# Development of a Configurational Model on Information Systems Strategic Alignment: a Hong Kong Study

by

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## DECLARATION

None of the materials contained in this thesis has been submitted for publication prior to the start of candidature. However, some of the work in the thesis has been published or submitted for publication in refereed international conferences prior to the completion of this thesis.

## SUMMARY

The strategic information systems (IS) literature often suggests that there is a need to align IS strategy with business strategy. However, three major limitations in the study of IS strategic alignment have not been adequately addressed. First, IS strategic alignment is usually not well-defined. Second, there are few research studies on appropriate measures of IS strategic alignment. Third, the significance and benefits of IS strategic alignment are difficult to determine.

This thesis develops a configurational model on IS strategic alignment that evaluates not only the internal consistencies between IS strategy and business strategy but also contingency approaches to different types of IS strategic alignment. The four alignment types are Business-strategy-led, Conservative, Organisation-led and Technology-led. Quantitative assessments on survey data indicate that there is a relationship between alignment types and IS planning factors, as well as significant differences in IS strategic planning characteristics among the four alignment types. More effective and less effective indicators for both IS strategic planning and IS success have been identified. Qualitative analyses from the survey and multiple case study evaluations have identified good practices and pitfalls to avoid in IS strategic planning, as well as the change processes in the migration of one alignment type to another.

The enhancement of the IS strategic alignment configurational model incorporates the "middle-fit" alignment type so that the configurational characteristics could be more distinctive, and the extension of the alignment theory to a capability-based resource alignment model by matching users' information management experience against the IT department's capability to develop and deliver high quality IS. Further research initiatives have been also been identified.

# CHAPTER 1 : INTRODUCTION

This chapter argues for the strategic importance of both Information Systems (IS) and Information Systems Strategic Planning (ISSP) as well as the need for the alignment of IS strategy with business. It then addresses the objectives and scope of the study and introduces the structure of this thesis.

## 1.1 Definition of Terms

One of the problems facing researchers in the rapidly changing field of information systems and technology is the ambiguity and proliferation of terminology. Hence, for the purpose of this study, relevant terms are defined here to establish a common protocol. As the terms *Information Systems* (IS) and *Information Technology* (IT) are often used interchangeably by different researchers, the definitions by Earl (1989) have been adopted here. **IS** refers to the functional applications (*what* to do) integrating relevant (business) information, (business) processes, procedures, people and organisations concerned with the achievement of certain (business) objectives, usually with the support of IT (*how* to do). **IT** refers to the generic technology platforms and tools such as computer hardware, software, networks, database management systems, programming languages, and program code generators, etc. which are used to build or develop IS. Hence, a combination of IS and IT will be represented by Information Systems and Technologies (**IST**).

There are different types of IS Planning (ISP). Lederer and Sethi (1988) define Strategic Information Systems Planning (SISP) as "the process of deciding the objectives for organisational computing and identifying potential computer applications which the organisation should implement". Galliers (1987) argues that SISP has its focus, effectiveness and efficiency and it aims at establishing the direction of development

rather than specific development projects. The view of both Anthony (1965) and Powell (1993) can be used to classify ISP by time horizon, namely strategic ISP for long-term planning and operational ISP for short-term planning. In this study, *IS Strategic Planning* (ISSP) is defined as a decision-making process (ideally with prior approval and led by top management) in establishing long-range plans for the effective deployment of IT resources to support corporate business goals through appropriate IS applications. The term ISSP is used to differentiate from another similar term SISP, which could be interpreted as closely associated with strategic IS or competitive IS. Hence, ISSP will be used instead of SISP in this thesis, while *IS strategy* (ISS) refers to the outcome of ISSP.

Also, different terms have been used by various authors to indicate the need to relate IS plan with business plan: "Organisational alignment" (Watson & Brancheau 1991), "Linkage between corporate and IS plan" (Galliers 1987), "Aligning IS and corporate goals" or "Integrating IT with corporate methods" (Grindley 1991; 1992). The term *IS strategic alignment*, which is used in this study, refers to how well IS strategy can support and align/fit (or even drive) with the business strategy of an organisation and/or its business unit(s).

## 1.2 Strategic Importance of IS

The rapid transformation of the industrial economy towards services sectors and the globalisation of market competition have led to a higher dependence of organisations on the effective use of information and knowledge management as enablers to business success (Ma 1994). Revolutionary information systems and technology (IST) offer a wide range and reach of choices and opportunities for pro-active organisations to gain or sustain competitive advantage and improve organisational effectiveness. The relevance of IS applications to an organisation's business performance has become widely accepted as illustrated by numerous success stories which have led to significant competitive

advantage and organisational effectiveness (McFarlan 1984; Porter & Millar 1985; Cash & Konsynski 1985; Scott-Morton 1991; Neumann et al 1992; Keen 1993). As time goes by, strategic IS, such as ATM systems for customers to access banking services via their bank's global networks, which helped some banks to gain competitive advantage in the 1980s, are becoming a competitive necessity for consumer banking operations in the 1990s. Powell (1993) challenges, however, the concept that such systems arose from the deliberate planning of strategic IS and suggests that such planning is not pervasive (Lederer & Mirani 1995). It can be argued that both successful and unsuccessful IS applications may change the way a business is run, major IS decisions can no longer be the sole responsibility of the IT department but must rest with top management.

## 1.3 Importance of ISSP and IS Strategic Alignment

The evolving role of IS from processing operational data to gaining or sustaining competitive advantage and improving organisational effectiveness has attracted a higher level of top management attention (Rockart 1979; Porter & Millar 1985; Lederer & Mendelow 1988; Moynihan 1990; Ginsberg & Venkatraman 1992). This change has led to higher ranks for IS managers in the organisational hierarchy (Raghunathan & Raghunathan 1989) and has increased the need for effective SISP (Henderson & Sifonis 1988) as well as more attention toward proactive, innovative and integrative ISSP approaches to address the more complicated issues of ISSP (Galliers 1987, 1991; King 1988; Henderson & Venkatraman 1989; Earl 1990, 1993; Ward et al 1990). Major reasons for ISSP include (after O'Connor 1993; Cash et al 1992):-

a) Competitive pressures have forced organisations to plan better everywhere in order to survive/prosper. Increased global competition and the use of IST for competitive advantage by competitors have all made ISSP a prerequisite for achieving a satisfactory level of business performance.

b) Scarcity of trained IST professionals coupled with their long training cycles and limited availability of financial and managerial resources put pressure on ISSP in assessing IST as one of many strategic investment opportunities for an organisation, and the potential financial returns of investments must be weighed against those of alternative investments.

c) Identification of potentially important technological trends minimises costs of technology obsolescence and takes advantage of integration possibilities as technologies merge.

d) Identification of organisational-wide information requirements provides the foundation for building a common IS infrastructure (Synnott 1987; Atkinson 1990), which incorporates data architecture, application systems architecture, and tools architecture in order to address system compatibility, technology integration, and data integrity.

e) Cost containment pressures (Grindley 1991, 1992) have led to more careful planning for resource allocation (Dickson & Wetherbe 1985) and prioritisation of the application portfolio (McFarlan & McKenney 1983; Synnott 1987) as well as co-ordination and control of IST expenditures.

f) There is the potential contribution of IST to business processing re-engineering (Hammer 1990; Davenport & Short 1990; Venkatraman 1991; Davidson 1993) which may be addressed through ISSP.

g) Assessment of the organisation's technical and managerial IS competence is needed to ensure successful implementation of ISSP.

h) Scheduling of projects for implementation and project management (Dickson & Wetherbe 1985) are required to ensure the quality, timeliness and accuracy of delivered systems.

These reasons may explain why ISSP has been frequently ranked as one of the most important IS management issues for many years overseas (Benjamin & Blunt 1992; Watson & Brancheau 1991; Neiderman et al 1991; Brancheau & Wetherbe 1987; Burn et al 1993). In a study by Moynihan (1990), CEOs, senior functional managers and IT managers identified that "more systematic planning process for IT" was needed to address their second most important IT management issue: the quality of planning for IT and especially the closeness of the link of IT planning with business planning.

Some empirical studies reveal that the alignment of IS to the competitive business strategies is relevant for organisations to gain competitive advantage (Neumann et al 1992; Chan & Huff 1992). The alignment of IS with business needs (Earl 1993) is found to be one of the most common ISSP objectives. Also, the internal focus of ISSP for the effective application of IS addresses the important relationship between ISSP and organisational structure (Burn 1989). Many researchers have identified a positive relationship between planning systems and their effect on the organisation performance (King 1988; Sambamurthy et al 1993; Chan & Huff 1992). Perhaps, these are reasons why IS strategic alignment, which is closely related to ISP, had also been ranked as an important IS management issue. However, there are counter arguments on whether the successful alignment of business and IS strategy is the direct/indirect result of ISSP or whether the traditional top-down approach to strategic fit is the best approach:

a) The development of American Airlines' computerised reservation system (SABRE) was aimed at solving the airlines' business problems with its travel agents, but it has helped the airline to gain competitive advantage over its competitors in the 1970's. The SABRE case has become a classic example of strategic IS and Neumann (1994) quotes this case as "leaders became visionary after facts".
b) The traditional top-down path to strategic fit (as a presupposition in the MIT90s framework, Scott-Morton 1991) is that (business) strategy is formulated to drive

structure; management processes; technology; as well as individual skills and roles. While Sauer and Yetton (1994) consider the study of strategic fit being important, they argue that technology could also be a driver to affect individual skills and roles; structure; management processes; and strategy through an incremental learning process in the introduction of IT to the organisation. Powell (1993) proposes that technology (IT) does not always follows (business) strategy, technology (IT) can drive (business) strategy. Also, Earl's (1993) findings does not support the assumption by Lederer and Sethi (1988, 1991) that formal SISP methods are used in principle as appropriate, nor a common assumption that a systematic linkage to the organisation's business planning procedures is beneficial (Boynton & Zmud 1987; Karimi 1988).

## 1.4 Problems of ISSP

Although the importance and history of ISSP are recognised (McLean & Soden 1977), the problems of linking IS strategy and business strategy have often been reported (Galliers 1987; Wilson 1989; Lederer & Sethi 1988/1991; Doyle 1991). Early studies on organisational planning and ISSP were concerned with planning concept, planners versus non-planners or presence versus absence of corporate plans, formal versus informal planning (McLean & Soden 1977). Since ISSP has become more sophisticated in order to respond to the dynamic business and technology environment, these superficial issues were not particularly helpful in improving the quality of ISSP. Traditional ISSP theory is passive and reactive, top management has formulated their business plan (which may or may not take into account of IT trends/needs) prior to sending in IS service requests to the IS department, these service requests will then become the basis for ISSP in many organisations to formulate information policy, determine IS architecture, allocate IS resources and schedule applications/projects. Such an approach may be considered as tactical rather than strategic planning (Synnott 1987) and the technology-driven

opportunities could hardly be incorporated in the strategic thinking process by top management (Ma 1994). Furthermore, some organisations adopt a single ISSP approach, which cannot appropriately address the complex issues of ISSP. Instead, multiple or contingency approaches appear to be more successful (Boynton & Zmud 1987; Galliers 1991; Earl 1993). In order for the IS plans to be realised, the quality of the resulting plans is of major concern. Some ISP problems that have been reported are that resulting plans require significant further analysis; are inflexible and do not adequately include resource plans for infra-structural developments for staffing, communications, hardware, and software. Another concern is that future IS/IT developments do not necessarily follow the resulting plans of ISSP (Lederer & Sethi 1988, 1992) and IS plans may become shelf-ware (Atkinson 1992).

Although there has been much discussion on IS strategic alignment (McLean & Soden 1977; Dickson et al 1984; Lederer & Mendelow 1986; Galliers 1987), there are few attempts to show either the effect of such interdependency (Henderson & Venkatraman 1989; Floyd & Wooldridge 1990; Burn 1993; Earl 1993) or how IS strategic alignment could affect the effectiveness of the ISSP (King 1987; Earl 1993). In practice, formulating and implementing effective business strategies in a dynamic business environment is a major challenge for senior executives. Likewise, incorporating appropriate IS strategies to support/enhance business strategies is another major challenge.

## 1.5 Objectives and Scope of Study

Despite the recognised importance of ISSP and severe problems being encountered by organisations at various stages of ISSP, limited ISSP research has been conducted to address the problems of ISSP overseas as well as in Hong Kong (Burn 1989; Burn 1993; Elliot 1993). Furthermore, Byrd et al (1995) argue that normative and prescriptive studies on the nature of the processes employed by IS planning groups have represented the bulk of the ISSP literature (Sambamurthy et al 1993) with a recent exception of the research work by Earl (1993), which focused on the contents of the IT plan without significant attention on the appropriate actions and behaviours associated with ISSP process. Also, although there has been increased attention with regard to the need for IS strategic alignment, it is dangerous to assume that IS strategic alignment will automatically improve the chances of ISSP success, IS effectiveness and organisational performance. Hence, this study selects a particular problem area of ISSP as summarised in the following research questions:

1. What is the nature of IS strategic alignment, if any?
2. Does IS strategic alignment have any impact on the perceived effectiveness of IS in the organisation?
3. Is there a particular contingency model of IS strategic alignment that supports different strategies more effectively?

The following research objectives are attempts to address the above problem statements:

1. To develop *composite models* to analyse how well (selected) organisations align their IS strategies with business strategies.
2. To develop *contingency models* to explore particular circumstances under which different models of IS strategic alignment are more or less appropriate.

3. To evaluate whether IS strategic alignment will affect IS effectiveness and business performance.
4. To evaluate whether ISSP will affect IS strategic alignment.

Although these research objectives are very broad and encompass a vast body of knowledge in a range of disciplines, this research has the potential to enrich the body of knowledge in multi-disciplinary IS research. This is supported by repeated calls in the IS literature for the use of appropriate reference disciplines in IS research (Bakos & Treacy 1986; Straub 1989; Walsham 1991; Galliers 1993). Multi-disciplinary research work, though difficult, time-consuming, risky (McFarlan 1985) and requiring researchers to reach an appropriate level of competence in the reference disciplines in addition to IS, is seen as very suitable in addressing the complex issues of IS and it enables more realistic evaluations of these issues in practice.

These objectives also cater for the special interest of practising managers (judging from the great demand of many selected organisations to extend this research to ISSP workshops and ISSP seminars for their managers) who are facing the major challenge of incorporating appropriate IS strategies to support/enhance/drive business strategies.

The scope of this study is limited to the study of selected organisations in Hong Kong (HK), including organisations which are indigenous to HK and subsidiaries of foreign firms. Hence, generalisations of the findings and recommendations for use in HK as well as other organisational and cultural context will also be evaluated. Furthermore, the study focuses on the study of IS strategic alignment of business units instead of the whole organisation (especially for large organisations/corporations). Variations of IS strategic alignment by different organisational contexts such as industry sectors

(including public sector versus private sector), planning horizon of both business and IS planning, and role of IS will also be examined.

## 1.6 An Outline of the Thesis

This thesis is organised as follows:

**Chapter 2** (*Literature review*) reviews the evolution of ISP both in relation to the evolution of strategic business planning and the changing role of IS in organisations. It then discusses the contribution of configurational theories and relevant research in IS strategic alignment.

**Chapter 3** (*Conceptual model and research propositions*) describes the development of a configurational model on IS strategic alignment and the propositions/hypothesis that the research is going to explore.

**Chapter 4** (*Research design and methodological justifications*) describes the research approach, design and the justifications for integrating both quantitative and qualitative research approaches.

**Chapter 5** (*Preliminary data analysis from survey*) reports on the exploratory factors analysis and the assignment of alignment types.

**Chapter 6** (*Analysis of IS strategic planning factors*) compares and contrasts the configurational characteristics of IS strategic planning.

**Chapter 7** (*Analysis of IS success factors*) compares and contrasts the configurational characteristics of IS success and concludes the findings and analysis from the survey.

**Chapter 8** (*Findings from multiple case study analyses*) reports and evaluates the findings from the case study analyses in order to explain the configurational characteristics and the process of change between alignment types.

**Chapter 9** (*Conclusions and Implications for Future Research*) builds from the analysis of findings in survey and case studies in order to extend the research model. It then provides a critical review of the research objectives, research model and the conclusions reached, as well as the contributions of this study and followed by the implications, limitations and possible future extension of this study.

**References** and **Appendices** are included to provide supporting information.

# CHAPTER 2 : LITERATURE REVIEW

This chapter examines the evolution of ISP both in relation to the evolution of strategic business planning and the changing role of IS in organisations. In order to structure the argument, the discussion first reviews relevant business strategy literature to show that the concepts of strategic planning have changed quite radically over the last three decades and may still be seen to be in an evolving state. This necessarily is reflected in the approaches which have been used for IS, since the concept of IT supporting the business strategy has been a long-held belief.

ISP approaches are reviewed through a number of stages (these are not definitive but selected by the author as representative of generic approaches which were promoted at different time periods) and cover Support Alignment models, Impact models, Contingency models and, Strategic Alignment models.

The recognition that IT can, however, change not just the business but the organisation and the society in which it exists has changed the charter from one of IT alignment with business strategy to one of complete integration (Synnott 1987) or full integration (King 1997). The way by which such integration can be achieved is the focus of this thesis and so while the chapter concludes with a review of business and IS strategic planning approaches, it also emphasises some of the limitations. Recommendations as to how existing ISSP approaches can be used as a basis for evaluating the effectiveness of organisations in integrating their business and IS strategies are then further developed in Chapter 3.

## 2.1 Business Strategy and Planning Approaches

Emerging Theories in Strategy Literature

The major approaches to strategy formulation are as follows:

a) Rational planning (Ansoff 1965)
b) Competitive Advantage (Porter 1980; 1985)
c) Processual approach to Strategy Planning (Mintzberg 1987; Pettigrew 1985; Whittington, 1993)
d) Reengineering (Hammer 1988; Davenport & Short 1990)
e) Core Competence; Resource Based View; Value-based and Capabilities-based Strategies (Prahalad & Hamel 1990; Amit & Shoemaker 1993; Kay 1993; Normann & Ramirez 1993; Peteraf 1993; Hamel & Prahalad 1994; Collis & Montgomery 1995)
f) New Perspectives in Strategy (Porter 1996; Hamel 1996)

Although excellent companies (Peters & Waterman 1982) and total quality management (TQM) were once very popular references for managers in the 1980's, the author considers that they are addressing "successful examples" and "incremental quality improvements" respectively instead of approaches to strategy formulation. Hence, they are not discussed.

The business strategy literature associated with adding value and capability-based resource alignment have gained strong support in recent years. This section discusses the new perspectives in strategy and then addresses the issues associated with resources, core competencies and capability-based resource alignment.

Porter (1996) defines strategy as the creation of fit among a company's activities. He argues that strategy is about finding the position in the market-place that best fits a firm's skills. If there is no fit among activities, there is no distinctive strategy and little sustainability. A company's choice of a new position must be driven by the ability to

find new trade-offs and leverage a new system of complementary activities into a sustainable advantage. The most valuable fit is strategy-specific because it enhances a position's uniqueness and amplifies trade-offs.

Hamel and Prahalad (1994) propose that strategy means deciding what a future market will look like and then directing the firm's resources so that it can take advantage of that market. Hamel (1996) argues that a common problem in strategy formulation is that organisations tend to focus on the incremental and tactical planning (or programming) instead of searching for a revolutionary strategy to shape the future industry. He proposes a new perspective that a corporation could be viewed as a bundle of core competencies rather than a collection of business units or product portfolios.

Amit and Shoemaker (1993:35) define *resources* of a firm as "stocks of available factors that are owned and controlled by the firm." "*Capabilities* refer to a firm's capacity to deploy resources, usually in combination, using organisational processes, to effect a desired end. They are information-based, tangible or intangible processes that are firm-specific and are developed over time through complex interactions among the firm's resources." "Capabilities are based on developing, carrying, and exchanging information through the firm's human capital. Information-based capabilities can be classified as 'invisible assets'." "The basic idea that underlies the Resource-Based View (RBV) of the firm is that marshalling a set of complementary set of resources and capabilities which are scare, durable, not easily traded, and difficult to imitate, may enable the firm to earn economic rents." (Amit & Shoemaker 1993:35-37)

Amit and Shoemaker (1993) have sought to replace the strategy field's concept of Key Success Factors with the notions of :

a) Strategic Industry Factors, the set of Resources and Capabilities that has become the prime determinant of economic rents for industry participants.

b) Strategic Assets, a firm level construct, referring to the set of firm specific Resources and Capabilities developed by management as the basis for creating and protecting their firm's competitive advantage.

Collis and Montgomery (1995) argue that the Resource-Based View (RBV) combines the internal analysis [a preoccupation of many management gurus since the mid-1980s] of phenomena within companies with the external analysis of the industry and the competitive environment [the central focus of earlier strategy approaches]. The RBV builds on, but does not replace, the two previous broad approaches to strategy by combining internal and external perspectives. The RBV sees companies as very different collection of physical and intangible assets and capabilities. No two companies are alike because no two companies have had the same set of experiences, acquired the same assets and skills, or built the same organisational culture. Valuable resources can take a variety of forms, including some overlooked by the narrower conceptions of core competence and capabilities. A greater number of resources cannot be imitated because of what economists call path dependency (or *where you want to go will have to depend on where you are at present*). Simply put, these resources are unique and, therefore, scarce because of all that has happened along the path taken in their accumulation. As a result, competitors cannot go out and buy these resources instantaneously. Instead, they must be built over time in ways that are difficult to accelerate. They argue that RBV helps us to understand why the track record of corporate diversification has been so poor and identifies the following three common and costly strategic errors companies make when they try to grow by leverage resources:

a) Managers tend to over-estimate the transferability of specific assets and capabilities.
b) Managers tend to over-estimate their ability to compete in high profitable industries.

c) The common diversification is to assume that leveraging generic resources, such as lean manufacturing, will be a major source of competitive advantage in a new market - regardless of the specific competitive dynamics of that market.

The basic resources of a firm have to be compiled over time and they can be categorised as follows: (Rowe et al, 1994:)

a) technical factors (patents, brand identity, manufacturing skills),

b) competitive factors (economic of scale, market share),

c) managerial factors (organisational culture, speed of response to changing conditions),

d) financial factors (access to capital, cost-competitiveness).

Rowe et al (1994) define core competencies as the unique combination of the resources and experience of a particular firm. It takes time to build these core competencies, and they are difficult to imitate.

Stalk et al (1992) distinguish core competencies and capability-based resources as follows: (a) *Core competencies* emphasise the underlying technology and production expertise at a particular areas of the value chain; and (b) *Capability-based resources* cover the entire value chain, especially areas that go beyond the core elements of resources. For this reason, they are more likely to be directly visible to the customer than core competencies. Normann and Ramirez (1993) argue that an important role of strategy is "to create value". They consider that strategy provides a company with direction and, if that direction is customer oriented, strategy can funnel energy towards creating and delivering value to customers.

The concept of adding value with carefully planned strategic capabilities is considered by Kay (1993) as a means of achieving long-term success:-

a) Some firms have unique, and carefully protected, products for which future demand seems assured. The achievement of any company is measured by its ability to add

value - to create an output which is worth more than the cost of its inputs which it uses.

b) The firm is defined by its contracts and relationships. Added value is created by its success in putting these contracts and relationships together, so it is the quality and distinctiveness of these contracts that promote added value.

c) Distinctive capabilities (architecture, reputation, innovation and strategic assets) based on well-managed reputation are more often enduring than those which result from positioning, or innovation, or from standards.

Johnson and Scholes (1997:137-8) argue that "successful strategies are dependent on the organisation having the *strategic capability* to perform at the level which is required for success". They propose that a major issue of strategic capability is concerned with the assessment of the competences, which exist to undertake the various activities of the business. An understanding of the competence in performing various value activities and managing the linkages between activities is crucial when assessing strategic capability.

"Those competences which critically underpin the organisation's competitive advantage are the *core competences* of the organisation which will differ from one organisation to another depending on how the firm is positioned and the strategies it is pursuing. Those unique resources and core competences which allow supermarkets to gain competitive advantages over corner shops are not core competences in the competitive rivalry among supermarkets." (Johnson & Scholes 1997:149)

Evolution of Strategic Business Planning

"Strategic planning is an oxymoron" (Mintzberg 1994:5).

When strategic planning arrived on the scene in the mid-1960s, corporate leaders embraced it as "the one best way" to devise and implement strategies that would enhance the competitiveness of each business unit. Ansoff (1965) embodied the ideas of Taylor on scientific management by suggesting a separation of thinking from doing by creating a new function of specialist strategic planners. This approach typifies the formal systems planning approach supported by a strong normative literature stating what factors should be included in a systematically planned strategy and how to analyse and relate these factors step by step (Katz 1970). While this approach may be excellent for some purposes, it tends to focus unduly on measurable quantitative factors and to under-emphasise the qualitative, organisational and power-behaviour aspects which so often determine strategic success (Quinn 1978).

A secondary wave of strategic planning approaches is often described as the power-behaviour approach (Cyert & March 1963; Pfeffer 1981; Pettigrew 1973), where far greater emphasis was given to the politics of strategic decision making, bargaining and negotiation and multiple goal structures. While adding greatly to the understanding of human dynamics in the strategic decision making process, such approaches generally lacked any normative guidance to the strategist. They do, however, highlight the fact that major organisational changes are an integral part of strategy, as first posited by Chandler (1962).

Both of these approaches concentrated on internal alignment of organisational infrastructure and strategy and it was only with the work of Porter (1980, 1985) that a major shift occurred in strategic thought and the emphasis moved to industry structure and generic strategies. The premise being that as industries have very different structures

and dynamics one must understand these before identifying the possible generic strategy for the firm itself.

Quinn (1978, 1981) suggests that a single-dimensional vision of strategy can never cope with the subtleties and complexities of strategic issues, and the inherent decision making and that strategic sub-systems must be blended incrementally into a cohesive pattern that becomes a company strategy. This approach is described as logical incrementalism and, in many ways, forms the basis for most strategic theory in current business and management literature. Mintzberg (1994:5) goes even further as noted in the quote at the beginning of this section. He suggests that strategic planning has been practised (at its best) as strategic programming, the articulation and elaboration of strategies or visions that already exist. What is meant by the term "strategic planning" is really all about strategic thinking, where flexibility is the key. Needless to say, his views have been extensively criticised, not least by Ansoff (1994, 1991), who suggests that Mintzberg's views are frozen in the 1960s.

Perhaps, the arguments of Ansoff and Mintzberg are due to their different strategic planning approaches as illustrated by the following four perspectives on strategy (Whittington 1993):

Classical approach : is the oldest and still the most influential. It relies on the rational planning methods. It advocates that profitability is the supreme goal of business and rational planning is the means to achieve it. Supporters include Chandler (1962); Sloan (1963) and Ansoff (1965).

Processual approach : pragmatically accommodates strategy to the fallible process of both organisations and markets. It assumes that effective strategies emerge directly from intimate involvement in everyday operations. Supporters include Mintzberg (1987) and Pettigrew (1985).

Evolutionary approach : draws on the fatalistic metaphor of bio-logical evolution, but substitutes the discipline of the market for the law of the jungle. It is based on the explicit parallel between economic competition and the natural law of the jungle where it relies on markets to secure profit maximisation, and best performers will survive. Supporters include Hannan and Freeman (1988) and Williamson (1991).

Systemic approach : is relativistic, regarding the ends and means of strategy as inescapably linked to the cultures and powers of the local social systems in which it takes place. It trusts the capacity of organisations to plan forward and to act effectively within their environment. Supporters include Granovetter (1985) and Marris (1964).

It is not the intent of this thesis to explore this particular argument in greater depth here, but to highlight that the consensus view which emerges is that there has been a transmutation of strategic planning and furthermore a general convergence towards the view that what is required is "horses for courses", where different environmental challenges require different strategic responses and, as a consequence, different planning approaches. It is also worth noting that while there may be some general agreement that strategic business planning will be ineffective and dysfunctional if conducted in a haphazard manner, the empirical evidence to support the value of formal strategic planning is inconclusive. Thune and House (1970) found that formal planning improved performance in 36 manufacturing firms, whereas the study by Pearce et al (1987) found inconsistent and often contradictory results when searching for support for the beliefs of strategic planning advocates. Many recent studies have therefore incorporated contingency variables when modelling the relationships between planning and performance (Doty et al 1993; Dvir et al 1993).

Concept of "Fit"

Even the earliest of theorists discussed strategic planning within a "concept of fit". Ansoff (1965) considered that an important role of senior management in the formulation of corporate strategy was to choose the appropriate positioning of the organisation based on an analysis of the organisation and its strengths and weaknesses in relation to its market situation.

Hofer and Schendel (1978) described strategy as the match an organisation makes between its internal resources and skills (i.e. its core competencies) and the opportunities and risks created by its external environment. White (1986) also considered that the fit between internal organisation and its external strategy was central to strategic management, and required the strategist to define a concept of linking strategy to the set of organisational attributes that can be adjusted to facilitate the effective, low-cost implementation of the strategy. This implied a differentiation between corporate strategy and business unit strategy and the means to integrate them.

Miles and Snow (1978) and Mintzberg (1987a) carried this argument further by focusing respectively on external and internal alignment models and deliberate and emergent strategies. As both of these research findings have a strong influence on ISP developments, they will be discussed in greater detail within the ISP context but are mentioned here to illustrate the progressive evolution of strategic planning in business and management theory and also the somewhat illusive nature of the beast. There is no single accepted view of strategic planning and the most one can say is that there has been a gradual convergence of opinion that it consists of several different foci, which cover the visioning or thinking aspect; the planning or programming aspect; and the implementation. Throughout there is a need to tailor one's approach to the particular operating environment and so the concept of strategic "fit" is generally viewed as of primary importance in the selection of the best approach. This is the view within which

the evolution of ISP will be examined and, where appropriate, related to business strategy theories.

## Evolution of Information Systems Planning

Despite the recognised importance and history of ISP in the past two decades, many problems have been reported (Lederer & Sethi 1988, Wilson 1989). These relate to the inadequacies of particular approaches and their inability to cover the whole planning agenda (Boynton & Zmud 1987); the lack of implementation guidelines (Lederer & Sethi 1988, 1992b); and the need to find business themes for IT rather than formulate IT strategies for business (Earl 1992).

A number of "stages" of ISP development can be traced, which closely reflect the evolution of business strategic planning methodologies. For the purpose of this dissertation, these are grouped into four classifications as Support Alignment theories, Impact theories, Contingency theories, and Strategic Alignment theories (Lederer & Mendelow 1986, Singh 1993, Elliot & Melhuish 1995). This classification allows the author to trace where major influences to current ISP approaches have occurred and the extent to which these may now be deemed applicable in the development of a more holistic approach. Within each of the classifications, a number of models will be evaluated and their contribution to current theory and practice evaluated.

## 2.2 Support Alignment Theories

Early approaches to ISSP (e.g. Nolan's Stage of Growth, IBM's Business Systems Planning and Rockart's Critical Success Factors as described in the following section) aimed at determining information and required techniques for defining an IST architecture with major emphasis on the "alignment" of IS to support business. Major limitations of these traditional ISSP approaches also reflect some of the ISSP problems reported in the 1980's such as ISSP being tactical/technical instead of strategic (Lederer & Mendelow 1986). Sullivan's (1985) IS infusion and diffusion matrix provides a good synthesis on the application of these early ISSP approaches.

### Stages of Growth Hypothesis

Nolan's Stages of Growth (SOG) contingency theory supports the exploitation of strategic IST opportunities through the analysis of the 4 stages of growth: initiation, growth, control and maturity (Gibson & Nolan 1974). Integration and data administration were inserted between "control" and "maturity" to form the extended 6-stage model (Nolan 1979). Knowledge of the current maturity stage (where the organisation's IT application position is) provides a base from which planners may think of subsequent stages to follow in order to develop appropriate IST strategies, management styles, control approaches and investment levels.

Benbasat et al (1984) comment that the stage hypothesis on the assimilation of computing technology provides one of the most popular models of describing and managing the growth of administrative IS [in the 1970's and early 1980's], despite little formal evidence of its reliability or robustness. They reviewed seven research studies involving SOG and partially confirmed two of the hypothesis: Organisation location and Usage of planning and control, but the following five were not confirmed: S-shaped

budget curve, Charge-back systems, IS skills, Data administration, Application of benchmarks, and Steering committees. Another criticism by King and Kramer (1984) is that it does not define the mechanism of change. Since Nolan's model was based on the operating environment in the 1970's, many of its assumptions were solely based on mainframes and highly centralised computing environments and hence its applicability is no longer valid today in a decentralised and PC-based or client-server computing environment. Another major inadequacy of Nolan's model is its lack of organisational and management focus, and the overly simplistic and subjective assumptions on which it is based. Galliers and Sutherland (1991) comment that this provides little help to the IS management attempting to create a successful IS function within the organisation. They have proposed a revised staged-growth model by matching the stages-of-growth (Nolan 1979) with the 7-S strategic planning model (Pascale & Athos 1981; Waterman et al 1980).

This is not to say, however, that Nolan's model has been without impact on ISP development nor that it is totally redundant as an approach for planning in today's environment. The SOG model highlights at least two important issues:

1. An organisation can have units in a number of different developmental stages where different management approaches may be required in order to achieve integration.
2. An organisation may need to adopt an evolutionary approach to ISP which accords with the need for different user needs at different stages of IT diffusion and innovation.

Gregoire and Lustman (1993) suggest that the SOG model can still be an effective aid to planning if it is extended to include the concept of organisational learning and to provide more detailed guidelines for transition stages. Extensions of the SOG model have been proposed by Earl (1988) and Galliers and Sutherland (1991)

which apply a contingency approach to organisational learning and management styles. These are further discussed in Section 2.4.

In summary, the SOG model was developed at a time when IT was viewed as a support tool for business and does not address the strategic role now perceived as the IT vision. It, nevertheless, has provided a basis for a number of evolutionary theories and may still be a viable model for organisations where there is no strong dependency on IT.

### Business Systems Planning

Business Systems Planning (BSP) is a comprehensive and more formal planning methodology developed by IBM (1975). It is supported by IBM manuals and training courses. The BSP planning team should be composed of both users and MIS personnel. BSP or its adapted methodology was one of the most popular ISP methods in the 1980's (Lederer & Putnam 1987).

The objective of BSP is to develop a long-range plan for the design, development, and implementation of a network of information systems to support the business process. The current IS are assessed, and weaknesses and deficiencies are noted. Processes and users that share data are identified, and the potential for common IS across organisational boundaries is determined. The output is the IS plan, which describes the overall IS architecture, and defines the scheduling implementation of individual systems within the overall network. It serves as the "blueprint" for the development of an integrated MIS.

BSP stresses that organisational-wide IS should involve top-down planning and bottom-up implementation. It involves top management in the study which may lead to better support in the implementation of the plan. It is a highly structured and well-documented planning methodology, providing a future information architecture of

systems, subsystems, hardware, software, priorities, and plans aimed at supporting the organisation's best interests with goals and a means of achieving them.

BSP may be too cumbersome and it is not easy to implement. Hence, a BSP study greatly depends on the study team's skills and abilities. Since BSP adopts a customised approach, cross reference among studies in different organisations has limited value. The main criticism, however, is that BSP focuses only on current business processes (in that sense it is the direct converse of a Business Process Reengineering [BPR] approach) and so attempts to make existing processes more efficient rather than to evaluate the strategic role for IT. BSP assumes that the organisation is functionally based and hence has a hierarchical approach rather than an integrated horizontal approach which can focus on core processes (such as customer service rather than functional support such as marketing or accounts). Some parts of the BSP methodology can be useful when there is a requirement to complete an audit of current systems in an organisation and the approach itself can be modified to align with future needs if combined with a more strategically oriented approach such as Critical Success Factors.

Critical Success Factors

A framework advocated by Rockart (1979) argues that the information needs for top managers can be derived from Critical Success Factors (CSF), i.e. the key areas for any organisation in which performance must be satisfactory if the business is to survive and flourish.

The CSF approach involves a series of interviews conducted in two or three sessions. In the first session, the manager is queried as to his or her goals and the CSFs that underlie those goals. Considerable discussion may be required to ensure that the analyst thoroughly understands the interrelationships between the goals and CSFs. Every effort is made to combine or eliminate similar CSFs and an initial set of performance measures is developed. The second session is a review of the first and primarily focuses

on identification of specific performance measures and possible reports. Additional sessions are held as necessary to obtain agreement on the CSFs measures and reports for tracking them. The reports and related information systems required to provide them are designed by the MIS group.

A major strength of CSF as a planning methodology is its introduction of a means-end relationship between goals of individuals and their needs for information (Henderson & Sifonis 1988; Boynton & Zmud 1987). CSFs for individuals can be compared to that of their managers, senior management as well as at the organisational level. Organisations in the same industry or having similar market positioning strategy can compare their CSFs (if they intend to do so!). Also, CSFs are being used to focus management attention on the most important activities for IS support. In practice, however, a CSF study tends to focus on top management requirements but may ignore important operational requirements.

Many contingency approaches will involve CSFs as part of the overall approach but CSFs alone are insufficient on their own to provide a holistic view of the organisation and the interaction of the external and internal strategies. One way in which CSF can be successfully applied is to combine it with a competitive forces analysis (Porter 1980, 1985) as discussed in Section 2.3.

Summary of Support Alignment Theories

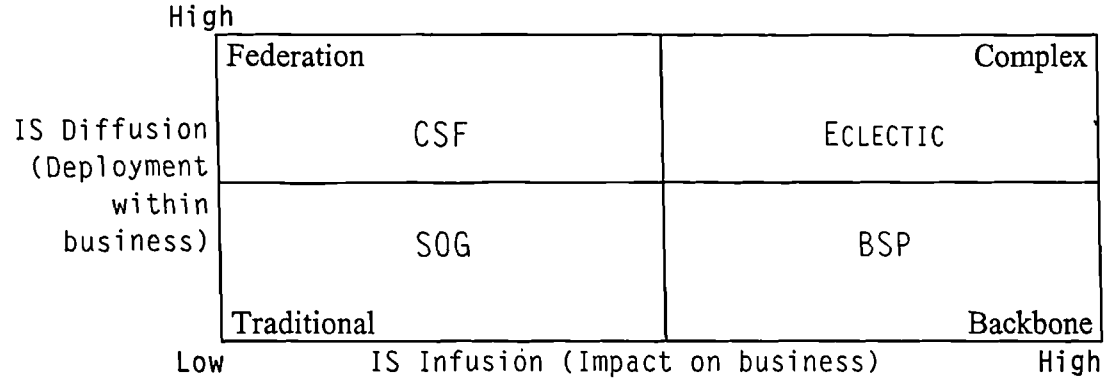


*Figure 1 : IS Infusion and Diffusion Matrix*

(Sullivan 1985)

Support Alignment theories reflect the IT role of their time since they mostly evolved before the strategic potential of IT as a business driver was fully realised. They still may have a certain value, however, as part of a portfolio of tools which can be applied during different periods of organisational learning. This is illustrated by Sullivan's (1985) IS infusion and diffusion matrix in Figure 1.

Sullivan (1985) offers a contingency approach to ISP with his IS Infusion and Diffusion matrix. He describes infusion as how well developed and important are IST applications to the business of the organisation and diffusion as the extent of IST applications throughout the organisation. He identifies four types of IST environments and associates an ISP approach for each environment. Stages-of-growth (SOG) approach is suitable for a *traditional* environment, BSP is appropriate for a *backbone* type of environment, and the CSF approach is appropriate for a *federation* type of environment. However, none of them is appropriate for a *complex* environment, which may require a mix of various ISP approaches to adequately cater for all of its complex web of concerns. Ward et al (1990) further argue that the complex environment is characterised by considerable organisational experience of IST with increasing awareness about the potential of IST. Organisations moving into this quadrant are ready for ISSP and may already have strategic IS applications. Hence, they need to use a mixture of ISP methods in order to avoid gaps in their IST application portfolio, an example of such a method is Earl's (1993) multiple methodology.

