in contradiction to the results from the assessment under moderation where it appears that Service 2's systems have the potential to make more of an impact than was thought by the interviewers and respondents themselves (See Table VIII-6).

Manufacturing 1 and 2 were more difficult to classify. Manufacturing 1 used information technology in innovative ways, however its information systems were not integrated nor did they allow the business strategy to be adapted according to new IT developments. Thus, although it appeared to have support for their systems, technology itself, rather than information, was more of a catalyst for alterations to the competitive positioning than information. Consequently the business was considered to be a Type II rather than a Type III organisation. Manufacturing 2 desired systems to support its business strategy, but the transition it was experiencing prevented any major developments until the structure of the organisation and the upgrading of the IS systems was completed. They were therefore classified as a Type I, however it was apparent that there existed significant potential for future improvement in their systems and alignment.

Finally, the retail firms were closer in their overall alignment than any other industry pair (according to the interviewers assessments). Retail 1 had problems with the information flows in their organisation, however the owner/manager who was in the position to improve the situation appeared to have little knowledge of the situation. Retail 1 would therefore be Type I as the present systems did little more than administrative functions. While Retail 2 had a system that provided excellent information for their needs it was unlikely that this situation would change in the future. They had good support for their strategy now, but this was changing, and there was no apparent consideration of how information systems could assist this change in strategic orientation. They would therefore be considered a low Type II until they began to adopt new systems and technology to support their changing business strategy.

C. Summary

The above discussion suggests that the firms chosen for this research appear to be typical of many small firms, and yet have a wide variation in their information systems and alignment. This wide range of understanding of alignment was also indicated by the assessments of the firms according to Venkatraman's (1991) three types.

A number of factors have appeared to be common amongst the group, such as the existence of a leader willing to invest and provide support for information systems. The industry factors that were seen to be important to past researchers have also been shown as relevant in this study. This indicates that it may be difficult to provide a set of instruments which measure strategic alignment with adequate specificity and yet can be used globally by any type of small firm.

Interestingly, the past findings that successful alignment may not actually be a prerequisite for a firm's success have also been observed in this study. This further illustrates the necessity for firms to be able to prioritise their investment in information systems in order to maximise the benefits.

The next and final chapter summarises the findings from the research in this thesis, and outlines the limitations that were encountered along with the suggestions for future research.

Chapter X. CONCLUSIONS

This chapter identifies the inherent limitations from the research approach and the small number of firms studied and these are discussed along with possible areas for future research. The final section involves drawing the conclusions from the research conducted for this thesis.

A. Limitations and Future Research

A number of concerns regarding the method need to be mentioned due to their possible effect on the validity of the conclusions.

First, the use of a case approach automatically raises the question of the generalisability of the findings. The instruments have been found to accurately reflect the level of alignment in the firms studied and the reliability of the findings has been tested as far as possible with only eight cases. Nevertheless there is always the possibility in a small sample that the accuracy of the findings are due to chance and would not be repeated in a further test. The results therefore need to be confirmed by a larger scale study.

Additionally, the assumption was made that successful alignment of the business strategy and the IS strategy impacts positively on performance. This needs to be investigated and confirmed by using the instruments and testing this hypothesis.

Strategy is considered to be a very complex construct. According to Chan & Huff (1992), differences in both external (environmental) and internal (company) factors may result in significant variance between companies. This concern is consistent with other recommendations to conduct studies within the same industry as far as possible. For example, Thompson & Iacovou (1993) customised the constructs and measures in their study for a single industry to reduce the potential for bias.

In this thesis this variance was controlled for as far as possible by choosing more than one firm from the same industry to compare, and also avoiding drawing conclusions regarding the actual level of alignment between organisations from different industries.

However, the exact level of this variance cannot be measured in any situation and thus may only be minimised where possible in future studies.

One of the most significant areas for future research involves the testing of the different perspectives in measuring alignment. A combination of four perspectives were tested in this thesis based on prior evidence and recommendations for their suitability, however the confirmation of these findings as well as the introduction of other perspectives would be a valuable aspect for further research. The past problems with difference scores used in the matching calculations largely relate to collinearity and other statistical problems and thus were not as critical at this stage of the research. However, these problems need to be ascertained and accounted for in future applications of this research (Edwards, 1993). Similarly the distinction between the direction of interactions will need to be considered (Chan, 1992).

Both the IS effectiveness and performance instruments were considerably shortened for this round of testing, and the research into these concepts in small firms was minimal. These constructs were considered less important at this stage of the research as the aim was to develop and validate the measure for strategic alignment itself. In particular, with the importance of keeping the instruments as short as possible, the UIS section from the original IS effectiveness instrument was eliminated. The mixed results experienced in past research using UIS justified the elimination of this section in this thesis, but this decision may need to be revised before the instruments are used in actually testing for the impact of alignment on IS effectiveness and performance. Thus, these concepts need to be investigated more thoroughly in order to adapt the instrument to accurately reflect the best way to measure the constructs in small firms.

Finally, some problems were encountered in the responses from certain firms, however solutions and possible action to minimise these have been suggested for future applications. Some items may also need to be reviewed based on comments from respondents. The different characteristics of each industry also provide some insight into the levels of certain dimension which may be considered 'normal' for firms from that industry and thus alleviate some of these concerns. The results also indicated that every firms' considered their performance to be above average (greater than 3.00), which indicated that every respondent considered that they were performing better than the

competition. This was not investigated any further but a concern was raised that no firm would admit they were performing below average. This would need to be tested in future studies, as well as testing firms in a loss situation.

B. Conclusions

This thesis has begun the process of developing instruments suitable for measuring the construct of strategic alignment in small firms. Initially, the literature on strategic alignment indicated that the past research most commonly utilised a classificatory approach in assessing organisations, however the comparative approach was beginning to be considered as a more comprehensive and informative method of assessing organisations. It was therefore decided that the comparative approach would be adapted in this thesis.

Churchill's (1979) approach for the development of construct measures was used as the basis for this research. The approach involves eight steps, however the current study only attempted to complete the first half of these steps. The exploratory nature of employing the comparative method in small firms meant that it was necessary to investigate strategic alignment in the context of small firms directly via qualitative methods, rather than a large scale survey for example, as the knowledge of context provided information regarding the suitability and accuracy of the instruments' assessment of strategic alignment that could not be ascertained by a mail assessment. The decision to use a multiple case approach precluded the use of statistical techniques for data analysis and testing of validity and reliability, and thus left the remaining steps for a later stage of research.

Chan (1992) provided the basis for the model of the relationship between business strategy, IS strategy, IS effectiveness and performance. A comparative approach was used in her study, which used assessments of both the business strategy and the IS strategy to calculate alignment. However Chan's model hypothesised that the degree of alignment impacted positively on IS effectiveness and performance, whereas the focus of this thesis was the measurement of alignment itself, based on the assessments of business strategy and IS strategy. Thus, while Chan's model was adapted for use in this thesis, it

was not an aim of the research to investigate the impact of alignment on IS effectiveness and performance.

The first of Churchill's steps involved assessing the domain of the constructs concerned. It was determined that the realised strategy should be the focus of this study, and both the business and IS strategy were defined at the competitive, or business level. Additionally, the goals were separated from the strategies and excluded from the conceptualisation of strategy used in this study and process was distinguished from the content of strategy. Thus 'strategy' for the purposes of this research included only the content of each strategy as it was realised in each organisation, and not the process of implementation or the goals of that firm.

Determining the most appropriate relationship of fit between the business strategy and the IS strategy was also necessary to complete Step 1. A number of differing models exist in past research and it was decided that the moderation approach, involving a multiplicative method, would be suitable for modelling strategic alignment in small firms. However, the competing perspective of matching, employing differences, was also used in order to provide a comparison to the moderation approach and because it had been more commonly employed in past research. With respect to the comparison between Drazin & Van de Ven's (1985) bivariate fit and systems outlook, both were used in calculations in this thesis. However it was not possible to draw any conclusions regarding the superiority of either approach, because the limited quantity of data obtained precluded the use of statistical tests. Future research into the differences in the bivariate and systems approaches to modelling fit would help to provide a more complete picture of the best way to model alignment in small firms.

The second of Churchill's steps required the generation of a sample of items for each dimension that had been defined as part of each construct. The constructs of business strategy and IS strategy had been defined by Venkatraman (1989a) and Chan (1992) as having eight dimensions. This dimensionality and also that for the performance construct were maintained for this research. The IS effectiveness construct adapted by Chan (1992) however, was considered to be too complex for this research and was reduced to only four dimensions.

The instruments developed in past research and employed by Chan (1992) were considered to be suitable as the starting point for the instruments to be used in this research to measure strategic alignment. However, the items used by Chan to represent each dimension were developed with respect to large firms and thus some required alteration before they could be used in the context of small firms.

Once the instruments had been adapted accordingly, it was possible to begin the process of data collection. This was conducted in two stages with a 'purification' of the instruments between the two rounds of data collection based on interviewers observations and comments from respondents. Case studies were conducted in firms from four different industries, and these involved a series of three interviews as well as respondents completing the instruments.

The data from each firm was analysed using the chosen perspectives and compared within industry as well as across all firms in the research. Overall the ranking of organisations from the interviewers assessments and the quantitative results from the instruments under moderation were congruent, demonstrating that the instruments successfully provided an accurate indication of the level of alignment in each firm. The accuracy of this quantitative assessment appeared to be highly promising in measuring the level of alignment in a particular firm. The validity and reliability of the instruments, particularly the STROBE and STROIS instruments, were assessed as far as possible with the limited number of firms involved in the study. On the basis of these assessments there would appear to be sufficient qualitative and quantitative evidence to warrant further research using the instruments.

In comparing the methods used in calculations, it was concluded that moderation provided a more representative indication of the level of alignment in each firm. Matching however, still provided some valuable information regarding prioritisation of firm's investment in IS. Additionally, the systems perspective was used to provide a single figure representative of the level of alignment achieved in a particular firm for the purposes of comparison. The bivariate fit perspective was used to compare the levels of various dimensions across all firms. This indicated that both perspectives provided information regarding the level of alignment which could be useful in different ways.

The instruments have performed well in assessing the level of alignment in the firms visited in this thesis. The instrument, interview and respondent results all provided a similar indication of the ranking of the organisations studied. Taking the limitations described above into account, the opportunities for further research are extensive.

This thesis only completed up to Step 5 of Churchill's recommendations and thus large scale data collection needs to be conducted in order to enable the completion of the validity and reliability tests and the confirmation of the results from this study. The completion of such research should provide a set of instruments that have been shown to reliably measure strategic alignment in small firms and that have been validated in the New Zealand small firm context.

ACKNOWLEDGEMENTS

As with any larger research undertaking, many people contributed to this thesis over the course of 1995. I would like to express my particular gratitude to Dr. Paul Cragg who provided the initial interest and enthusiasm for the project, the major guidance throughout, and most essentially, financial assistance for the research. Without each of these, this thesis would be unlikely to have been completed, and the entire research experience would have been significantly less satisfying. It is with regret that I turn down his offer of continuing research in this area.

Secondly, special thanks must go to my essentially lone proof-reader, Hassan Wong, of First NZ Capital in Wellington, who sacrificed many evenings and precious weekends at short notice to read the latest chapter, despite the added complication of distance. Many members of staff at the University provided assistance in opinions and technical knowledge, including Philip Schluter (Statistics), John Vargo and James Bacon (Information Systems), Alan Robb (Strategy), Peter Hinchey and Brendan Queree (Computer Technology) and Bob Hamilton (Small Firms).

Finally, family and friends have gracefully endured a very long and often stressful year, providing invaluable support in terms of tolerance at home, encouragement as well as hurried bibliographic searches, formatting and graphics.

To each of you personally, I express my sincerest gratitude.

Andrea Hale

University of Canterbury, 1995

BIBLIOGRAPHY

- Andrews, K. R., *The Concept of Corporate Strategy*, New York: Dow Jones-Irwin, 1980.
- Ansoff, H. I., *Corporate Strategy*, New York: McGraw Hill, 1965.
- Atkins, M. H., "Information Technology and IS Perspectives on Business Strategies", *Journal of Strategic Information Systems*, 3(2), 1994, pp 123-135.
- Atkinson, R. A., "The Motivations for Strategic Planning", *Journal of Information Systems Management*, Fall 1990, pp 53-56.
- Baets, W., "Aligning IS with Business Strategy", *Journal of Strategic Information Systems*, 1(4), September 1992, pp 205-213.
- Baker, B., "The Role of Feedback in Assessing Information Systems Planning", *Journal of Strategic Information Systems*, 4(1), March 1995, pp 61-80.
- Baker, W. H., "Status of Information Management in Small Business", *Journal of Systems Management*, 38(4), 1987, pp 10-15.
- Bakos, Y. & Treacy, M. E., "Information Technology and Corporate Strategy: A Research Perspective", *MIS Quarterly*, 10(2), May 1986, pp 106-119.
- Barclay, D. W., "Interdepartmental Conflict in Organizational Buying: The Impact of the Organizational Context", *Journal of Marketing Research*, May 1991, pp 145-159.
- Baroudi, J. J. & Orlikowski, W. J., "A Short Form Measure of User Information Satisfaction: A Psychometric Evaluation and Notes on Use", *Journal of Management of Information Systems*, 4(4), 1988, pp 45-59.
- Benbasat, I., Goldstein, D. K. & Mead, M., "The Case Research Strategy in Studies of Information Systems", *MIS Quarterly*, 11(3), September 1987, pp 369-386.
- Benjamin, R. I., Rockart, J. F., Scott Morton, M. S. & Wyman, J., "Information Technology: A Strategic Opportunity", *Sloan Management Review*, 25(3), 1984, pp 3-10.
- Bergeron, F. & Raymond, L., "Planning of Information Systems to Gain a Competitive Edge", *Journal of Small Business Management*, 30(1), January 1992, pp 21-26.
- Bergeron, F., Buteau, C. & Raymond, L., "Identification of Strategic Information Systems Opportunities: Applying and Comparing Two Methods", *MIS Quarterly*, 15(1), March 1991, pp 89-103.
- Birnberg, J. G., Shields, M. D. & Young, S. M., "The Case for Multiple Methods in Empirical Management Accounting Research (With an Illustration from Budget Setting)", *Journal of Management Accounting Research*, 2, Fall 1990, pp 33-66.

- Blili, S. & Raymond, L., "Information Technology: Threats and Opportunities for Small and Medium Sized Enterprises", *International Journal of Information Management*, 13, 1993, pp 439-448.
- Bollard, A., *Small Businesses in New Zealand*, Allen and Unwin, Port Nicholson Press, Wellington, 1989.
- Bonoma, T. V., "Case Research in Marketing: Opportunities, Problems, and a Process", *Journal of Marketing Research*, 22, May 1985, pp 199-208.
- Boyle, R. D. & Desai, H. A., "Turnaround Strategies for Small Firms", *Journal of Small Business Management*, 29(3), July 1991, pp 33-42.
- Boynton, A. C. & Zmud, R. W., "Information Technology Planning in the 1990's: Directions for Practice and Research", *MIS Quarterly*, 11(1), March 1987, pp 59-71.
- Chakrabarti, A. K., "Innovation and Productivity: An Analysis of the Chemical Textiles and Machine Tools Industries in the U.S.", *Research Policies*, 19, 1990, pp 257-269.
- Chakravarthy, B. S., "On Tailoring a Strategic Planning System to its Context: Some Empirical Evidence", *Strategic Management Journal*, 8, 1987, pp 517-534.
- Chan, Y. E., "Business Strategy, Information Systems Strategy, and Strategic Fit: Measurement and Performance Impacts", *PhD. Dissertation*, University of Western Ontario, September 1992.
- Chan, Y. E. & Huff, S. L., "The Development of Instruments to Assess Information Systems and Business Unit Strategy and Performance", in *Research in Strategic Management and Information Technology*, J. Henderson & N. Venkatraman eds., JAI Press, 1994.
- Chan, Y. E. & Huff, S. L., "Strategy: An Information Systems Research Perspective", *Journal of Strategic Information Systems*, 1(4), September 1992a, pp 191-204.
- Chan, Y. E. & Huff, S. L., "The Development of Instruments to Assess Information Systems and Company Strategy and Performance", *Working Paper 92-06*, March 1992b.
- Chan, Y. E. & Huff, S. L., "Investigating Information Systems Strategic Alignment", *Proceedings of the Fourteenth Conference on Information Systems*, Orlando, Florida, December 1993, pp 345-363.
- Chan, Y. E., Huff, S. L. & Morrison, A. J., "Assessing the Strategic Value of Company Information Systems", *Working Paper 93-06*, February 1993.
- Child, J., *Organization: A Guide to Problems and Practice*, New York: Harper and Row, 1977.
- Christenson, C. R., Andrews, K. R., & Bower, J. L., *Business Policy: Text and Cases*, Richard D. Irwin, Homewood, Illinois, 1978.

- Churchill, G. A., "A Paradigm for Developing Better Measures of Marketing Constructs", *Journal of Marketing Research*, 16, 1979, pp 64–73.
- Cooley, P. L., Walz, D. T. & Walz, D. B., "A Research Agenda for Computers and Small Business", *American Journal of Small Business*, 11(3), 1987, pp 31–42.
- Cragg, P. & King, M., "Small Firm Computing, Motivators and Inhibitors", *MIS Quarterly*, 17(1), March 1993, pp 47–58.
- Cron, W. & Sobol, M., "The Relationship between Computerization and Performance: A Strategy for Maximising Economic Benefits of Computerization", *Information & Management*, 6, 1983, pp 171–181.
- Crowston K. & Treacy, M. E., "Assessing the Impact of Information Technology on Enterprise Level Performance", *Proceedings of the Seventh International Conference on Information Systems*, San Diego, CA, 1986.
- Das, S. R., Zahra, S. A. & Warkentin, M. E., "Integrating the Content and Process of Strategic MIS Planning with Competitive Strategy", *Decision Sciences*, 22, 1991, pp 953–984.
- Department of Statistics, NZ, *A Guide to Good Survey Design*, Wellington, NZ, 1992.
- Dess, G. G. & Robinson, R. B., "Measuring Organisational Performance in the Absence of Objective Measures: The Case of the Privately Held Firm and Conglomerate Business Unit", *Strategic Management Journal*, 5, 1984, pp 265–273.
- Dillman, D. A., *Mail and Telephone Surveys: The Total Design Method*, Wiley–Interscience, Washington, 1978.
- Downs, S. R., "The Strategic Use of Information Systems: Implications for Communication and Internal Control", *PhD. Dissertation*, Graduate School of Business, University of Utah, 1988.
- Drazin, R. & Van de Ven, A. H., "Alternative Forms of Fit in Contingency Theory", *Administrative Science Quarterly*, 30, 1985, pp 514–539.
- Earl, M. J., "Information Systems Strategy Formulation", *Critical Issues in IS Research*, Chapter 7, 1987, pp 157–178.
- Edwards, J. R., "Problems with the Use of Profile Similarity Indices in the study of Congruence in Organisational Research", *Personnel Psychology*, 46, 1993, pp 641–665.
- Edwards, J. R., "The Study of Congruence in Organisational Behaviour Research: Critique and a Proposed Alternative", *Organisational Behaviour and Human Decision Processes*, 58, 1994, pp 51–100.
- Ein–Dor, P. & Segev, E., "Organisational Context and MIS Structure: Some Empirical Evidence", *MIS Quarterly*, September, 1982

- Eisenhardt, K. M., "Building Theories from Case Study Research", *Academy of Management Review*, 14(4), October 1989, pp 532–550.
- Emory, C. W. & Cooper, D. R., *Business Research Methods*, Richard D. Irwin, Homewood, Illinois, 1991.
- Fiedler, K. D., Grover, V. & Teng, J. T. C., "An Empirical Study of Information Technology Enabled Business Process Redesign and Corporate Competitive Strategy", *European Journal of Information Systems*, 4(1), February 1995, pp 17–30.
- Gable, G. G., "Integrating Case Study & Survey Research Methods: an example in IS", *European Journal of IS*, 3(2), April 1994, pp 112–126.
- Galliers, R. D., "Towards a Flexible Information Architecture: Integrating Business Strategies, IS Strategies & Business Process Redesign", *Journal of Information Systems*, 3(3), 1993a, pp 199–213.
- Galliers, R. D., "IT Strategies: Beyond Competitive Advantage", *Editorial, Journal of Strategic Information Systems*, 2(4), December 1993b, pp 283–291.
- Gatian, A. W., Brown, R. M. & Hicks, J. O., "Organisational innovativeness, competitive strategy and investment success", *Journal of Strategic IS*, 4(1), March 1995, pp 43–59.
- Grant, J. H. & King, W. R., *The Logic of Strategic Planning*, Boston: Little, Brown, 1982.
- Hagmann, C. & McCahon, C. S., "Strategic information systems and competitiveness", *Information & Management*, 25(4), 1993, pp 183–192.
- Hambrick, D. C., "Operationalising the Concept of Business-Level Strategy in Research", *Academy of Management Review*, 5(4), October 1980, pp 567–575.
- Hambrick, D. C., "Some Tests of the Effectiveness and Functional Attributes of Miles and Snow's Strategic Types", *Academy of Management Journal*, 26(1), 1983, pp 5–26.
- Hambrick, D. C. & Lei, D., "Toward an Empirical Prioritisation of Contingency Variables for Business Strategy", *Academy Management Journal*, 28(4), 1985, pp 763–788.
- Hayen, R. L., "Applying Decision Support Systems to Small Business Financial Planning", *Journal of Small Business Management*, 20(3), 1982, pp 35–46.
- Hofacker, C. F., "Alternative Methods for Measuring Organisation Fit: Technology, Structure, and Performance", *MIS Quarterly*, 18(1), March 1992, pp 45–57.
- Hofer, C. W. & Schendel, D. E., *Strategy Formulation: Analytical Concepts*, New York: West Publishing Company, 1978.