Sullivan's model illustrates the application of these three traditional ISP approaches but implicitly assumes a stage growth development of IT diffusion. Many organisations today (especially those newly established) can jump to a much more advanced stage of IT exploitation from a zero start - they do not have to consider existing investments in IT and also have the advantage of the latest developments to

support strategic application developments. A review of these models is useful nonetheless to highlight some important issues:

1. Different approaches may be needed within the organisation as different units advance at different rates and in different strategic directions in their usage of IT.
2. ISP approaches need to accommodate organisational learning mechanisms that facilitate the knowledge transfer from planners to implementers. Hence, effective ISP approaches must be evolutionary and continuous (Waema & Walsham 1990).
3. Guidance is needed as to how to operationalise a range of approaches.
4. A different approach is required in organisations with a high dependency on IT and a need for strategic direction.

Another important ISSP concept relates to the impact approaches, which will be discussed in the next section and then followed by the need for multiple ISSP approaches as reviewed in Section 2.4.

## 2.3 Impact Theories

As IS have evolved from an internal support role in processing data for operational applications (Ives et. al. 1980) to take up a strategic role in organisations for achieving competitive advantage and organisational effectiveness, the application of IST has become more important in organisations (Parson 1983; Ives & Learmonth 1984; Porter & Millar 1985; Wiseman 1985; Somogyi & Galliers 1987; Synnott 1987; Neumann et al 1992). In addition to the "alignment" of IS to support business in traditional ISSP approaches, more attention is also focused on the "impact" of technology driven opportunities. Perhaps the major impact on business planning in the 1980s came from Porter's work on Competitive Forces (1980) and Value Chain Analysis (1985) which shifted the focus of strategy from one of internal alignment to external

alignment. In particular, he suggested that strategy was only possible if it concentrated on the competitive forces which beset an organisation in a particular industry. This view had a similar impact on ISP and is worth reviewing here before ISP impact models are considered in depth.

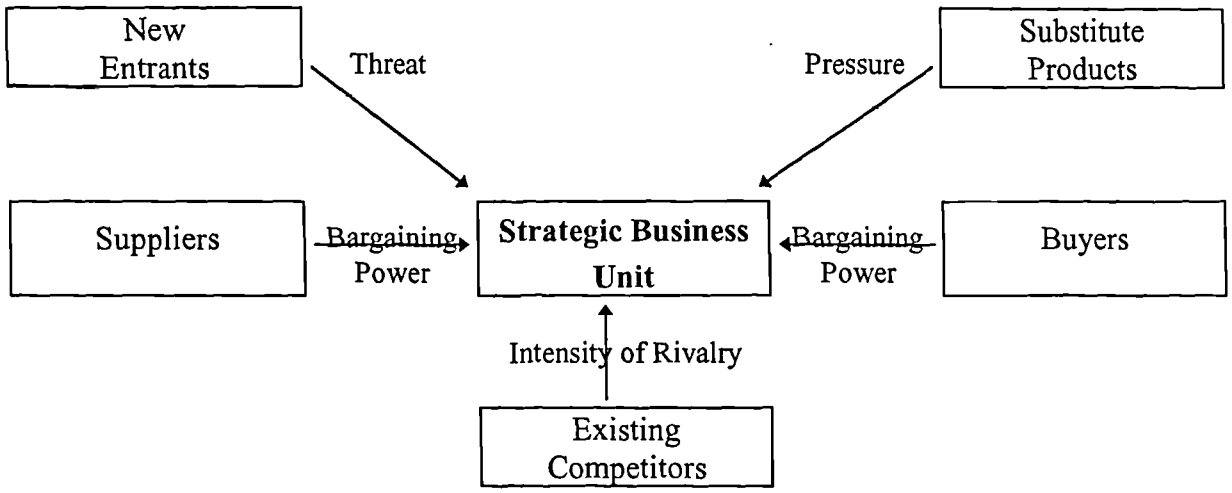


Figure 2: Five Competitive Forces
(Porter 1980)

Porter (1980) provided a simple analysis on the effect of the five basic forces that shape the competition in every industry. Many IT applications as shown below (after Ma 1994; Saxena & Ma 1995) have illustrated that organisations can selectively apply IST to gain a competitive edge, build defences against these forces and formulate actions to influence them.

"Threat of new entrants". IT can be used to create barriers to entry by increasing mandatory investments in IT and through locking customers with higher switching costs into existing distribution channels, such as in reservation systems for travel agents.

"Intensity of rivalry from existing competitors". IT can be seen as an enabler to create new business networks or strategic alliances among rivals, such as in ATM banking networks.

"Pressure from substitute products". IT can be used to shorten product development cycle and shorten the life cycle of old products, such as by introducing

CAD/CAM to produce better and more affordable new cars within short periods by Japanese car manufacturers. Also, IS development is a major part of product generation and product development for information-intensive products and conceptual products, such as banking and insurance products.

"Bargaining power of buyers" can be reduced by increasing the number of buyers, such as the use of Internet home pages for advertising and accepting sales enquiries. Also, IT is often used to lock out the competition and increase their switching costs, such as putting on-line terminals in customer sites.

"Bargaining power of suppliers" can be reduced by increasing the number of suppliers, by getting the best quotations from selected suppliers and a more speedy substitute of unfulfilled orders by other suppliers, such as through the use of EDI networks and access to electronic listings of specific product suppliers.

Porter (1985) extended his ideas on competitive analysis and introduced the term "*value chain*" to highlight the role of IST in competition whereby value-added to each of the chain of both line and staff activities can be examined. The value chain concept has had considerable impact on current strategic approaches to both business and IT. Since not only does it introduce the concept of the need to apply IT where most value-added benefits can be achieved but, it also highlights the benefits which can be achieved when process invasion takes place by developing IS which tie in the value chain of customers or competitors. In this sense, the Porter model has had a tremendous impact on "strategic thought". Hence, in order to implement his ideas it is generally necessary for an organisation to first identify the information dependency of their industry and the position they want to occupy in a competitive market. From this dependency analysis, they can then identify a portfolio of IT applications which support their strategy and overall business direction.

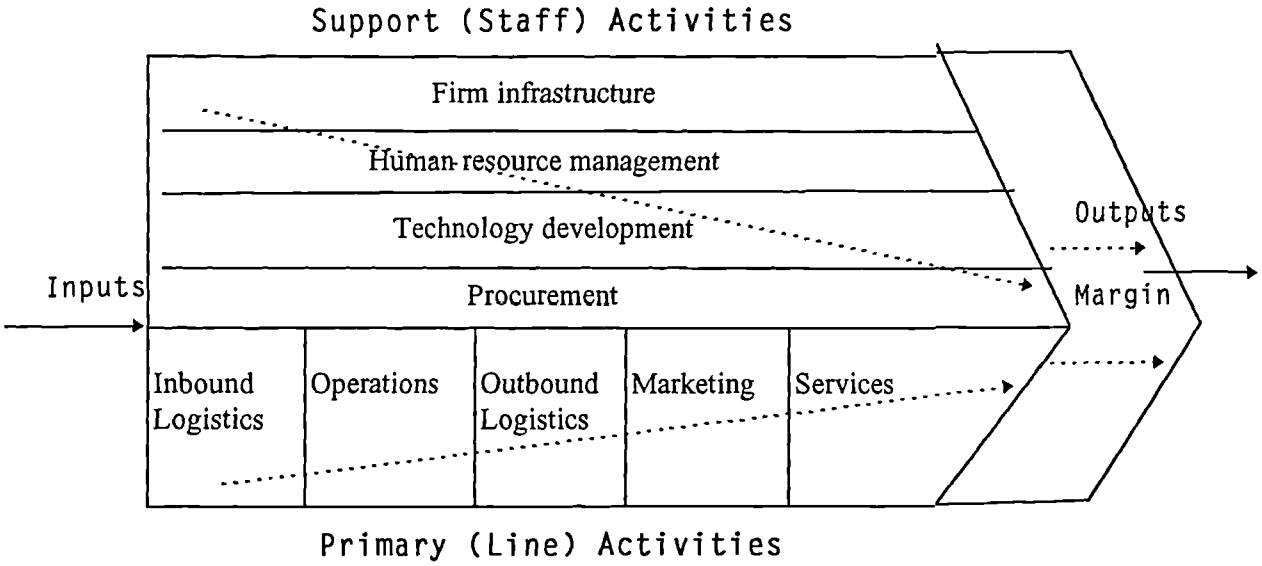


Figure 3: Value Chain Analysis

(Porter 1985)

However, Normann and Ramirez (1993) challenge that the traditional view of the value chain (Porter 1985) is based on the manufacturing paradigm, which could not assess the new ways of creating value by more recent trends such as global marketing, changing markets, and new technologies. Also, Lynch (1997:248) identifies a problem with the value chain in strategic development whereby the value chain is designed to explore the 'existing' linkages and value-added areas of the business. By definition, it works within the existing structure. Real competitive strategy may require a revolution that moves 'outside' the existing structure. Value chains may not be the means to achieve this.

The concept of "*information intensity*" (Porter & Millar 1985), which addresses the informational aspect of either the value chain or the product/service, partly overcomes its bias towards the manufacturing paradigm as commented by Normann and Ramirez (1993). Both of these concepts (the five competitive forces and the information intensity model as an extension of the value chain model) provide useful tools for analysing SIS potential.

Given the complexities of external analysis, it can be argued that the use of more than one framework/model (or composite models) will provide better analysis to relate the role of IS to ISSP, IS strategic alignment and IS effectiveness. Hence, two different approaches for determining the importance and role of IS to the organisations are evaluated in this section:

- Information Intensity and Industry Sectors (Porter and Millar 1985, Earl 1989)
- Composite Portfolio Matrix (McFarlan and McKenney 1982, Synnott 1987, Earl 1989)

Information Intensity and Industry Sectors

The concept of information intensity of products and operations as well as the value-chain model are seen as relevant indicators to determine the role of IS in different industry sectors. The dependence of a business sector on IS/IT may be assessed by matching its information intensity both in its operations/processes and its final products.

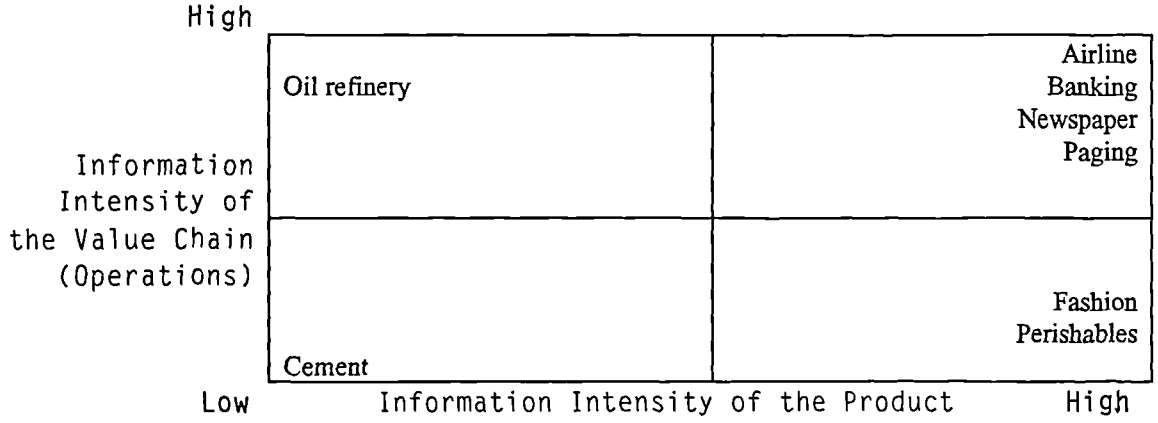


Figure 4: Information Intensity Matrix
(after Porter & Millar 1985 and Robson 1994)

As illustrated in Figure 4, most service sectors have a very high information intensity in their products/operations. For example, a newspaper is a product containing

almost 100% information and hence, publishing newspapers has a very high dependence on successful information management. Likewise, the business of banking may be described as "managing information about money and customers". Since banking and insurance products are considered as conceptual products, IS development is a major part (if not all) of product development. When the information intensity of the product is high, the information intensity of the value chain will tend to be high too. There are fewer examples in the right-lower quadrant of the matrix with the exceptions of fashion and perishables whereby associated information such as various size, colour, variations of styles (for fashion), expiration date and storage requirements (for perishables) have become an essential part of the product itself. Hence, different industry sectors will have different information intensity in their respective value chains as well as a different level of dependence on information management and IS.

The information intensity model (making use of Porter's value chain model to classify information intensity of operations) is a useful tool to determine the dependence of information management by various business/industry sectors and enables organisations to match their own position with that of the "norm" of the same industry or competitors in the matrix. It is obviously, only a first step in any analysis since it helps to set some standards for attainment with regard to IT dependency and can also provide industry norms for average IT expenditure.

| Sector: | Delivery | Dependent | Drive | Delayed |
|---|---|---|---|---|
| Strategic Context | IT is the means of delivering goods and services | Business strategies increasingly depend on IT | IT potentially provides new strategic opportunities | IT has no strategic impact |
| Characteristic | Computer-based transaction systems underpin business operations | Business strategies are enabled by major automation, information and communications technologies | Specific application or technologies are exploited for developing the business and changing ways of managing | Opportunities or threats from IT are not yet apparent or perceived |
| Strategy Mode | Infrastructure-led | Business-led | Opportunity-led | Not applicable |

*Table 1: IT Sector Framework and IS Strategy Modes*

(after Earl 1989)

This level of analysis can be extended by using the sector (quadrant) management framework for IT (Earl 1989) as shown in Table 1 classifying organisations into four quadrants. It can be argued that organisations in each of these four quadrants may have different requirements for ISSP and IS strategic alignment. Earl (1989) also proposes appropriate IS strategy modes for the respective quadrants.

Similar to Table 1, Earl (1989) further proposes appropriate information management activities within each quadrant of the IT Sector Framework as shown in Table 2.

| | Delivery | Dependent | Drive | Delayed |
|---|---|---|---|---|
| Planning | Integral | Derived | IT-push | Default |
| Organisation | Corporate | Business Unit | Line | IT |
| Control | Tight-loose | Loose-tight | Loose | Tight |
| Technology | Architectural | Pragmatic | Enabling | Ad hoc |

*Table 2: IT Sector Management*

(Earl 1989)

Furthermore, Galliers and Baker (1994) have mapped Earl's IT sector management classifications on to the information intensity matrix (Porter & Millar 1985) as shown in Figure 5, which can be used to reflect the nature and importance of IST to different organisations within different industries.

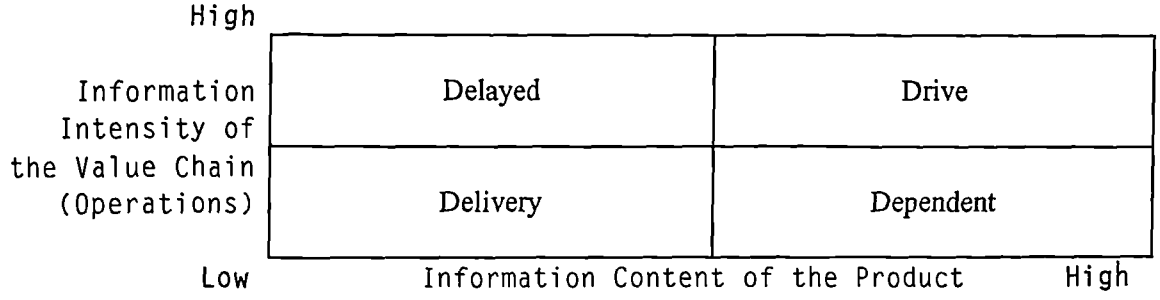


*Figure 5: Mapping Earl's IT Sector Management on to Information Intensity Matrix*

(Galliers & Baker 1994)

It is important for organisations to assess the role of IT as a strategic weapon within the industry as a whole prior to the preparation of any strategic plan for IT since

this will identify the strategy mode which should be adopted and the approach to planning, organisation and control.

The models discussed provide indicative modes and activities but all of these tend to assume that the organisation has a large degree of freedom in its choice of modus operandi and furthermore that IT can act as a driver for organisational structures. While IT researchers may wish to believe this, they must also accept that this is rarely the case in practice. The models are therefore helpful in a reactive rather than proactive sense. They help to diagnose where misfits occur but do not really provide directions for organisations seeking to match their IT alignment with their industrial dependency.

Composite Portfolio Matrix

The Strategic Grid (McFarlan & McKenney 1983) is used to classify the role of IS in organisations into four quadrants as shown in Figure 6. It is simple to use and easily understood by managers, it reflects the current and future IS application portfolio in organisations and it is one of the most popular models in ISSP research (Neumann et al 1992, Raghunathan & Raghunathan 1990, Premkumar & King 1992).

| Strategic Impact of Planned Application Development Portfolio | Strategic Impact of Existing Operating Applications: Low | Strategic Impact of Existing Operating Applications: High |
|---|---|---|
| High | **TURNAROUND or HIGH POTENTIAL**<br>IS applications are currently useful and may be important in achieving future success. | **STRATEGIC**<br>IS activities are critical to the current competitive strategy and to future strategic directions of the enterprise. IS applications are part of new strategic directions. |
| Low | **SUPPORT**<br>IS applications are useful but not critical to success. They are not included as part of future strategic directions. | **FACTORY**<br>IS applications are vital to the successful operations of well-defined, well-accepted activities. However, IS are not part of future strategic operations. |

*Figure 6: Strategic Grid*

(McFarlan & McKenney 1983)

This grid can be used as a diagnostic tool to assess the role of IS in an organisation. The position in the grid explains the needed level of top management involvement and the relationship of the IS and organisation plan.

The concepts have been extended by Earl (1989) in his Sector Management model. Earl (1989) prioritises IT management issues (in descending order) as planning, organisation, control and technology, and proposes appropriate information management activities within each quadrant of the strategic grid as shown in Table 3.

| | Support | Factory | Turnaround | Strategic |
|---|---|---|---|---|
| Planning | Ad hoc | Resource | Directional | Strategic |
| Organisation | Backroom | Department | Function | Complex |
| Control | Project | Budget | Programme | Mixed |
| Technology | Eclectic | Conventional | Rethink | Architectural |

*Table 3: Information Management by Strategic Grid*

(Earl 1989)

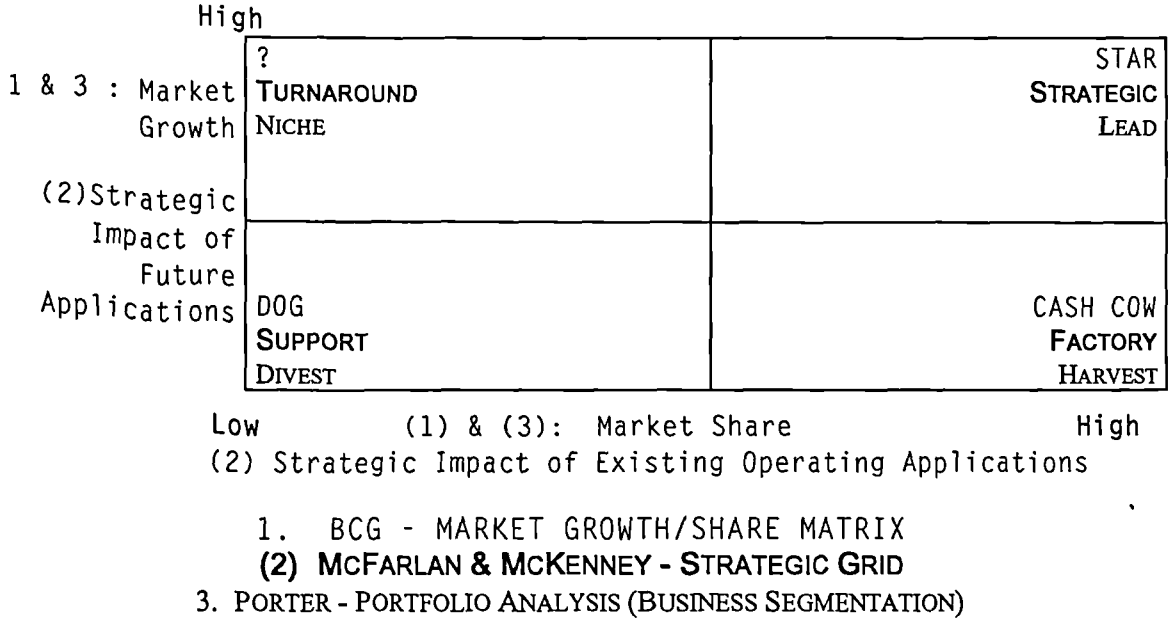


*Figure 7: Composite Matrix for Applications Portfolio*

(adapted from Synnott 1987)

Hence, IT investments may also be linked to the grid - perhaps, with a higher budget for strategic systems and a lower budget for support systems. Variations and emphasis of the strategic grid (adapted from Synnott 1987) have led to detailed portfolio analysis including cost/benefit evaluation and less problematic decisions with regard to IS for implementation as shown in Figure 7.

The Composite Matrix for Applications Portfolio is useful for reviewing the direction of business strategy with BCG's share-growth matrix and Porter's resource allocation matrix which can be matched with the strategic grid (McFarlan & McKenney 1983) to reflect if the allocation of resources to IS applications are consistent with the other matrices. Plotting an organisation's data in this matrix may provide an interesting reflection on the alignment of IS resource allocation with business direction, but still does not provide management direction with regard to planning organisation or control.

Summary of Impact Theories

Impact theories are generally part of a portfolio management approach to planning. Portfolio approaches are very popular with managers because they are easy to understand but they have some major failings:

a) They assume that managers will understand the portfolio mix they want and actually have a choice in the matter.
b) Earl's extension provides guidance for managers but only within single quadrants - there is no explanation as to how these might be combined should several or all quadrants be represented.
c) It assumes a highly rational approach - an approach which has been subjected to much recent criticism in the strategic planning literature (Quinn 1980; Mintzberg 1994).

## 2.4 Contingency Theories

Contingency theory approaches are very similar to configurational approaches adopted in the management literature. Two of these approaches which have had significant impact, are briefly reviewed before looking at the ISP approaches, which may be considered under this classification.

The development of configurational fit models, such as that of Mintzberg (1979) in classifying organisational structure into five types and that of Miles and Snow (1978) in classifying strategy orientation into four types, helps managers to appreciate better the theories concerned. By classifying their own organisation into a particular configurational type, managers will be in a better position to compare and contrast the characteristics of their own organisation against that of the "ideal type". Mintzberg and Quinn (1991) identifies five clusterings of organisations. These are respectively, Entrepreneurial (enhanced from simple structure), Machine Bureaucracy, Professional Bureaucracy, Diversified (enhanced from divisionalised form) and Adhocracy. For each of these configurations there are contingent styles of organisation and management which will imply a better "fit" with the overall philosophy for co-ordination and control. This may explain why the configurational theory of Mintzberg (since 1979) has drawn widespread attention due to its strong intuitive appeal, despite the fact that there was little or no systematic empirical support for its typology and underlying theory. Hence, it may come as a surprise when empirical testing of Mintzberg's (1979, 1983) configurational theory by Doty et al (1993) does not support the (widely held) proposition that organisations are more effective when they are aligned with their ideal type.

Miles and Snow (1978) suggest four strategic alignment models as Analyser, Prospector, Defender and Reactor and their theories have received support from the study by Doty et al (1993) with regard to fit, equifinality and organisational

effectiveness. Also, there is a strong intuitive appeal that "prospectors" (Miles & Snow 1978) are expected to be more dependent on technological progress than other strategic types in the high-tech industry. However, the empirical findings by Dvir et al (1993) among high-tech firms show rather that the influence is greater and more fruitful for "defenders" both on the short and long term.

While Mintzberg (1979) and Miles and Snow (1978) have proposed the widely used configurational theories based on ideal types of organisational structure and strategy orientation respectively, the development of configurational models for ISSP (e.g. as an extension of Earl's five SISP approaches) or reengineering models (e.g. Venkatraman's IT-induced reconfiguration model) is seen as equally promising in terms of theory development, theory testing and its application by managers in improving the ISSP effectiveness in their own organisation. Hence, the implication again is that organisations can choose a configuration and maintain a close alignment rather than evolve and maintain a constant balancing act of change, whether that be to an ideal type of organisation structure or an ideal type of ISSP.

Earl's Five SISP Approaches

| SISP Approach: Characteristics | Business-Led | Method-Driven | Administrative | Technological | Organisational |
|---|---|---|---|---|---|
| Emphasis | Business | Technique | Resources | Model | Learning |
| Basis | Business plans | Best method | Procedure | Rigor | Partnership |
| Ends | Plans | Strategy | Portfolio | Architecture | Themes |
| Methods | Ours | Best | None | Engineering | Any way |
| Nature | Business | Top-down | Bottom-up | Blueprints | Interactive |
| Influencer | IS Planner | Consultants | Committees | Method | Teams |
| Relation to Business Strategy | Fixed points | Derive | Criteria | Objectives | Look at business |
| Priority Setting | The board | Method recommends | Central committee | Compromise | Emerge |
| IS Role | Driver | Initiator | Bureaucrat | Architect | Team member |
| Metaphor | It's common sense | It's good for you | Survival of the fittest | We nearly aborted it | Thinking IS all the time |
| Slogan | Business Drives IS | Strategy Needs Method | Follow the Rules | IS Needs Blueprints | Themes with Teams |

Table 4: Five Approaches to ISSP

(Earl 1993)

It can be argued that different ISSP approaches may have significant impact on the results of ISSP. Earl (1989) and Galliers (1991) have proposed IS planning stages based on the review of ISSP activities from within the IS department, the corporate view and the external business environment of the enterprise. This is also supported by Earl (1993) who argues that successful SISP is more likely when organisations realise that relevant SISP issues associated with method, process and implementation are being addressed. He has proposed five SISP approaches (i.e. business-led, method-driven, administrative, technological and organisational), tested these five approaches based on his findings from 21 UK organisations in 1990 and provided further analysis in 1993. Earl's five ISSP approaches and characteristics are summarised in Table 4 and followed by evaluations of each of the approaches.

Business led: This approach emphasises the business of the organisation. It assumes that business will drive technology, and systems plans will emerge from business plans. This approach appears to be simple, easily understood and applied by managers. In reality, business strategies are not always clearly defined, not detailed enough for IS planners to derive IS plans and not always available to IS planners.

Method driven: This approach focuses on the use of more formal planning methods and techniques. It assumes that the best IS planning method will produce the best IS plans. Consultants are often the drivers for use of proprietary ISSP methods.

Resource driven: This approach (labelled by Earl as "administrative") focuses on resource allocation in order to determine the investment portfolio or budget. Very often, this approach is a roll-up budgetary exercise "to spend the money" (especially in the public sector) or bottom-up instead of top-down.

Technology driven: This approach assumes that the major outcome of ISSP is to determine IS/IT architecture. Since this approach is more technical, it may be difficult to obtain top management inputs and whether the outcome of ISSP could be well-aligned with business strategy is often questionable.

Organisational: This approach emphasises the learning processes with partnerships among various teams in the IS function and other units of the organisation.

Based on multidimensional ranking of SISP approaches, Earl (1993) compared the effectiveness of each of the five SISP approaches using three evaluation criteria as described below.

a) "means success scores" are ranked by each of the three stake-holders in an organisation (comprising general manager, user manager and IS manager) that are correlated with the SISP approach used in the organisations; these scores are grouped under planning method, process and implementation;
b) "frequency of concerns" are reported by each of the three stake-holders in the organisation with equal weight;
c) "competitive advantage application frequency" reflects the ability of the approach to generate competitive advantage applications.

Earl concluded that the "organisational" approach is most effective, with best overall ranking in the average of the three criteria (with equal weight); best ranking in (b) and (c); as well as second best ranking in (a) after the "technological" approach.

Earl's conclusion suggests that organisations with different levels of IS strategic alignment may tend to have different requirements for each of these five ISSP

approaches. Also, each of these five ISSP approaches may be more/less effective under particular circumstances, and an appropriate combination or "hybrid" of these approaches may be "tailored" for particular organisations. Intuitively, this makes sense but intuition is not good enough to help organisations plan and implement IS strategies more effectively. Although further analysis of findings from Earl (1993) based on the small sample size of 21 organisations (which are further sub-divided into five groups with a range of 2 to 6 organisations in each group) could hardly establish any meaningful relations or fit between SISP approaches and various organisational context variables (such as organisation size, structure, management style, industry sector, sector information intensity, and role of IS, etc.), it is important to note that Earl (1993) has provided a very rich framework of analysis in the evaluation of SISP approaches, which is very similar to the "configurational theory" approach.

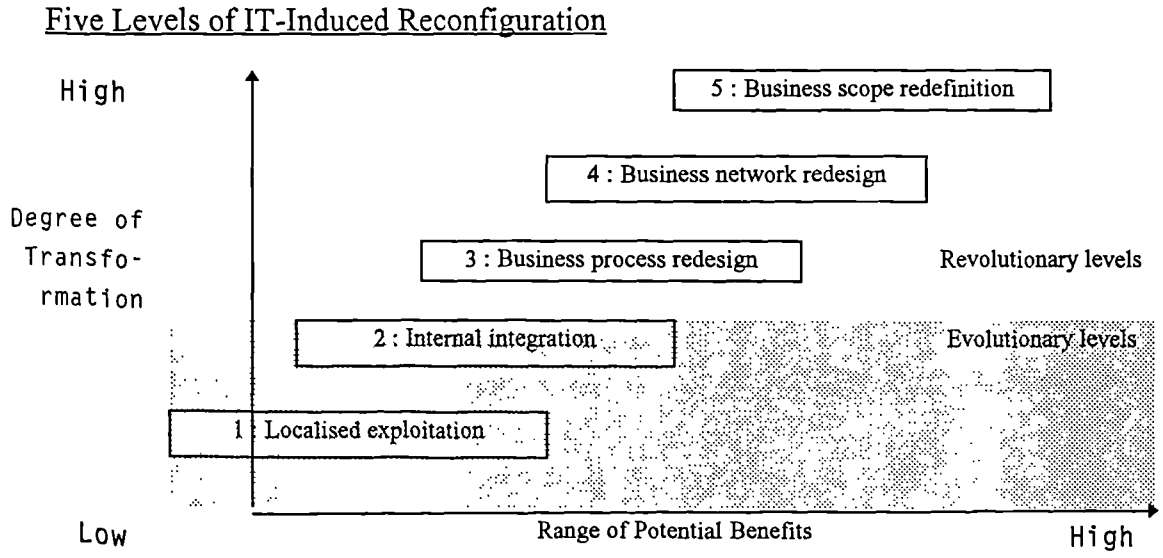


*Figure 8: Five Levels of IT-induced Reconfiguration*
(Venkatraman 1991)

The impact of ISSP to business transformation or business process reengineering (Hammer 1990; Davenport & Short 1990) is seen as a new but appropriate activity in ISSP to explore technology driven opportunities in a more systematic way. Venkatraman

(1991) has proposed to represent the degree of business transformation by the five levels of IT-induced reconfiguration as shown in Figure 8.

The first two evolutionary levels are established largely to develop IT infrastructure and IS applications for integrating functions within and across departments or business units of the organisation. Whereas the other three revolutionary levels provide the necessary IT-enabled infrastructure and IS applications for organisations to explore the potential of gaining competitive advantage, forming strategic alliances and improving inter-organisational effectiveness.

Level 1 - Localised exploitation: Automation of stand-alone functions

Level 2 - Internal integration: IT platform for integrating internal business activities

Level 3 - Business process redesign: IT as major drivers for re-engineering internal business processes

Level 4 - Business network redesign: Electronic integration for exchange of business among multiple participants in a business network, (e.g. VISA, ATM and EDI business networks)

Level 5 - Business scope redefinition: IS Applications enlarge or shift business scope, or even form a new business. (e.g. SABRE in America Airline)

It can be argued that organisations with a different spread of their application portfolios in each of these five levels may have different requirements for ISSP and IS strategic alignment. Venkatraman (1991) attempts to provide guidelines with regard to the management role both for business and IT as well as the measurement criteria for success through his perspectives model. This suggests that the organisation must identify the role of IT within the organisation and then align strategies and measurement criteria within this perspective. While this model overcomes the shortcomings of so many others

by giving practical guidance, it nevertheless assumes that the organisation can achieve a stable state of internal alignment where a single perspective is pursued. This would not seem to be supported by evidence from the organisational behaviour literature (Pettigrew 1985) or strategy literature (Mintzberg 1994; Ohmae 1988). Indeed much of the recent IT literature (Neumann 1994; Parker 1996) would suggest that organisations arriving at stage 5 through IT enabled transformation did so by chance rather than design and so question the role of IT planning for competitive advantage.

Summary of Contingency Models

ISP contingency models come closest to aligning IS theory with business and management theory using the concept of "fit". They also, all tend to extend the SOG model and even Venkatraman's five stages of business transformation can be seen as an SOG model but by another name. They also suffer from the same problems which might be said to apply to business oriented configuration models i.e. there is very little empirical support that such states of "fit" actually achieve states of more effective organisational alignment. Alignment cannot be a stable state. So theories which can accept that it is the transformation from one state to another that require the most effective management may provide greater insights. These are discussed under Strategic Alignment Models.

## 2.5 Strategic Alignment Theories

The traditional top-down path to strategic fit (as a presupposition in the MIT90s framework) is that strategy is formulated to drive structure; management processes; technology; as well as individual skills and roles. However, it is dangerous to assume that IS strategic alignment will automatically improve the chances of ISSP success, IS effectiveness and organisational performance. Sillince and Frost (1995) challenge

whether alignment is necessary and they attempt to explore the nature and relationship between business and IS strategies. While Sauer and Yetton (1994) consider the study of strategic fit to be important, they argue that technology could also be a driver to affect individual skills and roles; structure; management processes; and strategy, through an incremental learning process in the introduction of IT to the organisation. Hence, whether strategic fit will lead to better structure and processes for achieving better results for an organisation is considered an opportunity for further research. The following three relevant IS strategic alignment models will be further analysed:-

1. Enterprise-wide Information Management Planning Framework (Parker et al 1988);
2. Strategic Alignment Model (Henderson and Venkatraman 1989); and
3. IS Strategic Alignment Research (Chan and Huff 1992).

Enterprise-wide Information Management Planning Framework by Parker et al

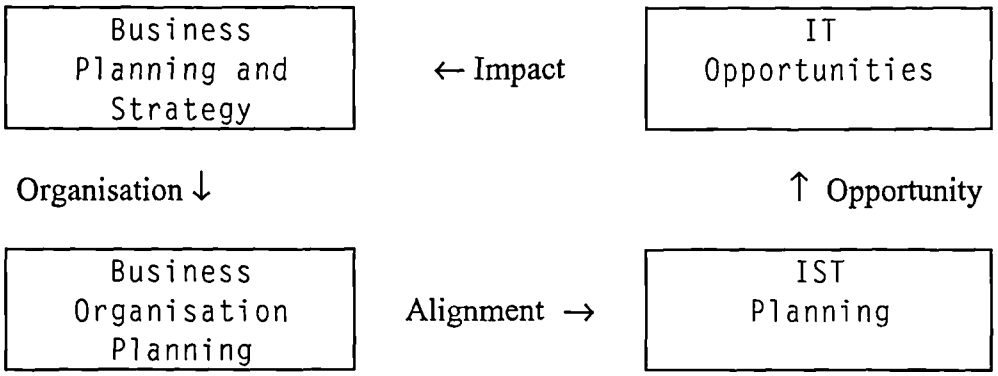


*Figure 9: Enterprise-wide Information Management Planning Framework*
(after Parker et al 1988)

Parker et al (1988) develop a planning framework called Enterprise-wide Information Management (EwIM) as shown in Figure 9, which can be used to justify IST investments as well as to illustrate the need to relate business planning with ISSP. EwIM is designed to plan, organise, implement and control information resources to meet current and future strategic goals.

This model provides a uni-directional alignment relationship as shown by its four processes to link-up the four boxes:

a) Impact: starts from IST Opportunities (via value linking, value acceleration and innovation valuation) to affect business strategy.

b) Organisation: starts with Business Planning and Strategy and formulates the organisation's infrastructure (via value restructuring and value linking) to implement it.

c) Alignment: starts with the existing business organisation and its functional requirements (via value restructuring, value linking and value acceleration) and derives its supporting IST plans.

d) Opportunity: starts with the existing IS activities (via value restructuring, value linking and value acceleration) and explores current and future IST opportunities that can affect the business plan or to align business needs.

An obvious limitation of this model is its uni-directional approach, which may not provide enough interactions and feedback among its components. This can be overcome by the strategic alignment model as discussed in the next section.

Strategic Alignment Model by Henderson and Venkatraman

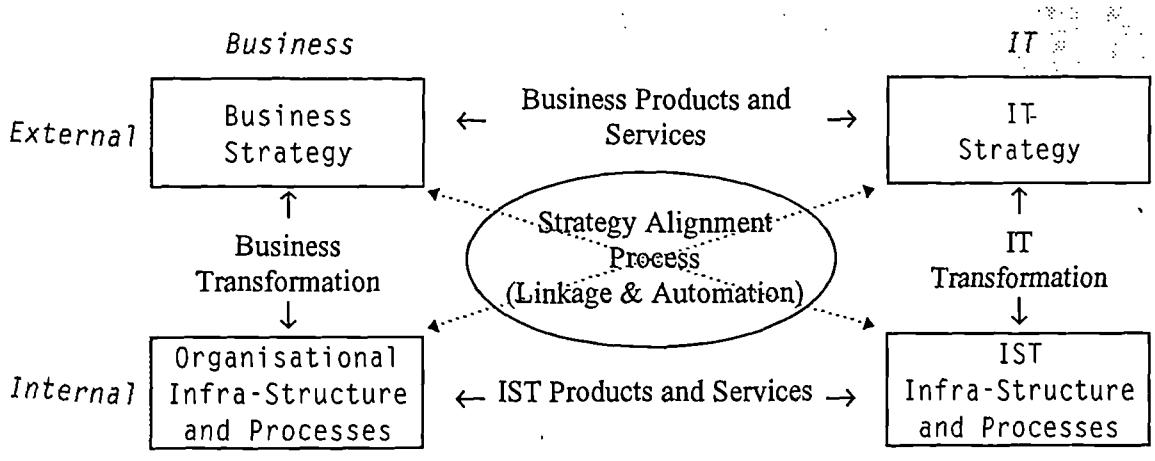


*Figure 10: Strategic Alignment Model*

(Henderson & Venkatraman 1989)

Strategic "alignment" between business and IS as well as "impact" of IST driven opportunities are important considerations in ISSP (Scott-Morton 1991). A few Strategic Alignment Models (SAM) and ISSP approaches have been developed for reflecting the interdependence of IS and business strategies (e.g. Henderson & Venkatraman 1993; Pyburn 1983; Ward 1990; Earl 1990, 1993; Sullivan 1985; Chan & Huff 1992). Henderson and Venkatraman (1989) argue that the integration of business strategy planning and ISSP have evolved from 3 stages:

a) IS planning is initiated as a response to business strategy, e.g. IBM's (1981) Business Systems Planning (BSP), and Rockart's (1979) Critical Success Factors (CSFs);
b) An integrated strategy which explores technology driven opportunities for IT to shape or enhance business strategy (King 1978; Zmud et al 1986; Henderson et al 1987);
c) The importance of strategic fit during the formulation of IT strategy and business strategy is recognised.

They also suggest, however, that a critical area which has been ignored is the external and internal alignment of strategy and their linkage processes. In this conclusion, they acknowledge the work of Miles and Snow (1978) as a major influence upon their theory development.