- Hoffman, J. J., Cullen, J. B., Carter, N. M. & Hofacker, C. F., "Alternative Methods for Measuring Organisation Fit: Technology, Structure and Performance", *Journal of Management*, 18(1), 1992, pp 45–57.
- Horne, M., Lloyd, F., Pay, J. & Roe, P., "Understanding the Competitive Process: A Guide to Effective Intervention in the Small Firms Sector", *European Journal of Operational Research*, 56, 1992, pp 54 – 66.
- Horovitz, J., "New Perspectives on Strategic Management", *Journal of Business Strategy*, Winter 1984, pp 19–33.
- Ives, B., Olson, M. H. & Baroudi, J. J., "The Measurement of User Information Satisfaction", *Communications of the ACM*, 26(10), October 1983, pp 785–793.
- Jarvenpaa, S. L. & Ives, B., "Organizing for Global Competition: The Fit of Information Technology", *Decision Sciences*, 24(3), May–June 1993, pp 547–580.
- Johnston, H. & Carrico, S., "Developing capabilities to use information strategically", *MIS Quarterly*, March 1988, pp 37–48.
- Kay, J., "The Structure of Strategy", *Business Strategy Review*, 4(2), Summer 1993, pp 17–37.
- Kovacevic, A. & Majluf, N., "Six Stages of Strategic Management", *Sloan Management Review*, 34(4), Summer 1993, pp 77–87.
- Lederer, A. L. & Mendelow, A. L., "Issues in Information Systems Planning", *Information & Management*, 10, January 1986, pp 245–254.
- Lee, A. S., "A Scientific Methodology for MIS Case Studies", *MIS Quarterly*, 13(1), March 1989, pp 33–50.
- Lefebvre, E., Lefebvre, L. A. & Harvey, J., "Competing Internationally Through Multiple Innovative Efforts", *R & D Management*, 23(3), July 1993, pp 227–237.
- Lefebvre, E., Lefebvre, L. A. & Roy, M., "Technological Penetration and Organizational Learning in SMEs: the Cumulative Effect", *Technovation*, 1995.
- Lefebvre, L. A., Langley, A., Harvey, J., Lefebvre, E., "Exploring The Strategy–Technology Connection in Small Manufacturing Firms", *Production and Operations Management*, 1(3), summer 1992, pp 1–17.
- Lin, B., Vassar, J. A. & Clark, L. S., "Information Technology Strategies for Small Businesses", *Journal of Applied Business Research*, 9(2), Spring 1993, pp 25–29.
- Lucas, H. C., "The Use of an Accounting Information System: Action and Organizational Performance", *Accounting Review*, L(4), 1975, pp 735–746.
- Lucas, H. C. & Turner, J.A., "A Corporate Strategy for the Control of Information Processing", *Sloan Management Review*, Spring 1982, pp 25–36.

- Marshall, C. & Rossman, G., *Designing Qualitative Research*, Sage Publications Inc., California, 1989.
- McFarlan, F. W., "Information Technology Changes the Way You Compete.", *Harvard Business Review*, 62(3), 1984, pp 98–103.
- McFarlan, F. W., McKenney, J. L. & Pyburn, P., "Information Archipelago – Plotting A Course", *Harvard Business Review*, 61(1), Jan/Feb 1983, pp 145–156.
- McKinnon, J., "Reliability and Validity in Field Research: Some Strategies and Tactics.", *Accounting, Auditing and Accountability*, 1(1), 1988, pp 34–54.
- Meredith, J., "The Strategic Advantages of New Manufacturing Technologies for Small Firms", *Strategic Management Journal*, 8, 1987, pp 249–258.
- Miles, M. & Huberman, A., *Analyzing Qualitative Data: A Sourcebook for New Methods*, Beverly Hills: Sage, 1984.
- Miles, R. E. & Cameron, K. S., *Coffin Nails and Corporate Strategies*, Prentice Hall, Englewood Cliffs, NJ, 1982.
- Miles, R. E. & Snow, C.C., *Organizational Strategy, Structure and Process*, McGraw-Hill, New York, 1978.
- Miller, D., "Toward a New Contingency Approach: The Search for Organisational Gestalts", *Journal of Management Studies*, 18(1), 1981, pp 1–26.
- Miller, D. & Friesen, P. H., "Archetypes of Strategy Formulation", *Management Science*, 24(9), May 1978, pp 921–933.
- Miller, D. & Friesen, P. H., *Organizations: A Quantum View*, Prentice Hall, Englewood Cliffs, NJ, 1984.
- Mintzberg, H., "Patterns in Strategy Formation", *Management Science*, 24(9), May 1978, pp 934–948.
- Mintzberg, H., "Crafting Strategy", *Harvard Business Review*, 65(4), July–August 1987, pp 66–75.
- Mintzberg, H., "Generic Strategies: Toward a Comprehensive Framework", *Advances in Strategic Management*, 5, 1988, pp 1–67.
- Mintzberg, H., "Opening up the Definition of Strategy", In *The Strategy Process*, J. B. Quinn, H. Mintzberg & R. J. James eds., Prentice Hall, Englewood Cliffs, NJ, 1988, pp 13–20.
- Mintzberg, H. & Waters, J. A., "Of Strategies, Deliberate and Emergent", *Strategic Management Journal*, 6(3), 1985, pp 257–272.
- Morrison, A. J., *Strategies in Global Industries: How U S Businesses Compete*, Quorum Books, Greenwood Publishing, Connecticut, 1990.

- Moser, C. A. & Kalton, K., *Survey Methods in Social Investigation*, 2nd Ed., Heinemann Educational Books Ltd, London, 1972.
- Neo, B. S., "Factors Facilitating the Use of Information Technology for Competitive Advantage: An Exploratory Study", *Information & Management*, 15, 1988, pp 191–201.
- Niederman, F., Brancheau, J. & Wetherbe, J., "Information Systems Management Issues in the 1990's", *MIS Quarterly*, 15(4), December 1991, pp 474–500.
- Nunnally, J. C., *Psychometric Theory*, New York: McGraw–Hill, 1978.
- Olson, P. D. & Bokor, D. W., "Strategy–Process–Content Interaction: Effects on Growth Performance in Small Start-up Firms", *Journal of Small Business Management*, 33(1), January 1995, pp 34–44.
- Philip, G., Gopalakrishnan, M. & Mawalkar, S., "Technology Management and Information Technology Strategy: Preliminary Results of an Empirical Study of Canadian Organizations", *International Journal of Information Management*, 15(4), 1995, pp 303–315.
- Porter, M. E., *Competitive Strategy*, Free Press, New York, 1980.
- Porter, M. E., *Competitive Advantage: Creating and Sustaining Superior Performance*, Free Press, New York, 1985.
- Porter, M. E. & Millar, V. E., "How Information gives you Competitive Advantage", *Harvard Business Review*, 65(1), 1985, pp 149–160.
- Prescott, J. E., "Environments as Moderators of the Relationship between Strategy and Performance", *Academy of Management Journal*, 29(2), 1986, pp 329–346.
- Prescott, J. E., Kohli, A. K. & Venkatraman, N., "The Market Share–Profitability Relationship: An Empirical Assessment of Assertions and Contradictions", *Strategic Management Journal*, 7, 1986, pp 377–394.
- Pyburn, P. J., "Linking the MIS Plan with Corporate Strategy", *MIS Quarterly*, 7(2), June 1983, pp 1–14.
- Quinn, J. B., "Strategies for Change", In *The Strategy Process*, J. B. Quinn, H. Mintzberg & R. J. James eds., Prentice Hall, Englewood Cliffs, NJ, 1988, pp 2–9.
- Raymond, L., "Organisational Characteristics and MIS success in the Context of Small Business", *MIS Quarterly*, 9(1), 1985, pp 37–52.
- Raymond, L., "Organisational Context and MIS Success", *Journal of Management Information Systems*, 6(4), 1990, pp 5–20.
- Raymond, L., "Computerisation as a Factor in the Development of Young Enterprises.", *International Small Business Journal*, 11(1), Oct/Dec 1992, pp 23–34.

- Raymond, L., Pare, G. & Bergeron, F., "Matching Information Technology and Organisational Structure: An Empirical Study with Implications for Performance", *European Journal of Information Systems*, 4(1), February 1995, pp 3–16.
- Raymond, L., Pare, G., Bergeron, F., "Information Technology and Organisational Structure Revisited: Implications for Performance", *Proceedings of Conference on IS*, December 1993, pp 129–143.
- Reich, B. H. & Benbasat, I., "Development of Measures to Investigate the Social Dimension of Linkage between Business and Information Technology Objectives", *Working Paper*, Simon Fraser University, Canada, August 1994a.
- Reich, B. H. & Benbasat, I., "Factors that Influence the Social Dimension of Linkage between Business and Information Technology Objectives", *Working Paper*, Simon Fraser University, Canada, December 1994b.
- Robson, W., *Strategic Management and Information Systems: An Integrated Approach*, Pitman Publishing, Clays Ltd, St Ives, England, 1994.
- Rockart, J. F., "Chief Executives Define their Own Data Needs", *Harvard Business Review*, March/April 1979, pp 81–93.
- Rumelt, R., "The Evaluation of Business Strategy", In *The Strategy Process*, J. B. Quinn, H. Mintzberg & R. J. James eds., Prentice Hall, Englewood Cliffs, NJ, 1988, pp 50–56.
- Sapienza, H. J., Smith, K. G. & Gannon, M. J., "Using Subjective Evaluation of Organisational Performance in Small Business Research", *American Journal of Small Business*, 12, 1988, pp 43–53.
- Schendel, D. & Hofer, C., *Strategic Management*, Little, Brown, Boston, 1979.
- Scott, J. E., "The Measurement of Information Systems Effectiveness: Evaluating a Measuring Instrument", *DATABASE: Advances in Information Systems*, 26(1), February 1995, pp 43–61.
- Sethi, V. & King, W. R., "Construct Measurement in Information Systems Research: An Illustration in Strategic Systems", *Decision Sciences*, 22, 1991, pp 455–472.
- Simons, R., "Accounting Control Systems and Business Strategy: An Empirical Analysis", *Accounting, Organisations and Society*, 12(4), 1987, pp 357–374.
- Snow, C., and Hambrick, D., "Measuring Organizational Strategies: Some Theoretical and Methodological Problems", *Academy of Management Review*, 5, 1980, pp 527–538.
- Stanworth, J., Westrip, A., Watkins, D. & Lewis, L., *Perspectives on a Decade of Small Business Research*, Gower Publishing Co Ltd, London, U.K., 1982.

- Taylor, G. S. & Banks, M. C., "Entrepreneurs, Small Business Executives and Large Business Executives: A Comparison of the Perceived Importance of Current Business Issues", *Journal of Small Business Management*, 30, October 1992, pp 24-40.
- Thompson, R. L. & Iacovou, C. L., "Information Technology, Critical Success Factors & Organisational Performance of Small Firms: A Causal Modelling Approach", *Working Paper WP-MIS-93-006-1*, School of Business Administration, University of Vermont, July 1993.
- Thow-Yick, L., "Organized and Strategic Utilisation of Information Technology", *Information & Management*, 24(6), June 1993, pp 329-337.
- Tilles, S., "How To Evaluate Corporate Strategy", *Harvard Business Review*, 41(4), July-Aug 1963, pp 111-121.
- Van de Ven, A. H. & Drazin, R., "The Concept of Fit in Contingency Theory", *Research in Organisational Behaviour*, JAI Press, 7, Staw, B. M. & Cummings, L. L. (eds), 1985, pp 333-365.
- Van de Ven, A. H. & Ferry, D. L., *Measuring and Assessing Organisations*, New York: Wiley, 1980.
- Van Maanen, J., "Reclaiming Qualitative Methods for Organisational Research", In *Qualitative Methodology*, J. Van Maanen, ed., 1983, pp 9-18.
- Venkatraman, N., "Strategic Orientation of Business Enterprises: the Construct, Dimensionality and Measurement", *Management Science*, 35(8), August 1989a, pp 942-962.
- Venkatraman, N., "The Concept of Fit in Strategy Research: Toward Verbal and Statistical Correspondence", *Academy Management Review*, 14(3), 1989b, pp 423-444.
- Venkatraman, N., "IT-Induced Business Reconfiguration", *Corporation of the 1990s: Information Technology and Organizational Transformation*, M. S. Scott Morton (eds), 1991, pp 122-158.
- Venkatraman, N. & Camillus, J. C., "Exploring the Concept of "Fit" in Strategic Management", *Academy Management Review*, 9(3), 1984, pp 513-525.
- Venkatraman, N. & Grant, J. H., "Construct Measurement in Organisational Strategy Research: A Critique and Proposal", *Academy Management Review*, 11(1), 1986, pp 71-87.
- Venkatraman, N. & Prescott, J. E., "Environment-Strategy Coalignment: An Empirical Examination of its Performance Implications", *Strategic Management Journal*, 11(1), 1990, pp 1-24.
- Weill, P. D., "Strategic Investment in Information Technology: An Empirical Study", *Information Age*, 12(3), July 1990, pp 141-147.

- Welsh, J. A. & White, J. F., "A Small Business is not a Little Big Business", *Harvard Business Review*, 59(4), 1981, pp 18–32.
- White, R. E., "Generic Business Strategies, Organisational Context & Performance: An Empirical Investigation", *Strategic Management Journal*, 7, 1986, pp 217–231.
- Williams, J. R. & Novak, R. S., "Aligning CIM Strategies to Different Markets", *Long Range Planning*, 23, 1990, pp 126–135.
- Wiseman, C., *Strategy and Computers: Information Systems as Competitive Weapons*, Dow Jones–Irwin, Homewood, 1985.
- Yin, R., *Case Study Research: Design and Methods*, London: Sage, 1989.
- Zelditch, M., "Some Methodological Problems of Field Studies", *American Journal of Sociology*, 67, 1962, pp 566–576.
- Zinatelli, N. & Cavaye, A., "Case Study Research in IS: Strategies for Success & Pitfalls to Avoid.", *NZ Journal of Computing*, 4(1), 1992, pp 7–22.

Chapter XI. APPENDICES

Appendix I: Summary Data of All Dimensions	154
Appendix II: Chan's Final Model and Subsequent Alterations ...	155
Appendix III: Final Questionnaires and Cover Letter	165
Appendix IV: Interview Guide	184

APPENDIX I: SUMMARY DATA OF ALL DIMENSIONS

1. Instrument Dimension Data

Summary Values																	
	Questionnaire 1							Questionnaire 2							Overall		
	Prof1	Prof2	Serv1	Serv2	Avg	Min	Max	Ret1	Ret2	Manu1	Manu2	Avg	Min	Max	Avg	Min	Max
STROBE																	
Aggressiveness	3.67	3.00	4.33	5.00	4.00	3.00	5.00	4.67	4.67	4.33	4.67	4.58	4.33	4.67	4.29	3.00	5.00
Analysis	4.67	3.33	3.67	4.67	4.08	3.33	4.67	3.33	2.33	3.33	3.67	3.17	2.33	3.67	3.63	2.33	4.67
Internal Defensiveness	4.67	4.00	4.00	4.33	4.25	4.00	4.67	2.67	3.67	2.00	3.67	3.00	2.00	3.67	3.63	2.00	4.67
External Defensiveness	5.00	3.00	4.50	5.00	4.38	3.00	5.00	4.00	4.00	5.00	4.00	4.25	4.00	5.00	4.31	3.00	5.00
Futurity	3.17	3.00	2.83	4.17	3.29	2.83	4.17	3.00	2.00	4.17	3.67	3.21	2.00	4.17	3.25	2.00	4.17
Proactiveness	4.50	2.75	3.50	4.50	3.81	2.75	4.50	4.67	4.00	4.67	4.33	4.42	4.00	4.67	4.11	2.75	4.67
Riskiness	1.75	2.25	1.75	1.50	1.81	1.50	2.25	3.00	3.00	4.00	3.75	3.44	3.00	4.00	2.63	1.50	4.00
Innovativeness	4.25	3.25	3.75	4.75	4.00	3.25	4.75	4.25	3.25	3.50	3.50	3.63	3.25	4.25	3.81	3.25	4.75
Average	3.96	3.07	3.54	4.24	3.70	3.07	4.24	3.70	3.36	3.88	3.91	3.71	3.36	3.91	3.71	3.07	4.24
STROIS																	
Aggressiveness	3.67	3.67	4.00	3.00	3.58	3.00	4.00	2.00	2.67	3.00	1.33	2.25	1.33	3.00	2.92	1.33	4.00
Analysis	4.67	4.00	4.00	3.33	4.00	3.33	4.67	1.33	3.67	3.67	1.00	2.42	1.00	3.67	3.21	1.00	4.67
Internal Defensiveness	4.67	3.67	4.00	2.67	3.75	2.67	4.67	2.00	3.67	3.67	2.00	2.83	2.00	3.67	3.29	2.00	4.67
External Defensiveness	4.25	3.25	4.00	2.50	3.50	2.50	4.25	1.50	4.00	2.75	1.00	2.31	1.00	4.00	2.91	1.00	4.25
Futurity	3.17	3.00	3.00	2.00	2.79	2.00	3.17	2.00	2.83	3.17	1.67	2.42	1.67	3.17	2.60	1.67	3.17
Proactiveness	2.25	2.50	3.00	3.25	2.75	2.25	3.25	3.00	3.33	3.00	1.67	2.75	1.67	3.33	2.75	1.67	3.33
Riskiness	2.25	2.75	2.75	3.25	2.75	2.25	3.25	3.50	2.50	2.50	4.00	3.13	2.50	4.00	2.94	2.25	4.00
Innovativeness	3.75	3.25	3.50	2.25	3.19	2.25	3.75	2.75	2.25	3.75	1.00	2.44	1.00	3.75	2.81	1.00	3.75
Average	3.58	3.26	3.53	2.78	3.29	2.78	3.58	2.26	3.11	3.19	1.71	2.57	1.71	3.19	2.93	1.71	3.58

IS Effectiveness	Prof1	Prof2	Serv1	Serv2	Avg	Min	Max	Ret1	Ret2	Manu1	Manu2	Avg	Min	Max	Avg	Min	Max
Op Efficiency	4.00	4.50	4.67	4.83	4.50	4.00	4.83	4.00	4.67	3.17	2.50	3.58	2.50	4.67	4.04	2.50	4.83
Mt Effectiveness	3.71	3.80	4.14	4.86	4.13	3.71	4.86	3.71	3.43	3.57	2.00	3.18	2.00	3.71	3.65	2.00	4.86
Market Linkages	3.00	3.50	3.50	4.25	3.56	3.00	4.25	3.71	3.25	3.50	3.75	3.55	3.25	3.75	3.56	3.00	4.25
Products & Services	3.25	3.67	4.25	4.5	3.92	3.25	4.50	3	3.5	3.5	3.00	3.25	3.00	3.50	3.58	3.00	4.50
Average	3.47	3.94	4.08	4.60	4.02	3.47	4.60	3.70	3.68	3.44	2.24	3.26	2.24	3.70	3.64	2.24	4.60
Performance																	
Financial	3.33	3.00	3.00	4.00	3.33	3.00	4.00	3.00	3.00	4.00	4.00	3.50	3.00	4.00	3.42	3.00	4.00
Market Growth	4.00	3.00	3.00	4.50	3.63	3.00	4.50	3.50	3.50	4.00	4.00	3.75	3.50	4.00	3.69	3.00	4.50
Co Innovation	4.50	3.50	3.50	4.00	3.88	3.50	4.50	4.50	4.50	4.50	3.50	4.25	3.50	4.50	4.06	3.50	4.50
Co Reputation	4.50	3.00	4.00	5.00	4.13	3.00	5.00	4.00	4.00	3.00	3.00	3.50	3.00	4.00	3.81	3.00	5.00
Overall	4.00	3.00	4.00	4.00	3.75	3.00	4.00	4.00	5.00	4.00	3.00	4.00	3.00	5.00	3.88	3.00	5.00
Average	4.00	3.10	3.40	4.30	3.70	3.10	4.30	3.70	3.80	3.90	3.20	3.65	3.20	3.90	3.68	3.10	4.30

2. Alignment Dimension Data

ALIGNMENT	Questionnaire 1							Questionnaire 2							Overall		
	Prof1	Prof2	Serv1	Serv2	Avg	Min	Max	Ret1	Ret2	Manu1	Manu2	Avg	Min	Max	Avg	Min	Max
Matching - Bivariate																	
Aggressiveness	0.00	0.82	1.00	2.16	0.99	0.00	2.16	2.71	2.16	1.41	3.37	2.41	1.41	3.37	1.70	0.00	3.37
Analysis	0.82	1.41	0.58	1.41	1.06	0.58	1.41	2.45	1.41	1.29	2.94	2.02	1.29	2.94	1.54	0.58	2.94
Internal Defensiveness	0.00	0.58	0.82	1.73	0.78	0.00	1.73	0.82	0.82	1.73	2.08	1.36	0.82	2.08	1.07	0.00	2.08
External Defensiveness	0.87	0.50	0.71	2.55	1.16	0.50	2.55	2.00	0.00	2.40	3.00	2.03	0.00	3.00	1.59	0.00	3.00
Futurity	0.58	1.00	0.41	2.55	1.13	0.41	2.55	2.74	1.58	1.29	2.45	1.83	1.29	2.45	1.48	0.41	2.55
Proactiveness	2.96	0.87	1.00	1.50	1.58	0.87	2.96	1.73	1.41	1.73	2.83	1.93	1.41	2.83	1.75	0.87	2.96
Riskiness	0.71	0.71	1.41	2.18	1.25	0.71	2.18	1.22	1.22	1.87	1.12	1.36	1.12	1.87	1.31	0.71	2.18
Innovativeness	1.58	0.71	0.87	2.74	1.47	0.71	2.74	1.58	1.22	0.87	2.55	1.56	0.87	2.55	1.51	0.71	2.74
- Systems	0.99	0.82	0.82	2.10	1.18	0.82	2.10	1.97	1.22	1.61	2.58	1.84	1.22	2.58	1.51	0.82	2.58
Moderation - Bivariate																	
Aggressiveness	17.00	11.00	17.33	15.00	15.08	11.00	17.33	9.33	12.33	13.00	6.33	10.25	6.33	13.00	12.67	6.33	17.33
Analysis	21.67	13.33	14.67	15.67	16.33	13.33	21.67	4.00	8.67	12.00	3.67	7.08	3.67	12.00	11.71	3.67	21.67
Internal Defensiveness	22.00	14.67	16.00	12.00	16.17	12.00	22.00	5.33	14.00	7.33	7.67	8.58	5.33	14.00	12.38	5.33	22.00
External Defensiveness	21.25	10.00	18.00	12.50	15.44	10.00	21.25	5.75	16.00	13.75	4.00	9.88	4.00	16.00	12.66	4.00	21.25
Futurity	11.17	9.33	8.67	8.17	9.33	8.17	11.17	5.67	6.00	13.33	6.33	7.83	5.67	13.33	8.58	5.67	13.33
Proactiveness	9.75	7.00	11.00	14.50	10.56	7.00	14.50	14.33	13.00	14.00	7.00	12.08	7.00	14.33	11.32	7.00	14.50
Riskiness	4.00	6.25	4.75	4.50	4.88	4.00	6.25	10.75	7.50	10.00	16.00	11.06	7.50	16.00	7.97	4.00	16.00
Innovativeness	16.25	10.50	13.00	10.50	12.56	10.50	16.25	11.75	7.50	13.50	3.50	9.06	3.50	13.50	10.81	3.50	16.25
- Systems	16.66	10.64	13.91	12.34	13.39	10.64	16.66	8.80	11.29	12.51	6.81	9.85	6.81	12.51	11.62	6.81	16.66

APPENDIX II: CHAN'S FINAL MODEL AND SUBSEQUENT ALTERATIONS

STROBE			
Dimension	Original (Chan, 1992)	Adaptions	Amendments
Proactiveness	1. We are almost always searching for new business opportunities	1. We are almost always searching for new business opportunities	1. We are hardly ever searching for new business opportunities
Riskiness	2. In general our mode of operations (i.e., our way of doing business) is riskier than our competitors'.	2. In general our mode of operations (i.e., our way of doing business) is riskier than our competitors'.	✓ ¹⁵
Internal defensiveness	3. We optimise co-ordination among our functions (e.g., finance and marketing)	3. We optimise co-ordination among our functions (e.g., finance and marketing)	✓
Futurity	4. Our criteria for budget allocations generally reflect short-term considerations	4. Our criteria for budget allocations generally reflect short-term considerations	✓
Aggressiveness	5. We strive to be one of the top three firms in each of our markets	5. We strive to be one of the top three firms in each of our markets	✓
Futurity	6. We carry out long-term research to provide us with a future competitive edge	6. We carry out long-term research to provide us with a future competitive edge	✓
Riskiness	7. We adopt a rather conservative view when making major decisions	7. We adopt a rather conservative view when making major decisions	✓
External defensiveness	8. We develop strong relationships with our major customers	8. We develop strong relationships with our major customers	✓
External defensiveness	9. We develop strong relationships with our suppliers (e.g., providers of key services, materials, finance)	9. We develop strong relationships with our suppliers (e.g., providers of key services, materials, finance)	✓
Analysis	10. We require a great deal of factual information to support our day-to-day decision making	10. We require a great deal of factual information to support our day-to-day decision making	✓

¹⁵ Indicating that the item was retained in the same format for the second round of case studies.