The SAM (Henderson & Venkatraman 1989) as illustrated in Figure 10 shows the four domains of strategic alignment perspective:

a) Business strategy refers to the choices pertaining to the positioning of the business in the competitive product-market arena.
b) Organisational infrastructure and processes refers to the choices pertaining to the particular internal arrangements and configurations that support the organisation's chosen position in the market.

c) IT strategy refers to the choices pertaining to the positioning of the business in the IT marketplace and is analogous to the business strategy.

d) IS infrastructure and processes refers to the choices pertaining to the internal arrangements and configurations that determine the data, applications and technology infra-structure to deliver the required IT product and services.

Strategic Fit is the alignment between external and internal domains which is represented by either business transformation or technology transformation. Strategic Integration is the link between the external components, (i.e. business and technology strategy domains) while Operational Integration is the link between the internal components (i.e. Organisational Infra-Structure & Processes and IST Infra-Structure & Processes). Cross Domain Alignment is the relationships along the two diagonals of the matrix, that is:

a) between Business Strategy and IS Infra-Structure & Processes

b) between IT Strategy and Organisational Infra-Structure & Processes

The SAM (Henderson & Venkatraman 1989) has illustrated the interactions among different components and the importance of strategic fit. Although, it is widely published as a model for reviewing IS strategic alignment (Thurlby 1993; Broadbent & Weill 1993; Luffman et al 1993), there is limited research work to further operationalise SAM as a research model, especially on the effect of IS strategic fit (Chan & Huff 1992) and its relation with ISSP process and IS effectiveness.

In searching for a "configurational model" as a basis to test IS strategic alignment, the strategic typology of Miles and Snow (1978) appears to be a very promising choice because it further exemplifies the connection between technology and strategy, and the varying impact of technology on the different dimensions of success. Furthermore, it has been tested with regard to the structures of information services by

Tavakolian (1989) and his research found a significant alignment match between the strategies adopted in business and the distribution model selected for their IS services in support of such strategies.

Burn (1993) has also found an alignment at functional level between organisational configurations (Mintzberg) and IS stages of growth (Nolan) and some evidence to suggest that the strongest alignment at the strategy level is related to Miles and Snow and Earl's typologies. Such research models may well help us to better understand the change processes which occur within an organisation but they do not necessarily identify a "best way" approach. There is, in fact, very mixed evidence as to whether alignment actually improves effectiveness. This is addressed by the work of Chan and Huff (1992).

IS Strategic Alignment Research by Chan and Huff

The research by Chan and Huff (1992) identifies a very useful and precise research model to examine the empirical relationships among IS strategic alignment, IS effectiveness and business performance. They collected valid responses from 164 organisations in USA and Canada in their survey with each valid set consisting of responses from four senior executives of the same organisation in the areas of planning, finance, major IS user department and the IT manager. Their key research finding was that IS strategic alignment was consistently positively related to the various dimensions of IS effectiveness. They have provided comprehensive measurement instruments to operationalise business strategy (extended from Venkatraman 1989), IS strategy (outcome but not process), and IS strategic alignment. They have provided interesting empirical results in the relatively new research area of IS strategic alignment. These instruments could also be used readily by practitioners. By applying these instruments,

IS researchers may further explore some of the relevant issues not fully addressed by their study:

a) They have assessed the IS strategic alignment based on the *outcome* of both business strategy and IS strategy. However, the scope of their research did not evaluate the relationship between IS strategic alignment and relevant processes within organisations (Chan and Huff 1992; 1994) that would link, facilitate or hinder the achievement and maintenance of IS strategic alignment. Furthermore, the match of strategic alignment against IS application portfolios (e.g. McFarlan's Strategic Grid and Venkatraman's 5-level IT transformation) will provide another good opportunity for further research.

b) The research by Henderson and Venkatraman (1989; 1993) has provided a very rich framework of analysis on the interactions among the four components on strategic alignment. Chan and Huff (1994) have rightly pointed out that there is no conceptual separation between IS strategy and IS infrastructure in their study because an organisation's IS infrastructure and deployment of IT are reflected in the *realised* IS strategy. Hence, further study of the relationships between IS strategic alignment and IS infrastructure is seen as another research opportunity.

c) Their questionnaire survey has made use of multiple respondents from each organisation, which has improved the validity of their findings. They have provided much more thorough analysis than that of most other similar surveys. However, it can be argued that a combination of both case study (Benbasat et al 1987; Yin 1993) and survey could provide a higher degree of interpretation and greater richness of analysis than that of survey results (Gable 1994).

d) Also, there may be a need to develop *contingency models* to explore particular circumstances under which different (configurational) models of IS strategic alignment are more or less appropriate. These should take into consideration a

number of the theories which have been evaluated within this chapter and shown to have a sustainable influence on strategic planning.

Summary of ISSP approaches

Some of the key concerns on ISSP with respect to the quality of ISSP process include: a weak link between business planning and ISP (Lederer & Mendelow 1986), failure to (adequately) assess the strength and weaknesses of the IS department; external technological environment; and organisation's competitive environment (King 1984). Moynihan (1990) has identified the need for more systematic planning process for IT. Henderson and Sifonis (1988) argue the need to address the following three major planning issues: (1) external validity (appropriateness of the resulting planning), (2) internal validity (the need to ensure that actions envisioned at one level are correctly operationalised at lower levels), and (3) co-operative behaviour in the planning process (in order to tap many sources of expertise and gain a shared commitment). Many other criticisms could be cited but, basically, they all add up to the same conclusion - existing ISSP processes are inadequate and unable to tackle the full extent of the problems associated with effective alignment of IT practices within the business environment. One of the most frequently suggested solutions is to apply a number of models contingent to the particular stage of IT development and organisational need. This also implies a need to implement some form of success measurement so that organisations can identify their level of achievement with respect to IT implementation. Two relevant issues concerning the measurement of ISSP effectiveness are the measuring process (means) for ISSP and measuring the outcome (ends) of ISSP. Measuring the outcome involves the assessment of whether or not ISSP has achieved its objectives.

This chapter has assessed the strength, weaknesses and effectiveness of ISSP based on a detailed literature review of both business and IS strategy theories. The concluding section will briefly review some measurements of IS effectiveness and then relate the findings from the literature study to the development of a proposed model for the evaluation of ISSP processes.

## 2.6 Conclusion

In order to test whether the IS strategic alignment configuration theory (developed in Chapter 3) is useful or not, it must be tested against certain evaluation criteria. The proposed criteria are: IS success and ISSP effectiveness. In order to reduce or overlap literature used in Chapters 2 and 3, a brief overview of the proposed criteria are discussed here and further coverage is included in Chapter 3.

### IS Success

The measurement of IS effectiveness is an important research issue because it is an important dimension to determine the achievement of IS mission and goals. Ives et. al. (1983) support the importance of the assessment of IS success. Baroudi and Orlikowski (1988) consider that the measurement of user information satisfaction is a pervasive measure of the success or effectiveness of IS. They have used the following three factors for measuring IS success: EDP staff and services, information product, and knowledge and involvement. Galletta and Lederer (1989) argue that user information satisfaction has potential impact in three critical areas: fulfilment of MIS department goals, user quality of work life and extent of voluntary system usage. In a study of the relationship between organisational context and IS success, Raymond (1990) has used user satisfaction, off-line usage and on-line usage to measure IS success.

Based on a comprehensive examination of various approaches for measuring IS success, Delone and McLean (1992) identify six underlying categories: system quality, information quality, use, user satisfaction, individual impact and organisational impact. They also observe that there is a broad list of individual dependent variables available to IS researchers. Since there is no consensus on the measure of IS success, IS researchers must choose the most appropriate instruments to use. This thesis considers that both user satisfaction and organisational impact are important measures of IS success and the criteria for measuring IS success/effectiveness include satisfaction with IS service, satisfaction with IST products, and the relative quality of IS service. Also, it is generally accepted that measuring IS effectiveness should involve the assessment of stake-holders' perceived satisfaction on IS (Ruohonen 1991, 1995). This study invites three types of stake-holders (i.e. senior managers at the strategic management level, line/functional managers of a user department and IT managers) in the assessment of IS effectiveness in an organisation.

Many researchers (Delone & McLean 1992; Chan & Huff 1992) have associated the impact of IS success on organisational performance using financial indicators such as return on investment, return on assets, and increased profits, etc. Since an organisation's business performance depends on so many variables, its impact by IS may not be always meaningful (even if it can be confirmed to be statistically significant - for example, SunHungKai Properties have the best financial performance and growth indicators among the property developers in HK, which is largely due to its huge reserve of prime land sites rather than contributions from IS/IT!!). Hence, a more cautious approach is adopted by this study in the analysis of IS success and particularly business performance.

It can be argued that IS success of the organisation is dependent on its IT capability. Sabherwal and Kirs (1994) define IT capability as the extent to which the technologies needed for manipulation, storage and communication of information are

available within the organisation. IT capability resembles both technology components (e.g. computer and communication, hardware and software) and information processing capacity (e.g. structural mechanisms such as teams and committees).

Also, it can be argued that technology components will depend on the know-how of the IT staff in choosing and implementing the appropriate technology infra-structure, while information processing capability will depend on the knowledge of users and managers in effectively defining their business information requirements as well as the systems analysts in transforming user requirements into appropriate systems and information models.

Evaluation of ISSP Process

In order to determine the effectiveness of ISSP processes in organisations, the following evaluation criteria are proposed here and expanded in Chapter 3.

Integration with Strategic Business Planning: The incorporation of inputs from strategic business planning into the IS planning process was considered as a major problem in ISSP (Lederer & Mendelow 1986). Major factors include the interaction between business planners and IS planners, and the participation of IS managers in strategic business planning (Premkumar & King 1994) as well as the means of facilitating the integration mechanism such as ISSP workshops (Galliers et al 1994).

Objectives and Coverage of IS Strategic Planning: The review of ISSP objectives can help determine an organisation's ISSP focus (Galliers 1987) and direction. The coverage of ISSP can reflect the particular emphasis of the planning process (Premkumar & King 1994; Neumann et al 1992; Moynihan 1988) and help identify any obvious omissions of importance ISSP issues.

Quality of ISSP Process: An important outcome of ISSP is to determine the internal and external domain of IS/IT through effective ISSP processes. These include the overall review of the collection of inputs for the planning processes and whether the outputs of ISSP are useful (King 1988; Premkumar & King 1994; Lederer & Sethi 1992b). Baker (1995) argues that feedback mechanisms in ISSP are extremely important in fine-tuning the ISSP process.

Quality of Implementation of IS Strategic Plans: Strategic planning is only useful if the plans are effectively implemented. Management support in the implementation of IS strategic plans is crucial to the success of ISSP's effect to organisations (Lederer & Sethi 1988 and Galliers 1991). In addition to management support, Premkumar and King (1994) propose that adequate resource, user involvement, monitoring systems for review and feedback are important factors for determining the quality of implementation mechanisms.

### Summary

Chapter 2 establishes the background for relevant IS theories and related ISSP research with a summary of some of the seminal research on business and IS strategy. It can be observed from the literature that ISSP has focused mainly on factors and guidelines for successful ISSP (Pyburn 1983; Sullivan 1985; Galliers 1987) with more emphasis on factors contributing to successful planning process and factors leading to successful implementation of IS plans (O'Connor 1993). In Chapters 3 and 4, this thesis argues that there is a need to relate IS strategic fit to ISSP process and then examines the effect of such a fit in organisations via a survey and case study. Further reinforcement of these theories will be covered in the concluding Chapter 9, where an emerging model on IS capability-based resource alignment will be discussed.

# CHAPTER 3 : CONCEPTUAL MODEL AND RESEARCH PROPOSITIONS

The research design of this study consists of three parts: (a) the development of the conceptual model and theory extension on IS strategic alignment, (b) the survey procedures, tests of constructs validity and reliability, as well as the comparative analysis of the differences among the four alignment types, and (c) multiple case study analyses for finding out effective practices of ISSP processes in more successful organisations (in terms of ISSP success and IS success) among each of the alignment types. This chapter describes the development of the research model, selection of research instruments, and the propositions that this study is going to explore. In Chapter 4, the justifications for the selection of appropriate IS research approaches, sample characteristics, and the integration of both survey methods and case study design are described.

Based on the literature review, this chapter further discusses the development of a contingency theory based composite research model called the "IS Strategic Alignment Configurational Model" for linking business unit strategy (after Venkatraman 1989 and Chan 1992) with IS strategy (after Chan & Huff 1992). In particular, this configurational model classifies organisations into four IS strategic alignment types in order to enable more specific comparative analysis on whether there are significant differences among the four types of organisations in their respective characteristics against two evaluation criteria. The first criteria is based on the importance and effectiveness of the ISSP process (after King 1988; Premkumar & King 1994; Earl 1993) while the second criteria is based on satisfaction with IS services (after Galletta & Lederer 1989; Downs 1988; Ives et. al. 1983; Raymond 1990; Neumann et al 1992). This is followed by further examinations of the relationship of IS strategic alignment against a set of organisational context variables (i.e. size, industry, planning time horizon, resources, role of IS in the organisation, and quality of strategic business planning). It can be argued that the "IS Strategic Alignment Configurational Model" is a diagnostic tool for providing a quick

but comprehensive review of IS strategic alignment and ISSP process in the organisation. The results from this study have the potential to provide relevant analyses, which may help organisations in formulating better IS strategy.

## 3.1 Research Issues

Research Questions

As an extension of the research questions in Chapter 1, the author has refined the major research questions in order to provide the basis for guiding the development of the conceptual framework:

1. Do some organisations consider ISSP more important than others? If so, what are the major factors that influence the perceived importance of ISSP in organisations?

2. How do organisations assess the success of ISSP?

3. What are the most important factors affecting the success of ISSP?

4. How do organisations assess the success of IS Service?

5. How do organisations relate business strategy and IS strategy?

6. Will the outcome of the alignment of business unit strategy and IS strategy affect the success of ISSP and IS success?

7. Do organisations with more rapid movements from their current strategic position toward their future strategic position pay more attention as well as allocate more resources to their strategic planning processes for both business and IS?

Literature Base

In order to develop a model to test these questions, a number of research theories have been selected based on the literature review and a brief explanation of their importance to this study follows.

The strategic alignment model by Henderson and Venkatraman (1989, 1993), which has been reviewed in Chapter 2, provides an excellent analysis of the various "drivers" of strategic alignment. However, the author considers that it remains an exploratory type of study at present and the development of more sophisticated or vigorous research models is seen as an opportunity for further research.

The Miles and Snow's (1978) configurational theory on strategy, structure and process has been widely used in research studies for matching organisations' strategy orientation types against various settings such as in linking IT structure with organisational competitive strategy by Tavakolian (1989); in matching strategy types against IS and organisational change by Burn (1991); in the test of fit, equifinality and organisational effectiveness by Doty et al (1993); and in comparing the performance of various strategy types among high-tech firms by Dvir et al (1993). However, a potential limitation of using this model is that there may be two interpretations of the "analyser" type. The first interpretation is that an "analyser" has adopted a strategy type which is in the mid-point between "defender" and "prospector" as expected of Miles and Snow (1978), though such a classification is not very scientific (Doty et al 1993). The second interpretation is that an organisation has illustrated a high level of "analysis" behaviour in strategic decision making. Another limitation is its adoption of the classificatory approach, whereby respondents are often required to select (or *tick*) one of the four types based on a brief description of each type, such as in Tavakolian (1989). Some respondents may possess behaviours of several types but could only select one single or dominant type. Also, Doty et al (1993) have queried whether the status of "reactor"

should be considered as a unique ideal type or as a residual category for ineffective organisations.

The Strategic Orientation of Business Enterprise (STROBE) model (Venkatraman 1985, 1989) is very vigorous in terms of operationalising the dimensions and testing the construct validity and scale reliability. Its comparative approach is more realistic than the classificatory approach in reflecting the strategic orientation of organisations via various dimensions or factors (which are further supported by the associated items of each of the dimensions). A possible drawback is that it is not widely used (perhaps, partly due to its complexity in the application and testing of various research constructs) with a few notable exceptions such as Chan and Huff (1992).

The Strategic Orientation of IS (STROIS) model (Chan & Huff 1992; Chan 1992) introduces the dimensions of IS strategy orientation for matching the respective dimensions of STROBE. It provides vigorous tests of strategic fit and resulting implications on IS success and business performance. However, its scope of research did not include the study of the relationship between IS strategic alignment and ISSP process, which is seen as an excellent opportunity for further research.

The study by Earl (1993) has provided an in-depth analysis of five SISP approaches based on findings from multiple interviewees in each of the 21 organisations. It provides a good framework of analysis not only in identifying the characteristics of each of the five SISP approaches but also as a basis for developing configurational models on ISSP or IS strategic alignment.

Table 5 briefly describes a summary of related ISSP studies from 1983 to 1993 which forms the basis for the development of the composite research model of which ISSP is a major component.

Summary of Related ISSP Studies

| Researcher / Reference | Research Method | Country | Sample Size | *Participants* * | | | Objective/Focus of Study |
|---|---|---|---|---|---|---|---|
| | | | | *sm* | *um* | *ism* | |
| Pyburn 83 | Case Study | US | 8 | | | | Describe approaches and factors leading to success or failure of ISP and the linkage between organisational factors and planning performance |
| Sullivan 85 | Interview | US | 37 | | | | Identify fit between extent of IS usage and ISP methodology |
| Galliers 87 | Survey | U.K. & Australia | 209 | ✓ | ✓ | ✓ | Compare ISP practice in UK & Australia |
| Lederer & Mendelow 86 | Group Discussion | US | 24 | | | ✓ | Issues in ISP |
| Lederer & Mendelow 87 | Interview | US | 20 | ✓ | | ✓ | Difficulties in communicating top management objectives to ISP |
| Lederer & Sethi 88, 91 | Questionnaire Survey | US | 163 | | | ✓ | Describe problems on implementing various SISP methodologies |
| Raghunathan & King 88 | Survey | US | 140 | | | ✓ | Link between strategic, systems, operational ISP and performance |
| Wilson 89 | Survey | UK | 186 | ✓ | ✓ | | Assess adoption of strategy for IS development |
| Earl 90, 93 | In-depth Interviews | UK | 21 | ✓ | ✓ | ✓ | Analyse the nature of SISP, and attitude and experiences of respondents |
| Burn 89-96 | Case Study | HK | over 200 firms | ✓ | ✓ | | Evaluate the relationship between IS strategy and organisational change with her own Organisational Cultural Audit model |
| Lin 91 | Questionnaire Survey | US | 604 | | | ✓ | Determine the impact of organisational and environment variables on ISP process factors, ISP effectiveness, and firm performance |
| Neumann et al 92 | Survey & Case Study | Israel | 117 | | | ✓ | Determine the strategic relevance of IS to organisation |
| Premkumar & King 91, 92 | Survey | US | 245 | | | ✓ | Analyse planning practice and effect of organisation factors |
| Harris & Kumar 91 | Survey | US | 92 | | | ✓ | Assessment of current ISP practices |
| Elliot 93 | Case Study | HK | 5 small mfg. firms | ✓ | ✓ | ✓ | Analyse strategies for management and use of IT in manufacturing industries |
| Chan & Huff 92, 93, 94 | Questionnaire Survey | Canada & US | 164 firms + | ✓ | ✓ | ✓ | Investigate IS strategic alignment based on realised strategies (+ each with 4 respondents) |
| Jordan 94 | Case Study | HK | 1 bank | ✓ | ✓ | ✓ | Analyse strategies for management and use of IT in a bank |

* Participants/Respondents: sm = senior management; um = user management; ism = IS management

*Table 5 : Summary of Related ISSP Studies from 1983-93*

(after Galliers 1987 and O'Connor 1993)

## 3.2 Research Model

Composite Research Model

The Composite Research Model as shown in Figure 11 consists of four constructs, namely "STROBE", "STROIS", "ISSP Processes" and "IS Success". The "IS Strategic Alignment" score is derived from the combination of both STROBE and STROIS. The solid lines represent the relationship paths between research constructs while the dotted lines do not.

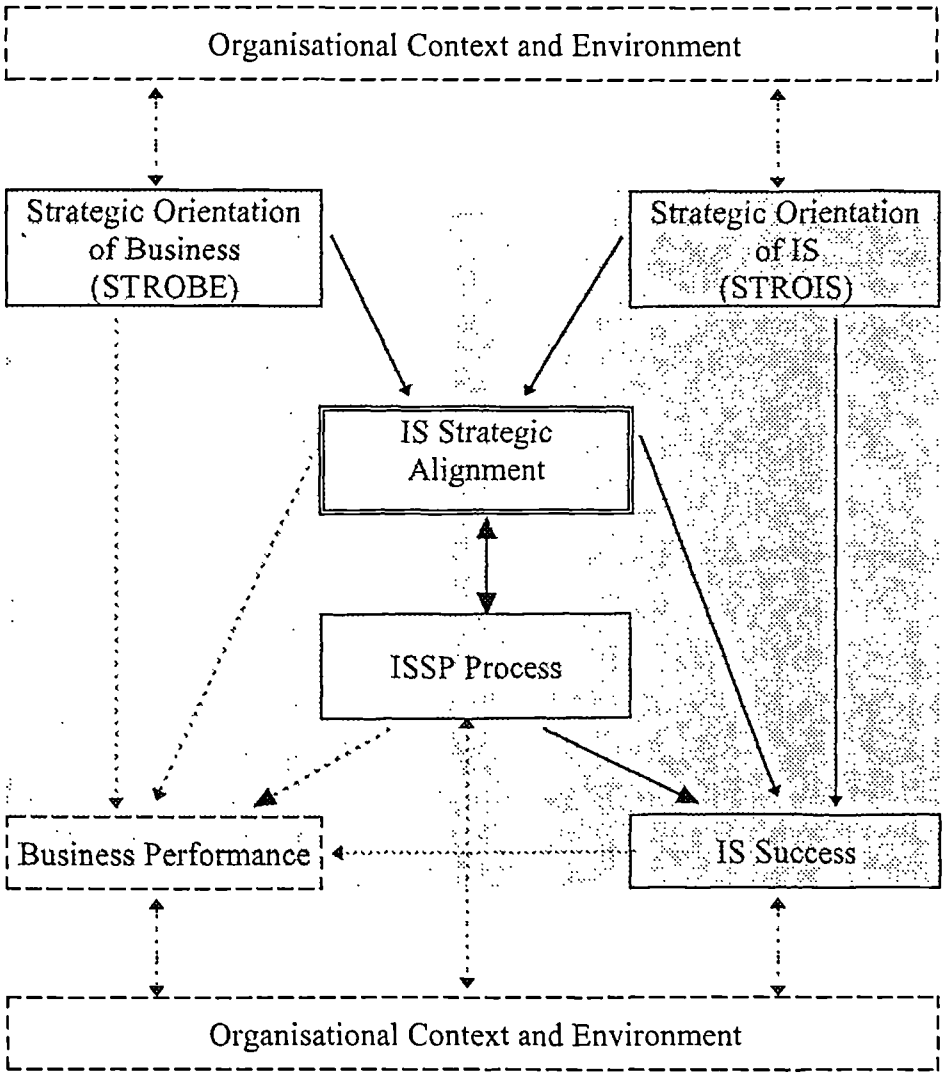


*Figure 11: Composite Research Model on IS Strategic Alignment and ISSP*

The scope of this study, as illustrated by the shaded area in Figure 11, is very broad. Since business performance is dependent on many factors, the impact of "IS Success" on "business performance" as well as the relationship between STROBE and "business performance" will not be directly covered by this study. Also, this study does not attempt to draw any firm conclusions on the contributions to "business performance" from STROBE, IS strategic alignment, ISSP and IS effectiveness (as shown by the dotted lines). Furthermore, since the major aim of this study is to introduce a framework of analysis via the development of the IS strategic alignment configurational model, the assessment tools and measuring instruments (such as research constructs and questionnaire measures) are adopted, adapted or developed from previous studies. Each of the components of this research model is discussed in the following sub-sections:-

a) Measurement of Realised Business Unit Strategy,
b) Measurement of IS Strategy Orientation,
c) Alignment of Business Strategy and IS Strategy and the development of the four IS Alignment Configuration Types,
d) ISSP Process,
e) IS Success, and
f) Business Performance.

Measurement of Realised Business Unit Strategy

An essential part of IS alignment study is to compare/match the measures of business strategy and the corresponding measures of IS strategy. Three models have been identified as appropriate candidates, the first two being very popular in strategy research while the last one is more comprehensive:-

a) Miles and Snow's (1978) configurational theory has been introduced in Chapter 2 and earlier sections of this chapter.
b) Porter's (1980) Generic Strategy model classifies organisation strategy into three types, namely cost leadership; differentiation; and focus.

c) Venkatraman's (1985; 1989) model on Strategic Orientation of Business Enterprise (STROBE) provides comprehensive measurements of business unit strategy.

The Miles and Snow's (1978) model is rejected due to the limitations described in the earlier part of this chapter. Porter's (1980) generic strategy is not very desirable because it focuses largely on market strategy instead of overall business strategy. Apart from being a more recent and comprehensive model for determining the strategic orientation of the business enterprise, the STROBE model is both practical and effective in determining the strategic alignment because managers are requested to assess their strategic orientation in terms of actual/realised strategy rather than planned or intended strategy. It also builds upon and extends the original Miles and Snow model. Hence, the STROBE model is seen as an appropriate research instrument for measuring strategy orientation of business.

The STROBE model (Venkatraman 1989), which consists of six important strategic dimensions/factors, is described below.

1. **Aggressiveness** refers to the posture adopted by a business in its allocation of resources for improving its chosen market positions at a relatively faster rate than its competitors.
2. **Analysis** refers to the trait of overall problem-solving posture as an important characteristic in organisational decision-making. This can be reflected by the tendency to search deeper for the roots of problems, and to generate the best possible solution alternatives. This trait is different from the "analyser" behaviour of Miles and Snow (1978) typology, which simply indicates the middle range between "purely prospecting" and "purely defensive" behaviour.
3. **Defensive** behaviour (Miles & Snow 1978) is normally reflected through defending the current market position via cost reduction and efficiency seeking methods.
4. **Futurity** reflects the emphasis of effectiveness (long-term) versus efficiency (short-term) considerations in major strategic decisions.

5. **Proactiveness** is reflected by the participation in emerging industries, continuous search for market opportunities and experimentation with potential responses to changing environmental trends (Miles & Snow 1978).
6. **Riskiness** is reflected by the extent of risk in various resource allocation decisions and choice of products and markets.

| Dimension | STROBE Items |
|---|---|
| Aggressiveness | 1. Sacrifice profitability to gain market share |
| | 2. Cutting prices to increase market share |
| | 3. Setting prices below competition |
| | 4. Seeking market share positions at the expense of cash flow. |
| Analysis | 1. Emphasise effective co-ordination among our functional areas |
| | 2. Information systems provide support for decision making |
| | 3. When confronted with a major decision, we usually try to develop thorough analyses |
| | 4. Use of planning techniques |
| | 5. Use of outputs of management information and control systems |
| | 6. Manpower planning and performance appraisal of senior managers |
| Defensiveness | 1. Significant modifications to the manufacturing technologies |
| | 2. Use of Cost control systems for monitoring performance |
| | 3. Use of production management techniques |
| | 4. Emphasis on product quality through the use of quality circles |
| Futurity | 1.* Our criteria for resource allocation generally reflect short-term considerations |
| | 2. We emphasise basic research to provide us with future competitive edge. |
| | 3. Forecasting key indicators of operations |
| | 4. Formal tracking significant general trends |
| | 5. "What-if" analysis of critical issues |
| Proactiveness | 1. Constantly seeking new opportunities related to the present operations |
| | 2. Usually the first ones to introduce new brands or products in the our market |
| | 3. Constantly on the look out for business that can be acquired |
| | 4.* Competitors generally pre-empt us by expanding capacity ahead of them |
| | 5. Operations in larger stages of life cycle are strategically eliminated |
| Riskiness | 1. Our operations is generally characterised as high risk |
| | 2.* We seem to adopt a conservative view when making major decisions |
| | 3.* New projects are approved on a *stage-by-stage* basis rather than with *blanket* approval |
| | 4.* A tendency to support projects where the expected returns are certain |
| | 5.* Operations have generally followed the "tried and true" paths |
| * = Reverse scored | |

*Table 6 : STROBE Dimensions and Indicators*

(Venkatraman 1989)

These six important strategic dimensions, which are further supported by 29 items as shown in Table 6, are used for measuring the strategy orientation of business units.

| Research Construct | No. of Dimensions | No. of Items |
|---|---|---|
| 1. STROBE | 8 | 59 |
| 2. STROIS | 8 | 57 |
| 3. IS Success | 7 | 49 |
| 4. Business Performance | 4 | 16 |
| Sub-Total | 27 | 181 |
| + ISSP | 5 | 44 |
| Total | 32 | 225 |

*Table 7 : Research Constructs*

It would appear that a straight-forward approach is simply to replicate the survey research by Chan and Huff (1992) and add supplementary questions on ISSP processes. The first four research constructs, dimensions and items used by Chan and Huff (1992) are listed in the Table 7.

After adding ISSP items and questions on general information to the questionnaires (all in English), its length will become prohibitively long for the Hong Kong environment (where over 90% of the respondents are expected to be Chinese). This would lead to an extremely low response (probably below 1%) as argued in Chapter 4. Chan and Huff (1992) have provided very vigorous tests on the validity, correlation and reliability of the first four of these constructs. Since the objectives of this study are not to do the same level of vigorous analyses as Chan and Huff (1992) but to relate various types of IS strategic alignment to ISSP processes and IS success, the minimum set of STROBE (Venkatraman 1989) has been basically adopted for measuring STROBE, which consists of the same 6 strategic dimensions/factors and 29 items as shown in Table 8. In particular, the item "use of planning techniques" has been dropped in the "analysis" dimension because the characteristics of planning techniques have already been reflected by several related items such as "tracking general trends", "production/operations management techniques", "what-if analysis", "forecasts on key indicators of operations". Although "planning techniques" was among the 59 STROBE items of Chan 1992, it was dropped in her final STROBE construct analysis. Instead,

"manpower planning and performance appraisal of senior managers" became two items because of the importance in the analysis of human resources planning requirements and the performance of senior managers. Furthermore, the items "production management techniques", "new products" and "product quality" have been changed to "production/operations management techniques", "new products/services" and "product/service quality" respectively in order to cater for the growing Services sectors and the large Public sector (instead of the declining Manufacturing sector) in Hong Kong. Further development of these indicators into specific questions is shown in Questionnaire A.

| Dimension | STROBE Items |
|---|---|
| Aggressiveness | 1. We sacrifice short-term profitability to gain market share.<br>We frequently cut prices to increase our market share.<br>We have a strong preference to set prices below competition.<br>We seek market share positions at the expense of cash flow. |
| Analysis | Use of Management information and control systems<br>Use of Manpower planning<br>Use of Performance appraisal of senior managers<br>We emphasise effective co-ordination among our functional areas (e.g. marketing, finance, and operations).<br>We require a great deal of factual information to support our day-to-day decision making.<br>When confronted with major decisions, we typically develop thorough analyses. |
| Defensive | Use of Cost control systems<br>Use of Production/operations management techniques<br>Emphasis on product/service quality.<br>Making significant modifications to the technologies in our business operations. |
| Futurity | Forecasting key indicators of operations<br>Tracking significant general trends<br>Use of "What-if" analysis of critical issues<br>Our criteria for resource allocation generally reflect long-term considerations.<br>We emphasise long-term research to provide us with future competitive edge. |
| Proactiveness | We are constantly seeking new opportunities related to the present operations.<br>We are usually the first ones to introduce new products/services in our market(s).<br>We are constantly on the look out for business that can be acquired.<br>We pre-empt our competitors by expanding our capacity ahead of them.<br>Our operations in later stages of life cycle are strategically eliminated. |
| Riskiness | * Our new projects are approved on a *stage-by-stage* basis rather than with *blanket* approval.<br>Our mode of operations is generally more risky than our competitors.<br>* We usually adopt a conservative view when making major decisions.<br>* We tend to support projects where the expected returns are certain.<br>* Our business operations have generally followed the "tried and true" paths. |
| * = reverse scored | |

*Table 8 : Adapted STROBE Dimensions and Indicators*

(after Venkatraman 1989 and Chan 1992)

Measurement of IS Strategy Orientation

| Dimension | STROIS Items |
|---|---|
| | *The Information Systems being used in our Business Unit:-* |
| Aggressiveness | 1. provide impact analysis on decrease in short-term profitability to gain market share.<br>2. provide impact analysis on cutting prices to increase our market share.<br>3. provide impact analysis on setting prices below competition.<br>4. provide impact analysis on market share positions on cash flow. |
| Analysis | 1. improve our management information and control systems.<br>2. improve our manpower planning.<br>3. provide analysis for performance appraisal of senior managers.<br>4. support effective co-ordination among our functional areas<br>5. provide a great deal of factual information to support our day-to-day decision making.<br>6. help us to develop thorough analyses in response to major decisions |
| Defensive | 1. provide cost control information.<br>2. enhance production/operations management techniques.<br>3. enhance our product/service quality.<br>4. are up-to-date through frequent modifications to the technologies used. |
| Futurity | 1. provide forecasts on key indicators of operations.<br>2. provide tracking on significant general trends.<br>3. provide "what-if" analysis of critical issues.<br>4. help us in resource allocation to reflect long-term considerations.<br>5. help our long-term research for future competitive edge. |
| Proactiveness | 1. help us to seek new opportunities related to the present operations.<br>2. help us to introduce new products/services in our market(s).<br>3. help us to look out for business that can be acquired.<br>4. help us to expand our capacity ahead of our competitors.<br>5. help us to eliminate our operations in later stages of life cycle. |
| Riskiness | 1. provide analysis for approval of our new projects on a stage-by-stage basis.<br>2. provide comparisons of risk factors of operations against that of our competitors'.<br>3. provide conservative analysis for supporting our major decisions.<br>4. provide information on the expected returns of our projects.<br>5. provide information on outcome of "tried and error" for various business scenarios. |

*Table 9 : STROIS Dimensions and Indicators*

(after Chan 1992)

Against each of the strategic dimensions and items of STROBE, Chan and Huff (1992) have developed a corresponding set of strategic dimensions and items to determine the Strategic Orientation of IS (STROIS). Similarly, an adapted model has been developed for measuring STROIS which consists of six strategic dimensions and

## 3.3 Theory Development: IS Strategic Alignment Configurational Model

Apart from the quantitative analysis on IS strategic fit and its implications, this study further develops the IS strategic alignment configurational model for analysing the characteristics of particular types of alignment of business unit strategy with IS strategy via a combination of STROIS and STROBE as shown in Figure 12.

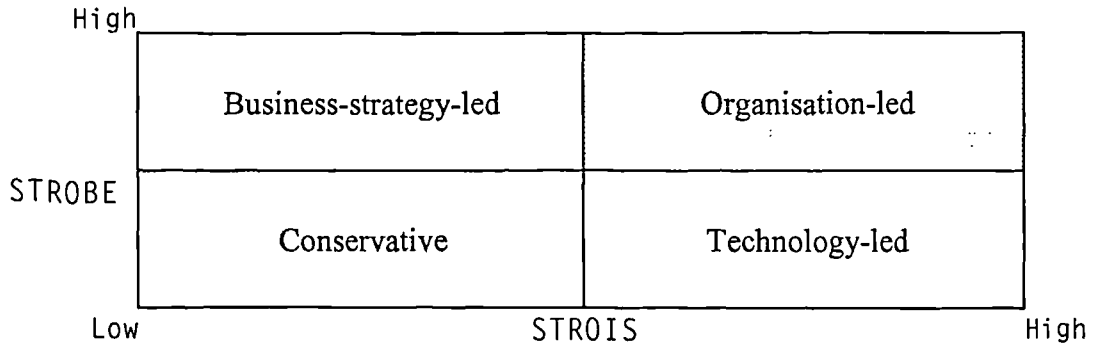


*Figure 12: IS Strategic Alignment Configurational Model based on STROBE vs. STROIS*

A contingency approach is adopted in the formulation of this configurational model whereby it proposes that organisations in different alignment types may need different approaches to ISSP in order to address more effectively particular issues relevant to the respective alignment types. By matching the current strategic position of the organisation or strategic business unit (SBU) as represented by their respective STROBE and STROIS, this study examines whether the four classifications of the matrix could fit in with the IS planning models [according to Earl (1993) and Sullivan (1985)] and application portfolio [according to Venkatraman's (1991) 5-Level of IT-Induced Reconfiguration, McFarlan's strategic grid and Earl's sector management]. Apart from comparative analysis on the major differences in ISSP and IS effectiveness among these four alignment types, this study further examines best practices and pitfalls in ISSP in each of the alignment types.

these four alignment types, this study further examines best practices and pitfalls in ISSP in each of the alignment types.

**Conservative**

The strategic orientation of "conservative" organisations is relatively low in both business strategy and IS strategy (as reflected by low scores in both STROBE and STROIS). This study examines whether organisations in this group will display the following characteristics:-

a) Role of IS: Since the operating environment of the organisations in this category is usually not very competitive and the demand for IS service is usually not very high, the application portfolio is expected to be largely concentrated in local exploitation (Level 1 of Venkatraman), the support quadrant (McFarlan's Strategic Grid) or the delay sector (Earl's Sector IT Management). User managers in general are not expected to have a very high demand for more sophisticated IS services.

b) ISSP: Since the business strategic orientation and IS applications in this group of organisations are probably not strategic, they may have less incentive to perform more formal and sophisticated business/IS strategic planning. Since the demand for IS service is usually not very high, the type of ISSP approaches is expected to be: (1) no ISSP whereby some organisations in this category may not consider the contribution from IS as significant enough to warrant ISSP, (2) SOG as suggested by Sullivan (1985) whereby organisations with a more stable environment tend to adopt a progressive approach in ISP, (3) Budgetary driven or administrative led as suggested by Earl (1993) whereby the objective of ISP is to allocate resources for the IS department/function.

**Technology-led**

The strategic orientation of "Technology-led" organisations is reflected by low score in STROBE but high score in STROIS. This study examines whether organisations in this classification will display the following ISSP characteristics:

a) Role of IS: Since the operating environment of the organisations in this category is usually not very competitive but the strategic orientation of IS is relatively high, the application portfolio is expected to be largely concentrated in local exploitation and internal integration (L1 & L2 of Venkatraman), the factory quadrant (McFarlan's Strategic Grid) or the dependent sector (Earl's Sector IT Management). A major concern is whether organisations with low business strategy orientation will continue to invest in IT where the expected return may not align with a conservative business strategy.
b) ISSP: Typically technology-driven or architectural approaches (e.g. BSP) are adopted for developing technology infrastructure such as telecommunication networks, database and office automation, etc.

**Business-strategy-led**

This group of "business-strategy-led" organisations demonstrate a relatively high strategic orientation of business but low strategic orientation of IS (as reflected by high score in STROBE but low score in STROIS). This study examines whether organisations in this classification will display the following characteristics:

a) Role of IS: Since the operating environment of the organisations in this category is high but the strategic orientation of IS is relatively low, the application portfolio is expected to be largely concentrated in BPR (Level 3 of Venkatraman), the turnaround quadrant (McFarlan's Strategic Grid) or the drive sector (Earl's Sector IT Management). The major concern in this configuration is that user managers are working in a more demanding business environment but the IT support may be

relatively weak.

b) ISSP: Since the business strategic orientation is high in this group of organisations but their IS applications are probably not very strategic, they may adopt a more business-oriented approach in both ISSP. Typically, business-driven approaches (e.g. CSFs analysis) may be adopted in defining information requirements.

**Organisation-led**

The strategic orientation of "organisation-led" organisations is reflected by high scores in both STROBE and STROIS. Since the business strategic orientation and IS applications in this group of organisations are relatively more demanding or strategic, they may consider the need for IS strategic alignment in business/IS strategic planning. This study examines whether organisations in this classification will display the following characteristics:

a) Role of IS: Since the operating environment of the organisations in this category is high but the strategic orientation of IS is relatively low, the application portfolio is expected to be largely concentrated in Levels 1-4 (Venkatraman 1991), the strategic quadrant (McFarlan's Strategic Grid) or the delivery sector (Earl's Sector IT Management).

b) ISSP: Since the orientation of both business unit strategy and IS strategy are high in this group of organisations, they may adopt an organisation wide approach in ISSP such as the theme-based exploration advocated by Earl (1993).