Analysis	11. When confronted with major decisions, we typically develop comprehensive analyses of the business situations faced	11. When confronted with major decisions, we typically develop comprehensive analyses of the business situations faced	11. When confronted with major decisions, we rarely develop comprehensive analyses of the business situations faced (REV SCORED)
Proactiveness	12. We regularly are on the look-out for business units to acquire	12. We regularly are on the look-out for organisations to acquire	DELETED
Proactiveness	13. We generally expand capacity, ahead of our competitors	13. We generally try to be the first to move in our markets (e.g. expand capacity, adopt innovations), ahead of our competitors	✓
Aggressiveness	1. A constant attempt to be ahead of the competition	1. We constantly attempt to be ahead of the competition	✓
Internal defensiveness	2. A constant drive to improve operating efficiency	2. We constantly drive to improve operating efficiency	✓
Innovativeness	3. Innovative and imaginative solutions for most business problems	3. We attempt to provide innovative and imaginative solutions for most business problems	✓
Riskiness	4. Business operations generally following 'tried and true' paths	4. Our business operations generally follow 'tried and true' paths	✓
Innovativeness	5. Early adoption of innovations	5. We adopt innovations early	We avoid early adoption of innovations (REV SCORED)
Aggressiveness	1. We tend to act aggressively in our marketplace	1. We tend to act aggressively in our marketplace	We rarely act aggressively in our marketplace (REV SCORED)
Riskiness	2. We tend to be risk-averse	2. We tend to be risk-averse	✓
Innovativeness	3. We tend to be creative and original	3. We tend to be creative and original	✓
Analysis	4. We tend to be highly analytical in our decision-making	4. We tend to be highly analytical in our decision-making	✓
Futurity	5. We tend to be future-oriented (i.e., more focused on the long term than on the short term)	5. We tend to be future-oriented (i.e., more focused on the long term than on the short term)	✓

Proactiveness	6. We seem to be always exploring new business opportunities	6. We seem to be always exploring new business opportunities	✓
Internal defensiveness	7. We devote a great deal of attention to improving the efficiency of our business operations	7. We devote a great deal of attention to improving the efficiency of our business operations	7. We devote little attention to improving the efficiency of our business operations (REV SCORED)
External defensiveness	8. We put a lot of emphasis on building relationships with major customers	8. We put a lot of emphasis on building relationships with major customers	✓
External defensiveness	9. We put a lot of emphasis on building relationships with major suppliers (e.g. providers of key services, materials, finance)	9. We put a lot of emphasis on building relationships with major suppliers (e.g. providers of key services, materials, finance)	✓
Futurity	1. Forecasting of key indicators of business operations	1. Forecasting of key indicators of business operations	✓
Innovativeness	2. Reviews of external technological developments (e.g., newly available materials, computer equipment)	2. Reviews of external technological developments (e.g., newly available materials, computer equipment)	✓
Futurity	3. Systems for strategic business planning	3. Systems for strategic business planning	✓
Futurity	4. 'What-if' studies of critical issues	4. 'What-if' studies of critical issues	✓
Demographics	1. Information technology is critical to our success	1. Information technology is critical to our success	✓
Demographics	2. In our industry, firms have to invest heavily in information technology if they wish to compete	2. In our industry, firms have to invest heavily in information technology if they wish to compete	✓
Demographics	3. Our managers frequently see potential business opportunities created by information technology developments	3. Our managers frequently see potential business opportunities created by information technology developments	✓
Demographics	4. Our business strategy is clearly defined (i.e., unambiguously stated)	4. Our business strategy is clearly defined (i.e., unambiguously stated)	✓
Demographics	6. Our information technology strategy is clearly defined (e.g., unambiguously stated)		✓

PERFORMANCE		
Dimension	Original	First Set
Market Growth	1. Revenue Growth	1. Revenue Growth
Financial Performance	2. Financial liquidity	2. Financial liquidity
Company Innovation	3. Technological developments and/or other innovations in business operations	3. Technological developments and/or other innovations in business operations
Company Reputation	4. Product quality	4. Product quality
Market Growth	5. Market share gains	5. Market share gains
Financial Performance	6. Net profits	6. Net profits
Financial Performance	7. Return on investment	7. Return on investment
Company Innovation	8. Frequency of new product or service introduction	8. Frequency of new product or service introduction
Company Reputation	9. Reputation among major customer segments	9. Reputation among major customer segments
Demographics	10. Overall performance	10. Overall performance
Demographics	11. The business unit's revenues in the 1995 fiscal year	11. The firm's revenues in the 1995 fiscal year
Demographics	12. Approximate number of full-time equivalent staff in the business unit in 1995	12. Approximate number of full-time equivalent staff in the firm in 1995
Demographics	13. Ownership of the business unit	13. Ownership of the business

STROIS			
Dimension	Original	First Set	Amendments
Proactiveness	1. The systems used in the business unit assist in the identification of new business opportunities	1. The systems used in the organisation assist in the identification of new business opportunities	1. The systems used in the organisation do little to assist in the identification of new business opportunities
Riskiness	2. The systems used in the business unit help us take calculated business risks	2. The systems used in the organisation help us take calculated business risks	✓
	3. The systems used in the business unit support effective co-ordination among functions (e.g., finance and marketing)	3. The systems used in the organisation support effective co-ordination among functions (e.g., finance and marketing)	✓
Futurity	4. The systems used in the business unit allow us to adjust budget allocation decisions based on short-term considerations	4. The systems used in the organisation allow us to adjust budget allocation decisions based on short-term considerations	✓
Aggressiveness	5. The systems used in the business unit help us be (or become) one of the top firms in our market (or markets)	5. The systems used in the organisation help us be (or become) one of the top firms in our market (or markets)	✓
Futurity	6. The systems used in the business unit represent investments geared at providing us with a future competitive edge	6. The systems used in the organisation represent investments geared at providing us with a future competitive edge	✓
Riskiness	7. The systems used in the business unit provide sufficiently detailed information to support conservative decision making	7. The systems used in the organisation provide sufficiently detailed information to support conservative decision making	✓
External defensiveness	8. The systems used in the business unit enable us to develop stronger ties with major customers	8. The systems used in the organisation enable us to develop stronger ties with major customers	✓

External defensiveness	9. The systems used in the business unit enable us to develop stronger ties with major suppliers (e.g., providers of key services materials, finance)	9. The systems used in the organisation enable us to develop stronger ties with major suppliers (e.g., providers of key services materials, finance)	✓
Analysis	10. The systems used in the business unit provide us with the facts and figures we need to support our day-to-day decision making	10. The systems used in the organisation provide us with the facts and figures we need to support our day-to-day decision making	✓
Analysis	11. The systems used in the business unit enable us to develop detailed analyses of our present business situation	11. The systems used in the organisation enable us to develop detailed analyses of our present business situation	11. The systems used in the organisation enable us to develop comprehensive analyses of major decisions
Proactiveness	12. The systems used in the business unit help us identify companies we may be interested in acquiring	12. The systems used in the organisation help us identify companies we may be interested in acquiring	DELETED
Proactiveness	13. The systems used in the business unit, by allowing us to keep track of our competitors, assist us in pre-empting them if necessary	13. The systems used in the organisation , by allowing us to keep track of our competitors, assist us in pre-empting them if necessary	13. The systems used in the organisation assist us in pre-empting competitors
Aggressiveness	1. The systems used in the business unit help us stay ahead of (or catch up with) the competition	1. The systems used in the organisation help us stay ahead of (or catch up with) the competition	✓
Internal defensiveness	2. The systems used in the business unit improve the efficiency of our business operations	2. The systems used in the organisation improve the efficiency of our business operations	2. The systems used in the organisation do little towards improving the efficiency of our business operations
Innovativeness	3. The systems used in the business unit help us generate innovative solutions for business problems	3. The systems used in the organisation help us generate innovative solutions for business problems	✓
Riskiness	4. The systems used in the business unit provide us with the data we need to steer clear of overly risky business propositions	4. The systems used in the organisation provide us with the data we need to steer clear of overly risky business propositions	✓

Innovativeness	5. The systems used in the business unit employ innovative, leading edge technologies	5. The systems used in the organisation employ innovative, leading edge technologies	✓
Aggressiveness	1. The systems used in the business unit help us aggressively go after market share	1. The systems used in the organisation help us aggressively go after market share	✓
Riskiness	2. The systems used in the business unit give us the information we need in order to minimise business risks	2. The systems used in the organisation give us the information we need in order to minimise business risks	✓
Innovativeness	3. The systems used in the business unit are creative and original	3. The systems used in the organisation are creative and original	✓
Analysis	4. The systems used in the business unit enable us to carry out detailed analyses of major business decisions	4. The systems used in the organisation enable us to carry out detailed analyses of major business decisions	4. The systems used in the organisation enable us to be highly analytic in our decision making
Futurity	5. The systems used in the business unit assist us more with long-term planning than with short-term planning	5. The systems used in the organisation assist us more with long-term planning than with short-term planning	✓
Proactiveness	6. The systems used in the business unit give us the information we need to grasp opportunities that come our way	6. The systems used in the organisation give us the information we need to grasp opportunities that come our way	✓
Internal defensiveness	7. The systems used in the business unit help us maximise the efficiency of our business operations	7. The systems used in the organisation help us maximise the efficiency of our business operations	✓
External defensiveness	8. The systems used in the business unit help us establish strong market links in general (e.g., with customers, suppliers and distributors)	8. The systems used in the business help us establish strong market links in general (e.g., with customers, suppliers and distributors)	✓

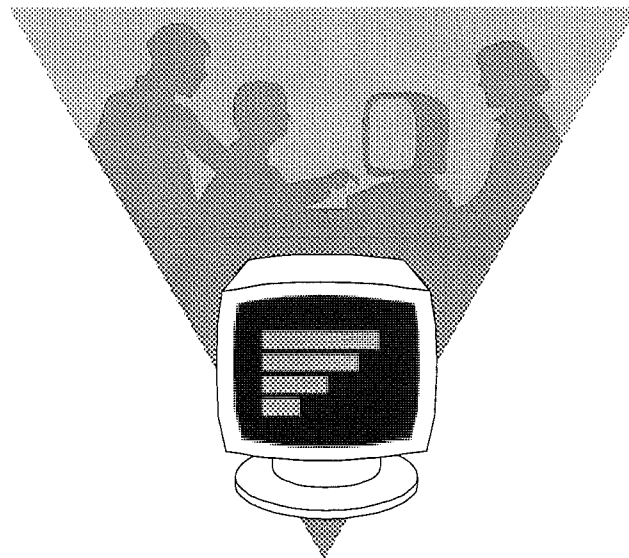
Futurity	1. Forecasting of key indicators of business operations	1. The systems used in the organisation provide us with the ability to forecast key indicators of business operations	✓
Innovativeness	2. Reviews of external technological developments (e.g., newly available materials, computer equipment)	2. The systems used in the business enable us to review external technological developments (e.g., newly available materials, computer equipment)	✓
Futurity	3. Systems for strategic business planning	3. The organisation uses systems for strategic business planning	3. The organisation uses systems to assist with strategic business planning
Futurity	4. 'What-if' studies of critical issues	4. The systems used in the business enable us to conduct 'What-if' studies of critical issues	✓
Demographics	1. The systems used in the business unit are an integral part of our competitive strategy	1. The systems used in the business unit are an integral part of our competitive strategy	✓
Demographics	2. The systems used in the business unit take advantage of our firm's unique strengths	2. The systems used in the business unit take advantage of our firm's unique strengths	✓
Demographics	3. The systems used in the business unit have top management support	3. The systems used in the business unit have top management support	✓
Demographics	4. The systems used in the business unit are continually being enhanced	4. The systems used in the business unit are continually being enhanced.....	✓
Demographics	5. Our business strategy and systems strategy are closely aligned	5. Our business strategy and systems strategy are closely aligned	✓

IS Effectiveness			
Dimension	Original	First Set	Amendments
Operational Efficiency	1. Increase the efficiency of our business operations	1. Increase the efficiency of our business operations	✓
Operational Efficiency	2. Accelerate our business processes (e.g., speed up our operations)	2. Accelerate our business processes (e.g., speed up our operations)	✓
Market Linkages	3. Allow us to serve a wide variety of customers	3. Allow us to serve a wide variety of customers	3. Do little in allowing us to serve a wide variety of customers
Management Effectiveness	4. Improve management effectiveness	4. Improve management effectiveness	✓
IS Contribution to Management Effectiveness	5. Allow us to capture electronically the expertise of our employees (e.g., via the use of expert systems)	5. Allow us to capture electronically the expertise of our employees (e.g., via the use of expert systems)	✓
IS Contribution to Products and Services	6. Enhance our products and services	6. Enhance our products and services	✓
IS Contribution to Market Linkages	7. Allow us to penetrate new markets	7. Allow us to penetrate new markets	✓
IS Contribution to Operational Efficiency	8. Assist us in controlling (e.g., improving the coordination of) our business operations	8. Assist us in controlling (e.g., improving the coordination of) our business operations	✓
IS Contribution to Products and Services	9. Support our products (e.g., by providing detailed product information)	9. Support our products (e.g., by providing detailed product information)	✓
IS Contribution to Products and Services	10. Are an integral part of our products	10. Are an integral part of our products	✓
IS Contribution to Market Linkages	12. Provide us with information <u>on</u> our distributors (e.g., agents, brokers, owned or independent branches and outlets)	12. Provide us with information on our distributors (e.g., agents, brokers, owned or independent branches and outlets)	✓
IS Contribution to Market Linkages	13. Provide us with information <u>on</u> our customers	13. Provide us with information on our customers	✓
IS Contribution to Market Linkages	15. Provide information <u>to</u> our distributors (e.g., agents, brokers, branches and outlets)	15. Provide information to our distributors (e.g., agents, brokers, branches and outlets)	✓
IS Contribution to Market Linkages	16. Provide information <u>to</u> our customers.	16. Provide information to our customers.	✓

IS Contribution to Operational Efficiency	20. Result in significant time savings	20. Result in significant time savings	20. Rarely result in significant time savings
IS Contribution to Operational Efficiency	21. Result in significant cost savings	21. Result in significant cost savings	✓
IS Contribution to Management Effectiveness	22. Improve our decision-making	22. Improve our decision-making	✓
IS Contribution to Management Effectiveness	23. Improve our planning	23. Improve our planning	✓
IS Contribution to Management Effectiveness	24. Adequately organize (e.g., input, manipulate, and output) the business information we need.	24. Adequately organize (e.g., input, manipulate, and output) the business information we need.	✓
IS Contribution to Market Linkages	26. Provide marketing support	26. Provide marketing support	26. Provide little in the way of marketing support
IS Contribution to Management Effectiveness	27. Provide support for management (e.g., decision support)	27. Provide support for management (e.g., decision support)	✓
IS Contribution to Operational Efficiency	1. Efficiency increases in company operations due to information systems	1. Efficiency increases in company operations due to information systems	✓
IS Contribution to Management Effectiveness	5. Improved effectiveness of management decision-making due to information systems	5. Improved effectiveness of management decision-making due to information systems	✓
IS Contribution to Products and Services	6. Introduction of new products and services based on advances in information technology	6. Introduction of new products and services based on advances in information technology	✓
IS Contribution to Market Linkages	7. Establishment of market linkages (e.g., with customers, suppliers and distributors) via information systems	7. Establishment of market linkages (e.g., with customers, suppliers and distributors) via information systems	✓
Demographics	1. Extent to which you have made use of information systems in general (e.g., via the use of printed reports and online inquiries)	1. Extent to which you have made use of information systems in general (e.g., via the use of printed reports and online inquiries)	✓
Demographics	5. Extent to which you have made use of the business unit's information systems (e.g. via printed reports and on-line enquiries)	5. Extent to which you have made use of the business unit's information systems (e.g. via printed reports and on-line enquiries)	✓

CEO QUESTIONNAIRE

To be completed by the Chief Executive Officer
or Owner/Manager familiar with the Business
Strategy of the _____ organisation.



Researchers:
Andrea J. Hale and Dr. Paul B. Cragg



Department of Accountancy, Finance and Information Systems
University of Canterbury
Christchurch
New Zealand

Phone (03) 364-2604
Fax (03) 364-2727

PROJECT INTRODUCTION AND GENERAL INSTRUCTIONS

The utilization of information technology to support business strategy presents a major challenge for owners and managers in small firms.

This study aims to provide an effective way for small firms to measure the current alignment of their IS strategy with their business strategy, and to highlight areas which could be improved, via a three part questionnaire.

The first part evaluates the strategic orientation of the organisation and assesses its performance. The second part investigates the strategic use of information technology in the organisation in order to evaluate how well the information systems of the business support the strategy. The final part evaluates the perceived effectiveness of the information systems in the business. Each of the parts should be completed by the most suitable member of the organisation in order to provide as complete a view of the organisation as possible.

These questionnaires are in the process of development, and your assistance is greatly appreciated. This particular questionnaire should take approximately thirty minutes, and most of the questions can be answered by circling one of several alternatives provided. There are no right or wrong answers.

It would be appreciated if you could answer all questions in relation to your firm. The answer should reflect the general pattern of your business operations rather than any single decision situation.

We would like to assure you that your responses will be treated with the strictest confidence. In no instance will you or your company be identified as having given a particular response. We are able to offer immediate feedback on the results from these questionnaires on an individual firm basis, and possibly on a comparative industry basis later in 1996. If you would like to discuss this, please indicate your preference on page 7.

We would also like to thank you for your participation in this study. If you have any questions or comments, please do not hesitate to contact us by phone (364-2604) or fax (364 2727).

PART ONE - STRATEGIC ORIENTATION

A-I: The following statements help us understand your organization's strategic orientation. Please indicate by circling the appropriate number the extent to which you agree with each statement as it relates to your firm.

	STRONGLY AGREE	NEITHER AGREE NOR DISAGREE			STRONGLY DISAGREE	N/A OR DO NOT KNOW
	↓ 5	4	↓ 3	2	↓ 1	↓ 0
1. We strive to be one of the top three firms in each of our markets	5	4	3	2	1	0
2. In general our mode of operations (i.e., our way of doing business) is riskier than our competitors'.	5	4	3	2	1	0
3. We optimise co-ordination among our functions (e.g., finance and marketing).	5	4	3	2	1	0
4. Our criteria for budget allocations generally reflect short-term considerations	5	4	3	2	1	0
5. We hardly ever search for new business opportunities.....	5	4	3	2	1	0
6. We carry out long-term research to provide us with a future competitive edge	5	4	3	2	1	0
7. We adopt a rather conservative view when making major decisions.....	5	4	3	2	1	0
8. We develop strong relationships with our major customers	5	4	3	2	1	0
9. We develop strong relationships with our suppliers (e.g., providers of key services, materials, finance).....	5	4	3	2	1	0
10. We require a great deal of factual information to support our day-to-day decision making	5	4	3	2	1	0
11. When confronted with major decisions, we rarely develop comprehensive analyses of the business situations faced.....	5	4	3	2	1	0
12. We generally try to be the first to move in our markets (e.g. expand capacity, adopt innovations), ahead of our competitors.....	5	4	3	2	1	0

A-II. Several statements describing various organizations' strategic orientations are provided below. Please indicate the extent to which you agree with each statement as it relates to your firm.

	STRONGLY AGREE		NEITHER AGREE NOR DISAGREE		STRONGLY DISAGREE	N/A OR DO NOT KNOW
	↓		↓		↓	↓
AS AN ORGANISATION:	5	4	3	2	1	0
1. We constantly attempt to be ahead of the competition.....	5	4	3	2	1	0
2. We constantly drive to improve operating efficiency.....	5	4	3	2	1	0
3. We attempt to provide innovative and imaginative solutions for most business problems.....	5	4	3	2	1	0
4. Our business operations generally follow 'tried and true' paths.....	5	4	3	2	1	0
5. We avoid early adoption of innovations	5	4	3	2	1	0

A-III: The following statements help us understand your organization's strategic orientation. Please indicate the extent to which you agree with each statement as it relates to your organisation.

	STRONGLY AGREE		NEITHER AGREE NOR DISAGREE		STRONGLY DISAGREE	N/A OR DO NOT KNOW
	↓		↓		↓	↓
AS AN ORGANISATION:	5	4	3	2	1	0
1. We rarely act aggressively in order to gain market share	5	4	3	2	1	0
2. We tend to be risk-averse.....	5	4	3	2	1	0
3. We tend to be creative and original.....	5	4	3	2	1	0
4. We tend to be highly analytical in our decision-making	5	4	3	2	1	0
5. We tend to be future-oriented (i.e., more focused on the long term than on the short term)	5	4	3	2	1	0
6. We seem to be always exploring new business opportunities.....	5	4	3	2	1	0
7. We devote little attention to improving the efficiency of our business operations.....	5	4	3	2	1	0
8. We put a lot of emphasis on building relationships with major customers.....	5	4	3	2	1	0
9. We put a lot of emphasis on building relationships with major suppliers (e.g. providers of key services, materials, finance).....	5	4	3	2	1	0

A-IV: Business organizations employ a variety of management techniques, analytical models and management systems suited to their situations. Please indicate the extent to which each of the following is used in business operations. (These systems and services may be either computerized or non-computerized, and may be administered anywhere in your organization.)

	USED VERY FREQUENTLY ↓		USED OCCASIONALLY ↓		NEVER USED ↓		N/A OR DO NOT KNOW ↓
AS A FIRM WE UNDERTAKE:	5	4	3	2	1		0
1. Forecasting of key indicators of business operations	5	4	3	2	1		0
2. Reviews of external technological developments (e.g., newly available materials, computer equipment)	5	4	3	2	1		0
3. Strategic business planning	5	4	3	2	1		0
4. 'What-if' studies of critical issues	5	4	3	2	1		0

A-V: The following statements ask you to assess the importance of business strategy and information technology strategy to company success. Please indicate the extent to which each statement accurately describes your organisation.