## 3.4 Theory Extension: Movements and Direction of Strategic Orientation

The author supports the views of both Mintzberg (1994) and Ohmae (1982) that one should attempt to differentiate *Strategic Thinking,* which is the process to determine and identify long-term strategic direction and targets (*where the organisation wants to go*), and *Strategic Planning*, which is the process to formulate implementation strategies *(what the organisation should do)* to bridge the gap between its current strategic position (*where you are*) towards its future strategic direction. Hence, an important step in strategic planning is to determine the current strategic position (*where you are*) and to plan the course of actions *(what the organisation should do)* towards the future strategic direction (*where the organisation wants to go*).

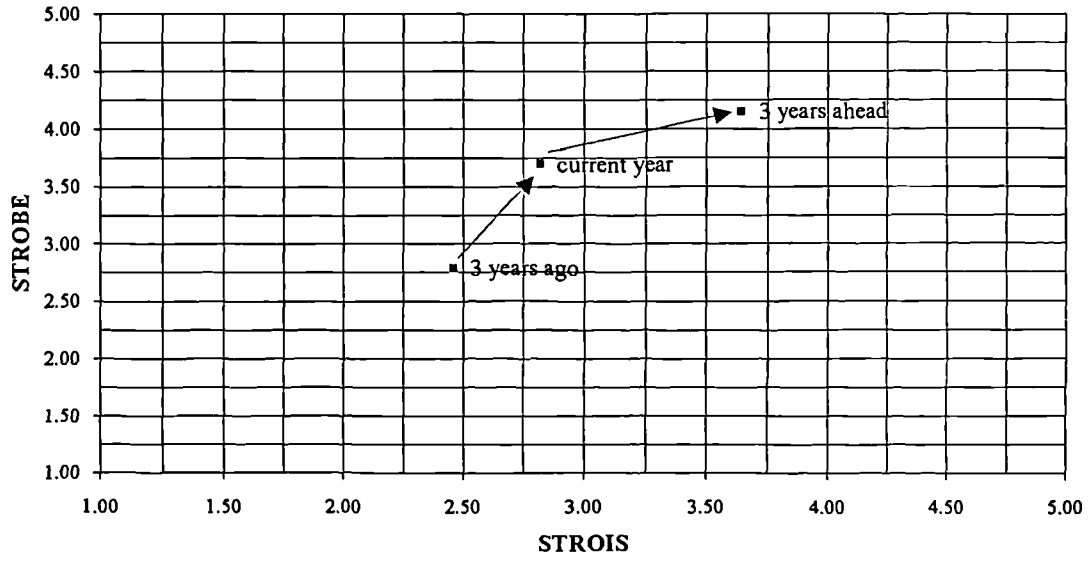


*Figure 13 : Movements and Direction of STROBE vs. STROIS*

The trend analysis sample chart in Figure 13 illustrates that the organisation (or strategic business unit) concerned is migrating from a "Conservative Environment" 3 years ago to "Business-strategy-led" at present, and is expected to move towards "Organisation-led" 3 years ahead. Based on similar findings from the respective chart for

each of the selected organisations, this study can verify whether its ISSP model and Application Portfolio match one of the four types of strategic alignment in respective organisations. This matching and further evaluation on the effectiveness of ISSP and IS effectiveness will provide interesting analyses for the selected organisations under study. Furthermore, it can identify whether organisations with more rapid movements from their current strategic position toward their future strategic direction will pay more or less attention as well as allocate more or less resources accordingly to their strategic planning processes for both business and IS.

## 3.5 Final Research Model

The alignment of business strategy and IS strategy (or IS strategic alignment) based on the combination of STROBE and STROIS is used to measure IS strategic fit. The tests on constructs validity, scale reliability and comparative analysis are covered by the test results as presented in Chapter 5.

Having identified the realised business unit strategy and the IS strategic orientation, this research model will determine (a) whether organisations behave differently in the development and implementation of IS strategy and (b) whether organisations in different alignment types will have different levels of IS success. Based on the above analyses and justifications, the resulting research model is illustrated in Figure 14.

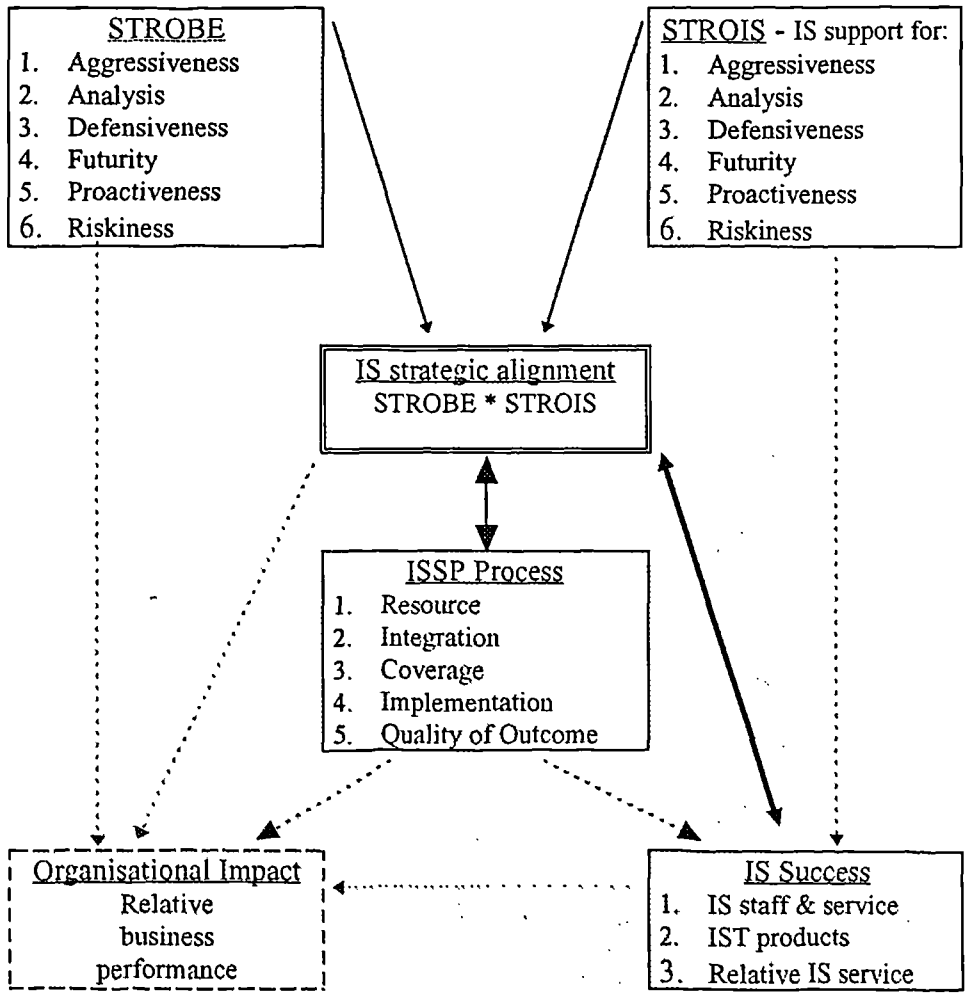


*Figure 14: Research Model on IS Strategic Alignment, ISSP Process and IS Success*

In short, this research classifies business units into four alignment types based on the combination of STROBE and STROIS. Then, the configurational characteristics on ISSP Process and IS Success will be analysed.

### 3.5.1 Assessment of ISSP

The constructs of the assessment of the ISSP Processes are illustrated in Figure 15.

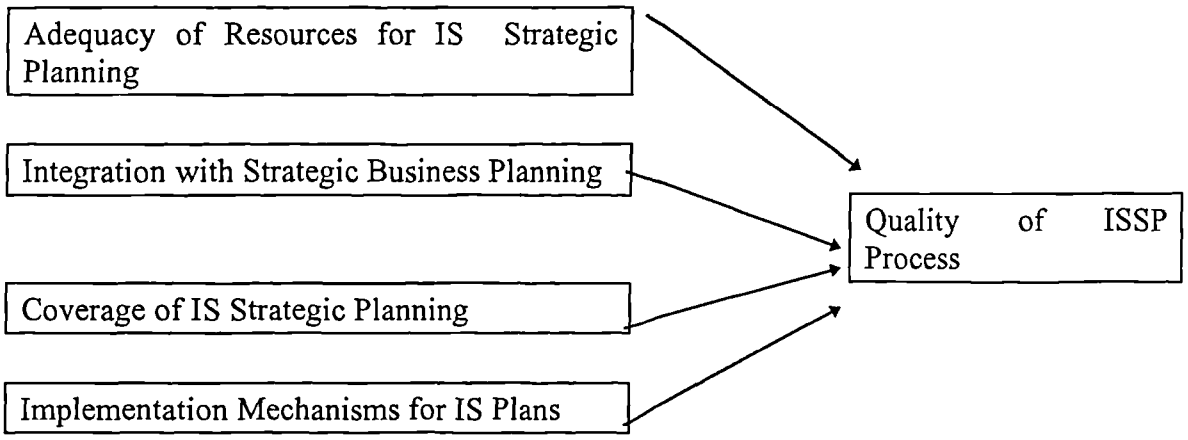


*Figure 15 : ISSP Characteristics*

These five major ISSP issues have been selected as follows and a detailed review of each is provided in subsequent sub-sections of this chapter.

a) Adequacy of Resources for IS Strategic Planning: this is an important item to determine an organisation's commitment in ISSP.
b) Integration with Strategic Business Planning: this process is very important in order to ensure that there is adequate linkage between business and IS plans.
c) Coverage of IS Strategic Planning: the overall coverage and processes for determining the comprehensiveness of ISSP are proposed.
d) Implementation Mechanisms for IS Plans: the implementation of IS plans has been one of the major ISSP problems (Lederer & Sethi 1988, 1991)

e) Quality of ISSP: this is one of the methods for assessing the outcome of ISSP. It can be argued that the "Quality of ISSP" can be assessed based on the above four important processes of ISSP.

Adequacy of Resources for IS Strategic Planning

Major issues in assessing the adequacy of resources for ISSP are concerned with the quality of the ISSP team as well as the commitment, involvement and useful inputs from top management and user management (Premkumar & King 1992).

The quality and commitment of the ISSP team are crucial to the overall process and outcome of ISSP. Major items addressing this issue include:

1. Commitment and involvement of IS planners
2. Expertise of IS planners
3. Expertise of the Leader of IS strategic planning team

The involvement and quality of inputs from top management and user management are important considerations. Major items addressing this issue include:

4. Adequate Top Management Involvement (Pyburn 1983)
5. Adequate User Involvement
6. Quality of Inputs from Top Management
7. Quality of Inputs from Users
8. Funding for the IS strategic planning Process

Integration with Strategic Business Planning

The incorporation of inputs from strategic business planning into the IS planning process is considered as a major problem in ISSP (Lederer & Mendelow 1986). Major factors include the interaction between business planners and IS planners and the

participation of IS managers in strategic business planning (Premkumar & King, 1994). Also, the means of facilitating the integration mechanism such as ISSP workshops (Galliers et al 1994).

It can be argued that organisations with a higher level of IS strategic alignment will demand a higher level of both business strategic planning and ISSP.

Also, the effectiveness of *business strategy planning* and its interactions with ISSP play an important role in the alignment of IS and business strategies. In order to incorporate both business-driven and IT-driven opportunities (Ma 1994), a relatively longer period in business strategy planning is seen as necessary to facilitate better IS-business integration in ISSP.

The following criteria for determining the integration of ISSP with strategic business planning were selected for use in this study (Premkumar & King 1994; Galliers et al 1994):-

1. Interaction between business planners and IS planners: This is an important mechanism to enable planners to have better awareness and working knowledge of both business and IS plans.
2. Participation of CIO or IS manager in strategic business planning (Lederer & Mendelow 1987): This is an important role for the CIO to be aware of the business direction and identify/project necessary changes to IS plans.
3. Quality of Inputs from strategic business planning to IS strategic planning: IS literature cannot assume that ISSP can simply follows business planning because some organisations do not have business plans (or not available to CIO) and some business plans may address very broad issues that are not very useful to ISSP.

Coverage of IS Strategic Planning

The review of ISSP coverage (or Comprehensiveness of ISSP as used by Lin 1991) can help determine an organisation's ISSP focus and direction. The following major items for determining the coverage of ISSP were selected for use in this study (after Lin 1991; Neumann et al 1992; Earl 1993; Premkumar & King 1994; Galliers et al 1994):

1) Review/Revise charter/mission of IS/IT department (Dickson & Wetherbe 1985): The role of the IS department should be reviewed in ISSP in order to ensure that the IS department will continue to proceed towards the "right" direction.
2) Explore opportunities for gaining competitive advantage from IS (Synnott 1987; Neumann et al 1992; Porter & Millar 1985): This is an important step in searching technology opportunity for business in ISSP in order to incorporate new/innovative IS applications.
3) Assess internal strengths and weakness of our current IT environment (Dickson & Wetherbe 1985): This is similar to SWOT analysis in business planning.
4) Assess impact of future IT environment and its effect on our business unit (Synnott 1987; Boyton & Zmud 1987): This role of technology watch is very important in order to ensure that future technology being adopted by the organisation will not become obsolete so easily.
5) Assess business opportunities and threats associated with IS/IT (Martin 1994): This is an important process to assess the opportunity versus risk in the IS/IT environment, which is seen as equivalent to SWOT analysis in business planning.

The following four processes (6-9) are important in identifying/determining IS infrastructure platforms/requirements: enterprise-wide data requirements; corporate

database requirements; hardware and software requirements; and telecommunications/networking requirements (after Synnott 1987; Martin & Leben 1989).

6) Analyse enterprise data modelling requirements (Martin & Leben 1989): This is an important process in identifying major enterprise-wide data requirements and relationship among data models.
7) Analyse corporate database requirements (Martin & Leben 1989; Goodhue et al 1992): This is an important process in identifying major enterprise-wide data base requirements.
8) Analyse hardware and software requirements (Dickson & Wetherbe 1985): This is an important process in identifying major hardware and software requirements as well as capacity planning.
9) Analyse telecommunications requirements (Synnott 1987): This is an important process in identifying major hardware and software requirements as well as capacity planning.

The following two processes (10-11) are required to determine the systems development requirements in terms of role of end-users in building systems as well as the prioritisation of application portfolios.

10) Analyse role of end-user computing: The role and extent of EUC are part of ISSP in order to determine the extent of EUC and developments by the IS department.
11) Select and prioritise application systems portfolio (Synnott 1987; McFarlan 1981): Application portfolio is an important part of ISSP which often leads to the prioritisation of various projects.

The following three processes (12-14) are essential in determining; acquiring; and developing the appropriate IS resources:

12) Analyse human resource requirements for the IS department

13) Analyse human resource requirements for user departments in applying IT

14) Assess hardware and software markets for formulating acquisition plans

Apart from the above 14 major ISSP processes to work out the IS plans, the following three ISSP processes reflect the iterative nature of ISSP in order to improve the efficiency, effectiveness and refinement of the IS plans.

15) Review alternative strategies (Ramanujam & Venkatraman 1987): It may be too risky to look at one (the best) strategy. Instead, a few alternative strategies should be assessed in order to cater for various business/technology scenarios.

16) Analyse resource constraints and contingency plans: Planning must be based on sets of assumptions, constraints and estimates. Hence, contingencies must be reserved to accommodate some of the unforeseen events.

17) Review, feedback and refinement of plans (King 1988; Baker 1995): ISSP can be seen as an organisational learning process (Earl 1993). Lessons learnt from ISSP in previous years or in earlier processes with the current ISSP exercise may be valuable for current and future ISSP processes. The major arguments are whether these lessons are adequately reviewed, feedback to current plans or used for refining the ISSP processes.

Quality of Implementation of IS Strategic Plans

Strategic planning is only useful if the resulting IS plans are effectively implemented, otherwise, the IS plans remain as shelf-ware (Atkinson 1992). Common problems of planning implementation identified by Lederer and Sethi (1988; 1991) are that it is difficult to secure top management commitment to implementation; that planning outputs are unrealistic or that significant further analysis is required for implementation. Management support in the implementation of IS strategic plans is

crucial to the success of ISSP's effect to organisations (Lederer & Sethi 1988, Galliers 1991). In addition to management support, Premkumar and King (1994) proposed that adequate resource, user involvement, monitoring systems for review and feedback are important factors for determining the quality of implementation mechanisms. Apart from the facilitating role, a control role is also assessed to ensure whether the approval of new systems follows recommendations of IS plan (Lederer & Sethi 1992b). The following criteria for determining the quality of implementation mechanisms for ISSP were selected for use in this study: (after Premkumar & King 1994; Lederer & Sethi 1992b and Lin 1991)

1) Top Management Commitment (Lederer & Mendelow 1988) on the implementation of the resulting IS plans is essential. Otherwise, ISSP should not start at all !
2) Funding for the implementation of IS plan (Premkumar & King 1994): Adequate funding for planned acquisitions of IST resources is essential to support the implementation of strategic IS plans.
3) Staffing for the implementation of IS plan (Premkumar & King 1994): Adequate staffing is essential to support the implementation of IS plans. Some organisations provide controls not only on funding but also on head-counts. Hence, the approval of staffing is also essential.

The following three items indicate management's determination to initiate major organisational changes for the effective implementation of the resulting IS plans. This argument was also supported by almost all CIOs and some CEOs in the pilot study as well as in the case study interviews.

4) Plan to include re-structuring the chosen business unit for the implementation of IS plan (adapted from Kochan & Useem 1992).

5) Plan to include re-designing major business processes for the implementation of IS plan (adapted from Davenport 1993).
6) Approval of new systems follows recommendations of IS plan (Lederer & Sethi 1992b): This item is important in order to ensure that new systems must be based on IS plans.

Quality of ISSP Process

An important outcome of ISSP is to determine internal and external domain of IS/IT through effective ISSP processes (King 1988). This includes the overall review of the input, process and output of ISSP. The following major indicators for determining the quality of ISSP process were selected for use in this study. They reflect the most important considerations in ISSP.

1) Better communications with top management (Lederer & Mendelow 1987): IS plans can be used as an effective means to communicate with top management so that they may better understand the role of IS as well as to facilitate their decisions in approval of IS plans and their associated investments.
2) Users can better appreciate the role and benefits of IS (Neumann et al 1992): This could lead to more active involvement and better commitment from users that would enhance both the ISSP process and utilisation of IS.
3) Better integration of business plans with IS plans (Galliers 1987; Earl 1993) is one of the very common criteria for assessing the success of ISSP.
4) Better appreciation of the business unit's overall information needs (Parker & Benson 1989; Martin & Leben 1989): the outcome of ISSP in defining enterprise-wide information needs and corporate data models is considered very important.
5) Better IT investments decisions (Earl 1989; Powell 1993): One of the important outcomes of ISSP is the allocation of IT budget/investments.

6) Better assessment of future IT Environment (Synnott 1987; Dickson & Wetherbe 1985): The role of technology watch is an important consideration.

7) Better technology infra-structural paths and policies (Synnott 1987): The technology vision and development of IT infra-structure are important outcome of ISSP.

8) Greater exploitation of IS opportunities for gaining competitive edge (Neumann et al 1992): This is an important consideration in order to benefit from technological innovation.

9) Better planning and control of human, software and hardware resources (Premkumar & King 1994): Resources can be better planned and controlled as an outcome of ISSP.

10) Improvements on ISSP processes (King 1988; Earl 1993; Baker 1995): ISSP can be seen as a learning process for continuous improvement and refinement, which is an important component of ISSP.

### 3.5.2 IS Success

It may be argued that the same strategic orientation of IS (STROIS) or role of IS may be more effective or less effective under particular circumstances. In order to relate the role of IS with IS effectiveness, this research investigates the proposition that organisations with a higher strategic orientation of IS (STROIS) will assign a higher level (extent) of resources to ISSP activities than organisations with lower STROIS. Also, IS effectiveness may be reflected by relative quality of IS service in comparison to major competitors. There are numerous studies of the impacts of IS with respect to IS Success - these relate to a wide range of factors - user satisfaction, quality of IS and services impact, and profitability ratios, etc.

The author cannot hope to include all of the suggested variables but has reviewed the relevant literature and identified these factors and items which have greatest support

and these in which subjectively he also believes to act as strong influencers. The identification of these criteria should not be seen as a statement of absolute values but rather a test on the validity of the most commonly held assumptions with respect to IS effectiveness and a test of the author's own held assumptions.

Satisfaction with Information Systems Service

User Information Satisfaction (UIS) was a popular measure of users' satisfaction with IS (Galletta & Lederer 1989; Ives et. al. 1983; Raymond 1990) while IS effectiveness is another important measure (Downs 1988; Chan & Huff 1992). This research has adopted a short form based on selected items from these instruments for determining the satisfaction with IS service.

a) Quality and competence of IS staff are importance criteria for assessing satisfaction with IS services (adapted from Downs 1988). The following three criteria are selected:

1. Technical expertise of IS staff in general;
2. Ability of IS staff to specify IS requirements;
3. Ability of IS staff to customise (e.g. develop in-house) systems;

b) This study argues that the success of IS should depend on the important role of end-users in clearly defining their business requirements and information requirements.

4. End-users' knowledge and ability in defining business information requirements;

c) The two most common criteria for assessing IS service are systems/projects delivered on time and within budget. These two criteria have also been ranked highly by senior managers and CIOs in the pilot study (as well as in unsolicited responses from cases study interviews).

5. IS delivered on-time;

6. IS delivered within budget;

e) The following criteria for assessing the role or functionality of IS service, which are based on the contribution of IS to transaction processing and core operations of the organisation; co-ordination of managerial activities (including support for decision-making) as well as in improving profitability. Although it is desirable to further develop the respective items for each of these three types of IS contributions, this thesis simply adopts the three items as shown below in order to maintain the questionnaire within a reasonable length.

7. IS contribution to operational efficiency;
8. IS contribution to managerial effectiveness;
9. IS contribution to improving either profitability or mission critical goals (for non-profitable organisations);

Satisfaction with Information Systems Products

It can be argued that the quality of information systems depends not only on users' satisfaction with IS services but also the technical quality of IT in providing an appropriate environment for IS. The satisfaction with the technical quality of IS/IT products as perceived by the IT manager can be seen as an important factor for assessing the capability and constraints of the IT infrastructure. Synnott (1987) has identified the following technical components as the basis for developing the IT infrastructure. Although the list may not be exhaustive, it has covered the major components.

1. Database
2. Computer hardware platforms
3. Communications and networking platforms
4. Systems software platforms

5. Systems development tools
6. End-user computing tools
7. Office automation products

Relative Quality of Information Systems Services

Apart from the satisfaction with an organisation's own IS service and products, it is very desirable that managers assess the relative quality of IS services in comparison to their counter-parts or competitors in the same industry. This comparison is seen as an important assessment in relative terms, especially in finding out the "best" organisations in terms of satisfaction with IS service. The following three criteria for determining the relative quality of IS services were selected for use in this study: (after Premkumar & King 1994, Galletta & Lederer 1989, Ives et. al. 1983, Raymond 1990 and Neumann et al 1992).

1. Application of IS to advance Critical Success Factors [CSFs are the few areas in which performance must be good if the organisation is to continue to exist and prosper] in comparison to other organisations in the same industry.
2. IS contribution to operational efficiency in comparison to other organisations in the same industry.
3. IS contribution to managerial effectiveness in comparison to other organisations in the same industry.

### 3.5.3 Organisational Impact

Though it can be argued that business performance depends on a variety of environmental and organisational factors, some major financial indicators and business performance indicators may be directly or indirectly associated with business and IS. Some of these indicators are relative to competitors while others are assessed by the

level of satisfaction with the management or various stake-holders of the organisation (Ruohonen 1991, 1995).

**Role of IS Applications in Organisations**

The Strategic Grid (McFarlan 1982) is used to assess the importance or role of IS applications in organisations by classifying them into four quadrants as shown in Figure 6. The grid reflects the current and future IS application portfolio in organisations and it is one of the most popular models in ISSP research (Neumann et al 1992, Raghunathan & Raghunathan 1990, Premkumar & King 1992). Alternatively, the sector information management framework (Earl 1989) and the 5-level IT-induced reconfiguration model proposed by Venkatraman (1991) are useful for determining the strategic relevance of IS to the organisation. Some specific factors for determining the strategic relevance of IS to the organisation are of particular interest (Neumann et al 1992). A review of applications portfolio and IST resource allocation (McFarlan 1982, Porter & Millar 1985, Synnott 1987, and Parker 1988 & 1989) is an important process in ISSP. The reporting structure of the IS department to senior management and the rank of IS manager (Raghunathan & Raghunathan 1989) reflect the importance and role of IS functions in organisations and serve as a basis for further analysis. Once again, this research adopts a comparative approach whereby respondents are requested to fill in the percentage of applications in each of the "four quadrants" of the Strategic Grid (McFarlan) and the "five levels" of application portfolio (Venkatraman 1991) instead of classificatory approach in forcing respondents to select a single or dominant quadrant/level.

**Importance of Business Goals**

The first three of the following criteria for assessing the importance of business goals were selected for use in this study (after Venkatraman 1989). The last three represents the importance of business strategies, IS strategies and IS services respectively which are used for testing against whether their importance will affect the importance and effectiveness of ISSP and IS success.

1) Revenue Growth Rate
2) Return on Investment
3) Return on Sales
4) Effective Business Strategies
5) Effective Information Systems Strategies
6) Effective Information Systems Services

**Relative Business Performance**

The following six indicators for determining the relative business performance (after Venkatraman 1989) were selected for use in this study. The addition of "service/product quality" is an important criteria of perceived business success especially when the benefits of product/services cannot always be quantified in monetary terms. All six items will be used in factor analysis of the constructs.

1) Revenue Growth
2) Market Share gains
3) Net Profits
4) Return on Investment
5) Financial Liquidity
6) Service/Product Quality (Synnott 1987)

**Review of Organisational Context Variables**

Some organisational context variables have been identified to test whether they have any impact on IS strategic alignment. These variables include planning horizon for business planning and ISSP; the relative rank of the CIO as well as the type of industries of the organisation.

## 3.6 Summary of Research Propositions

Since this research is of an exploratory nature, the exact factors/dimensions and their associated items cannot be fully determined at the research design stage. However, results on dimensions will be available after the factors analysis and then significant items within the emerged dimensions will be used for comparative analyses among each of the four alignment types. The rationale of the approach taken in the establishment of propositions is discussed below :

1. It can be argued that organisations which behave differently in the development and implementation of IS strategy (ISSP), have different degrees of IS strategic alignment. For the purpose of this research, the configuration type of an organisation is first identified through the matching of STROBE and STROIS and this is followed by examining whether organisations with different alignment types will behave differently in ISSP.
2. Similarly, it can be argued whether organisations with different alignment types will have different levels of IS success.

The following major research propositions, which have been identified and justified in the earlier sections of this chapter, are listed below.

**Proposition Set 1: Relative IS Success Among the four Alignment Types**

P1.1 Organisations in the "business-strategy-led" group (high STROBE but low STROIS) *will have a relatively lower level of IS Success because their demanding business environment is not matched with adequate support by IS.*

P1.2 Organisations in the "conservative" group (low STROBE but low STROIS) *will have a relatively lower level of IS Success because a high level of IS success may not be required by their less demanding business environment.*

P1.3 Organisations in the "organisation-led" group (high STROBE and high STROIS) *will have a relatively higher level of IS Success because their demanding business environment is adequately supported by IS.*

*P1.4* Organisations in the "technology-led" group (low STROBE but high STROIS) *will have a relatively higher level of IS Success because their less demanding business environment is more than adequately supported by IS.*

**Proposition Set 2: Relative ISSP Effectiveness Among the four Alignment Types**

P2.1 Organisations in the "business-strategy-led" group *will be relatively more effective in ISSP because of the requirement by their demanding business environment.*

P2.2 Organisations from the "conservative" group *will be relatively less effective in ISSP because their business environment may not demand a high level of IS planning.*

P2.3 (a) Organisations in the "organisation-led" group *will be relatively more effective in ISSP because of the requirement by their demanding business environment.*

P2.3 (b) Organisations in the "organisation-led" group *will have a relative higher level of alignment in the ISSP process because their demanding business environment is matched by more capable IS service.*

P2.4 Organisations in the "technology-led" group *will be relatively less effective in ISSP because their business environment may not demand a high level of IS planning.*

The major objective of this research is to provide and justify an alternative view on the contingency nature of IS strategic alignment through the development of the configurational theory and its extension to include a change process in the "movement and direction of strategic alignment". Hence, apart from the above propositions, the configurational characteristics (in terms of for both "ISSP" and "IS Success") for each of the four alignment types will also be developed and evaluated.

# CHAPTER 4 : RESEARCH DESIGN AND METHODOLOGICAL JUSTIFICATIONS

Following on from the literature review and conceptual model development, this chapter evaluates alternative research methods with respect to their approaches, relative merits and limitations as well as justifications for the adoption of specific IS research approaches and methods for this study. A survey was designed to explore the relationships of the research variables in selected organisations. This is followed by multiple case studies in order to provide explanations and descriptive relationships among homogeneous groups of organisations. Particular assessments on ISSP and IS success are used to determine whether there are significant differences among each of the four IS strategic alignment types. The objective of the multiple case study analyses is to determine any common practice of ISSP in the best ranked organisations within each IS strategic alignment type.

## 4.1 Alternative IS Research Approaches

Various IS research approaches and methods were reviewed prior to the adoption of possible research approaches and their associated research methods in this study. Experience of major IS researchers in Hong Kong (Burn 1991, Jordan 1994, Elliot 1994, Cheung 1995) were also studied in the evaluation of the practicability and applicability of various approaches in the local context. Particular references to the respective strengths and weaknesses of various IS research approaches have been examined (Galliers 1992, Orlikowski & Baroudi 1991, Yin 1993/94, Gable 1994, Walsham 1995). Galliers (1992) classifies IS research approaches in the context of the scientific and interpretist philosophies as shown in Table 10. Each of these research approaches are further reviewed and evaluated in the following sections.

| Scientific | Interpretivist |
|---|---|
| Laboratory experiments | Subjective / argumentative |
| Field experiments | Reviews |
| Surveys | Action research |
| Case studies | Descriptive / interpretive |
| Theorem proof | |
| Forecasting | Futures research |
| Simulation | Role / game playing |

*Table 10: IS Research Approaches in the context of the scientific and interpretive philosophies*

(Galliers 1992)

Initial Screening of Research Approaches

The following research approaches have been considered: laboratory experiments, field experiments, surveys, case studies, theorem proof, forecasting, simulation and action research.

**Laboratory Experiments**

Laboratory experiments investigate the precise relationships between selected variables in a controlled environment usually under specific laboratory situations. The results of the experiments are analysed by using statistical techniques to make generalisable statements applicable to real-life situations. The major strength is its ability to isolate and control a small number of variables which may then be examined intensively. A major weakness is that the findings in a controlled environment may not reflect real-life situations and this may constraint its ability to make generalisations. *This approach is not suitable for collecting the type of data/information required by the objectives of this study.*

**Field Experiments**

Field experiments are extended from laboratory experiments to real-life situations of organisations and/or society. While this approach may achieve greater realism and is less artificial than laboratory experiments, it may be difficult to find organisations which are prepared to be experimented on, especially for exercising controls, replications and alterations of the study variables. *This approach is not suitable for collecting the type of data/information required by the objectives of this study.*

**Surveys**

The survey approach refers to a group of methods that emphasise quantitative analysis, where data for a large number of organisations is collected through methods such as mail questionnaires, telephone interviews, structured interviews based on a questionnaire, or from published statistics or reports. Collected data is then analysed by using statistical techniques. By analysing a representative sample of responding organisations, the survey approach seeks to discover relationships, which exist in the past, present and future, that are common across organisations and thus provide a snap-shot of the situation at a certain time. Galliers (1992) argues that this approach reveals little information on the underlying meaning of the data and there may be possible bias in respondents, the researchers, and the moment in time which the research is undertaken.

It is very difficult to design good questionnaires in strategy research. If the questionnaire is too short, it will not be comprehensive enough to collect the required information. On the contrary, if the questionnaire is too long, the response rate may be extremely low (especially in the Hong Kong context - many researchers in Hong Kong have experienced extremely poor response rate from questionnaire surveys, with 5% to 10% being taken as the norm. A recent study on Globalisation of IT Services in Hong

Kong got a response rate of around 8% (Cheung 1995). Another difficulty is to write out the questions at the level of understanding of the target respondents. Strategy research (both business and IS) is a specialised area of study, some of the questions may not always be interpreted correctly by all responding managers (especially in Hong Kong, where English is a second language after Chinese), even at senior levels. *Despite the above constraints, this approach is a viable alternative for collecting the type of data/information required by the objectives of this study*

**Theorem proof**

Galliers (1992) classifies theorem proof as a positivist/scientific approach because it is concerned with the development and testing of theorems at the end of the socio-technical spectrum. *This approach is not suitable for collecting the type of data/information required by the objectives of this study.*

**Case Study**

The case study approach refers to a group of methods that emphasise in-depth understanding and qualitative analysis, where data is collected from a small number of organisations through methods such as participant-observation, in-depth interviews and longitudinal studies. The case study approach seeks to understand the relationships which exist in reality in the selected organisations. The approach provides opportunity to ask penetrating questions and to capture the richness of organisation behaviour. However, it is difficult to control variables and the results could be biased by different interpretations of events by individual researchers/stake-holders. Also, the conclusion drawn may be specific to the particular organisation(s) under study and may not be generalisable. This has drawn (historical) criticisms that case study research is not a sufficiently rigorous research method. However, many researchers have illustrated improvements in the application of case study research as scientific approaches

(Benbasat et.al. 1987, Lee 1989, Yin 1993, Yin 1994, Walsham 1995). Mintzberg and Quinn (1991) comment that much of the strategy literature is prescriptive and normative instead of descriptive and realistic. Hence, findings from case study research can enrich the literature on what organisations did in (IS) strategy formation. *This approach is a viable alternative for collecting the type of data/information required by the objectives of this study, especially in determining the characteristics of "good practice" of ISSP in organisations with best scores in IS success in each of the IS strategic alignment types.*

**Forecasting and Future**

Galliers (1992) proposes that these approaches make use of such techniques as regression analysis and time series analysis, or Delphi method and change analysis to extrapolate/deduce likely/future possible events or impacts. *This approach is <u>not</u> suitable for collecting the type of data/information required by the objectives of this study.*

**Simulation, game/role playing**

These approaches attempt to copy the behaviour of a system which would otherwise be difficult/impossible to solve analytically, usually by using random numbers to test the variables Galliers (1992). *This approach is <u>not</u> suitable for collecting the type of data/information required by the objectives of this study.*

**Action Research**

Galliers (1992) describes this type of applied research as an attempt to obtain results of practical value to groups with whom the researcher is associated with, while at the same time adding to theoretical knowledge. Baskerville and Wood-Harper (1996) also suggest certain domains of ideal use in IS research (such as systems development methodology). While this approach is very suitable for internal strategy studies within an organisation, it *is <u>not</u> suitable for this study because the author does not work for nor*

*associate with the target organisations. However, the author has had extensive experience in running IS strategy workshops and he considers that the use of action research as a means of assessing the effectiveness of IS strategy workshop approaches may be of interest as an extension of this study.*

Adoption of Survey and Multiple Case Study Research Approaches

| Evaluation Criteria | Survey | Case Study |
|---|---|---|
| Controllability | Medium | Low |
| Deductibility | Medium | Low |
| Repeatability | Medium | Low |
| Generalisability | High | Low |
| Exploratory | Medium | High |
| Representability (potential model complexity) | Medium | High |

*Table 11: Relative Strengths of Survey and Case Study Methods*

(Gable 1994)

After the initial screening of various IS research approaches, both surveys and case study are found to be the most appropriate approaches for fulfilling the objectives of this research and a combination of both approaches is seen as very desirable (Gable 1994). A summary of their relative strengths is shown in Table 11 while further elaboration of the research approaches follows.

Benbasat et.al. (1987) propose three strengths of the case study approach: (i) the researcher can study IS in a natural setting, learn about the state of art, and generate theories from practice; (ii) the approach allows the researcher to understand the nature and complexity of the process taking place; and (iii) valuable insights can be gained into new topics emerging in the rapidly changing IS field. In order to avoid a common mistake of researchers in case study of simply hanging around a "willing site", Yin (1993) advises that it is necessary to plan the following steps: (i) setting vigorous boundaries to the unit of analysis, (ii) establishing clear and strong link between the unit of analysis and the research objectives, (iii) identifying critical evidence and compiling

relevant analysis of the evidence collected, and (iv) the making of generalisations. Yin (1993) has identified relevant situations for different research strategies as shown in Table 12. In particular, he adopts an implicitly positivist stance in the description of case study research and suggests that case studies are the preferred research strategy to answer "how?" and "why?" questions. With the exception of "experiment", there is no need to control the behavioural events of the study.

| Strategy | Form of research questions | Requires control | Focus on contemporary events |
|---|---|---|---|
| Experiment | how, why | yes | yes |
| Survey | *who, what, where, how many, how much* | no | yes |
| Case study | *how, why* | no | yes |
| Archival analysis | who, what, where, how many, how much | no | yes / no |
| History | how, why | no | no |

*Table 12: Relevant Situations for Different Research Strategies*

(Yin 1994)

Yin (1994) argues that evidence for case studies may come from six sources: documents, archival records, interviews, direct observation, participant observation, and physical artifacts.

An attempt is made to integrate both surveys and case study methods in order to combine their strengths and overcome some of their individual limitations. The overall research approach is described in section 4.2.

## 4.2 The Research Approach

This research assesses the relationship between the role of IS and the characteristics of ISSP processes in the selected organisations. Further analysis and evaluations on the relationship between the role of IS and the alignment of IS strategy with business needs as well as their implication to IS performance will be explored. Some potential hypotheses or propositions have been established and will be tested in the research. An integrated approach (adapted from Gable 1994) covering both survey

research and explanatory case study analysis (Yin 1993/94) has been adopted as described in the two phases of research activities. The research approach is illustrated in Figure 16.

A quantitative survey is applied to each organisation with the three sets of questionnaires. The results of these questionnaires will form the basis to :

(a) develop the configurational characteristics with emerging factors and items for both ISSP (Chapter 6) and IS Success (Chapter 7); and

(b) select organisations with "best or very good" scores in ISSP and IS success for case study analysis in order to learn the good/best practices in each of the configuration types as well as for providing a rich source of information for supporting further analysis and evaluation.

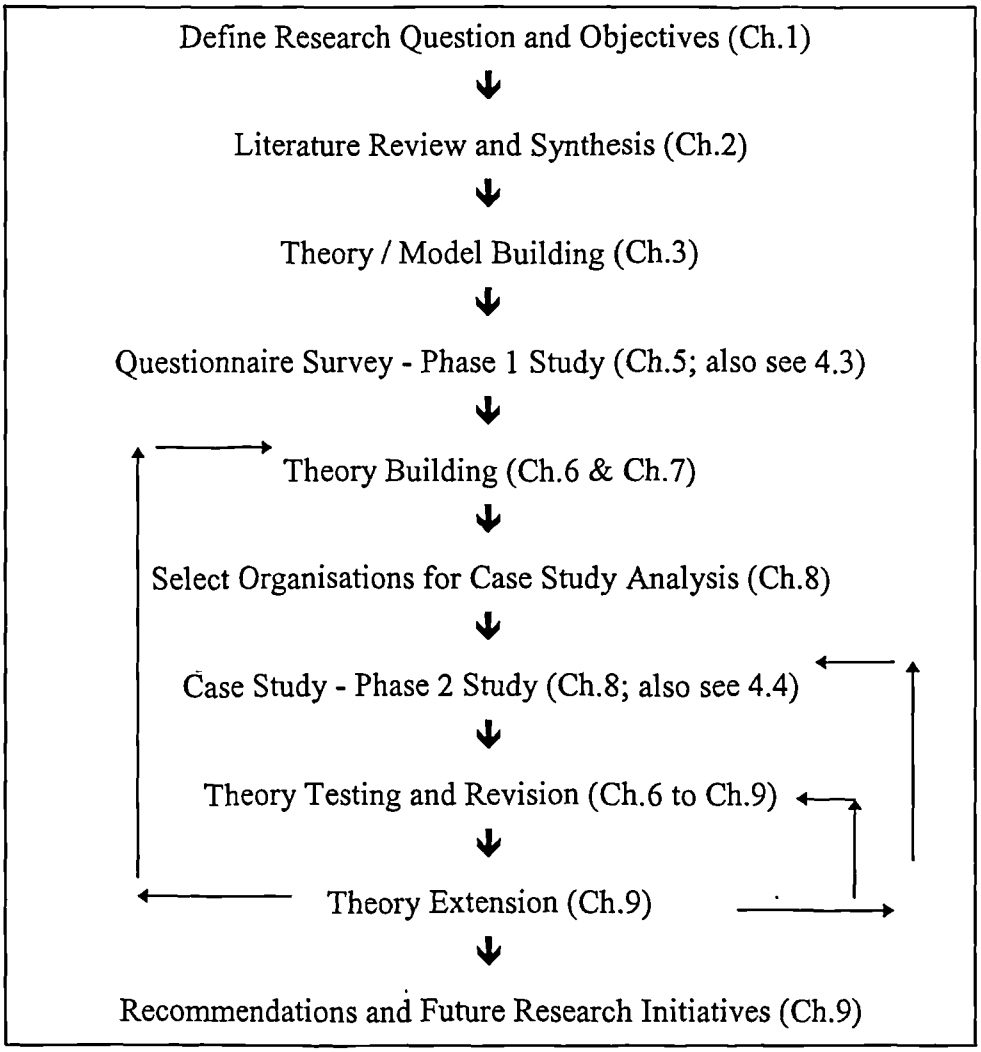


*Figure 16: The Research Approach*

Also, most IS strategic alignment research projects adopt a static view of alignment, especially survey-based research projects. It can be argued that comprehensive multiple case study analyses will be able to provide the assessment of how organisations progress in their IS strategic alignment over time. This in turn would provide better understanding of the evolution of *alignment (where the strategic position of the organisation* was 3 years ago versus that of the current position as well as *where the organisation is going to* 3 years ahead - see Figure 13). Furthermore, the observation of factors and reasons (through multiple case study analyses) that explain organisational movement towards different levels of IS strategic alignment will be extremely valuable.

Detailed procedures of these two phases are described in sections 4.3 and 4.4 respectively. Since IS strategy research is a very complex process, the adoption of any particular research methodology may be seen as a compromise. Although this dissertation study attempts to improve the reliability of the research design through a combination of survey and multiple case study analyses, there are certain limitations. Hence, an assessment of the strength and limitations of the research design is covered in section 4.5.

## 4.3 Phase 1 Study

In order to cater for the interests of various stake-holders or multiple sources of inputs within the chosen business unit of the same organisation, the investigation will have to invite the participation of multiple parties as shown in Table 13. Three types of questionnaire are designed to collect relevant information (with most items being measured on a 5-point Likert scale) to support relevant analysis and evaluation. Additional information is also collected from a variety of sources to support further evaluation. It is also necessary to interview a number of staff within the same organisation at different levels, especially the participants as shown in Table 13 (usually

after they have returned their completed questionnaires) so that further inputs and explanations could be obtained/reviewed.

Questionnaire A (see Appendix 3.2)

Parts A and B cover Business Goals and Relative Business Performance indicators, Parts C and D cover STROBE items, Part E covers the Satisfaction with Business Performance, and Part F covers the "Overall Assessment on ISSP Success".

Questionnaire B (see Appendix 3.3)

Parts A and B cover IS Success indicators, Part C covers STROIS items, and Part D covers the "Overall Assessment on ISSP Success".

Questionnaire C (see Appendix 3.4)

Parts A and B cover IS Success indicators, Part C covers ISSP items, Part D covers Application Portfolios and Part E covers the "Overall Assessment on ISSP Success".

| Questionnaire: | A | B | C |
|---|---|---|---|
| Areas of Analysis | Strategic Planner, CEO or GM - familiar with Business Strategy and Business Performance | Senior Manager of a Department consisting of major IS Users | IS/IT Manager or CIO in-charge of IS/IT functions |
| STROBE | Detailed | | |
| STROIS | | Detailed | |
| Strategic Role of IS | ✓ | ✓ | |
| IS Success | | Detailed | Detailed |
| ISSP Characteristics | | | Detailed |
| Overall Success of ISSP | ✓ | ✓ | ✓ |
| Overall Satisfaction with IS | ✓ | ✓ | ✓ |
| Business Performance | ✓ | | |

*Table 13: Participation of Senior Executives*

Initial findings are based on a questionnaire survey in order to ensure completeness, replicability and the possibility of refinement. The three types of survey questionnaires are designed to identify ISSP problems and determining the relationship between business strategies and IS strategies. These three personnel are the target respondents within the same organisation. A fourth type is designed for ISSP consultants for reviewing how their own ISSP methods address the strategic issues and the problems encountered by their clients. The fourth type was completed by a consultant from DMR and some of the findings were incorporated in the research design (see Table 14). This approach will ensure consistency through comparison and contrast of their multiple views and thus improve the validity of results. Some of the survey and questionnaire design techniques as recommended by Dillman (1978) such as writing questions, constructing questionnaires and directions for answers were incorporated. Responses from the 3 sets of organisational questionnaires helped select a sample of organisations for detailed case study. Detailed analysis of the problems and opportunities of ISSP were based on an adapted model of Strategic Alignment of IS strategy with business needs. With the exception of the pilot survey, the same set of questionnaires is used for the survey in all selected organisations.

A review on the length of some ISSP questionnaires on similar studies reflected that the number of A4-sized non-reduced pages were: Galliers (1987) with 12 pages, Harris and Kumar (1991) with 16 pages and Chan and Huff (1993) with an average of 10 pages for each of the four questionnaires. The response rate is likely to be lower if the questionnaire requires more time to complete, especially in Hong Kong where manager's response rate has been extremely low. Also, most organisations may be more reluctant to participate in studies associated with organisational strategies. Since a PhD research project usually has a limited time-scale, the constraint of poor response may affect the choice of sampling and research approaches.

In order to compensate for the weaknesses of the questionnaire survey, this research has included follow-up interviews with respondents from selected organisations in order to verify the findings in addition to further analysis of the processes of ISSP within the organisations.

Implementation of Survey

| Industry/Organisations | Outcome of Pilot Study |
|---|---|
| • **Banking and Finance** | |
| 1. ABC Bank | 3 sets of questionnaires completed (also participated in case study analysis) |
| 2. Bank of China Group | 3 sets of questionnaires completed |
| 3. Standard Chartered Bank | CIO questionnaire completed |
| • **Trade/Commerce** | |
| 4. Inchcape Pacific Ltd. | Ran ISSP workshops for them (1992) as part of the author's initial PhD study on ISSP workshops; Received their advice on the 3 sets of questionnaires; Unfortunately, the IS department dissolved in 1994. |
| 5. Johnson & Johnson Ltd. | 3 sets of questionnaires completed |
| 6. XYZ Shipping Co. Ltd. | 3 sets of questionnaires completed (also participated in case study analysis) |
| 7. Dorfair Co. Ltd. | 2 sets of questionnaires completed |
| 8. Dow Chemical Ltd. | Dropped due to CIO changing job |
| • **Public Sector** | |
| 9. Immigration Department | Received advice on 3 questionnaires |
| 10. Tradelink Ltd. [EDI Services for Trade Documents] | Received advice on 3 questionnaires |
| 11. Hong Kong Polytechnic University | Received advice on 3 questionnaires |
| • **Consulting** | |
| 12. DMR Consultants | Received advice on their ISP methodology and consultant's questionnaire completed |
| 13. Price Waterhouse | Received advice on their ISP methodology |
| 14. Continuum Systems (Insurance Software) | Received advice on 3 sets of questionnaires |

*Table 14: Organisations Participated in Pilot Study*

An open seminar on "Problems and Opportunities on ISSP" was held at the Hong Kong Polytechnic in April 1992 (Ma & Whitmore 1992). Invitations were sent to 30

selected large organisations (major IT users such as Hong Kong Bank, Standard Chartered Bank, America International Data Centre, Cathay Pacific Airways, Mass Transit Railway, Inchcape Pacific, Kowloon-Canton Railway, Hongkong Air Cargo Terminal, Dow Chemicals, etc.) as well as all Universities and Polytechnics in Hong Kong. Around 90 participants attended the seminar. A very brief questionnaire was used to ask the attendees to identify the issues of ISSP as well as their interests in participation on an ISP study/research. Only 10 organisations expressed interest in ISP study.

Based on expressed interest and organisations with whom the author had prior contact, 14 organisations were selected giving a broad coverage of private and public sector industries. A small scale pilot survey was carried out in June/July 1994. Three types of questionnaires were sent to each of the 14 selected organisations (as shown in Table 14) in order to investigate their problems on the use of alignment models from different perspectives. Since Hong Kong is well-known for her role in international trade and as a financial centre, initial plans were to cover at least the "Banking and Finance" and "Commerce and Trade" sectors. The "Public Sector" was also included because it is an important sector in any country and government departments are more willing to provide planning information/documents. These 14 organisations selected all have more established IT applications. Preliminary results from a few completed questionnaires revealed that very few organisations adopted a particularly high priority for ISSP and only 3 out of the 14 organisations agreed to participate in the detailed case study. A valid response must include all the 3 sets of questionnaires from the same organisation. The general comments from some respondents were that the pilot questionnaires were relatively too long and too complicated. The questionnaires were revised to reduce the overlapping areas of analysis.

A typical approach to select samples in survey research (Dillman 1978) is to randomly pick up entries from the phone-book or commercial listings as the basis for choosing the sample organisations in particular industries. Based on the extremely poor response rates experienced by other IS researchers in Hong Kong (e.g. Cheung 1995), the extensive information required by this study as well as the poor response feedback from the pilot survey, indications were that there would be a high risk of failure in a survey on ISSP. Furthermore, *a valid response from an organisation must contain 3 sets of completed questionnaires.* Hence, the author considers that this "random pick" approach simply does not work in HK for the type of survey required for this study at all! In order to minimise the risk of poor response rate in the survey, this study does not attempt to use the random sampling approach. Instead, the author decided to choose willing co-ordinators and then send to each of them the three questionnaires, who then administer the questionnaire survey by directing the three questionnaires (in three separate enclosed envelopes) to appropriate company executives in their own organisation for completion, and to return the completed questionnaires to the author via large pre-paid envelopes. The co-ordinators were selected from the following three sources:-

a) Some of the 90 participants at the open seminar on "Problems and Opportunities on ISSP" held at the Hong Kong Polytechnic (Ma & Whitmore 1992), who have expressed interests in ISSP studies, were invited.
b) Some of the Committee members and paper presenters at the Hong Kong International Computer Conference (1993-95), who were interested in ISSP, were invited. (The author is a member of the organising committee for the annual Conference from 1993-96.)
c) The part-time students/graduates attending post-graduate courses at the Faculty of Business and Information Systems at the Hong Kong Polytechnic University are mostly professionals and managers from various organisations in public/private

sectors. Some of these professionals and managers, who are interested in pursuing ISSP studies, were invited. (The author is an assistant professor at the University for more than 8 years and over 400 post-graduate students/graduates have attended his MIS courses.)

Between December 1994 and November 1995, the three sets of revised questionnaires were distributed to an invited co-ordinator in each of the 128 selected organisations, who then distributed the questionnaires in their own organisations covering senior management, user manager and IT manager. 80 out of 128 business units returned the three complete sets of questionnaires and only 74 sets contain sufficient data for analysis. Out of these 74 sets, there were five duplicated sets from four organisations, each set, however, came from a different business unit and so can be regarded as unique. The results from their questionnaires were entered into a spreadsheet template, which was used to indicate the trend analysis tables/charts and show any correlation among various constructs in graphical format. These charts were returned to the co-ordinators so that they could confirm the findings with the respondents, especially with respect to the strategic orientation chart as shown in Figure 13.

These data were then converted to the Statistical Package for Social Sciences (SPSS/PC) windows version 6.1 for statistical analysis. Interviews have been arranged to explore the most interesting and relevant cases for further analyses and evaluations in Phase 2. Four organisations (one from each alignment type) were selected with each organisation having a high score in ISSP success and IS effectiveness from each of the four alignment types (i.e. business-strategy-led, conservative, organisational and technology-led). The analyses are reported in Chapter 8.

## 4.4 Phase 2 Study

The major objective of this phase is to test the Composite Research Model based on extensive case studies in selected organisations. Further evaluation of the completed sets of 3 questionnaires by each organisation is followed by a more in-depth analysis and verification of the findings from the Phase 1 survey. A combination of unstructured, semi-structured and structured interviews as well as examination of published documents (e.g. annual reports or planning documents) is considered as an effective method of information collection for analysis and evaluation.

Case study is a suitable research method for addressing complex situations (Yin 1993) such as in ISSP that facilitates a thorough review of the dynamic and practical aspects of ISSP processes in the selected organisations. Yin (1993) also proposes that single case studies are appropriate if the research objective is to explore new areas of research, whereas multiple case-designs are more appropriate when the aim of the research is descriptive analysis, theory building or theory testing.

Since some of the case study analysis cannot be carried out in parallel, the same (initial) model was applied to some of the selected organisations (in the pilot survey). As the case study analysis continued, the fine-tuned or evolving models were used in subsequent organisations, taking the lessons learned from earlier studies. In adapting the multiple-case design to the current study, the homogeneity of the selected organisations provide a strong platform for contrast and comparison. The reason for choosing a relatively small number of organisations for "detailed" case study analysis is to enable the test of fit to the multiple case design rather than to sampling logic. Good qualitative data obtained from in-depth case study analysis are more likely to lead to unplanned/accidental findings and to new integrations which enable the researcher to get

beyond initial conceptions and to generate or revise conceptual frameworks (Miles & Huberman 1994).

Target participants in structured interviews include senior managers and IS managers in selected Hong Kong organisations. Unstructured interviews are more appropriate for top management to explore strategic and visionary issues. Content analysis of secondary sources (such as annual reports and planning documents) have been used to build up background information and to verify some of the results from interviews and questionnaire findings.

Major Review Questions

Information Systems Strategic Planning may be defined as "the process of deciding the objectives for organisational computing and identifying potential computer applications which the organisation should implement".

1. Strategic Business Planning (SBP)
- Are there any means to exploit technology opportunities for business benefits in SBP?
- What sorts of inputs are required from the IT manager?

2. Information Systems Strategic Planning (ISSP)
- What are the major Objectives and Coverage of ISSP?
- What sorts of inputs are required from the strategic business plans or planners?
- Are there any means to guide the implementation of IS plans?

3. Link between SBP and ISSP
- What are the facilitators and inhibitors for the effective link between SBP and ISSP?
- Have your organisation encountered any benefits/problems resulting from the good/poor linkage between SBP and ISSP?
- Have your organisation considered any comparative business advantage as a guide to IS strategies?

4. Information Systems Success
- What criteria are being used to determine the success of your IS services?

*Table 15: List of Questions for Interviewees*

The checklist of questions as shown in Table 15 was used to obtain feedback on conclusions from respondents (e.g. via interviews with them and show them the findings

and charts based on the returned questionnaire). Great care has also been taken to ensure that any limitations of findings or processes are evaluated (e.g. including any personal preferences or potential biases which may affect the findings). Other sources of relevant information are required (in addition to the three questionnaires as appendices) for analysis. Relevant changes over time (e.g. competition, organisational structure, leadership, CEO, CIO etc.) were also considered. The list of questions had been faxed to the interviewees in advanced (at least one week prior to the interviews) in order to allow participants to be aware of the interview topic area and be prepared for a considered response instead of a spontaneous response. Although this approach could lead to a reduction in spontaneity (which is acceptable because spontaneity is not a requirement for this study), it would in turn improve the accuracy and reliability of the results of the interviews.

## 4.5 Expected Strengths and Limitations of this Research

The uniqueness and expected contribution of this study to the body of knowledge of ISSP can be summarised below:-

a) Although the composite research models in this research are adopted, adapted or developed from existing IS research models, this study contributes to theory modification and theory enhancement. The major value-added process in this research is built around the method of analysis on the linkages and interactions of the different models as well as the application of the models in the field.

b) The composite research models and the questionnaires can be used by organisations as a diagnostic tool for identifying problems and opportunities of ISSP in their organisations.

c) The research approach aims at integrating survey and case study methods. Also, the participation of multiple parties in both survey and multiple case study analysis

(i.e. senior management, user management, and IS management) will reduce the personal bias by a single group of respondents. This will improve the validity of the research findings.

The expected limitations of the research design are summarised below:-

a) While the requirement for multiple respondents from within each of the organisations (i.e. senior management, user management, and IS management) will improve the reliability of the findings, it will also reduce the number of completed sets of questionnaires. This limitation will lead to a small sample size, which makes it impossible to perform more sophisticated statistical analysis (e.g. path construct analysis using LISREL). Multiple case studies have been planned to provide supplementary analyses. Hence, the results of the research may be seen to be biased towards exploratory rather than definitive.

b) CEOs are often too busy or reluctant to be interviewed. Hence, a very long lead-time is required for multiple case study analyses in order to include the collection of background information of the organisations, appointments with appropriate interviewees, actual interviews, and a number of follow-up discussions to confirm and evaluate the findings with the interviewees. This therefore limited the number of case studies which could be conducted in the time available.

# CHAPTER 5 : PRELIMINARY DATA ANALYSIS FROM THE SURVEY

This chapter provides preliminary analysis of data from the survey. It starts with an overview of the profile of organisations and business units in the survey. Then it provides an exploratory factor analysis for identification of major factors and their associated items for each of the four research constructs: STROBE, STROIS, ISSP process, and IS Success. This is followed by confirmatory analysis to validate their scale reliability and an overview of the method of statistical analysis to be used in Chapters 6 and 7. Finally, it covers the assignment of an alignment type to each of the organisations. The analysis on ISSP factors and overall ISSP success by alignment type are covered in Chapter 6, which is then followed by the analysis of IS Success factors and the overall satisfaction with IS in Chapter 7.

An overview of the profile of the survey respondents is shown in Table 16 and the lists of organisations and business units by Industry and by Alignment Type are included in Appendix 1.

| Industry | Count |
|---|---|
| 1. Accounting and Audit | 2 |
| 2. Banking and Finance | 13 |
| 3. Education | 6 |
| 4. Government | 16 |
| 5. Hospital | 3 |
| 6. IT | 3 |
| 7. Manufacturing | 7 |
| 8. Property | 2 |
| 9. Utilities | 2 |
| 10. Trade and Commerce | 16 |
| 11. Transport/Storage | 4 |
| Total | 74 |

*Table 16 : Organisations by Industry*

## 5.1 Exploratory Factor Analysis

Factor analysis is used to summarise a large number of variables with a smaller number of derived variables, called factors; a factor is used to identify underlying constructs that explain the correlation among a set of variables. Principal components analysis and factor analysis are used to estimate the underlying factors (or dimensions) that yield the correlation among a set of items (or variables). Principal components analysis uses the principal components model, in which variables are assumed to be exact linear combinations of factors. Principal components analysis for each of the four constructs (i.e. STROBE, STROIS, ISSP Process, and IS Success) was carried out to determine the factor structures underlying the instruments. In order to identify meaningful factors based on the hypothetical factor matrix, the most commonly used (Varimax) method of orthogonal rotation was adopted as an attempt to minimise the number of variables that have high loading on a factor. The four sets of factor analysis are presented in Table 17 in order to support the evaluation of the appropriateness of the conceptual model and to propose construct dimensions/factors, which could be used for future research. The factor analysis could not be used to refine the design or wording of the questionnaire items, which had already been distributed and data collected. However, they can be used to delete items from the corresponding research constructs in order to reduce the number of items and the number of emergent factors, which then increase the reliability of the corresponding constructs prior to further analysis. It can also lead to recommendations for refinement of the questionnaire items in follow-up research of this nature.

Two criteria were applied in the data reduction process: significance of factor representations and significance of item loading. According to the first criteria, scree plots and eigenvalues were examined in order to determine the number of factors largely responsible for variation in the data, only factors with an eigenvalue (or the total variance explained by the factor) greater than 1.00 were accepted. According to the

second criteria, only those items with a loading of at least 0.40 on any of their associated factors were retained. Although the cut-off point can be as low as 0.30 (Churchill 1987), a slightly higher cut-off point is considered more appropriate for this research because it consists of a relatively small sample size. Based on these two criteria, items with the smallest loading and being less than 0.40 in each iteration were dropped one at a time until stable, clear and interpretable factors were reported. The original items (and deleted items, if any) in each of the research constructs are summarised in Tables 18 to 21 respectively. This will be followed by the confirmatory analysis to verify scale reliability of the constructs in section 5.2.

| Research Construct | Factor | Eigenvalue | % Variance Explained | Cumulative % |
|---|---|---|---|---|
| STROBE | 1 | 5.616 | 19.4% | 19.4% |
| | 2 | 3.642 | 12.6% | 31.9% |
| | 3 | 2.135 | 7.4% | 39.3% |
| | 4 | 2.028 | 7.0% | 46.3% |
| | 5 | 1.671 | 5.8% | 52.0% |
| | 6 | 1.444 | 5.0% | 57.0% |
| | 7 | 1.282 | 4.4% | 61.4% |
| | 8 | 1.199 | 4.1% | 65.6% |
| | 9 | 1.051 | 3.6% | 69.2% |
| STROIS | 1 | 12.409 | 42.8% | 42.8% |
| | 2 | 3.076 | 10.6% | 53.4% |
| | 3 | 1.725 | 5.9% | 59.3% |
| | 4 | 1.469 | 5.1% | 64.4% |
| | 5 | 1.257 | 4.3% | 68.7% |
| | 6 | 1.098 | 3.8% | 72.5% |
| IS Strategic Planning | 1 | 24.091 | 54.8% | 54.8% |
| | 2 | 2.263 | 5.1% | 59.9% |
| | 3 | 1.703 | 3.9% | 63.8% |
| | 4 | 1.576 | 3.6% | 67.3% |
| | 5 | 1.440 | 3.3% | 70.6% |
| | 6 | 1.305 | 3.0% | 73.6% |
| | 7 | 1.147 | 2.6% | 76.2% |
| Satisfaction with IS | 1 | 7.663 | 34.8% | 34.8% |
| | 2 | 2.149 | 9.8% | 44.6% |
| | 3 | 1.704 | 7.7% | 52.3% |
| | 4 | 1.399 | 6.4% | 58.7% |
| | 5 | 1.200 | 5.5% | 64.2% |

*Table 17 : Factors Emerging from the Exploratory Factor Analysis*

STROBE Factors

| Factor | Item | Item Description | Loading |
|---|---|---|---|
| Factor 1 | | Analysis, Defensiveness and Future Planning | |
| | BANA2 | Use of Manpower planning | 0.732 |
| | BDEF1 | Use of Cost control systems | 0.705 |
| | BANA3 | Use of Performance appraisal of senior managers | 0.697 |
| | BANA1 | Use of Management information and control systems | 0.668 |
| | BFUT1 | Forecasting key indicators of operations | 0.621 |
| | BDEF2 | Use of Production/operations management techniques | 0.602 |
| | BFUT2 | Tracking significant general trends | 0.577 |
| Factor 2 | | Aggressiveness | |
| | BAGG2 | We frequently cut prices to increase our market share. | 0.844 |
| | BAGG4 | We seek market share positions at the expense of cash flow. | 0.833 |
| | BAGG3 | We have a strong preference to set prices below competition. | 0.829 |
| | BAGG1 | We sacrifice short-term profitability to gain market share. | 0.712 |
| Factor 3 | | Analysis, Defensiveness and Proactiveness | |
| | BANA4 | We emphasise effective co-ordination among our functional areas (e.g. marketing, finance, and operations). | 0.791 |
| | BDEF3 | We emphasise product/service quality. | 0.769 |
| | BPRO1 | We are constantly seeking new opportunities related to the present operations. | 0.660 |
| | BANA5 | We require a great deal of factual information to support our day-to-day decision making. | 0.610 |
| | BDEF4 | We have made significant modifications to the technologies in our business operations. | 0.525 |
| Factor 4 | | Risk Taking and Proactive | |
| | BPRO2 | We are usually the first ones to introduce new products/services in our market(s). | 0.855 |
| | BRISK2 | Our mode of operations is generally more risky than our competitors. | 0.437 |
| Factor 5 | | Analysis and Risk Reduction | |
| | BANA6 | When confronted with major decisions, we typically develop thorough analyses. | 0.780 |
| | BRISK1 | Our new projects are approved on a stage-by-stage basis rather than with blanket approval. | 0.747 |
| Factor 6 | | Resource Allocation and Divestment | |
| | BRISK4 | We tend to support projects where the expected returns are certain. | 0.759 |
| | BPRO5 | Our operations in later stages of life cycle are strategically eliminated. | 0.721 |
| Factor 7 | | Proactive and Risk Taking | |
| | BPRO3 | We pre-empt our competitors by expanding our capacity ahead of them. | 0.672 |
| | BPRO4 | We are constantly on the look out for business that can be acquired. | 0.562 |
| | BRISK3 | We usually adopt a conservative view when making major decisions. | -0.539 |
| Factor 8 | | Futurity | |
| | BFUT5 | We emphasise long-term research to provide us with future competitive edge. | 0.855 |
| | BFUT4 | Our criteria for resource allocation generally reflect long-term considerations. | 0.513 |
| | BFUT3 | Use of "What-if" analysis of critical issues | 0.418 |
| Factor 9 | | Rational Resource Allocation | |
| | BRISK5 | Our business operations have generally followed the "tried and true" paths. | 0.817 |

*Table 18: STROBE Factors*

The scree plot produced the principal component analysis of the questionnaire items contained in Questionnaire A (for CEO or General Manager) and suggested that

nine STROBE factors had emerged as shown in Table 18. These factors accounted for just over 69% of the variation in the data.

STROIS Factors

| Factor | Item | Item Description | Loading |
|---|---|---|---|
| *Factor 1* | | IS Support for Aggressiveness and Risk Assessment | |
| | ISAGG3 | IS provide impact analysis on setting prices below competition. | 0.912 |
| | ISAGG4 | IS provide impact analysis on market share positions on cash flow. | 0.890 |
| | ISAGG1 | IS provide impact analysis on decrease in short-term profitability to gain market share. | 0.874 |
| | ISAGG2 | IS provide impact analysis on cutting prices to increase our market share. | 0.869 |
| | ISRISK2 | IS provide comparisons of risk factors of operations against that of our competitors'. | 0.554 |
| *Factor 2* | | IS Support for Analysis, Defence and Future Planning | |
| | ISANA5 | IS provide a great deal of factual information to support our day-to-day decision making. | 0.819 |
| | ISANA6 | IS help us to develop thorough analyses in response to major decisions | 0.731 |
| | ISANA4 | IS support effective co-ordination among our functional areas | 0.711 |
| | ISFUT2 | IS provide tracking on significant general trends. | 0.595 |
| | ISDEF1 | IS provide cost control information. | 0.591 |
| | ISFUT3 | IS provide "what-if" analysis of critical issues. | 0.570 |
| | ISFUT1 | IS provide forecasts on key indicators of operations. | 0.568 |
| | ISFUT4 | IS help us in resource allocation to reflect long-term considerations. | 0.544 |
| *Factor 3* | | IS Support for Enhancing Operations and Proactiveness | |
| | ISDEF2 | IS enhance production/operations management techniques. | 0.754 |
| | ISDEF3 | IS enhance our product/service quality. | 0.707 |
| | ISFUT5 | IS help our long-term research for future competitive edge. | 0.568 |
| | ISPRO4 | IS help us to expand our capacity ahead of our competitors. | 0.553 |
| | ISPRO2 | IS help us to introduce new products/services in our market(s). | 0.531 |
| *Factor 4* | | IS Support for Risk Avoidance | |
| | ISRISK3 | IS provide conservative analysis for supporting our major decisions. | 0.806 |
| | ISRISK4 | IS provide information on the expected returns of our projects. | 0.639 |
| | ISRISK1 | IS provide analysis for approval of our new projects on a stage-by-stage basis. | 0.631 |
| | ISRISK5 | IS provide information on outcome of "tried and error" for various business scenarios. | 0.509 |
| *Factor 5* | | IS Support for Proactiveness and Innovation | |
| | ISPRO5 | IS help us to eliminate our operations in later stages of life cycle. | 0.635 |
| | ISPRO1 | IS help us to seek new opportunities related to the present operations. | 0.607 |
| | ISDEF4 | IS are up-to-date through frequent modifications to the technologies used. | 0.546 |
| | ISPRO3 | IS help us to look out for business that can be acquired. | 0.527 |
| *Factor 6* | | IS Support for Analysis of Planning and Control | |
| | ISANA2 | IS improve our manpower planning. | 0.711 |
| | ISANA1 | IS improve our management information and control systems. | 0.634 |
| | ISANA3 | IS provide analysis for performance appraisal of senior managers. | 0.607 |

*Table 19: STROIS Factors*

The scree plot produced the principal component analysis of the questionnaire items contained in Questionnaire B (for User Manager) and suggested that six STROIS factors had emerged as shown in Table 19. These factors accounted for just over 72% of

the variation in the data and with Factor 1 (IS Support for Aggressiveness and Risk Assessment) covering 42.8%.

ISSP Factors

| Factor | Item | Factor / Item Description | Loading |
|---|---|---|---|
| *Factor 1* | | ISSP Coverage | |
| | Cover14 | Assess hardware and software markets for formulating acquisition plans | 0.724 |
| | Cover12 | Analyse human resource requirements for the IS department | 0.710 |
| | Cover10 | Analyse role of end-user computing | 0.692 |
| | Cover16 | Analyse resource constraints and contingency plans | 0.687 |
| | Cover9 | Analyse telecommunications requirements | 0.668 |
| | Cover8 | Analyse hardware and software requirements | 0.667 |
| | Cover15 | Review alternative strategies | 0.620 |
| | Cover17 | Review, feedback and refinement of plans | 0.581 |
| | Cover13 | Analyse human resource requirements for user departments in applying IT | 0.563 |
| | Cover11 | Select and prioritise application systems portfolio | 0.541 |
| *Factor 2* | | Quality of ISSP | |
| | QISP1 | Better Communications with Top Management | 0.699 |
| | QISP9 | Better planning and control of human, software and hardware resources | 0.694 |
| | QISP7 | Better technology infra-structural paths and policies | 0.673 |
| | QISP8 | Greater exploitation of IS opportunities for gaining competitive edge | 0.653 |
| | QISP2 | Users can better appreciate the role and benefits of IS | 0.639 |
| | QISP3 | Better integration of business plans with IS plans | 0.631 |
| | QISP4 | Better appreciation of the business unit's overall Information Needs | 0.621 |
| | QISP5 | Better IT investments decisions | 0.617 |
| | QISP6 | Better assessment of future IT Environment | 0.599 |
| | QISP10 | Improvements on IS strategy planning processes | 0.598 |
| | Cover2 | Explore opportunities for gaining competitive advantage from IS | 0.416 |
| *Factor 3* | | ISSP Coverage and Inputs from Users | |
| | RES5 | Adequate User Involvement | 0.735 |
| | Cover6 | Analyse enterprise data modelling requirements | 0.596 |
| | Cover7 | Analyse corporate database requirements | 0.556 |
| | Cover5 | Assess business opportunities and threats associated with IS | 0.550 |
| | Cover1 | Review/Revise charter/mission of IS/IT department | 0.543 |
| | RES7 | Quality of Inputs from Users | 0.527 |
| | Cover4 | Assess impact of future IT environment and its effect on our business unit | 0.487 |
| | Cover3 | Assess internal strengths and weakness of our current IT environment | 0.433 |
| *Factor 4* | | ISSP Team | |
| | RES3 | Expertise of the Leader of IS strategic planning team | 0.788 |
| | RES2 | Expertise of IS planners | 0.743 |
| | RES1 | Number of IS planners | 0.691 |
| *Factor 5* | | Business Integration and Top Management Support | |
| | INTEG3 | Quality of Inputs from strategic business planning to IS strategic planning. | 0.756 |
| | INTEG2 | Participation of IS managers in strategic business planning. | 0.733 |
| | INTEG1 | Interaction between business planners and IS planners. | 0.643 |
| | IMPL1 | Top Management Commitment | 0.541 |
| *Factor 6* | | Adequate Resource for Planning and Implementation | |
| | IMPL2 | Funding for the implementation of IS plan | 0.784 |
| | RES8 | Funding for the IS strategic planning Process | 0.674 |
| | RES4 | Adequate Top Management Involvement | 0.527 |
| | RES6 | Quality of Inputs from Top Management | 0.457 |
| *Factor 7* | | Implementation of IS Plan | |
| | IMPL5 | Re-designing major business processes for the implementation of IS plan | 0.812 |
| | IMPL4 | Re-structuring the chosen business unit for the implementation of IS plan | 0.719 |
| | IMPL6 | Approval of new systems follows recommendations of IS plan | 0.610 |
| | IMPL3 | Staffing for the implementation of IS plan | 0.522 |

*Table 20: ISSP Factors*

The scree plot produced the principal component analysis of the questionnaire items contained in Questionnaire C (for CIO) and suggested that seven ISSP factors had emerged as shown in Table 20. These factors accounted for just over 76% of the variation in the data with ISSP Coverage being most important (covering 54.8% of the variation). The grouping of the ISSP factors and their associated items will be used again for the identification of any significant differences of each of these items among the four alignment types in Chapter 6.

IS Success Factors

| Factor | Item | Factor / Item Description | Loading |
|---|---|---|---|
| *Factor 1* | | Relative Quality of IS Services | |
| | ByQSer6 | Relative Alignment of IS Plans with Business Needs | 0.841 |
| | ByQSer3 | Relative IS contribution to managerial effectiveness | 0.805 |
| | ByQSer4 | Relative Functional Quality of IS | 0.780 |
| | ByQSer2 | Relative IS contribution to operational efficiency | 0.721 |
| | ByQSer1 | Relative Application of IS to advance *Critical Success Factors* | 0.704 |
| | ByQSer5 | Relative Technical Quality of IS | 0.691 |
| | BPROD1 | Database | 0.453 |
| *Factor 2* | | IS Staff and IS Contribution | |
| | BYSER1 | Technical expertise of IS staff in general | 0.844 |
| | BYSER2 | Ability of IS staff to specify IS requirements | 0.780 |
| | BYSER7 | IS contribution to operational efficiency | 0.683 |
| | BYSER3 | Ability of IS staff to customise (e.g. develop in-house) systems | 0.625 |
| | BYSER8 | IS contribution to managerial effectiveness | 0.553 |
| *Factor 3* | | IS Products and End Users' Ability in defining Information Requirements | |
| | BPROD4 | Systems software platforms | 0.769 |
| | BPROD3 | Communications and networking platforms | 0.669 |
| | BPROD5 | Systems development tools | 0.602 |
| | BPROD2 | Computer hardware platforms | 0.572 |
| | BYSER4 | End-users' ability in defining business information requirements | -0.494 |
| *Factor 4* | | IS Contribution | |
| | BYSER9 | IS contribution to improving Profitability | 0.788 |
| | BPROD7 | Office Automation products | 0.602 |
| | BPROD6 | End-user computing tools | 0.583 |
| *Factor 5* | | IS Project Management | |
| | BYSER6 | IS delivered within budget | 0.808 |
| | BYSER5 | IS delivered on-time | 0.621 |

*Table 21: IS Success Factors*

The scree plot produced the principal component analysis of the questionnaire items, which are obtained from "Part A: Satisfaction with IS service" and "Part B: Relative Quality of IS Service" of Questionnaire B (for User Managers) and suggested that five IS Effective factors had emerged as shown in Table 21. These factors accounted for just over 64% of the variation in the data. The grouping of the IS Success factors and their associated items will be used again for the identification of any significant differences of each of these items among the four alignment types in Chapter 7.

Business Performance Factors

Since most respondents from the CEO/GM (Chief Executive Officer and General Manager) group did not provide details on business performance, it cannot be analysed. This is a common phenomenon in Hong Kong where managers are more reluctant to reveal information relating to the business strategy/profitability. This was expected in the research design and hence the evaluation of business performance is not an essential part of this dissertation. It again, however, presents an interesting area for follow-up research at a later stage.

## 5.2 Confirmatory Analysis and the Approach to Statistical Analysis

### 5.2.1 The Confirmatory Approach

This section provides significance tests on constructs validity and scale reliability. Cronbach's alphas and standardised item alphas are used which contain the values being obtained when all of the items had been standardised to have a variance of 1. The results of Cronbach's Alpha test are shown in Table 22. These tests enable the identification of weak items with low alphas (e.g. the alphas for factors 4-8 of STROBE are less than the threshold value of 0.60 as highlighted in Table 22 while factor-3 entitled "Satisfaction with IS" is marginally acceptable at around 0.60 with its alpha at

0.6280 and its standardised item alpha at 0.5978) so that the deletion of certain items or rewording of the questions of the associated items may improve the overall reliability of the constructs. This conventional analysis provides the basis for the adjustments of the constructs or to filter out some less reliable factors prior to more advanced tests such as LISREL. However, due to the relatively small sample size as expected from the research design, LISREL will not be included in this analysis but it may be considered for further analysis if the sample size can be built up gradually over a number of years of continuing research.

| Constructs / Factors | No. of Items | Cronbach's Alpha | Standardised Item Alpha |
|---|---|---|---|
| **STROBE** | | | |
| 1. Analysis, Defensiveness and Future Planning | 7 | .8186 | .8225 |
| 2. Aggressiveness | 4 | .8440 | .8477 |
| 3. Analysis, Defensiveness and Proactiveness | 5 | .7757 | .7790 |
| 4. Risk Taking and Proactive | 2 | .4448 | .4471 |
| 5. Analysis and Risk Reduction | 2 | .5694 | .5701 |
| 6. Resource Allocation and Divestment | 2 | .4766 | .4800 |
| 7. Proactive and Risk Taking | 3 | .1615 | .0152 |
| 8. Futurity | 3 | .4788 | .4858 |
| 9. Rational Resource Allocation | 1 | n.a. | n.a. |
| **STROIS** | | | |
| 1. IS Support for Aggressiveness and Risk Assessment | 5 | .9322 | .9326 |
| 2. IS Support for Analysis, Defence and Future Planning | 8 | .8982 | .8981 |
| 3. IS Support for Enhancing Operations & Proactiveness | 5 | .8293 | .8295 |
| 4. IS Support for Risk Avoidance | 4 | .8674 | .8672 |
| 5. IS Support for Proactiveness and Innovation | 4 | .8131 | .8154 |
| 6. IS Support for Analysis of Planning and Control | 3 | .7318 | .7325 |
| **IS Strategic Planning** | | | |
| 1. ISSP Coverage | 10 | .9397 | .9397 |
| 2. Quality of ISSP | 11 | .9581 | .9582 |
| 3. ISSP Coverage and Inputs from Users | 8 | .9358 | .9368 |
| 4. ISSP Team | 3 | .9201 | .9198 |
| 5. Business Integration and Top Management Support | 4 | .8806 | .8809 |
| 6. Adequate Resource for Planning and Implementation | 4 | .8680 | .8695 |
| 7. Implementation of IS Plan | 4 | .8778 | .8792 |
| **IS Success** | | | |
| 1. Relative Quality of IS Products | 7 | .8843 | .8880 |
| 2. IS Staff and IS Contribution | 5 | .8267 | .8315 |
| 3. IS Products and End Users' Ability in defining Information Requirements | 5 | .6280 | .5978 |
| 4. IS Contribution | 3 | .6415 | .6485 |
| 5. IS Project Management | 2 | .6415 | .6449 |

*Table 22: Instrument Reliability Assessment : Cronbach's Alpha Test*

### 5.2.2 The Convention used in Statistical Analysis

The statistical tests on the comparison of mean scores by alignment type in Chapters 6, 7 and 9 follow the following convention.