	STRONGLY AGREE ↓		NEITHER AGREE NOR DISAGREE ↓		STRONGLY DISAGREE ↓		N/A OR DO NOT KNOW ↓
	5	4	3	2	1		0
1. Information technology is critical to our success	5	4	3	2	1		0
2. In our industry, firms have to invest heavily in information technology if they wish to compete ...	5	4	3	2	1		0
3. Our managers frequently see potential business opportunities created by information technology developments	5	4	3	2	1		0
4. Our business strategy is clearly defined (i.e., unambiguously stated and formally documented)	5	4	3	2	1		0
5. Our business strategy has changed substantially over the last three years	5	4	3	2	1		0
6. Our information technology strategy is clearly defined (e.g., unambiguously stated and formally documented)	5	4	3	2	1		0

PART TWO - PERFORMANCE

P-I: For each of the following statements, please indicate by circling the appropriate number your best estimate of the business unit's position relative to its major (e g., top three) competitors, on average, over the last three years. *(Do not hesitate to contact others within the organisation to verify information if necessary).*

	MUCH BETTER THAN THE COMPETITION ↓ 5	4	SAME AS THE COMPETITION ↓ 3	2	MUCH WORSE THAN THE COMPETITION ↓ 1	N/A OR DO NOT KNOW ↓ 0
1. Revenue Growth.....	5	4	3	2	1	0
2. Financial liquidity	5	4	3	2	1	0
3. Technological developments and/or other innovations in business operations.....	5	4	3	2	1	0
4. Product quality	5	4	3	2	1	0
5. Market share gains	5	4	3	2	1	0
6. Net profits	5	4	3	2	1	0
7. Return on investment.....	5	4	3	2	1	0
8. Frequency of new product or service introduction	5	4	3	2	1	0
9. Reputation among major customer segments.....	5	4	3	2	1	0
10. Overall performance	5	4	3	2	1	0

11. The firm's revenues in the 1995 fiscal year: (Please place an x by the most appropriate entry.)

Less than \$250 000	_____
\$250 - 500 000.....	_____
\$500 000 - 1 million	_____
\$1 million - 10 million	_____
Over \$10 million	_____

12. Approximate number of full-time equivalent staff in the firm in 1995: (Please place an x by the most appropriate entry.)

5 or fewer	_____
6 - 10	_____
11 - 25	_____
26 - 50	_____
51 - 100	_____
More than 100.....	_____

13. Ownership of the business (please place an x by the most appropriate entry):

_____ Privately owned company	_____ Publicly owned company
_____ Subsidiary of a privately owned company	_____ Subsidiary of a publicly owned company
_____ Company owned by policy holders (applicable for some financial institutions)	_____ Other

P-II: We would appreciate it if you would provide us with the following background information for our analysis:

1. Your title (please print): _____

2. Number of years that you have been with this company: _____

3. Feedback

a. Would you like to receive feedback on your firm's response?	Yes	No
b. Would you be willing to discuss this questionnaire further with the researcher?	Yes	No
c. Would you like to know more about this research?	Yes	No

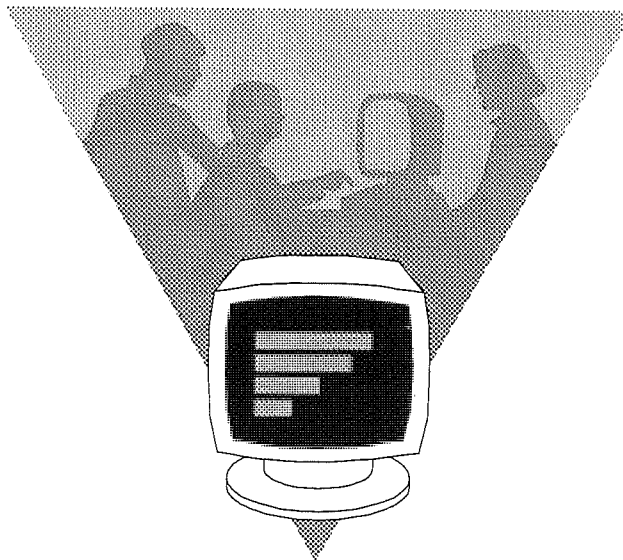
P-III. Additional comments you may have:

If you have questions or comments at any stage, please do not hesitate to phone (364-2604) or fax (364 2727) us. Thank you.

ASSESSING THE STRATEGIC ALIGNMENT OF ORGANISATIONAL INFORMATION SYSTEMS

IS QUESTIONNAIRE

To be completed by the Manager or other Senior
Executive responsible for the Information Systems
used in this _____ organisation.



Researchers:
Andrea J. Hale and Dr. Paul B. Cragg



Department of Accountancy, Finance and Information Systems
University of Canterbury
Christchurch
New Zealand

Phone (03) 364-2604
Fax (03) 364-2727

PROJECT INTRODUCTION AND GENERAL INSTRUCTIONS

The utilization of information technology to support business strategy presents a major challenge for owners and managers in small firms.

This study aims to provide an effective way for small firms to measure the current alignment of their IS strategy with their business strategy, and to highlight areas which could be improved, via a three part questionnaire.

The first part evaluates the strategic orientation of the organisation and assesses its performance. The second part investigates the strategic use of information technology in the organisation in order to evaluate how well the information systems of the business support the strategy. The final part evaluates the perceived effectiveness of the information systems in the business. Each of the parts should be completed by the most suitable member of the organisation in order to provide as complete a view of the organisation as possible.

These questionnaires are in the process of development, and your assistance is greatly appreciated. This particular questionnaire should take approximately twenty minutes, and most of the questions can be answered by circling one of several alternatives provided. There are no right or wrong answers.

It would be appreciated if you could answer all questions in relation to your firm. Most of the questions explore how information systems are used in the organisation. We ask that when completing questions, you focus on systems that are reasonably well established, i.e., have been in use for a year or more.

Please also note that our definition of information systems is broad, covering minicomputers, personal computers, software, information based manufacturing technologies (e.g., robotics), networks, databases, and so forth. It covers centralized and decentralized information systems services, manual and automated systems, and proprietary company information systems as well as external systems (e.g., databases) to which your company has access. Please keep this broader definition in mind as you answer the questions in the booklet.

We would like to assure you that your responses will be treated with the strictest confidence. In no instance will you or your company be identified as having given a particular response.

Finally, we would like to thank you for your participation in this study. If you have any questions or comments, please do not hesitate to contact us by phone (364-2604) or fax (364 2727).

D-I: Please indicate the extent to which you agree with each of the following statements as it relates to the information systems available to the organisation. (Consider only systems that have been in use for at least a year. Do not hesitate to consult others within the organisation to verify information if necessary, and remember there are no right or wrong answers).

	STRONGLY AGREE ↓ 5	4	NEITHER AGREE NOR DISAGREE ↓ 3	2	STRONGLY DISAGREE ↓ 1	N/A OR DO NOT KNOW ↓ 0
1. The systems used in the organisation do little to assist in the identification of new business opportunities	5	4	3	2	1	0
2. The systems used in the organisation help us take calculated business risks	5	4	3	2	1	0
3. The systems used in the organisation support effective co-ordination among functions (e.g., finance and marketing)	5	4	3	2	1	0
4. The systems used in the organisation allow us to adjust budget allocation decisions based on short-term considerations	5	4	3	2	1	0
5. The systems used in the organisation help us be (or become) one of the top firms in our market (or markets)	5	4	3	2	1	0
6. The systems used in the organisation represent investments geared at providing us with a future competitive edge	5	4	3	2	1	0
7. The systems used in the organisation provide sufficiently detailed information to support conservative decision making	5	4	3	2	1	0
8. The systems used in the organisation enable us to develop stronger ties with major customers	5	4	3	2	1	0
9. The systems used in the organisation enable us to develop stronger ties with major suppliers (e.g., providers of key services, materials, finance)	5	4	3	2	1	0
10. The systems used in the organisation provide us with the facts and figures we need to support our day-to-day decision making	5	4	3	2	1	0
11. The systems used in the organisation enable us to develop comprehensive analyses of major decisions	5	4	3	2	1	0
12.. The systems used in the organisation assist us in pre-empting competitors	5	4	3	2	1	0

D-II: Please indicate the extent to which you agree with each of the following statements as they relate to the information systems available to the organisation. (Consider only systems which have been in use for at least a year. Do not hesitate to consult others within the organisation to verify information, and remember there are no right or wrong answers).

	STRONGLY AGREE		NEITHER AGREE NOR DISAGREE		STRONGLY DISAGREE	N/A OR DO NOT KNOW
	↓ 5	4	↓ 3	2	↓ 1	↓ 0
1. The systems used in the organisation help us stay ahead of (or catch up with) the competition	5	4	3	2	1	0
2. The systems used in the organisation do little towards improving the efficiency of our business operations ...	5	4	3	2	1	0
3. The systems used in the organisation help us generate innovative solutions for business problems.....	5	4	3	2	1	0
4. The systems used in the organisation provide us with the data we need to steer clear of overly risky business propositions	5	4	3	2	1	0
5. The systems used in the organisation employ innovative, leading edge technologies	5	4	3	2	1	0

D-III: Please indicate the extent to which you agree with each of the following statements as they relate to the information systems available to the organisation and to your information systems strategy. (Do not hesitate to consult others within the organisation to verify information if necessary).

	STRONGLY AGREE		NEITHER AGREE NOR DISAGREE		STRONGLY DISAGREE	N/A OR DO NOT KNOW
	↓ 5	4	↓ 3	2	↓ 1	↓ 0
1. The systems used in the organisation help us aggressively go after market share	5	4	3	2	1	0
2. The systems used in the organisation give us the information we need in order to minimise business risks.....	5	4	3	2	1	0
3. The systems used in the organisation are creative and original.....	5	4	3	2	1	0
4. The systems used in the organisation enable us to be highly analytic in our decision making.	5	4	3	2	1	0
5. The systems used in the organisation assist us more with long-term planning than with short-term planning.....	5	4	3	2	1	0
6. The systems used in the organisation give us the information we need to grasp opportunities that come our way.....	5	4	3	2	1	0
7. The systems used in the organisation help us maximise the efficiency of our business operations	5	4	3	2	1	0
8. The systems used in the business help us establish strong market links in general (e.g., with customers, suppliers and distributors)	5	4	3	2	1	0

D-IV. Business organizations employ a variety of management techniques, analytical models and management systems suited to their situations. Please indicate the extent to which each of the following is used in the specified organisation's operations. (These systems and services may be either computerized or non-computerized, and may be administered within the Information Systems Department or elsewhere within your firm.)

	USED VERY FREQUENTLY		USED OCCASIONALLY		NOT USED AT ALL	N/A OR DO NOT KNOW
	↓ 5	4	↓ 3	2	↓ 1	↓ 0
1. The systems used in the organisation provide us with the ability to forecast key indicators of business operations.....	5	4	3	2	1	0
2. The systems used in the business enable us to review external technological developments (e.g., newly available materials, computer equipment).....	5	4	3	2	1	0
3. The organisation uses systems to assist with strategic business planning.....	5	4	3	2	1	0
4. The systems used in the business enable us to conduct 'What-if' studies of critical issues.....	5	4	3	2	1	0

D-V: The following statements ask you to indicate the linkage between the systems used in the business and the business strategy. Please indicate the extent to which each statement accurately describes your organisation.

	STRONGLY AGREE		NEITHER AGREE NOR DISAGREE		STRONGLY DISAGREE	N/A OR DO NOT KNOW
	↓ 5	4	↓ 3	2	↓ 1	↓ 0
1. The systems used in the organisation are an integral part of our competitive strategy.....	5	4	3	2	1	0
2. The systems used in the organisation take advantage of our firm's unique strengths.....	5	4	3	2	1	0
3. The systems used in the organisation have top management support.....	5	4	3	2	1	0
4. The systems used in the organisation are continually being enhanced.....	5	4	3	2	1	0
5. Our business strategy and systems strategy are closely aligned.....	5	4	3	2	1	0

D-VI: We would appreciate it if you would provide us with the following background information for our analysis:

1. Your title (please print): _____

2. Number of years that you have been with this company: _____

3. Which of the following most accurately describes your organizational responsibilities?
(Please place an x by the most appropriate response):

_____ Information systems	_____ Functional	_____ Information and Functional
_____ Other	(If other, please explain)	

4. The period in which your organisation first obtained or began to use computers on a regular basis. (Please place an x by the most appropriate entry.)