Analysis Of Variance

One-Way Analysis Of Variance (ANOVA : SPSS/PC for Windows version 6.1) has been applied to test the significance differences of mean scores among the four Alignment Types. This procedure tests the null hypothesis that the data are a sample from a population in which the mean of a test variable is equal in several independent groups of cases defined by the single grouping variable - the Alignment Type. This is followed by the Least Significant Difference (LSD) test to identify any significant differences among the four groups of data where the High scores (indicated by "h" ) are greater than the Low scores (indicated by "L") of the same item (within the Same Row) at significance level of 0.05. If there is a second set of scores with significant differences between two or more groups, they will be denoted by "hh" and "LL".

Abbreviations of IS strategic alignment types

The abbreviations of IS strategic alignment types as used in statistical tables are shown below:

| Alignment Type | Abbreviation used in Tables | Abbreviated Code in Statistical Tables | |
|---|---|---|---|
| Business-strategy-led | Business-led | B | 1 |
| Conservative | | C | 2 |
| Organisation-led | | O | 3 |
| Technology-led | | T | 4 |

## 5.3 Assignment of Alignment Types Based on STROBE and STROIS

An important step in this research is to assign an alignment type to each of the organisations participating in the survey. The classification of alignment types has been covered in Chapter 3 (Figure 12) and is summarised below.

| Alignment Type | | STROBE | STROIS |
|---|---|---|---|
| Business-strategy-led | B | High | Low |
| Conservative | C | Low | Low |
| Organisation-led | O | High | High |
| Technology-led | T | Low | High |

The six dimensions and 29 items as defined in Table 8 (for STROBE) and Table 9 (for STROIS) are used for calculating the STROBE score and the STROIS score respectively. The item score was collected from the questionnaires based on a 5-point Likert scale. The average score of the items within each dimension is taken as the dimension score while the average score of the six dimensions gives the final scores for STROBE and STROIS respectively.

The mid-point on the Likert scale of 1-to-5 is used as a dividing line between High scores and Low scores. Hence, a score which is greater or equal to 3, is considered as High, and a score which is less than 3 is considered as Low. Using the calculations just described, the Alignment Types for each of the 74 organisations are assigned as shown in Appendix 2. and the count is as follows :

| Alignment Type | | Count |
|---|---|---|
| B | Business-strategy-led | 16 |
| C | Conservative | 26 |
| O | Organisation-led | 19 |
| T | Technology-led | 13 |

Due to relatively higher response rates from the government and education sectors, this sample is a bit dominated by the "conservative" group. Hence, this bias should be taken into account during data analysis.

Summary

This chapter has presented the assignment of alignment types to each of the 74 organisations, as well as the approach and rationale behind the statistical analysis. Chapters 6 and 7 will discuss the implications of the findings.

# CHAPTER 6 : ANALYSIS OF IS STRATEGIC PLANNING FACTORS

This chapter provides the analysis of CIOs' perceived effectiveness of ISSP (based on the ISSP factors) and the perceived ISSP success by CEO/GM; User Managers and CIOs. These findings and analyses are then used as the basis to develop the configurational characteristics on ISSP. This is followed by the analysis of IS Success factors and the overall satisfaction with IS in Chapter 7. The configurational characteristics on both ISSP and IS Success will be further explored through the multiple case study analyses in Chapter 8 and then these results will form the basis for the development of the composite model as presented in Chapter 9.

## 6.1 Alignment Type and IS Strategic Planning Factors

The 44 items on the "effectiveness of ISSP" in Part C of Questionnaire C (for CIO) are used to determine the level of achievements of the items associated with the ISSP process in the business unit based on the 5-point Likert scale. The grouping of emerging ISSP factors and their associated items from Table 20 are used again for the analysis of the average mean scores of the items by alignment type. The overall mean scores of items on ISSP process (grouped by each factor) are shown in Table 23 in descending order of their mean scores. This is followed by a more thorough analysis of each of these factors from subsections 6.1.1 to 6.1.7 together with a summary in 6.1.8.

| | Factor/Item Description | B | C | O | T | Mean |
|---|---|---|---|---|---|---|
| | Factor 1: ISSP Coverage | | | | | |
| Cover8 | Analyse hardware and software requirements | 3.13 | 3.12 | 3.53 | 3.31 | 3.26 |
| Cover12 | Analyse human resource requirements for the IS department | 3.50 h | 2.85 L | 3.26 | 3.08 | 3.14 |
| Cover11 | Select and prioritise application systems portfolio | 3.31 | 3.04 | 3.32 | 2.85 | 3.14 |
| Cover16 | Analyse resource constraints and contingency plans | 3.63 h | 2.65 L | 3.16 | 2.77 L | 3.01 |
| Cover14 | Assess hardware and software markets for formulating acquisition plans | 3.25 | 2.88 | 3.00 | 2.92 | 3.00 |
| Cover10 | Analyse role of end-user computing | 3.31 | 2.81 | 3.00 | 3.00 | 3.00 |
| Cover17 | Review, feedback and refinement of plans | 3.13 | 2.85 | 3.21 | 2.77 | 2.99 |
| Cover15 | Review alternative strategies | 3.19 | 2.73 L | 3.26 h | 2.77 | 2.97 |
| Cover13 | Analyse human resource requirements for user departments in applying IT | 3.06 | 2.65 | 3.11 | 3.08 | 2.93 |
| Cover9 | Analyse telecommunications requirements | 2.50 L | 2.19 L | 3.37 h | 2.77 | 2.66 |
| | Factor 2 : Quality of ISSP | | | | | |
| QISP1 | Better Communications with Top Management | 3.75 h | 3.08 L | 3.58 | 3.23 | 3.38 |
| QISP5 | Better IT investments decisions | 3.50 | 3.08 | 3.53 | 3.00 | 3.27 |
| QISP4 | Better appreciation of the business unit's overall Information Needs | 3.50 h | 2.85 L | 3.47 h | 3.38 | 3.24 |
| QISP7 | Better technology infra-structural paths and policies | 3.56 | 3.00 | 3.32 | 3.15 | 3.23 |
| QISP2 | Users can better appreciate the role and benefits of IS | 3.31 | 2.96 | 3.37 | 3.31 | 3.20 |
| QISP6 | Better assessment of future IT Environment | 3.44 | 2.92 | 3.37 | 3.15 | 3.19 |
| QISP9 | Better planning and control of human, software and hardware resources | 3.88 h | 2.81 L | 3.21 L | 3.08 L | 3.19 |
| QISP3 | Better integration of business plans with IS plans | 3.25 | 2.88 L | 3.47 h | 3.08 | 3.15 |
| QISP10 | Improvements on IS strategy planning processes | 3.63 h | 2.77 L | 3.26 | 3.08 | 3.14 |
| QISP8 | Greater exploitation of IS opportunities for gaining competitive edge | 3.44 h | 2.73 L | 3.21 | 3.00 | 3.05 |
| Cover2 | Explore opportunities for gaining competitive advantage from IS | 3.25 | 2.73 | 3.16 | 3.08 | 3.01 |
| | Factor 3 : ISSP Coverage and Inputs from Users | | | | | |
| Cover3 | Assess internal strengths and weakness of our current IT environment | 3.31 | 3.00 L | 3.53 h | 3.15 | 3.23 |
| Cover7 | Analyse corporate database requirements | 3.56 | 2.92 | 3.42 | 3.00 | 3.20 |
| Cover4 | Assess impact of future IT environment and its effect on our business unit | 3.50 | 2.92 | 3.42 | 3.00 | 3.19 |
| Cover1 | Review/Revise charter/mission of IS/IT department | 3.31 | 3.00 | 3.32 | 2.92 | 3.14 |
| RES5 | Adequate User Involvement | 3.13 | 2.92 | 3.47 | 3.00 | 3.12 |
| RES7 | Quality of Inputs from Users | 3.44 h | 2.65 L | 3.32 h | 3.15 | 3.08 |
| Cover5 | Assess business opportunities and threats associated with IS | 3.13 | 2.77 L | 3.32 h | 3.00 | 3.03 |
| Cover6 | Analyse enterprise data modelling requirements | 3.19 | 2.81 | 3.21 | 2.92 | 3.01 |
| | Factor 4 : ISSP Team | | | | | |
| RES3 | Expertise of the Leader of IS strategic planning team | 3.25 | 2.77 L | 3.53 h | 3.08 | 3.12 |
| RES2 | Expertise of IS planners | 3.25 | 2.65 L | 3.47 h | 2.92 | 3.04 |
| RES1 | Number of IS planners | 3.00 | 2.46 L | 3.16 h | 2.85 | 2.82 |
| | Factor 5 : Business Integration and Top Management Support | | | | | |
| IMPL1 | Top Management Commitment in the Implementation of IS plans | 4.13 h | 3.23 L | 3.74 | 3.38 L | 3.58 |
| INTEG1 | Interaction between business planners and IS planners. | 3.38 | 2.77 | 3.37 | 3.08 | 3.11 |
| INTEG3 | Quality of Inputs from strategic business planning to IS strategic planning. | 3.13 | 2.81 L | 3.42 h | 2.77 | 3.03 |
| INTEG2 | Participation of IS managers in strategic business planning. | 3.19 | 2.69 L | 3.37 h | 2.92 | 3.01 |
| | Factor 6 : Adequate Resource for Planning and Implementation | | | | | |
| IMPL2 | Funding for the implementation of IS plan | 3.69 h | 3.04 L | 3.63 h | 3.38 | 3.39 |
| RES4 | Adequate Top Management Involvement | 3.50 | 2.81 L | 3.84 h | 3.08 L | 3.27 |
| RES8 | Funding for the IS strategic planning Process | 3.56 h | 2.77 L | 3.52 h | 3.15 | 3.20 |
| RES6 | Quality of Inputs from Top Management | 3.38 | 2.73 L | 3.63 h | 2.85 L | 3.12 |
| | Factor 7 : Implementation of IS Plan | | | | | |
| IMPL5 | Re-designing major business processes for the implementation of IS plan | 3.06 h | 2.46 L | 3.21 h | 2.77 | 2.84 |
| IMPL3 | Staffing for the implementation of IS plan | 3.50 h | 2.77 L | 3.53 h | 2.92 | 3.15 |
| IMPL6 | Approval of new systems follows recommendations of IS plan | 3.13 | 2.84 L | 3.47 h | 3.15 | 3.12 |
| IMPL4 | Re-structuring the chosen business unit for the implementation of IS plan | 3.19 | 2.38 L | 3.26 h | 2.61 L | 2.82 |

(LSD test: "h" scores are greater than "L" scores within the Same Row at significance level .05 )

*Table 23: Relationship of IS Strategic Alignment and ISSP Dimensions*

### 6.1.1 Alignment Type vs. ISSP Coverage

| Factor 1: ISSP Coverage | B | C | O | T | Mean |
|---|---|---|---|---|---|
| 1. Analyse human resource requirements for the IS department | 3.50 h | 2.85 L | 3.26 | 3.08 | 3.14 |
| 2. Analyse resource constraints and contingency plans | 3.63 h | 2.65 L | 3.16 | 2.77 L | 3.01 |
| 3. Review alternative strategies | 3.19 | 2.73 L | 3.26 h | 2.77 | 2.97 |
| 4. Analyse telecommunications requirements | 2.50 L | 2.19 L | 3.37 h | 2.77 | 2.66 |
| • Analyse human resource requirements for user departments in applying IT | 3.06 | 2.65 | 3.11 | 3.08 | 2.93 |
| • Analyse role of end-user computing | 3.31 | 2.81 | 3.00 | 3.00 | 3.00 |
| • Assess hardware and software markets for formulating acquisition plans | 3.25 | 2.88 | 3.00 | 2.92 | 3.00 |
| • Review, feedback and refinement of plans | 3.13 | 2.85 | 3.21 | 2.77 | 2.99 |
| • Select and prioritise application systems portfolio | 3.31 | 3.04 | 3.32 | 2.85 | 3.14 |
| • Analyse hardware and software requirements | 3.13 | 3.12 | 3.53 | 3.31 | 3.26 |

(LSD test: "h" scores are greater than "L" scores within the Same Row at significance level .05 )

*Table 24: Alignment Type vs. ISSP Coverage*

Four out of ten items in Table 24 have significant differences among the four alignment types associated with "ISSP Coverage". CIOs from the "conservative" group had significantly lower average scores in the four items as well as lowest average scores in four of the other six items. CIOs from the "technology-led" group had relatively lower average scores in "Analyse resource constraints and contingency plans" as well as lowest average scores in "Review, feedback and refinement of plans" and "Select and prioritise application systems portfolio". One possible reason for the lower average scores by both "conservative" and "technology-led" organisations could be that since they usually operate in a less demanding business environment (lower STROBE), there may be limited resource allocations to the IT functions.

CIOs from the "business-strategy-led" group had relatively higher average scores in "Analyse human resource requirements for the IS department" and "Analyse resource constraints and contingency plans". One possible reason for this could be that since "business-strategy-led" organisations usually operate in a demanding business environment, their CIOs are more concerned about human and IT resource allocations and hence, they also had slightly higher average scores in "Analyse role of end-user computing" and "Assess hardware and software markets for formulating acquisition plans". However, they had relatively lower average scores in "Analyse

telecommunications requirements", which could be a concern due to its role as an important component in the IT infrastructure (Synnott 1987).

CIOs from the "organisation-led" group had relatively higher average scores in "Review alternative strategies" and "Analyse telecommunications requirements", as well as slightly higher average scores in "Analyse hardware and software requirements". These indicators may reflect that these organisations are more concerned about better ISSP and pay more attention to the development of alternative strategies to ensure better ISSP outcome.

### 6.1.2 Alignment Type vs. Quality of ISSP

| Factor 2 : Quality of ISSP | B | C | O | T | Mean |
|---|---|---|---|---|---|
| 1. Better Communications with Top Management | 3.75 h | 3.08 L | 3.58 | 3.23 | 3.38 |
| 2. Better appreciation of the business unit's overall Information Needs | 3.50 h | 2.85 L | 3.47 h | 3.38 | 3.24 |
| 3. Better planning and control of human, software and hardware resources | **3.88 h** | 2.81 L | 3.21 L | 3.08 L | 3.19 |
| 4. Better integration of business plans with IS plans | 3.25 | 2.88 L | 3.47 h | 3.08 | 3.15 |
| 5. Improvements on IS strategy planning processes | 3.63 h | 2.77 L | 3.26 | 3.08 | 3.14 |
| 6. Greater exploitation of IS opportunities for gaining competitive edge | 3.44 h | 2.73 L | 3.21 | 3.00 | 3.05 |
| • Better IT investments decisions | 3.50 | 3.08 | 3.53 | 3.00 | 3.27 |
| • Better technology infra-structural paths and policies | 3.56 | 3.00 | 3.32 | 3.15 | 3.23 |
| • Users can better appreciate the role and benefits of IS | 3.31 | 2.96 | 3.37 | 3.31 | 3.20 |
| • Better assessment of future IT Environment | 3.44 | 2.92 | 3.37 | 3.15 | 3.19 |
| • Explore opportunities for gaining competitive advantage from IS | 3.25 | 2.73 | 3.16 | 3.08 | 3.01 |

(LSD test: "h" scores are greater than "L" scores within the Same Row at significance level .05 )

*Table 25: Alignment Type vs. Quality of ISSP*

As shown in Table 25, six out of eleven items have significant differences among the four alignment types associated with "Quality of ISSP". Once again, CIOs from the "conservative" group had significantly lower average scores in the six items and also had the lowest average scores in four of the other five items.

CIOs from the "business-strategy-led" group had ***significantly higher average scores in "Better planning and control of human, software and hardware resources" than their counterparts in the other three groups.*** *This is the only item (out of 44 ISSP*

*items) in which an average score from an alignment group is significantly higher than each of the other three groups.* They also had much higher average scores in "Better Communications with Top Management", "Better appreciation of the business unit's overall Information Needs", "Improvements on IS strategy planning processes", and "Greater exploitation of IS opportunities for gaining competitive edge". This is consistent with the findings from the "business-strategy-led" group in Table 24 where they had higher average scores in both "Analyse human resource requirements for the IS department" and "Analyse resource constraints and contingency plans".

CIOs from the "organisation-led" group had a relatively higher average score in "Better integration of business plans with IS plans" and slightly higher average scores in "Better IT investments decisions" and "Users can better appreciate the role and benefits of IS". These planning indicators are consistent with their "realised strategies" with high STROBE and high STROIS.

### 6.1.3 Alignment Type vs. ISSP Coverage with Inputs from Users

| Factor 3 : ISSP Coverage and Inputs from Users | B | C | O | T | Mean |
|---|---|---|---|---|---|
| 1. Assess internal strengths and weakness of our current IT environment | 3.31 | 3.00 L | 3.53 h | 3.15 | 3.23 |
| 2. Quality of Inputs from Users | 3.44 h | 2.65 L | 3.32 h | 3.15 | 3.08 |
| 3. Assess business opportunities and threats associated with IS | 3.13 | 2.77 L | 3.32 h | 3.00 | 3.03 |
| • Analyse corporate database requirements | 3.56 | 2.92 | 3.42 | 3.00 | 3.20 |
| • Assess impact of future IT environment and its effect on our business unit | 3.50 | 2.92 | 3.42 | 3.00 | 3.19 |
| • Review/Revise charter/mission of IS/IT department | 3.31 | 3.00 | 3.32 | 2.92 | 3.14 |
| • Adequate User Involvement | 3.13 | 2.92 | 3.47 | 3.00 | 3.12 |
| • Analyse enterprise data modelling requirements | 3.19 | 2.81 | 3.21 | 2.92 | 3.01 |

(LSD test: "h" scores are greater than "L" scores within the Same Row at significance level .05 )

*Table 26: Alignment Type vs. ISSP Coverage with Inputs from Users*

As shown in Table 26, three out of seven items have significant differences among the four alignment types associated with "ISSP Coverage and Inputs from Users". Once again, CIOs from the "conservative" group had significantly lower average

scores in the three items and they also had the lowest average scores in four of the other five items.

CIOs from the "business-strategy-led" group had a significantly higher average score in "Quality of Inputs from Users" as well as a relatively higher average score in "Analyse corporate database requirements".

CIOs from the "organisation-led" group had significantly higher average scores in "Assess internal strengths and weakness of our current IT environment", "Assess business opportunities and threats associated with IS" and "Quality of Inputs from Users". They also had a higher average score in "Adequate user involvement".

The general observation here is that CIOs from both "business-strategy-led" and "organisation-led" groups considered that they had better quality of inputs from users as well as better ISSP coverage in assessing IT environment and business opportunities; database; and data modelling.

### 6.1.4 Alignment Type and ISSP Team

As shown in Table 27, all three items have significant differences among the four alignment types associated with "ISSP Team". CIOs from the "organisation-led" group had *significantly higher* average scores than their counterparts from the "conservative" group in all three items. Hence, it can be concluded that the planning team in ISSP is an important factor leading to a higher level of IS strategic alignment in the "organisation-led" group.

| Factor 4 : ISSP Team | B | C | O | T | Mean |
|---|---|---|---|---|---|
| 1. Expertise of the Leader of IS strategic planning team | 3.25 | 2.77 L | 3.53 h | 3.08 | 3.12 |
| 2. Expertise of IS planners | 3.25 | 2.65 L | 3.47 h | 2.92 | 3.04 |
| 3. Number of IS planners | 3.00 | 2.46 L | 3.16 h | 2.85 | 2.82 |

(LSD test: "h" scores are greater than "L" scores within the Same Row at significance level .05 )

*Table 27 : Alignment Type vs. ISSP Team*

### 6.1.5 Alignment Type vs. Business Integration and Top Management Support

As shown in Table 28, three out of four items have significant differences among the four alignment types associated with "Business Integration and Top Management Support". Once again, CIOs from the "conservative" group had significantly lower average scores in the three items. CIOs from the "business-strategy-led" group had the highest average score in "Top Management Commitment in the Implementation of IS plans". CIOs from the "technology-led" group had lower average scores in "Top Management Commitment in the Implementation of IS plans" and "Quality of Inputs from strategic business planning to IS strategic planning". CIOs from the "organisation-led" group scored highest in the two alignment items "Quality of Inputs from strategic business planning to IS strategic planning" and "Participation of IS managers in strategic business planning". CIOs from both "organisation-led" and "business-strategy-led" groups also had higher average score in "Interaction between business planners and IS planners".

Once again, the "organisation-led" group indicated good achievements in integration while "business-strategy-led" groups indicated good top management support.

| Factor 5 : Business Integration and Top Management Support | B | C | O | T | Mean |
|---|---|---|---|---|---|
| 1. Top Management Commitment in the Implementation of IS plans | 4.13 **h** | 3.23 L | 3.74 | 3.38 L | 3.58 |
| 2. Quality of Inputs from strategic business planning to IS strategic planning | 3.13 | 2.81 L | 3.42 h | 2.77 | 3.03 |
| 3. Participation of IS managers in strategic business planning | 3.19 | 2.69 L | 3.37 h | 2.92 | 3.01 |
| • Interaction between business planners and IS planners | 3.38 | 2.77 | 3.37 | 3.08 | 3.11 |

(LSD test: "h" scores are greater than "L" scores within the Same Row at significance level .05 )

*Table 28: Alignment Type vs. Business Integration and Top Management Support*

### 6.1.6 Alignment Type vs. Adequate Resource for Planning and Implementation

| Factor 6 : Adequate Resource for Planning and Implementation | B | C | O | T | Mean |
|---|---|---|---|---|---|
| 1. Funding for the implementation of IS plan | 3.69 h | 3.04 L | 3.63 h | 3.38 | 3.39 |
| 2. Funding for the IS strategic planning Process | 3.56 h | 2.77 L | 3.52 h | 3.15 | 3.20 |
| 3. Adequate Top Management Involvement | 3.50 hh | 2.81 L LL | 3.84 h | 3.08 L | 3.27 |
| 4. Quality of Inputs from Top Management | 3.38 | 2.73 L | 3.63 h | 2.85 L | 3.12 |

(LSD test: "h" scores are greater than "L" scores within the Same Row at significance level .05 )
(LSD test: "hh" scores are greater than "LL" scores within the Same Row at significance level .05 )

*Table 29: Alignment Type vs. Adequate Resource for Planning and Implementation*

As shown in Table 29, all four items have significant differences among the four alignment types associated with "Adequate Resource for Planning and Implementation". Once again, CIOs from the "conservative" group had significantly lower average scores in the four items. CIOs from the "organisation-led" group scored higher in the two "funding" items while the "organisation-led" group scored higher in the two items associated with top management involvement and their quality of inputs. CIOs from the "technology-led" group also had lower average scores in "Adequate Top Management Involvement" and "Quality of Inputs from Top Management".

### 6.1.7 Alignment Type vs. Implementation of IS Plan

| Factor 7 : Implementation of IS Plan | B | C | O | T | Mean |
|---|---|---|---|---|---|
| 1. Re-designing major business processes for the implementation of IS plan | 3.06 h | 2.46 L | 3.21 h | 2.77 | 2.84 |
| 2. Re-structuring the chosen business unit for the implementation of IS plan | 3.19 hh | 2.38 L LL | 3.26 h | 2.61 L | 2.82 |
| 3. Approval of new systems follows recommendations of IS plan | 3.13 | 2.84 L | 3.47 h | 3.15 | 3.12 |
| 4. Staffing for the implementation of IS plan | 3.50 h | 2.77 L | 3.53 h | 2.92 | 3.15 |

(LSD test: "h" scores are greater than "L" scores within the Same Row at significance level .05 )
(LSD test: "hh" scores are greater than "LL" scores within the Same Row at significance level .05 )

*Table 30: Alignment Type vs. Implementation of IS Plan*

As shown in Table 30, all four items have significant differences among the four alignment types associated with "Implementation of IS plan". CIOs from the

"organisation-led" group had significantly higher average scores than their counterparts in the "conservative" group in all four items.

### 6.1.8 Summary

CIOs from the "conservative" group had the lowest average scores in 41 out of 44 ISSP items while CIOs from the "technology-led" group had the lowest average scores in three items, namely "Better IT investments decisions", "Review/Revise charter/mission of IS/IT department" and "Quality of inputs from strategic business planning to ISSP".

CIOs from the "business-strategy-led" group had the highest average scores in 19 out of 44 ISSP items. In particular, they had a significantly higher average score in the item "Better planning and control of human, software and hardware resources". They also had relatively higher average scores in "Top Management Commitment in the Implementation of IS plans" and "Analyse resource constraints and contingency plans".

CIOs from the "organisation-led" group had the highest average scores in 24 out of 44 ISSP items. In particular, they had the highest average scores in all items within two ISSP factors, namely, "ISSP Team" and "Implementation of IS Plan". Also, they had relatively higher average scores in two items associated with top management, namely "Adequate Top Management Involvement" and "Quality of Inputs from Top Management".

Having identified the configurational characteristics in ISSP factors, it would be interesting to evaluate whether these configurational characteristics have any relationship with the perceived ISSP success as assessed by CEO/GM; User Managers and CIOs. This is examined in the following section.

## 6.2 Alignment Type and Success of ISSP

The last part of each of the three questionnaires contains the question as shown in Table 31 (adapted from Earl 1993). It was designed to collect the perceived ISSP success of the chosen business unit from CEO/GM, User Managers and CIOs. Furthermore, the question is also designed to allow the respondent to circle a point at the "ruler" with each "-" representing 0.20 apart within each of the five numbers. Apart from "circling" on the scale provided, the respondents were also requested by the question to write down the major (unsolicited) criteria for ISSP success/failure that they have used.

How successful has ISSP been in your chosen business unit? (please circle on the scale below with each "-" = "0.2" and then comment)

| 1 - - - - | 2 - - - - | 3 - - - - | 4 - - - - | 5 |
|---|---|---|---|---|
| Failure | Some Benefits But did Not Need ISSP to Achieve them | Some Benefits which can Hardly be Achieved Without ISSP | Successful but can improve | Highly Successful |

Major criteria for success/failure: _____

*Table 31 : Assessment on ISSP Success*

| Success of ISSP | Mean by Alignment Type | | | | All Mean |
|---|---|---|---|---|---|
| | B | C | O | T | |
| 1. CEO/GM | 3.06 h | 2.42 L | 3.32 h | 2.95 | 2.88 |
| 2. User Manager | 2.71 LL | 2.61 L | 3.47 h hh | 3.15 h | 2.95 |
| 3. CIO | 3.41 | 2.91 L | 3.58 h | 3.11 | 3.22 |
| Overall Average Success of ISSP | | | | | 3.02 |

(LSD test: "h" scores are greater than "L" scores within the Same Row at significance level .05 )
(LSD test: "hh" scores are greater than "LL" scores within the Same Row at significance level .05 - a second set of indicators "O" > "B" for User Managers)

*Table 32: Relationship of IS Strategic Alignment and ISSP Success*

Mean scores of ISSP success are shown in Table 32. The overall average score of 3.018 (from three respondents each in the 74 organisations) is roughly at the stage that ISSP is marginally useful or "Some Benefits which can Hardly be Achieved Without

ISSP". CEO/GMs from the "conservative" group had significantly lower average scores than their counterparts in both "organisation-led" and "business-strategy-led" groups. User Managers from the "conservative" group had significantly lower average scores than their counterparts in both "organisation-led" and "technology-led" groups while User Managers from the "business-strategy-led" group also had significantly lower average scores than their counterparts in the "organisation-led" group. CIOs from the "conservative" group had significantly lower average scores than their counterparts in the "organisation-led" group.

Perhaps, more interestingly, however, is that the perceived success of IS in every one of the four alignment types scored by the CIO, then the CEO/GMs and with the exception of the "technology-led" group ranked higher by the CIO and the User Manager (with the "technology-led" group has the highest ranking by User Managers). Similarly, apart from the "business-strategy-led" group, all User Managers ranked satisfaction higher than CEO/GMs with the "business-strategy-led" group giving the highest perceived satisfaction to users. Some of these difference may be explained by the unsolicited criteria which each of the three management groups provided. The issues related to these are discussed for each group as given below.

Criteria for Assessing ISSP Success or Failure

As shown in Table 31, all three types of respondents could provide unsolicited responses on a voluntary basis whereby they could fill in any criteria for either ISSP success or ISSP failure. The use of unsolicited responses may not be as biased as in the use of a tick from a given list of limited selections. Perhaps, these unsolicited responses (presented in Tables 33 to 35) could partly explain the results as shown in Table 32.

CEO/GMs' Criteria for ISSP Success and Failure

As shown in Table 33, CEO/GMs are more concerned with criteria for ISSP success such as top management commitment and participation, business alignment, resource allocation and assessment of expected outcome of IS plans. Given the "blue-sky" approach of CEO/GMs, that is, their concern that IS plans reflect business and commitment, the "conservative" and "technology-led" groups all find that there is not an obvious match between the "intended" strategies and the "realised" strategies. The CEO/GMs from the "business-strategy-led" group are happier with this situation than their User Managers because the business strategy is leading IS and may not therefore be as appropriate to the users. CEO/GMs from the "organisation-led" group have a higher perceived level of success where all three groups suggest that their strategy has a closer alignment.

| Unsolicited Criteria for ISSP Success | Unsolicited Criteria for ISSP Failure |
|---|---|
| 1. Top level commitment<br>2. Management Support<br>3. To ensure success of the ISSP, management at the highest level should be involved<br>4. User Participation<br>5. Business Strategy in line with IS Strategy and Partnership<br>6. Relevant to Business Nature, Technology and Business Environment<br>7. Market experience/driven, good IT application<br>8. Resources Allocation<br>9. To assess whether expected outcome is achieved or not<br>10. Coordination and communication with other business units<br>11. Improve service productivity<br>12. Able to identify needs of the operations<br>13. Productivity gain<br>14. Streamlining administrative work and controlling cost<br>15. Users satisfaction and support administrative approval and support | 1. No ISSP<br>2. Lack of leadership<br>3. MIS manager is not familiar with business of the organisation<br>4. Resources limitations<br>5. No major support from top management |

*Table 33: CEO/GMs' Criteria for ISSP Success and Failure*

User Managers' Criteria for ISSP Success and Failure

Most of the User Managers hold middle management positions or assume a professional role (e.g. accountants and engineers). They are more concerned with IS support for operations and controls. Therefore, they relate their satisfaction criteria (i.e. success or failure) to the extent that they see IS being implemented with effective controls for management and operational support. Given their overall lower rating of satisfaction, it would appear that the "blue sky" vision of CEO/GMs is not the actualised reality of IS implementation.

| Unsolicited Criteria for ISSP Success | Unsolicited Criteria for ISSP Failure |
|---|---|
| 1. Management support and acceptance of ISSP | 1. Lack of top management participation |
| 2. Adequate cost/benefits analysis | 2. IS cannot support "judgement and insight" on foreign exchange (forex) market movements |
| 3. Good technical support in ISSP | 3. Insufficient technical know-how |
| 4. Foresight in identifying societal trends | 4. Insufficient financial support |
| 5. Adequate information for planning and controls | |
| 6. Adequate IS support for daily operations | |

*Table 34: User Managers' Criteria for ISSP Success and Failure*

CIOs' Criteria for ISSP Success and Failure

As shown in Table 35, CIOs are more concerned with the impact of IS on the overall strategy and would approach the success of ISSP based on their knowledge of what IS can do for the organisation rather than necessarily what it is perceived to be doing by users and senior management. This again suggests that their views are not those reflected by the realised strategy but rather the intended IS strategy. Perhaps, a "green field" approach has been adopted by the CIOs instead of the "blue sky" vision expected

of the CEO/GMs. CIOs perceived the opportunities for IS impact but do not necessarily map it on to the urban settlement of the organisation. They assume that the impacts of IS will be felt throughout the organisation without regard to the users' perception.

| Unsolicited Criteria for ISSP Success | Unsolicited Criteria for ISSP Failure |
|---|---|
| 1. Vision and sense of business impact | 1. Failure to improve business process |
| 2. Obtain business plan and department management support | 2. Insufficient communication with Sole Proprietor |
| 3. It can cope with current business needs and has the potential to cope with future changes | 3. Different timing in implementing various systems leads to complication in systems integration |
| 4. Senior management involvement in ISSP | 4. Insufficient users' inputs |
| 5. Responsive to changing market needs | |
| 6. Technology infra-structural policies | |
| 7. Timely reports and smooth | |
| 8. Improvement - BPR | |
| 9. Improvement in cost controls and authorisation of office duties | |

*Table 35: CIO's Criteria for ISSP Success and Failure*

Summary

The three groups of managers identified quite different average scores on ISSP success which suggests that they hold different perceptions and expectations related to their managerial role.

## 6.3 Configurational Characteristics on IS Planning Factors

| Business-strategy-led | Organisation-led |
|---|---|
| More Effective Indicators<br>1. *Better Planning and Control of human, software & hardware requirements*<br>2. *Top management commitment in Implementing IS plans*<br>3. Analyse resource constraints and contingency plans<br>4. Quality of Inputs from Users<br>5. Funding for the implementation of IS plan<br>6. Funding for the IS strategic planning Process<br>7. Improvements on IS strategy planning processes<br>8. Better appreciation of the business unit's overall Information Needs<br>9. Greater exploitation of IS opportunities for gaining competitive edge<br><br>Less Effective Indicators<br>1. Analyse telecommunication requirements | More Effective Indicators<br>1. *ISSP Team*, especially team leader<br>2. Better Integration of business and IS plans<br>3. Involvement and Quality of Top management support<br>4. Approval of new IS follows recommendations of ISSP<br>5. BPR and restructuring of business unit for implementing IS plan<br>6. Better appreciation of the business unit's overall Information Needs<br>7. Review alternative strategies<br>8. Assess internal strengths and weakness of our current IT environment<br>9. Assess business opportunities and threats associated with IS<br>10. Quality of Inputs from Users<br>11. Quality of Inputs from strategic business planning to IS strategic planning.<br>12. Participation of IS managers in strategic business planning.<br><br>Less Effective<br>(no obvious item) |
| **Conservative** | **Technology-led** |
| More Effective Indicators<br>(no obvious item)<br><br>Less Effective Indicators (in most items, especially the following items)<br>1. Appreciation of business unit's information needs<br>2. Quality of Inputs from Users<br>3. Top Management support<br>4. Funding for ISSP and its Implementation<br>5. BPR for implementation of IS plans | More Effective Indicators<br>(no obvious item)<br><br>Less Effective Indicators<br>1. Selection of Application Portfolios<br>2. Top Management support and involvement<br>3. Quality of Inputs from Top Management<br>4. Planning and control of human, software and hardware resources<br>5. Top Management Commitment in the Implementation of IS plans<br>6. Re-structuring the chosen business unit for the implementation of IS plan |

*Table 36 : Configurational Characteristics for ISSP*

Apart from the identification of the configurational characteristics for ISSP as summarised in Table 36, this chapter has also analysed the significant differences that occur at two levels : (1) by four types of alignment and (2) by three types of Managers. These highlight the need to constantly review the underlying assumptions and presumptions which may be held by different groups of respondents.

# CHAPTER 7 : ANALYSIS OF IS SUCCESS FACTORS

This chapter provides the analysis of User Managers' perceived "IS Success" (based on the IS Success factors) as well as the perceived "Overall Satisfaction with IS" by CEO/GM; User Managers; and CIOs. These findings and analyses are then used as the basis to develop the configurational characteristics on "IS Success". This is followed by an overall summary on the configuration characteristics in both "ISSP" and "IS Success". These configurational characteristics will be further explored through the multiple case study analyses as covered in Chapter 8.

## 7.1 IS Strategic Alignment and IS Success

This chapter looks at the IS Success factors as opposed to ISSP factors as summarised in 6.1. The results obtained from the set of 22 questions in Part A (A.1.1-A.1.9 and A.2.1-A.2.7) and Part B (B.1-B.6) of Questionnaire-B (for User Managers) are reported in Table 37. User Managers are seen as the most relevant group to evaluate the actual operational efficiency and effectiveness of IS services. These questions are used to determine the "IS Success" in the business unit based on the 5-point Likert scale. The grouping of emerging IS Success factors and their associated items from Table 21 are used again for the analysis of the average scores of the items by alignment type. The overall average scores of factors and their associated items on IS Success are shown in Table 37. This is followed by a more thorough analysis of each of these factors from subsections 7.1.1 to 7.1.5 together with a summary.

| IS Success Factors | | Mean Score of User Managers | | | | All |
|---|---|---|---|---|---|---|
| | No. of Business Units : | 16 | 26 | 19 | 13 | 74 |
| | Alignment Type : | B | C | O | T | Mean |
| | Factor 1: Relative Quality of IS Service | | | | | |
| ByQSer6 | • Relative Alignment of IS Plans with Business Needs | 2.69 L | 2.65 L | 3.32 h | 3.23 h | 2.93 |
| ByQSer3 | • Relative IS contribution to managerial effectiveness | 2.75 L | 2.96 | 3.21 | 3.46 h | 3.07 |
| ByQSer4 | • Relative Functional Quality of IS | 2.69 L | 3.11 | 3.21 h | 3.31 h | 3.08 |
| ByQSer2 | • Relative IS contribution to operational efficiency | 2.81 L | 3.08L | 3.26 | 3.69 **h** | 3.18 |
| ByQSer1 | • Relative Application of IS to advance CSFs | 2.44 L | 2.69 L | 3.58 **h** | 3.00 | 2.92 |
| ByQSer5 | • Relative Technical Quality of IS | 2.63 L | 2.92 | 3.26 h | 3.23 | 3.00 |
| BPROD1 | • Database | 2.88 | 3.04 | 3.16 | 3.85 | 3.14 |
| | Factor 2: IS Staff and IS Contribution | | | | | |
| BYSer1 | • Technical expertise of IS staff in general | 3.18 | 3.30 | 3.47 | 3.23 | 3.31 |
| BYSer2 | • Ability of IS staff to specify IS requirements | 2.94 | 3.15 | 3.16 | 3.00 | 3.08 |
| BYSer7 | • IS contribution to operational efficiency | 3.25 | 3.46 | 3.74 | 3.46 | 3.49 |
| BYSer3 | • Ability of IS staff to customise (develop in-house) systems | 2.56 | 3.12 | 3.11 | 3.08 | 2.99 |
| BYSer8 | • IS contribution to managerial effectiveness | 3.13 | 3.12 | 3.53 | 3.30 | 3.26 |
| | Factor 3: IS Products and Users' Ability in Defining Information | | | | | |
| BPROD4 | • Systems software platforms | 3.00 | 3.04 | 3.26 | 3.23 | 3.12 |
| BPROD3 | • Communications and networking platforms | 2.94 | 2.65 | 3.26 | 3.31 | 2.99 |
| BPROD5 | • Systems development tools | 2.50 | 2.27 L | 2.84 h | 3.00 h | 2.59 |
| BPROD2 | • Computer hardware platforms | 2.94 | 3.08 | 3.26 | 3.31 | 3.14 |
| BYSer4 | • End-users' ability in defining business information requirements | 3.06 L | 3.26 L | **3.84 h** | 2.84 L | 3.30 |
| | Factor 4: IS Contribution | | | | | |
| BYSer9 | • IS contribution to improving Profitability | 2.50 L | 2.19 L | **3.37 h** | 2.77 | 2.66 |
| BPROD7 | • Office Automation products | 3.00 | 3.04 | 3.53 | 3.38 | 3.26 |
| BPROD6 | • End-user computing tools | 2.56 | 2.65 | 3.10 | 2.92 | 2.80 |
| | Factor 5: IS Project Management | | | | | |
| BYSer6 | • IS delivered within budget | 2.75 | 2.92 | 3.21 | 3.08 | 2.99 |
| BYSer5 | • IS delivered on-time | 2.13 L<br>LL | 2.88<br>hh | 3.26 **h** | 2.53 L | 2.76 |

(LSD test: "h" scores are greater than "L" scores within the Same Row at significance level .05 )
(LSD test: "hh" scores are greater than "LL" scores within the Same Row at significance level .05 )

*Table 37 : Alignment Type and IS Success Factors*

### 7.1.1 Alignment Type vs. Relative Quality of IS Service (Factor 1)

The mean scores of User Managers in Table 37 indicate that there are significant differences among the four alignment types in six out of seven items associated with "Relative Quality of IS Service".

User Managers from the "business-strategy-led" group scored relatively lower in these six items although their counterparts in the "conservative" group scored slightly lower on average in "Relative Alignment of IS Plans with Business Needs".

User Managers from the "organisation-led" group scored relatively higher in "Relative Application of IS to advance CSFs" and slightly higher in "Relative Alignment of IS Plans with Business Needs" and "Relative Technical Quality of IS".

User Managers from the "technology-led" group scored relatively higher in "Relative IS contribution to operational efficiency" and slightly higher in "Relative IS contribution to managerial effectiveness" and "Relative Functional Quality of IS".

It is apparent that both "organisation-led" and technology-led" groups (both scoring highly in STROIS) scored higher average scores in the "relative quality of IS service" than the other two alignment groups (with lower STROIS).

### 7.1.2 Alignment Type vs. IS Staff and IS Contribution (Factor 2)

As shown by the mean score of User Managers in Table 37, although there are no significant differences among the four alignment types in all five items associated with "IS Staff and Operational Efficiency", User Managers from the "organisation-led" group had relatively higher average scores in "IS contribution to managerial effectiveness", "Technical expertise of IS staff in general" and "IS contribution to operational efficiency".

### 7.1.3 Alignment Type vs. IS Products and Users' Ability in Defining Information (Factor 3)

As shown by the mean score of User Managers in Table 37, there are significant differences among the four alignment types in two out of five items associated with "IS Products and Users' Ability in Defining Information". User Managers from the "organisation-led" group had *significantly higher average score in "End-users' ability in defining business information requirements*" than their counterparts in all the other three groups. *This is the only item (out of 22 IS Effectiveness item) in which an average score from an alignment group is* ***significantly higher*** *than each of the other three groups.* User Managers from the "conservative" group scored significantly lower in "Systems development tools" than their counterparts in both "technology-led" and "organisation-led" groups. It is extremely interesting to note that User Managers from the "technology-led" group considered the inadequate ability of their staff (end-users) in defining business information requirements. This strong contrast of *"End-users' ability in defining business information requirements*" between the "organisation-led" and "technology-led" groups (both scored highly in STROIS) is clearly a good explanation of the misfit in the "technology-led" group.

### 7.1.4 Alignment Type vs. IS Contribution and IS Product (Factor 4)

As shown by the mean scores of User Managers in Table 37, there is one out of three items with significant differences among the four alignment types in "IS Contribution and IS Product". The "organisation-led" group had significantly higher average score in "IS contribution to improving Profitability" than their counterparts in both "business-strategy-led" and "conservative" groups.

### 7.1.5 Alignment Type vs. IS Project Management (Factor 5)

As shown by the mean score of User Managers in Table 37, User Managers from the "organisation-led" group not only scored significantly higher in "IS delivered on-time" than their counterparts in both "business-strategy-led" and "conservative" groups but also had a relatively higher average score than the other three groups in "IS delivered within budget".

Summary

A short summary is provided here and further elaboration will be covered by the configurational characteristics on "IS Success" in section 7.3 after the review of the "overall satisfaction with IS" in section 7.2.

## 7.2 Alignment Type and Overall Satisfaction with IS Service

| Satisfaction with IS Service | Mean by Alignment Type | | | | |
|---|---|---|---|---|---|
| | B | C | O | T | Mean |
| 1. CEO/GM (Questionnaire A - Part E.8) ** | 2.67 | 2.25 L | 3.36 h | 2.67 | 2.69 |
| 2. User Manager (Questionnaire B - Part A.1.11) | 3.03 L | 3.23 | 3.63 h | 3.38 | 3.32 |
| 3. CIO (Questionnaire C - Part C.1.11) | 3.50 | 3.23 | 3.53 | 3.46 | 3.41 |

(LSD test: "h" scores are greater than "L" scores within the Same Row at significance level .05 )
(** only 42 respondents instead of 74 since many CEOs skipped Part E on Business Performance G.2)

*Table 38: Alignment Type and Overall Satisfaction with IS Service*

As shown in Table 38, CEO/GMs from the "conservative" group had significantly lower average scores than their counterparts in the "organisation-led" group. User Managers from the "business-strategy-led" group had significantly lower average scores than their counterparts in the "organisation-led" group. Although there is no significant differences in the average scores of CIOs' "overall satisfaction with IS Service", the average score from the "organisation-led" group is also the highest.

## 7.3 Configurational Characteristics for IS Success

| **Business-strategy-led** | **Organisation-led** |
|---|---|
| More Satisfied with or Better in<br>(no obvious item)<br><br>Less Satisfied with or Weak in<br>1. IS delivered on-time<br>2. Relative Functional Quality of IS<br>3. Relative Technical Quality of IS<br>4. Ability of IS staff to customise (develop in-house) systems<br>5. Application of IS to advance CSFs<br>6. IS contribution to improving Profitability<br>7. Relative IS contribution to managerial effectiveness<br>8. IS contribution to operational efficiency<br>9. Relative Alignment of IS Plans with Business Needs | More Satisfied with or Better in<br>*1. End-users' ability in defining business information requirements*<br>2. Application of IS to advance CSFs<br>3. IS contribution to improving Profitability<br>4. Relative Functional Quality of IS<br>5. Relative Technical Quality of IS<br>6. IS delivered on-time<br>7. IS delivered within budget<br>8. Alignment of IS Plans with Business Needs<br><br>Less Satisfied with or Weak in<br>(no obvious item) |
| **Conservative** | **Technology-led** |
| More Satisfied with or Better in<br>(no obvious item)<br><br>Less Satisfied with or Weak in<br>1. IS contribution to improving Profitability<br>2. Systems development tools<br>3. Relative Alignment of IS Plans with Business Needs<br>4. Application of IS to advance CSFs<br>5. Relative IS contribution to operational efficiency<br>6. End-users' ability in defining business information requirements | More Satisfied with or Better in<br>1. Relative IS contribution to operational efficiency<br>2. Relative IS contribution to managerial effectiveness<br>3. Systems development tools<br>4. Relative Alignment of IS Plans with Business Needs<br>5. Relative Functional Quality of IS<br><br>Less Satisfied with or Weak in<br>1. End-users' ability in defining business information requirements<br>2. IS delivered on-time |

*Table 39 : Configurational Characteristics for Perceived IS Success*

After analysing the IS Success items from the comparison of their mean scores, the items with significantly high mean scores and significantly low scores are grouped under "More Satisfied with or Better in" and "Less Satisfied with or Weak in" respectively Table 39. As expected, User Manages from both "business-strategy-led" and "conservative" groups (with low STROIS) indicated a lower level of IS Success,

especially the "business-strategy-led" group. User Manages from both "organisation-led" and "technology-led" groups indicated strong satisfaction with IS.

## 7.4 Configurational Characteristics for both ISSP and IS Success

### 7.4.1 Configurational Characteristics of the Business-Strategy-led Group

Although the CIOs perceived that there are many effective indicators in ISSP (e.g. good top management support, funding of both ISSP and the Implementation of IS plan) User Managers are less satisfied with IS (e.g. poor quality of systems and poor IS contribution). There is an obvious "misfit" between ISSP and IS implementation as perceived by the two interest groups.

| Perceived ISSP Effectiveness (CIOs) | Perceived IS Success (User Managers) |
|---|---|
| More Effective Indicators<br>1. *Better Planning and Control of human, software & hardware requirements*<br>2. *Top management commitment in Implementing IS plans*<br>3. Analyse resource constraints and contingency plans<br>4. Quality of Inputs from Users<br>5. Funding for the implementation of IS plan<br>6. Funding for the IS strategic planning Process<br>7. Improvements on IS strategy planning processes<br>8. Better appreciation of the business unit's overall Information Needs<br>9. Greater exploitation of IS opportunities for gaining competitive edge<br><br>Less Effective Indicators<br>Analyse telecommunication requirements | More Satisfied with or Better in<br>(no obvious item)<br><br>Less Satisfied with or Weak in<br>1. IS delivered on-time<br>2. Relative Functional Quality of IS<br>3. Relative Technical Quality of IS<br>4. Ability of IS staff to customise (develop in-house) systems<br>5. Application of IS to advance CSFs<br>6. IS contribution to improving Profitability<br>7. Relative IS contribution to managerial effectiveness<br>8. IS contribution to operational efficiency<br>9. Relative Alignment of IS Plans with Business Needs |

*Table 40 : Configurational Characteristics of Business-Strategy-led group*

### 7.4.2 Configurational Characteristics of the Conservative Group

There is a fairly good match between "ISSP" and "IS Success" as shown in Table 41. The CIOs in this group considered that ISSP is less effective and the User Managers are less satisfied with IS. In order words, a "conservative fit" is a good "fit" with regard to alignment but an unsatisfactory approach to develop successful ISSP or IS.

| Perceived ISSP Effectiveness (CIOs) | Perceived IS Success (User Managers) |
|---|---|
| More Effective Indicators<br>(no obvious item)<br><br>Less Effective Indicators (in most items, especially the following items)<br>1. Appreciation of business unit's information needs<br>2. Quality of Inputs from Users<br>3. Top Management support<br>4. Funding for ISSP and its Implementation<br>5. BPR for implementation of IS plans | More Satisfied with or Better in<br>(no obvious item)<br><br>Less Satisfied with or Weak in<br>1. IS contribution to improving Profitability<br>2. Systems development tools<br>3. Relative Alignment of IS Plans with Business Needs<br>4. Application of IS to advance CSFs<br>5. Relative IS contribution to operational efficiency<br>6. End-users' ability in defining business information requirements |

*Table 41 : Configurational Characteristics of Conservative Group*

### 7.4.3 Configurational Characteristics of the Organisation-led Group

There is a good match between "ISSP" and "IS Success" as shown in Table 42. This indicates that there is a high integration of STROBE and STROIS and the "fit" is perceived by both groups as appropriate.

| Perceived ISSP Effectiveness (CIOs) | Perceived IS Success (User Managers) |
|---|---|
| More Effective Indicators<br>1. *ISSP Team*, especially team leader<br>2. Better Integration of business and IS plans<br>3. Involvement and Quality of Top management support<br>4. Approval of new IS follows recommendations of ISSP<br>5. BPR and restructuring of business unit for implementing IS plan<br>6. Better appreciation of the business unit's overall Information Needs<br>7. Review alternative strategies<br>8. Assess internal strengths and weakness of our current IT environment<br>9. Assess business opportunities and threats associated with IS<br>10. Quality of Inputs from Users<br>11. Quality of Inputs from strategic business planning to IS strategic planning.<br>12. Participation of IS managers in strategic business planning.<br><br>Less Effective<br>(no obvious item) | More Satisfied with or Better in<br>*1. End-users' ability in defining business information requirements*<br>2. Application of IS to advance CSFs<br>3. IS contribution to improving Profitability<br>4. Relative Functional Quality of IS<br>5. Relative Technical Quality of IS<br>6. IS delivered on-time<br>7. IS delivered within budget<br>8. Alignment of IS Plans with Business Needs<br><br>Less Satisfied with or Weak in<br>(no obvious item) |

*Table 42 : Configurational Characteristics of Organisation-led Group*

### 7.4.4 Configurational Characteristics of the Technology-led Group

This is a complex situation in matching "ISSP Effectiveness" and "IS Success" as shown in Table 43., since it again shows a "misfit" yet one in which the User Managers are satisfied despite the apparent lack of effectiveness in ISSP. It is interesting to note that User Managers considered that their staff (end-users) had inadequate ability in defining business information requirements. This is clearly a good explanation of the misfit in the "technology-led" group. This may be explained by the fact that much of the development in such an environment will be user driven - they have the technology and so they will use it. Whether they are using the technology in support of top management plans is open to question. It may just be that top management have been overtaken by technology and are unsure of their expectations.

| Perceived ISSP Effectiveness (CIOs) | Perceived IS Success (User Managers) |
|---|---|
| <u>More Effective Indicators</u><br>(no obvious item)<br><br><u>Less Effective Indicators</u><br>1. Selection of Application Portfolios<br>2. Top Management support and involvement<br>3. Quality of Inputs from Top Management<br>4. Planning and control of human, software and hardware resources<br>5. Top Management Commitment in the Implementation of IS plans<br>6. Re-structuring the chosen business unit for the implementation of IS plan | <u>More Satisfied with or Better in</u><br>1. Relative IS contribution to operational efficiency<br>2. Relative IS contribution to managerial effectiveness<br>3. Systems development tools<br>4. Relative Alignment of IS Plans with Business Needs<br>5. Relative Functional Quality of IS<br><br><u>Less Satisfied with or Weak in</u><br>1. End-users' ability in defining business information requirements<br>2. IS delivered on-time |

*Table 43 : Configurational Characteristics of Technology-led Group*

Summary

From the data analysis in Chapters 6 and 7, it can be observed that there are significant differences between perceived "ISSP Effectiveness" and perceived "IS Success" as shown in Tables 23 and 37 respectively.

Both "business-strategy-led" and "organisation-led" groups, which score highly in STROBE, are operating in a more demanding business environment, and hence, consider planning as important. However, both "technology-led" and "organisation-led" groups, which score highly in STROIS, see enhanced user satisfaction and improved operation efficiency as important.

Furthermore, the following four "fits" were identified :

1. Good fit: alignment in ISSP with satisfactory level of IS is found in the "organisation-led" group.
2. Conservative fit: low satisfaction with ISSP and low expectation of IS is found in the "conservative" group.
3. IS-Misfit: effective ISSP but low IS success is found in the "business-strategy-led" group.
4. Misfit: ineffective ISSP but relatively strong IS success is found in the "technology-led" group.

These differences between perceived or "intended strategy" and actual or "realised strategy" suggest that there is a need to explore these models further in order to define particular criteria and develop a more comprehensive model combining both ISSP and IS implementation. This is further explored in Chapters 8 and 9. Chapter 8 uses multiple case study analyses to identify the extent of impact of these factors and Chapter 9 develops and extends the contingency model.

# CHAPTER 8 : FINDINGS FROM MULTIPLE CASE STUDY ANALYSES

Findings from multiple case study analyses for each of the organisations are presented in this chapter together with evaluations and conclusions from each case. Relevant charts from the embedded questionnaire study within each of the selected organisations are also included for supporting the analysis. The objectives of the case study are :

a) to identify the ISSP characteristics and IS Success factors, and evaluate whether these relate to the findings of the survey as analysed in Chapters 6 and 7.
b) to further investigate the strategic orientation of organisations by reviewing where they have currently practised their IS strategy and "where they wish to go" - this is seen as a particularly interesting area for further investigation and a major contribution of this study.
c) to identify the extent to which the composite research model (in Chapter 3) is seen to be appropriate and modification which may be required to develop a more robust model for further evaluations.

At the end of each case study, an evaluation of the findings is presented which considers these three factors as a review of the case combinations. A summary is also included at the end of this chapter, which is then followed by the presentation of an extended research model in Chapter 9.

## 8.1 Selection of Organisations for Multiple Case Study Analyses

Multiple case study analyses have been conducted in order to learn from the effective and less effective organisational practices on IS strategic alignment and factors affecting IS success in the selected organisations from each of the four alignment types which showed a high score in IS Success. Also, some of the outstanding questions from

the survey analysis have been further explored via these multiple cases study analysis. In the selection of organisations, the major criteria was to select the highest scores in ISSP success, ISSP process and IS success and also whether the chosen organisation represented the typical characteristics of the alignment type. Another criteria was a reasonable mix between private and public organisations. A major constraint was that most organisations were reluctant to participate in case study interviews and that some managers revealed limited information, especially in the area of business strategy. Four cases study analyses (one in each alignment type) were successfully conducted and reported below.

Business-strategy-led case: A very large IT company (organisation I1 in Appendix 1.2) and a government department (organisation G4 in Appendix 1.2) were selected. I1 had the highest scores in both ISSP success and IS success and its Accounting Manager is very supportive of this research. However, in the process of arranging interviews, the MIS manager returned to Japan and the new MIS manager was reluctant to attend an interview due to his new arrival while the CEO was always too busy. (Recent contacts have been re-established and the MIS manager would attend interviews in the near future.) G4 had the highest score in ISSP success and an international management consulting firm is helping them in ISSP. Interviews were conducted with the principal officer (who is very supportive of this research) and the CIO in G4. However, the interviewees only provided very limited information on both business strategy and IS strategy, mainly due to their concern on the sensitivity of the information. Although a profitable bank (organisation B10 in Appendix 1.2) only had slightly above-average scores on ISSP approach and IS success, it was selected because the responding managers were very supportive of the interviews and the bank is also a typical case of the alignment type.

Conservative case: An accounting and auditing firm (organisation A1 in Appendix 1.2) was chosen because it had the highest scores in ISSP success and IS success among Conservative organisations and good support was also available from the CEO and the Audit manager.

Organisation-led case: A public authority (organisation H1 in Appendix 1.3) was chosen because it had the highest scores in ISSP process and IS success among Organisation-led organisations, and good support was also available from the three respondents.

Technology-led case: A large bank (organisation B1 in Appendix 1.3) had the highest scores in ISSP success but the author could not arrange case study interviews. A shipping company (organisation T3 in Appendix 1.3) was chosen because it had the highest score in importance of ISSP process among Technology-led organisations and both the CEO and CIO were very supportive of the research.

| Organisation Code | BBB | CCC | OOO | TTT |
|---|---|---|---|---|
| Organisation shown in Appendices 1.2 and 1.3 | B10 | A1 | H1 | T3 |
| Alignment Type | Business-strategy-led | Conservative | Organisation-led | Technology-led |
| Industry | Banking | Certified Public Accountants | Public Authority - Healthcare | Transport and Storage (shipping) |
| Number of Employees in Organisation | over 600 | over 50 | over 40,000 | over 200 |
| Number of Employees in IT | over 30 | 4 | over 200 | 15 |
| Business Unit studied | Consumer banking | Certified Public Accountants | A large hospital | Shipping |
| Number of Employees in BU | over 300 | over 50 | over 1,000 | over 40 |
| Face-to-face in-depth Interviews: Interviewee Position | • General manager of SBU<br>• Operations manager of SBU<br>• MIS manager of BBB | • CEO<br>• Audit manager | • Chief Executive of a large hospital<br>• CIO of OOO<br>• Systems manager | • CEO<br>• General manager<br>• MIS manager |

*Table 44: Organisations selected for Multiple Case Study Analyses*

Interviews were held individually with at least two managers in each of the above selected organisations (IS manager/CIO, plus CEO/senior manager, and/or user manager). These interviews lasted for two to four hours and further questions followed-up, if necessary. The list of questions in Table 15 was extended to include the interpretation and confirmation of the results/charts from the embedded survey analysis as shown in Table 45.

Information Systems Strategic Planning may be defined as "the process of deciding the objectives for organisational computing and identifying potential computer applications which the organisation should implement".

1. Strategic Business Planning (SBP)

1.1 Are there any means to exploit technology opportunities for business benefits in SBP?

1.2 What sorts of inputs are required from the IT manager?

+1.3 Analysis of STROBE

2. Information Systems Strategic Planning (ISSP)

2.1 What are the major Objectives and Coverage of ISSP?

2.2 What sorts of inputs are required from the strategic business plans or planners?

2.3 Are there any means to guide the implementation of IS plans?

+2.4 Analysis of STROIS

+2.5 Review of ISSP

3. Link between SBP and ISSP

3.1 What are the facilitators and inhibitors for the effective link between SBP and ISSP?

3.2 Have your organisation encountered any benefits/problems resulting from the good/poor linkage between SBP and ISSP?

3.3 Have your organisation considered any comparative business advantage as a guide to IS strategies?

4. Information Systems Success

What criteria are being used to determine the success of your IS services?

+ Review IS Application Portfolio

+5. Evaluation and Future Outlook

+ Review of Trend of STROBE and STROIS

*Table 45: Extended List of Questions for Interviewees*

## 8.2 Business-Strategy-Led Case

B10 Bank (Hong Kong) Limited (BBB)

Background

BBB is a fully owned subsidiary of BBB International, which operates as an international bank with its headquarters in a Western country. Although BBB started its Hong Kong operations over 70 years ago, it has maintained a conservative approach and low profile in its Hong Kong operations. It is one of the 178 fully licensed banks in Hong Kong and has over 10 branch offices. BBB used to focus in commercial and merchant banking business for over half a century but it has taken a more active role in consumer/retail banking business in these few years.

BBB is divided into five business divisions and supported by four functional departments.

Case Study Analysis

The strategic business unit (SBU) under study is Consumer Banking Division of BBB and its General Manager co-ordinated with two other managers (himself, Operations Manager of Consumer Banking and MIS Manager) in completing the three questionnaires (A, B, C respectively). The author was also granted access to some of their internal documents (e.g. the organisation chart, background of the organisation and its branch offices, computer configurations and application systems, etc.). Although BBB is a very small bank (by counting the number of branches), its relative business performance is very impressive with 3%-4% market share in recent years.

The findings from the questionnaires and their respective charts were compiled and then returned to the respondents for review and comments. The author arranged individual interviews with the three respondents from November 1995 to January 1996. A list of interview questions was sent to each interviewee at least one week prior to the interview. Follow-up phone calls were also made to confirm the findings.

### 8.2.1 Strategic Business Planning (SBP)

The annual SBP process is based on the business planning standard from the Headquarters and it starts in November and completes in December. It is directed by the Managing Director who requires the five divisional heads to draft its policy and strategy for the coming three years for his review. The Managing Director and the Financial Controller then consolidate the overall business plan and derive resource plans and the overall financial budget in consultation with the five divisional heads. The consolidated business plan of BBB is then submitted to the headquarters for approval. A mid-year review of SBP is conducted in May.

*1.1 Are there any means to exploit technology opportunities for business benefits in SBP?*

Strategic business planning horizon is three years with major concentration on resources allocation and theme based exploration for the first two years. Both SWOT analysis and CSFs analysis are being used in SBP. With the exception of the General Manager of consumer banking, the Managing Director and the other four divisional heads have very limited IS knowledge although the whole management team have excellent knowledge and experience in banking.

*1.2 What sorts of inputs are required from the IT manager?*

The MIS Manager is not involved in SBP. His role is limited to the reactive support for the business plan once it is prepared. However, he maintains informal discussion with senior managers in order to get some early inputs to assist his "reactive" ISSP as well as to let senior managers beware of resource implications for new IST developments.

1.3 Analysis of STROBE

As shown in Chart 1.3, the scores for both Futurity and Riskiness dimensions do not change from three years ago, at present and three years ahead. Since BBB is going to expand the consumer banking activities, a slight growth in the scores of the other four dimensions is expected in the next three years.

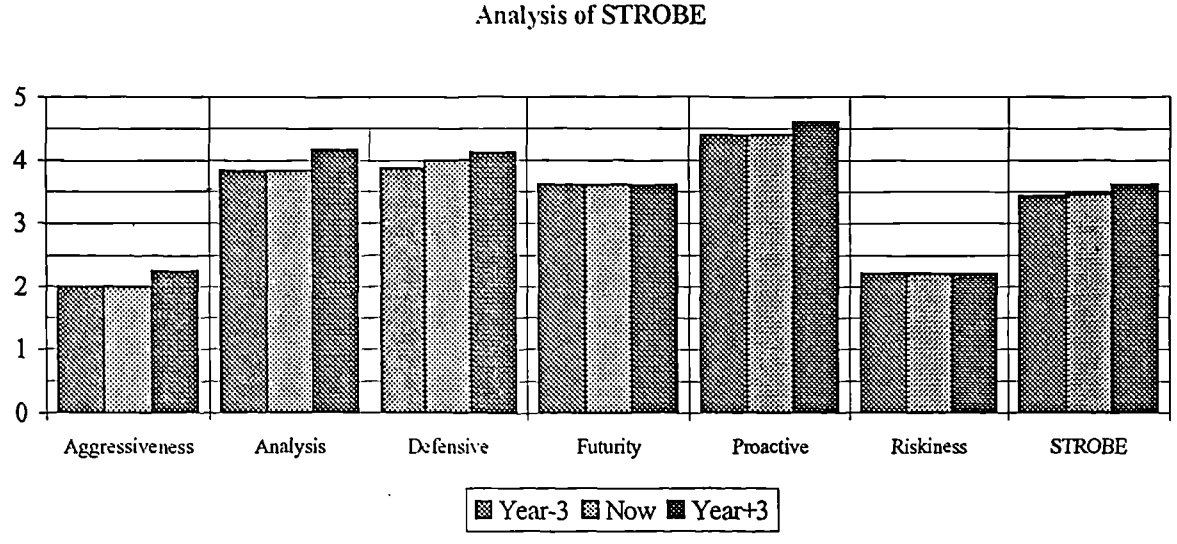


Chart 1.3: Analysis of STROBE

### 8.2.2 Information Systems Strategic Planning (ISSP)

The aim of ISSP is to respond to the requests of IS services from the formulated business plan within budgetary constraints. ISSP is an annual process (with the same time-zone as SBP in November-December with mid year review in May) of the IS Steering Committee, which is chaired by the MIS Manager. The coverage of ISSP is basically one year although some "soft" targets may also be included beyond one year.

*2.1 What are the major Objectives and Coverage of ISSP?*

The MIS Manager revealed that the mission of IS service is to support and enhance business requirements. The major ISSP objectives are to address business requirements and resource planning and impact analysis of on-going systems and new systems. The MIS manager has adapted some of the planning steps from the systems development planning segment of Andersen's Method/1 and has found these planning steps very useful in ISSP.

*2.2 What sorts of inputs are required from the strategic business plans or planners?*

Inputs from IS Steering Committee and headquarters are most important for ISSP while production problems analysis are very useful for short-term operational and maintenance planning. Resources management (both human resources and IS/IT capacity) and upgrade of network and other technology platforms are also included.

*2.3 Are there any means to guide the implementation of IS plans?*

User Resource Committee and project planning are means to co-ordinate the implementation of IS plans.

*2.4 Analysis of STROIS*

There has been a steady increase in STROIS scores both in the past three years and in the next three years as shown in chart 2.4. Since BBB is expanding its consumer banking activities which in turn require more support from IS in all dimensions and especially in the dimensions of Analysis, Riskiness, Futurity and Defensiveness. In particular, the rate of growth in the Analysis dimension is faster in the next three years.

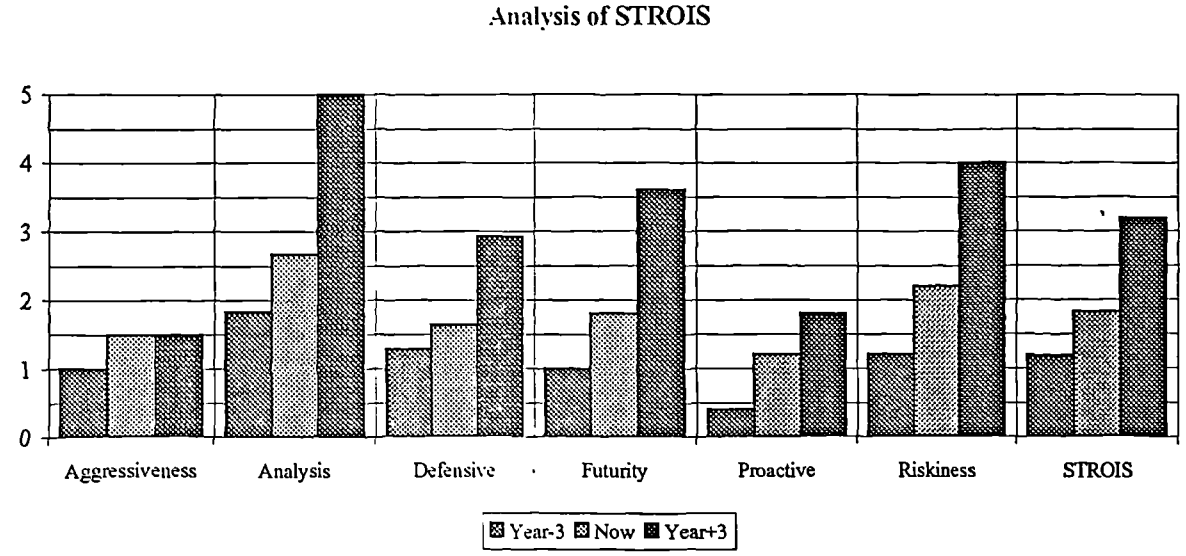


Chart 2.4: Analysis of STROIS

*2.5 Review of ISSP*

It can be observed from Chart 2.5 that the MIS Manager considered ISSP being important especially "Integration of ISSP with Strategic Business Planning", "Implementation of IS Plans" and "Adequacy of Resources for ISSP". However, the ranking of ISSP by the MIS Manager (Chart 2.5) did not get endorsement from the General Manager nor the Operations Manager!

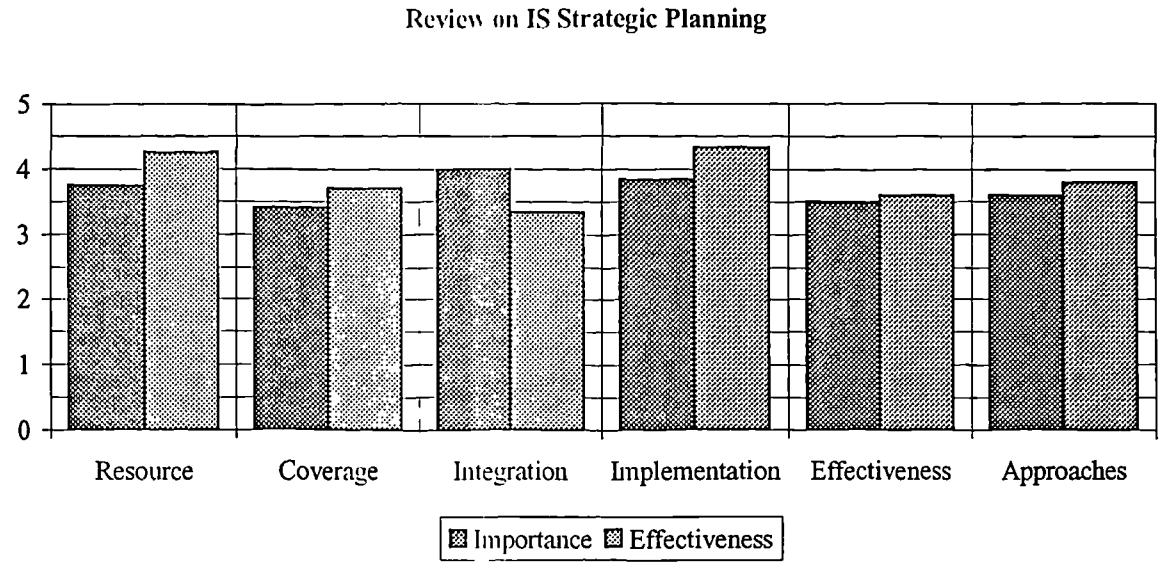


Chart 2.5: Review of ISSP

The MIS Manager considered that ISSP effectiveness is quite high with the exception of "Integration of ISSP with Strategic Business Planning". While the MIS Manager ranked ISSP success as "(4) - successful but can be improved", the Operations Manager considered that ISSP enabled better IT support for banking operations and ranked ISSP success as "(3) - some benefits which can hardly be achieved without ISSP". However, the General Manager considered the ISSP process as being operational or project-based planning rather than strategic planning and he ranked ISSP success as "(2) - some benefits but did not need ISSP to achieve them". The "Proactive" dimension as shown in Chart 2.4 is quite low and both the General Manager and the Operations Manager commented that the MIS department is "reactive" rather than "proactive" in planning for the banking applications and in technology watch! An example of inadequate technology planning by the previous EDP Manager was quoted: after upgrading all branch systems with new communications controllers and new dumb terminals for about a year, the bank replaced all of them with LAN servers and PCs two years ago.

### 8.2.3 Link between SBP and ISSP

*3.1 What are the facilitators and inhibitors for the effective link between SBP and ISSP?*

All three managers consider that top management commitment and involvement is the most important facilitator for linking SBP and ISSP but top management's limited awareness on IST opportunities is seen as a major constraint. The MIS Manager is also concerned that there is insufficient funding on IT to match with business requirements

and technology investments are often among the first to hit during budget cuts.

*3.2 Has your organisation encountered any benefits/problems resulting from the good/poor linkage between SBP and ISSP?*

As a result of good linkage between SBP and ISSP, the bank has experienced good IT resource planning and IS supports/enhances product features as well as better control. However, poor linkage has led to extra overheads in supporting piece-meal systems and short-life systems.

*3.3 Has your organisation considered any comparative business advantage as a guide to IS strategies?*

The bank is very passive in considering any comparative business advantage as a guide to IS strategies. Instead, it concentrates on audit requirements, review and control process in introducing IST.

### 8.2.4 Information Systems Success

*4.1 What criteria are being used to determine the success of your IS services?*

The MIS Manager considered that the success of IS can be determined by the level of reliability; security and controls; and systems performance. Other requirements include up-to-date technology; adoption of open systems concepts; and a reasonable (short) lead-time to introduce systems. The Operations Manager considered that the success of IS can be determined by: up-to-date technology; responsiveness to user's service requests; deliver systems on-time; and MIS staff quality. The General Manager added that it is essential to have top management support in providing appropriate funding for the MIS department.

As shown in Chart 4.1, both the MIS Manager and the Operations Manager ranked IS success three years ago quite poorly. They considered that IS service and IS products have improved substantially and are currently comparable to their competitors in general.

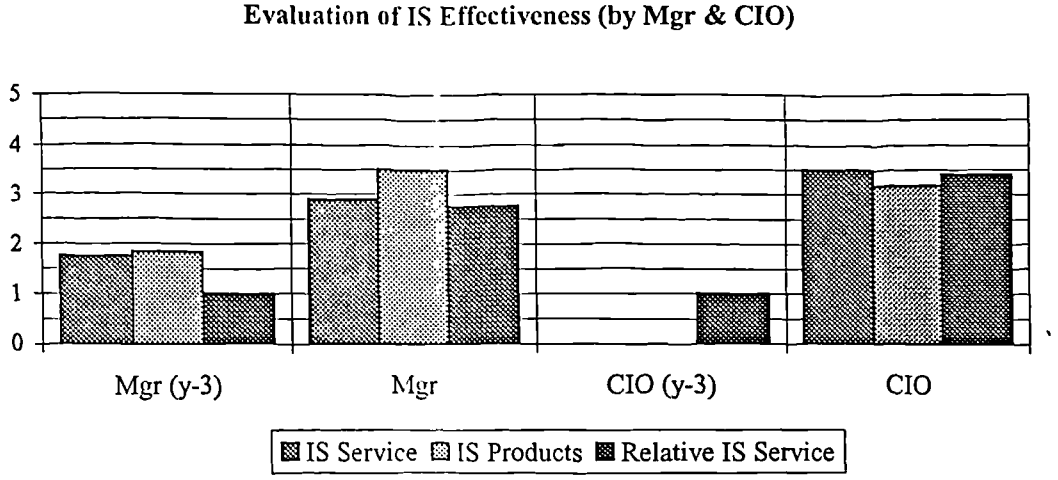


Chart 4.1: IS Success

*4.2 IS Application Portfolio*

As observed from the Strategic Grid in Chart 4.2.1, 60% of BBB's IS applications were classified as Factory. This is consistent with the MIT's Application Portfolio in Chart 4.2.2, whereby 40% of its IS applications were in level 2, internal integration. Furthermore, 70% of its IS budget are in software and IS development with 30% on hardware and maintenance. The budget allocation is consistent with its application portfolio in order to maintain a very high standard of coherence in the integration and upgrade of the scattered/piece-meal systems introduced in previous years.

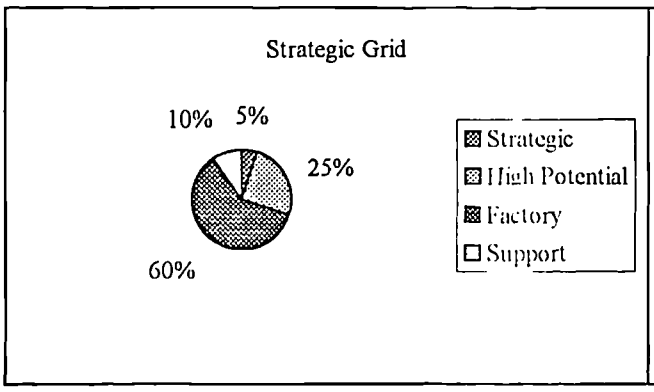


Chart 4.2.1: Strategic Grid

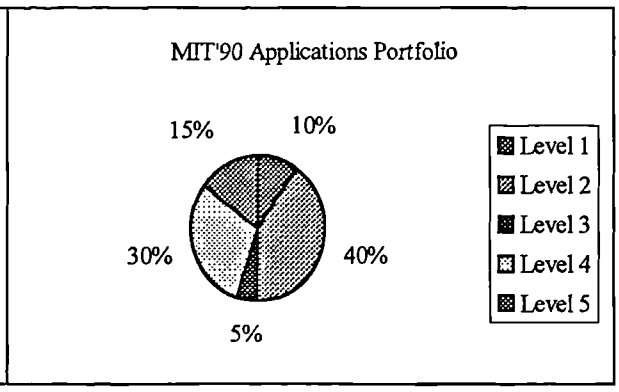


Chart 4.2.2: MIT's Application Portfolio

### 8.2.5 Recommendations

Based on the findings from questionnaire analysis and case study interviews, the ISSP effectiveness and IS Success characteristics of BBB are summarised in Table 46 while the strategic orientation chart is shown in Chart 8.2.5

| Perceived ISSP Effectiveness | Perceived IS Success |
|---|---|
| <u>More Effective Indicators</u><br>1. End-users' ability in defining business information requirements<br><br><u>Less Effective Indicators</u><br>1. GM's dissatisfaction with ISSP success<br>2. Inadequate Technology watch<br>3. ISSP being reactive<br>4. Inadequate Top Management support and involvement<br>5. Inadequate quality of Inputs from Top Management<br>6. MIS manager is not aware of the business direction | <u>More Satisfied with or Better in</u><br>1. End-users' ability in defining business information requirements<br><br><u>Less Satisfied with or Weak in</u><br>1. IS delivered on-time<br>2. IS delivered within budget<br>3. Weak in application of IS to advance CSFs<br>4. Short-lived IT investments (due to inadequate technology watch)<br>5. Inadequate quality of IS Services in supporting the Business |

*Table 46 : Configurational Characteristics (Business-strategy-led Case)*

Trend of STROBE against STROIS

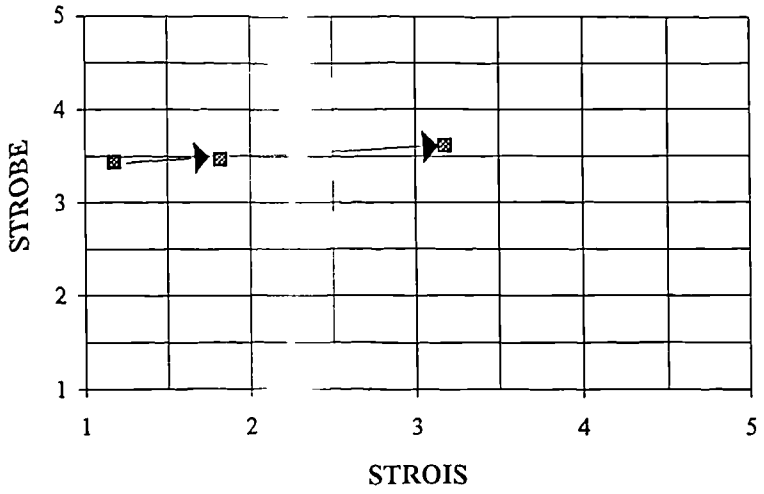


Chart 8.2.5 : Trend of STROBE vs. STROIS

The competitive environment of banking operations in Hong Kong demands a relatively high strategic orientation of banks. Hence, business-strategy-led alignment type is very common. BBB is well known for its conservative business strategy. The lack of aggressiveness in the competitive banking industry may lead to a decline in market share. Although it has started to expand its Hong Kong operations, its business strategy remains relatively conservative. BBB recognises that its IS services are very much behind its major competitors especially in the area of consumer banking. Hence, BBB has started to raise its IS strategic orientation (as shown in Chart 8.2.5) over the past three years and expects to rapidly improve its IS services in order to shorten the gap in IS services between their competitors.