1994 - 1995 _____

1992 - 1993 _____

1990 - 1991 _____

1985 - 1989 _____

1980 - 1984 _____

Before 1980 _____

5. Are your information systems plans formally documented, i.e., are they in written format? (Please place an x by the most appropriate entry):

_____ YES, THEY ARE
FULLY
DOCUMENTED

_____ YES, THEY ARE
PARTIALLY DOCUMENTED

_____ NO, THEY ARE NOT
DOCUMENTED

6. Degree of change in the organization and staffing of Information Systems over the last three years (please place an x by the most appropriate entry):

_____ GREAT DEAL OF
CHANGE

_____ FAIR AMOUNT OF CHANGE

_____ LITTLE
CHANGE

7. Feedback

- | | | |
|--|-----|----|
| a. Would you like to receive feedback on your firm's response? | Yes | No |
| b. Would you be willing to discuss this questionnaire further with the researcher? | Yes | No |
| c. Would you like to know more about this research? | Yes | No |

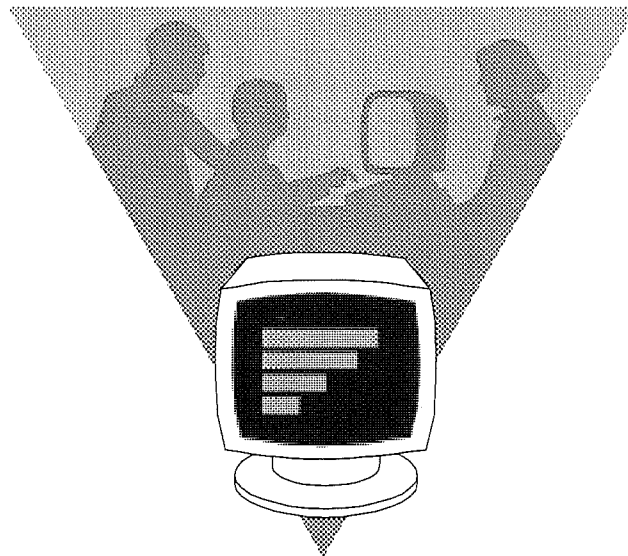
D-VII: Additional comments you may have:

If you have questions or comments at any stage, please do not hesitate to phone (364-2604) or fax (364 2727) us. Thank you.

ASSESSING THE STRATEGIC ALIGNMENT OF ORGANISATIONAL INFORMATION SYSTEMS

QUESTIONNAIRE E

To be completed by the Chief Executive Officer or other Senior Executive as nominated whose area of responsibility (e.g., Marketing, Operations) makes significant use of the company information systems in the _____ organisation.



Researchers:
Andrea J. Hale and Dr. Paul B. Cragg



Department of Accountancy, Finance and Information Systems
University of Canterbury
Christchurch
New Zealand

Phone (03) 364-2604
Fax (03) 364-2727

PROJECT INTRODUCTION AND GENERAL INSTRUCTIONS

The utilization of information technology to support business strategy presents a major challenge for owners and managers in small firms. This study aims to provide an effective way for small firms to measure the current alignment of their IS strategy with their business strategy, and to highlight areas which could be improved, via a three part questionnaire. This final part evaluates the perceived effectiveness of the information systems in the business.

These questionnaires are in the process of development, and your assistance is greatly appreciated. This particular questionnaire should take approximately ten minutes and most of the questions can be answered by circling one of several alternatives provided. There are no right or wrong answers.

Do not focus on any single information system that you may be especially familiar with but choose responses that best describe the information systems in general in the business unit. Concentrate on systems that are reasonably well established, i.e., have been in use for a year or more.

Note that our definition of information systems is broad, covering minicomputers, personal computers, software, information based manufacturing technologies (e.g., robotics), networks, databases, and so forth. It covers centralized and decentralized information systems services, manual and automated systems, and proprietary company information systems as well as external systems (e.g., databases) to which your company has access. Please keep this broader definition in mind as you go through the booklet.

We would like to assure you that your responses will be treated with the strictest confidence. In no instance will you or your company be identified as having given a particular response.

Finally, we would like to thank you for your participation in this study.

E-I: The following statements help us understand the impact of information technology on the organisation's operations. Please indicate by circling the appropriate number the extent to which you agree with each statement as it relates to the firm.

THE INFORMATION SYSTEMS OF OUR ORGANISATION :	STRONGLY AGREE ↓ 5	NEITHER AGREE NOR DISAGREE ↓ 3	STRONGLY DISAGREE ↓ 1	N/A OR DO NOT KNOW ↓ 0		
1. Increase the efficiency of our business operations.....	5	4	3	2	1	0
2. Accelerate our business processes (e.g., speed up our operations)	5	4	3	2	1	0
3. Do little in allowing us to serve a wide variety of customers	5	4	3	2	1	0
4. Improve management effectiveness.....	5	4	3	2	1	0
5. Allow us to capture electronically the expertise of our employees (e.g., via the use of expert systems).....	5	4	3	2	1	0
6. Enhance our products and services.....	5	4	3	2	1	0
7. Allow us to penetrate new markets.....	5	4	3	2	1	0
8. Assist us in controlling (e.g., improving the co-ordination of) our business operations	5	4	3	2	1	0
9. Provide little support for our products (e.g., by providing detailed product information)	5	4	3	2	1	0
10. Are an integral part of our products	5	4	3	2	1	0

Continued Over:

E-I continued:

The following statements help us understand the impact of information technology on the organisation's operations. Please indicate by circling the appropriate number the extent to which you agree with each statement as it relates to the firm.

THE INFORMATION SYSTEMS OF OUR ORGANISATION :	STRONGLY AGREE ↓ 5	NEITHER AGREE NOR DISAGREE ↓ 3	STRONGLY DISAGREE ↓ 1	N/A OR Do NOT KNOW ↓ 0		
11. Provide us with information on our distributors (e.g., agents, brokers, owned or independent branches and outlets).....	5	4	3	2	1	0
12. Provide us with information on our customers	5	4	3	2	1	0
13. Provide information to our distributors (e.g., agents, brokers, branches and outlets)	5	4	3	2	1	0
14. Provide information to our customers.....	5	4	3	2	1	0
15. Result in significant cost savings.....	5	4	3	2	1	0
16. Rarely result in significant time savings	5	4	3	2	1	0
17. Improve our decision-making	5	4	3	2	1	0
18. Improve our planning	5	4	3	2	1	0
19. Adequately organize (e.g., input, manipulate, and output) the business information we need.....	5	4	3	2	1	0
20. Provide little in the way of marketing support.....	5	4	3	2	1	0
21. Provide support for management (e.g., decision support).....	5	4	3	2	1	0

E-II: Several ways in which information systems can affect organizational effectiveness are listed below. Please indicate the *importance* of each of the following to the success of the firm.

	ALMOST ALWAYS IMPORTANT ↓ 5			FREQUENTLY IMPORTANT ↓ 3			OCCASIONALLY IMPORTANT ↓ 1		N/A OR DO NOT KNOW 0
1. Efficiency increases in company operations (due to information systems)...	5	4	3	2	1				0
2. Improved effectiveness of management decision-making (due to information systems).....	5	4	3	2	1				0
3. Introduction of new products and services based on advances in information technology	5	4	3	2	1				0
4. Establishment of market linkages (e.g., with customers, suppliers and distributors) via information systems	5	4	3	2	1				0

E-III: We would appreciate it if you would provide us with the following background information for our analysis:

	EXTENSIVELY ↓ 5			A FAIR AMOUNT ↓ 3			NOT AT ALL ↓ 1
1. Extent to which you have made use of the business unit's information systems (e.g., via printed reports and on-line inquiries).	5	4	3	2	1		
2. Extent to which you have made use of information systems in general (e.g., via the use of printed reports and on-line inquiries)..	5	4	3	2	1		

If you have questions or comments at any stage, please do not hesitate to phone (364-2604) or fax (364 2727) us. Thank you.

First Interview

Any prior information about firm

Name and Position of First Interviewee

Interviewer Questions

Int1: Introduction

Interviewee's role

Others involved in management

IT - major responsibility, who else has a say

Int2: **The Firm** - Structure
 - Chain of command

Position - Length of time with organisation-other roles/promotion as such?
 - Responsibilities
 - Who else around/under

Others involved in management

IT - your opinion of the systems, is there any input in development from you/anyone else?

Int1: Objectives of the Study

Benefit to participating firm

Int2: Questions for IT person

(PTO)

Int1: CEO Questionnaire - importance of getting it filled out by the most senior person
Also - appointment for Second Interview

Would there be anyone else we should see? Marketing etc?

Closing - Thankyou

IT Questions

(Define Information technology)

- Describe the **role and use of IT** generally in the organisation is it mainly for **administrative or is it actually part of the business** that you are in. Name some functions of the systems eg for word-processing, budgeting, external communications

- **who uses** computer resources or other technology?
- How much of your time/ **proportion of your job** involves IT or using outputs from that technology?
- Business objectives - any planning? - **where is the firm heading**
- How did the use of IT evolve - on purpose, with goals in mind or gradual? Are there any future plans for further investments?
- What are some of the Firms **major activities** that have made use of IT - both currently, or in the past - what **results** from them - ongoing? Performance?

Acquisition, usage, training acceptance

- Importance of IT to the organisation - self imposed or industry?
- Business objectives - any planning? - brief outline of strategy if possible
- IT alignment - involves using/developing IT to support the business strategy
- What are **Strengths of the business**, things that will ensure its survival; what about **strengths of the information systems** that you use
- IT and the performance of the business - related in any way?
- IT effectiveness - expectations met?

Business Strategy dimensions - **KEEP IN MIND**

Aggressiveness - push to dominate, even at expense of cashflow

Innovativeness - creativity and experimentation

Proactiveness - step ahead - first to introduce new products etc

Internal defensiveness - emphasis on cost cutting and efficiency

External defensiveness - forming tight marketplace alliances

Futurity - long term orientation

Analysis - reliance on detailed numerical studies prior to action

Riskiness - willingness to take on risky projects

Areas which are lacking/could be improved

- Own opinion of alignment - given the prior discussion of alignment
(do they know what is meant by it)-Is the organisation well aligned?

Questions for CEO

- Business objectives, major goals, time frame
- Strategy, formulation, any specific meetings/documents

Can I look at any documents?

- Major initiatives?

Major changes in the past 5? Years - what triggered them, what were results?
(Strategy and then IT independently)

Is IT leading the changes, for IT sake, or does the business decide they want to do something then the possibilities are investigated, which solution is best?

Business Strategy dimensions

Aggressiveness - push to dominate, even at expense of cashflow

Innovativeness - creativity and experimentation

Proactiveness - step ahead - first to introduce new products etc

Internal defensiveness - emphasis on cost cutting and efficiency

External defensiveness - forming tight marketplace alliances

Futurity - long term orientation

Analysis - reliance on detailed numerical studies prior to action

Riskiness - willingness to take on risky projects

- Areas which are lacking/could be improved

- Strengths

- Define Information technology - What is the role of IT in the business - is its importance self-imposed or is it in line with the industry? At all?

- IT and the performance of the business - related in any way?

- IT effectiveness - expectations met?

- IT alignment

- Own opinion of alignment - given the prior discussion of alignment
(do they know what is meant by it)

Is the organisation well aligned?