However, increasing IT investments alone will not necessarily improve the overall effectiveness of IT services. There is an urgent need for the senior management group to learn more about the benefits offered by banking technology so that their future strategies will include both business-driven and technology-driven opportunities. Since the bank is adopting a more aggressive business strategy, there is an urgent need to

develop a better IT infrastructure, and especially to obtain more qualified and experienced IS staff. This could be achieved by outsourcing part of the IT functions, staff development and recruiting highly qualified IT professionals as business systems analysts (with good experience in banking application systems). Also, the MIS Manager should play a more pro-active role in strategic business planning so that the opportunities and constraints of IST could be assessed at an early stage of business planning. Better IS alignment could only be achieved through a more proactive approach in ISSP and the MIS manager must take a more active role in business planning.

## 8.3 Conservative Case

A1 Certified Public Accountants - Hong Kong (CCC)

Background

CCC is a fully owned subsidiary of CCC International, which is an international accounting firm with headquarters in Europe. CCC started its Hong Kong operations in 1970's and CCC is now a medium-sized accounting firm in Hong Kong with over 40 staff. CCC is managed by three managing partners. It provides accounting, auditing, taxation, and company secretarial services to their clients and over 80% of their clients are foreign investors or traders (mainly from Europe) participating in various industries in Hong Kong and China. There are six departments with four client services departments covering the above areas in addition to two support departments, namely EDP and internal Accounting & Administration.

Case Study Analysis

Three senior managers (a managing partner who also acts as the CEO for CCC, an Audit Manager and the EDP manager) completed the three questionnaires (A, B, C respectively) in October 1995. The author was also granted access to some of their internal documents (e.g. the organisation chart, mission statement, and background of the organisation, etc.). The findings from the questionnaires and their respective Charts were compiled and then returned to the respondents for review and comments. The author conducted individual interviews with the CEO and the Audit Manager in November 1995. The EDP manager replied that there is no formal ISSP in CCC and did not see the need for an interview. Hence, the inputs from the EDP manager are limited to his responses to Questionnaire C. A list of interview questions was sent to each interviewee one week prior to the interview. Follow-up phone calls were also made to confirm the findings.

### 8.3.1 Strategic Business Planning (SBP)

The three managing partners formulate major organisational goals which are documented for reference by departmental managers. Since the three of them can meet regularly to decide the firm's policies, they consider that formal SBP is not always necessary.

*1.1 Are there any means to exploit technology opportunities for business benefits in SBP?*

There is no specific approach, processes nor specific planning methods although CSFs analysis and SWOT analysis may be occasionally used. The CEO considers that the major CSFs are service level; staff quality and training; linking with international clients; and professional presentation and reports. Future plans include the marketing of computer services based on cost/benefits analysis versus client needs.

*1.2 What sorts of inputs are required from the IT manager?*

The EDP manager is participating in the planning activities as an advisor in addressing IT related issues. In particular, the firm is exploring the opportunities on computer services, which can be sold to clients such as compliance, communications and e-mail, reporting systems, work in progress, budgetary and control systems, billing and time reporting.

*1.3 Analysis of STROBE*

There has been a steady increase in STROBE scores both in the past three years and in next three years as shown in Chart 1.3. Scores for Aggressiveness, Proactiveness and Riskiness are very stable because the headquarters control the minimum price levels at a comparable level with major international audit firms (Aggressiveness) and CCC provides a traditional accounting and auditing service (low in Proactiveness and Riskiness).

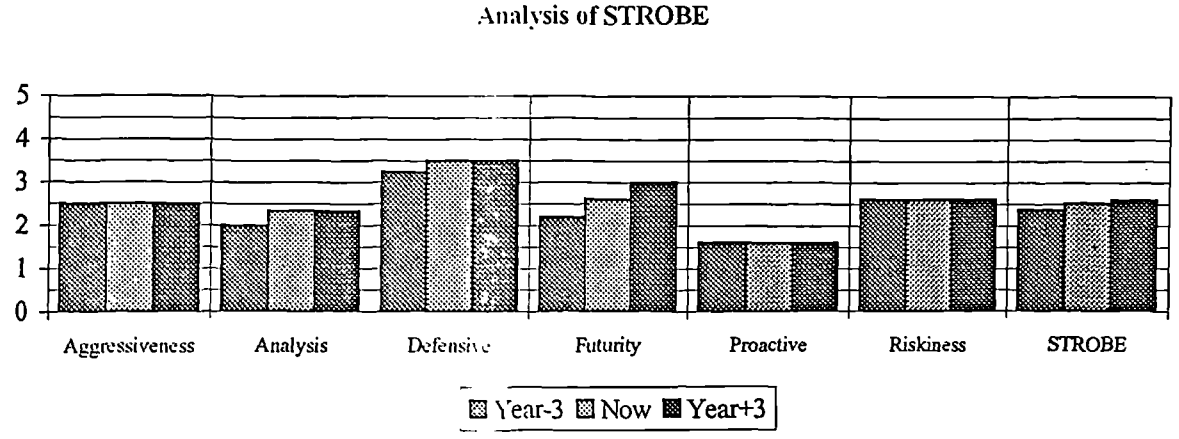


Chart 1.3: Analysis of STROBE

### 8.3.2 Information Systems Strategic Planning (ISSP)

There is practically no formal ISSP in CCC.

*2.1 What are the major Objectives and Coverage of ISSP?*

There is no formal ISSP in CCC. Based on the business requirements passed from the CEO, the EDP Manager prepares the budget on both hardware and software requirements and then pass it back to the CEO for approval. Hence, ISSP is reactive to business planning.

*2.2 What sorts of inputs are required from the strategic business plans or planners?*

The CEO provides informal inputs to ISSP.

*2.3 Are there any means to guide the implementation of IS plans?*

Project planning is used to schedule implementation.

*2.4 Analysis of STROIS*

As shown in Chart 2.4.1, the scores for Aggressiveness and Riskiness remain low because the managing partners analysed these two dimensions manually instead of depending on IS. IS support operations by providing key indicators for analysis and forecasting.

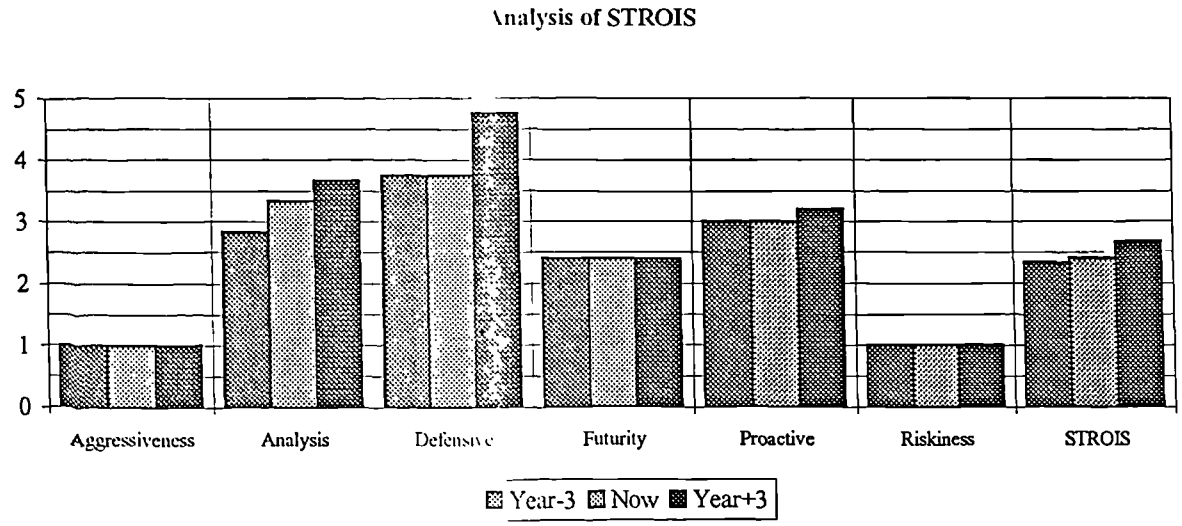


Chart 2.4: Analysis of STROIS

*2.5 Review of ISSP*

The EDP Manager considered that all ISSP dimensions were important except Coverage. This was partly due to the small establishment of the EDP department (EDP Manager with three programmers) which would limit their coverage as well as their Implementation effort.

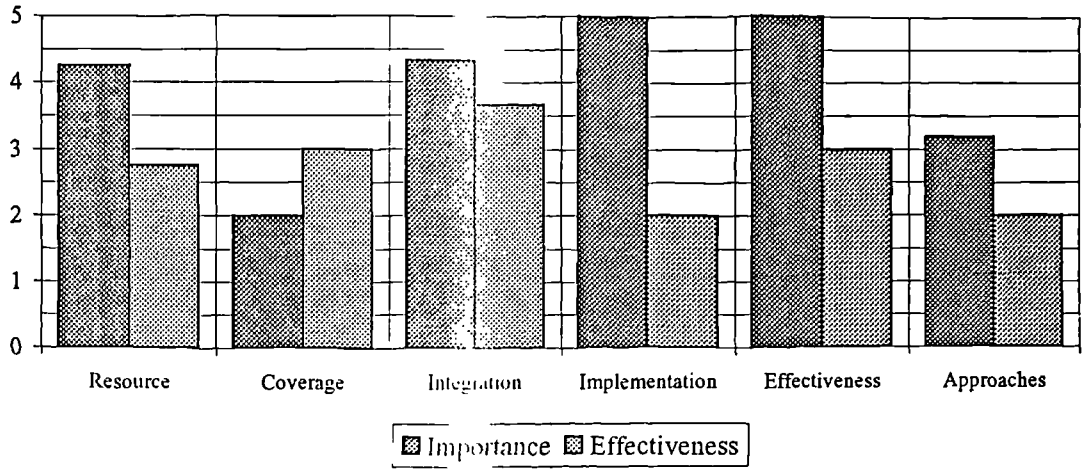


Chart 2.5: Review of ISSP

While the EDP manager ranked ISSP process as "(5) - highly successful", both the CEO and the Audit Manager ranked it as "(4) - successful but can be improved".

### 8.3.3 Link between SBP and ISSP

*3.1 What are the facilitators and inhibitors for the effective link between SBP and ISSP?*

CCC does not have any formal SBP nor ISSP. However, the CEO recognises the benefits from computerisation. Hence, there is an informal linkage between the CEO and the EDP Manager. Whenever the CEO has some business plans, he will seek advice from the EDP Manager. Once the EDP Manager understands the business requirements, he will plan how to use IST to support/enhance these requirements. Due to the close connection and interactions between the CEO and the EDP Manager, the linkage between SBP and ISSP is considered by all the respondents to be quite effective.

*3.2 Has your organisation encountered any benefits/problems resulting from the good/poor linkage between SBP and ISSP?*

Both the CEO and the Audit Manager have experienced the following benefits of good alignment:

- Elimination of repetitive tasks through office automation and better reporting systems;
- IS can assist staff for improving productivity via comparative analysis;
- IS provide analysis on historical data and receivable for improving management and cash-flow control.

*3.3 Has your organisation considered any comparative business advantage as a guide to IS strategies?*

This is not being experienced by CCC and its positioning strategy is not going for leading edge.

### 8.3.4 Information Systems Success

*4.1 What criteria are being used to determine the success of your IS services?*

The CEO emphasised "value for money" as the most important criteria. More specific criteria include: improvement in efficiency within office productivity and better reporting systems to ensure that its quality of written work is in the top 10% to 15% within the industry.

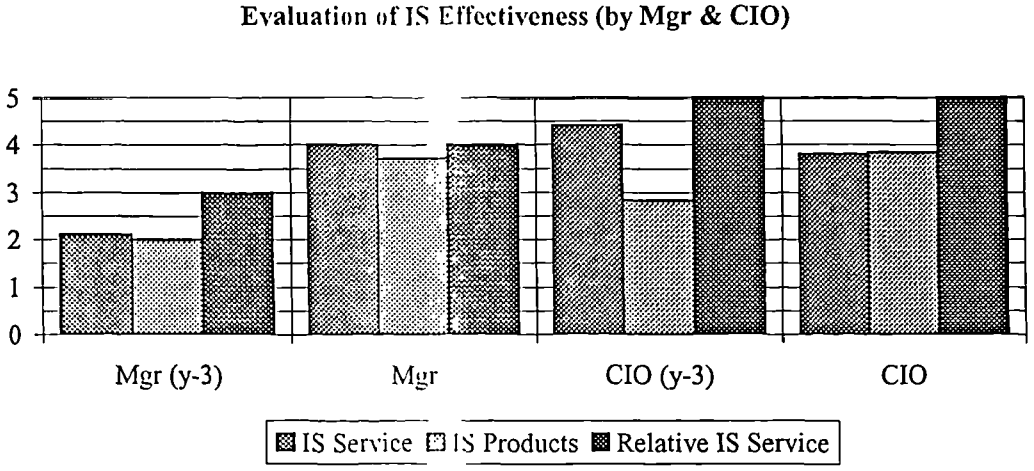


Chart 4.1: IS Success

*4.2 IS Application Portfolio*

The EDP Manager considered that the survey on IS Application Portfolio is not very useful and he arbitrary filled in the portfolio with "equal" ratios as shown in both charts! Hence, this part cannot be analysed by the charts.

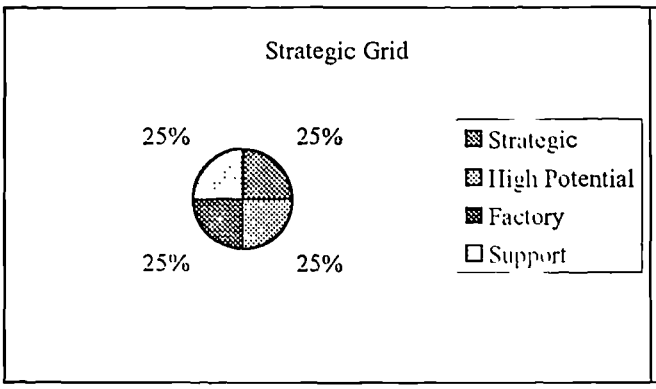


Chart 4.2.1: Strategic Grid

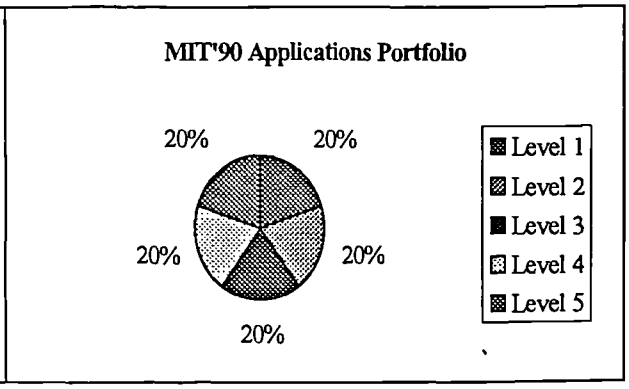


Chart 4.2.2: MIT's Application Portfolio

### 8.3.5 Recommendations

Based on the findings from questionnaire analysis and case study interviews, the ISSP effectiveness and IS Success characteristics of CCC are summarised in Table 47 while the strategic orientation chart is shown in Chart 8.3.5

| Perceived ISSP Effectiveness | Perceived IS Success |
|---|---|
| <u>More Effective Indicators</u><br>(no obvious item)<br><br><u>Less Effective Indicators</u><br>1. Limited resource allocation to planning<br>2. Inadequate communications between IS planners and business planners<br>3. Inadequate Management support and involvement<br>4. Inadequate quality of Inputs from Top Management<br>5. Little planning but tight control of human, software and hardware resources<br>6. Inadequate User involvement | <u>More Satisfied with or Better in</u><br>1. CEO's satisfaction with cost-effective IS service<br><br><u>Less Satisfied with or Weak in</u><br>1. Lack of end-user computing tools<br>2. Inadequate technical quality of IS |

*Table 47 : Configurational Characteristics (Conservative Case)*

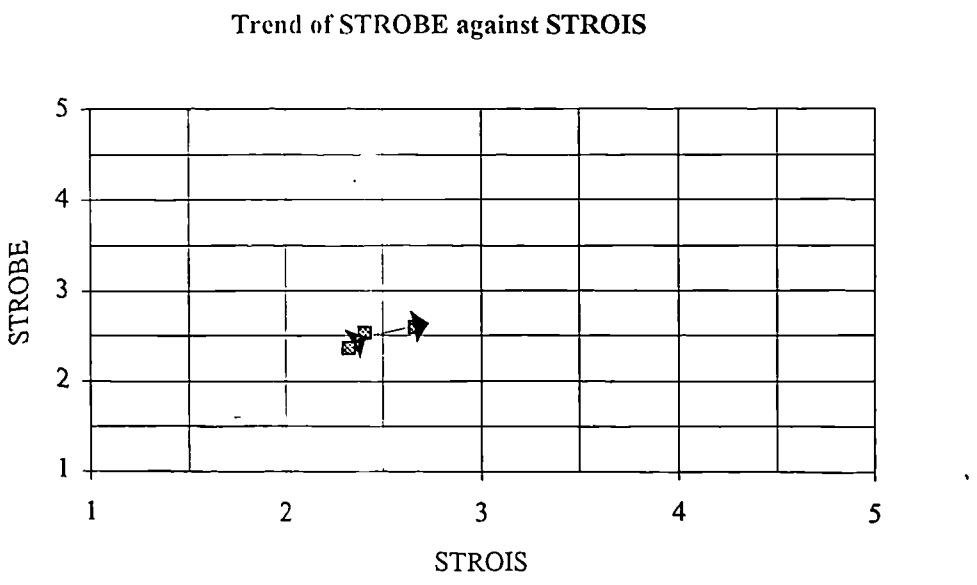


Chart 8.3.5: Trend of STROBE vs. STROIS

Since the ISSP in CCC is informal but "business-led" (Earl 1993) and there is little change in the business strategy, CCC has remained in the Conservative classification (low in both STROBE and STROIS) three years ago, at present and three years ahead as shown in Chart 8.3.5. The CEO is fully aware of the supporting role of IS in the organisation and is satisfied with the cost-effective IT service though the user managers would like to demand better service. Since CCC is well-established and is operating in a stable business environment, it can remain cost-effective to stay at the "conservative" environment because its business is not highly dependent on IT at present. Although this is a typical case of a "conservative fit" where the demand for and supply of IS service is relatively low, certain areas could be improved. Perhaps, the tight IT budget coupled with demand for better IT services from users should lead to more end-user computing activities.

## 8.4 Organisation-Led Case

H1 Authority - (OOO)

Background

The H1 Authority (OOO) was established in the early 1990's for managing over 40 government and subvented hospitals in the Big Island. There are around 40,000 employees.

Case Study Analysis

Three senior managers (a hospital chief executive, an executive manager and a senior systems manager) filled in the questionnaires. The author was also granted access to some of their internal documents (e.g. part of business strategy plan - OOO Annual Plan 1995/96 and 1996/97, Overview of the OOO IT/IS Strategy 1992-2000, annual report 1994/95 and the organisation Chart.). The findings from the questionnaires and their respective Charts were compiled and then returned to the respondents for review and comments. This is followed by individual interviews with the Deputy Director-IS (to be abbreviated as CIO) and an Hospital Chief Executive. A list of interview questions was sent to each interviewee at least one week prior to the interview. Further discussions were also held with an IT manager in addition to the two interviewees. Follow-up phone calls were also made to confirm the findings.

### 8.4.1 Strategic Business Planning (SBP)

SBP is carried out on a periodic basis by the Corporate Plan Steering Committee comprising CEO of OOO and all Deputy Directors (including the CIO).

*1.1 Are there any means to exploit technology opportunities for business benefits in SBP?*

There is a good awareness of business direction within the senior management group (of which the CIO is a member). Senior managers accept that information and database models are very useful to support their business and to operationalise IT infrastructure. Furthermore, Hospital Chief Executives and senior management are gaining insights of technology opportunities from their visits to overseas hospitals.

*1.2 What sorts of inputs are required from the IT manager?*

CSFs are used by senior managers to derive information needs. Hospital Chief Executives define their business and interface requirements with CIO (e.g. in defining information superhighway and in the transfer of laboratory test results, etc.).

*1.3 Analysis of STROBE*

As shown in Chart 1.3, OOO's overall score in STROBE is increasing steadily both in the past three years and in the next three years and is well above the mid-point of 3.0. With the exception of a continuous reduction in Riskiness score, (as expected in the Health Care Industry) all scores in the other five dimensions are increasing. Due to the heavy subsidy from the Government, OOO provides patients with medical services at a much lower cost than private hospitals or clinics (Aggressiveness).

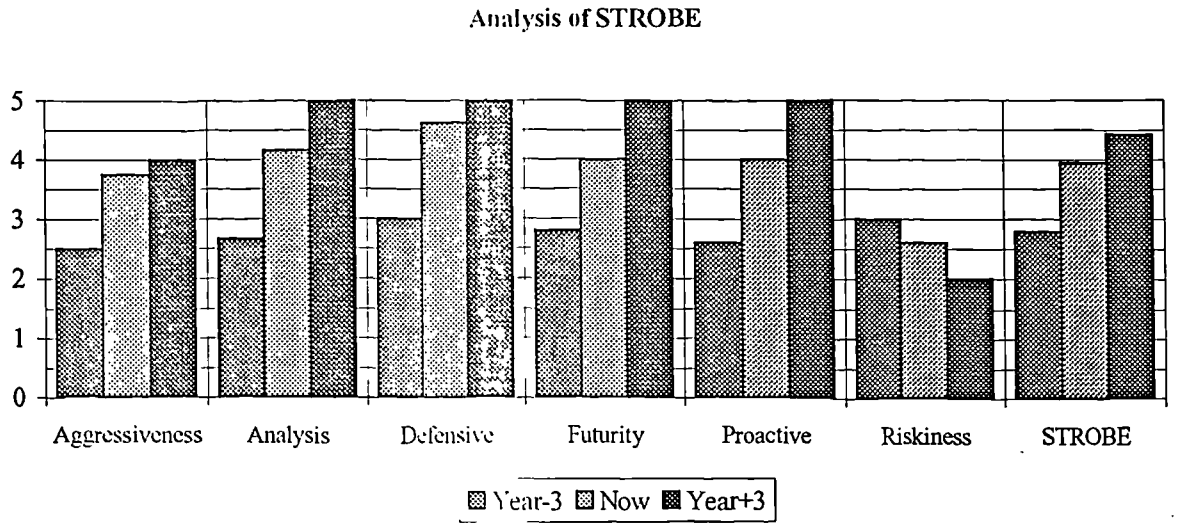


Chart 1.3 Analysis of STROBE

### 8.4.2 Information Systems Strategic Planning (ISSP)

There are 120 full-time staff in the IT Department and its annual operating budget is over GBP 11 million in 1995/96. The CIO is responsible for the ISSP process and is assisted by a Chief Systems Manager working almost half-time on ISSP. The role of IS/IT in OOO has 4 key aspects (OOO Annual Plan 1996/97): (1) enabling innovation; (2) enabling process re-engineering; (3) systems integration; and (4) infrastructure design, development and maintenance. The first IT/IS strategy (1992-98) was approved by Executive Committee.

*2.1 What are the major Objectives and Coverage of ISSP?*

Top-down planning and bottom-up implementation have been adopted and the aim is also to maximise parallelism (satisfy multiple requests). The direction of IS strategy is to ensure that Hospital IS is supported by the following three initiatives:

(1) Information and database models are considered by the CIO as the basis to develop their IT infrastructure.

(2) Application Portfolio: Concurrent developments are encouraged subject to overall framework and availability of human resources.

(3) Overcoming Barriers: Plan and resolve behavioural issues

*2.2 What sorts of inputs are required from the strategic business plans or planners?*

Information management is one of the CSFs for business functions.

*2.3 Are there any means to guide the implementation of IS plans?*

The CIO considers that design is more important than implementation. When the overall design is sound, implementation plans will be monitored via individual project management plans.

*2.4 Analysis of STROIS*

As shown in Chart 2.4.1, there is a steady increase in STROIS scores in the past three years but they are more stable in the next three years. Once again, there is a relatively higher score in Analysis.

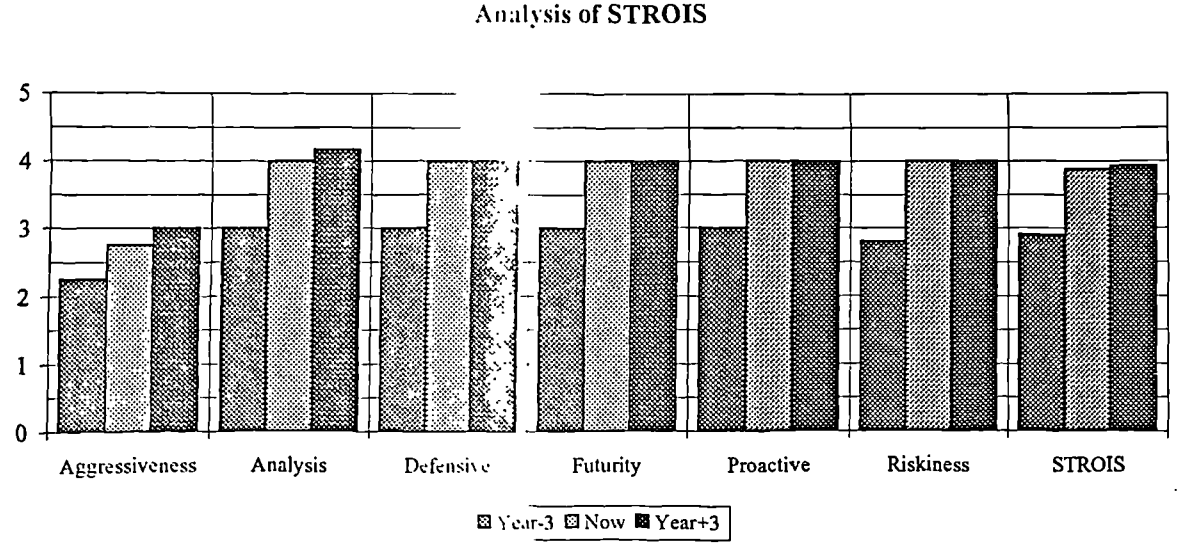


Chart 2.4: **Analysis of STROIS**

*2.5 Review of ISSP*

The CIO has adopted a combination of enterprise data modelling, CSFs and BSP-like planning method. Top-down planning is used to define business requirements via enterprise data modelling and CSFs analysis while bottom-up implementation planning is used for designing IS/IT architecture. The Hospital Chief Executive, the senior manager and CIO all ranked their ISSP success with a relatively high score of 4.0, which represents "Successful but can Improve". This ranking is consistent with the ranking in Chart 2.5, which all ISSP dimensions have a higher score in "importance" than "effectiveness".

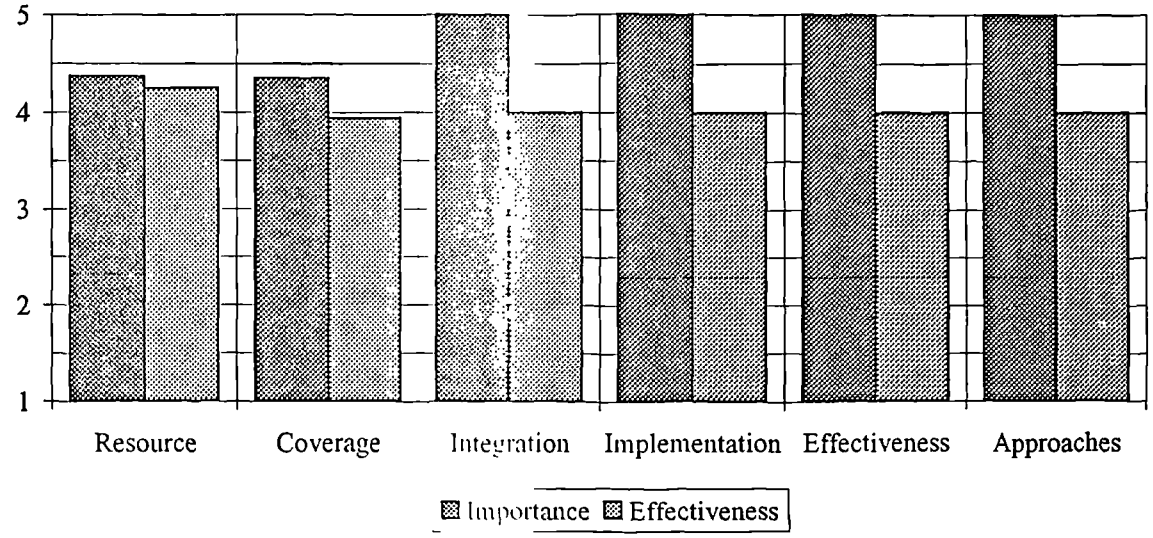


Chart 7. : Review of ISSP

### 8.4.3 Link between SBP and ISSP

*3.1 What are the facilitators and inhibitors for the effective link between SBP and ISSP?*

The CIO considers that the most important facilitator is people and leadership bridging between business and IT. This is followed by an appropriate IS/IT infrastructure that enables long-term requirements and applications to be developed and supported by short-term deliverables. The inhibitors include (1) poor communication; and (2) structural deficiency, where conflicting role and responsibility exist.

The Hospital Chief Executive considers that the link between SBP and ISSP is highly important especially for more sophisticated information flow in hospitals. Also, centralised database systems and communication networks/e-mail are essential for supporting hospital operations.

*3.2 Has your organisation encountered any benefits/problems resulting from the good/poor linkage between SBP and ISSP?*

Both the CIO and the Hospital Chief Executive agree that IS have to match with organisational cycles and industry demands. The Hospital Chief Executive uses the example of "multi-key access to answer patient's enquiry." Poor linkage is considered as fatal to the development of the organisation and especially IS.

*3.3 Has your organisation considered any comparative business advantage as a guide to IS strategies?*

The CIO considered that comparative business advantage as a guide to IS strategies include matching technology trend; outpatients and confidentiality. The Hospital Chief Executive expects that with better IT support, doctors and nurses can give more attention to patients as well as have better control of abnormal cases.

### 8.4.4 Information Systems Success

*4.1 What criteria are being used to determine the success of your IS services?*

The following criteria have been used by the CIO: contribution to enterprise success; dependency on IT; outcome of evaluation audit (both internal and external); customer evaluation (satisfaction/fulfilled needs in dollar terms are resulting in organisational behavioural change); and outcome and process are based on value-added to business and the co-ordination between main stream developments and end-user computing

The following criteria were suggested by the Hospital Chief Executive: more user friendly and reliable systems; IT-enabled BPR; use of IT for promotion of health programmes; training and education.

Both the user manager and the CIO are satisfied with IS service, IS products and relative IS service and they gave a relatively high ranking (at or above 4.0) to all these dimensions.

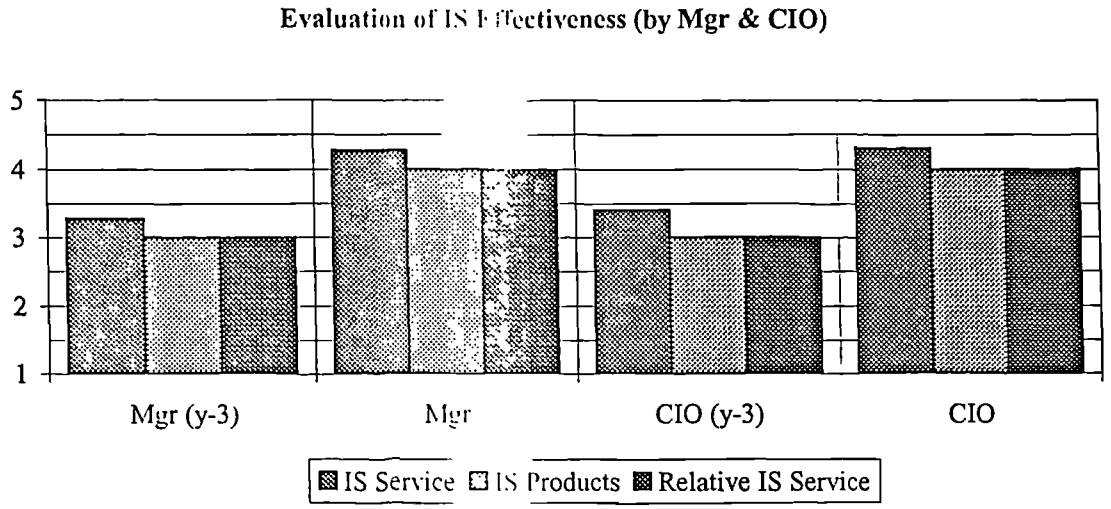


Chart 4.1: IS Success

4.2 IS Application Portfolio

Since OOO was established in 1991 and all systems were either developed in-house (by the high calibre professionals and managers in IT department) or through acquisition of application software packages. Hence, they have a very low % of "support" and "high potential" applications in the Grid as well as a very low % in "level 1" within the MIT portfolio.

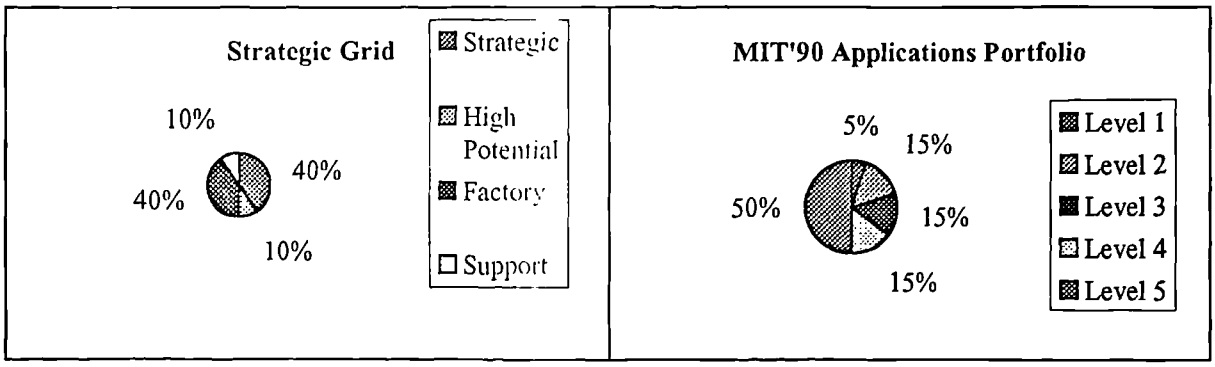


Chart 4.2.1: Strategic Grid

Chart 4.2.2: MIT's Application Portfolio

### 8.4.5 Recommendations

Based on the findings from questionnaire analysis and case study interviews, the ISSP effectiveness and IS Success characteristics of OOO are summarised in Table 48 while the strategic orientation chart is shown in Chart 8.4.5.

| Perceived ISSP Effectiveness | Perceived IS Success |
|---|---|
| More Effective Indicators (in most items, especially those below)<br>1. CIO is a member of the management board and participates in business planning<br>2. Good top management support in planning both business and IS strategies.<br>3. Good planning and implementation of IT infrastructure<br>4. Good functional applications<br><br>Less Effective Indicators<br>(no obvious item) | More Satisfied with or Better in (in most items, especially those below)<br>1. Top management, users and CIO are all satisfied with IS service<br><br>Less Satisfied with or Weak in<br>(no obvious item )<br>In view of its huge IT budget, it may be argued whether the good IS service is cost effective - this is difficult to measure in health services. |

*Table 48 : Configurational Characteristics(Organisation-led Case)*

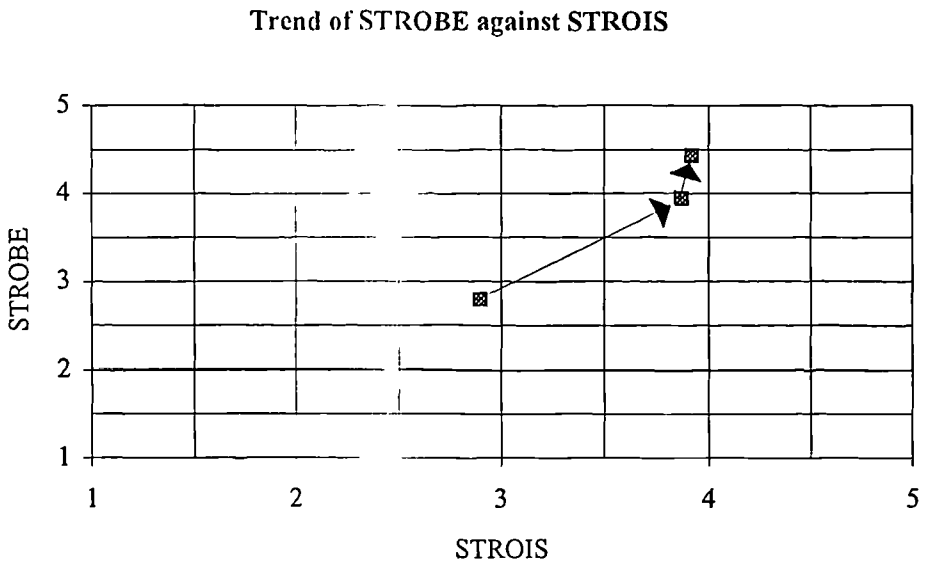


Chart 8.4.5: Trend of STROBE vs. STROIS

It can be argued that the success of IS may depend on the capability of the IT department to deliver quality and efficient systems as well as the ability of end-users to clearly define their business requirements and information needs. OOO is a well-established organisation with high calibre managers and staff. Hence, they are very successful in their operations both in medical services and IT services. The founding Chairman of their Management Council is a visionary person, who approved a block grant of over GBP 40 million for the IT department to establish the IT infrastructure for OOO from 1991/92 to 1995/96. The CIO made the initial justifications for funding and could then concentrate on developing the IT infrastructure and IS services for OOO (This is very different from the MIS manager in the case BBB bank who had to struggle with the justifications for IT spending against cost-based investment appraisal methods, which had been invented long before the invention of computers.) There is a very large training section to run various IT/IS training programmes and management seminars in order to ensure that medical professionals, end-users and managers are well aware of the application of IT for delivering medical information (such as transferring laboratory test results or patient records via LAN/WAN within the hospital and to other hospitals), information management and daily operations. This may explain why OOO can be so

successful in the "Organisation-led" category. In order to enable the OOO to sustain the successful "Organisation-led" position with the rapid increase in the complexity and demand for quality healthy-care services, the CIO expects that adequate resource allocation for the IT department must continue after the block grant allocation ending in 1995/96! Should this resource allocation not be sufficient, the CIO will have to re-examine their position and adopt a more conservative role - the implications of this are further discussed in Chapter 9.

## 8.5 Technology-Led Case

T3 Shipping (Hong Kong) Company Limited - (TTT)

Background

TTT is a fully owned subsidiary of TTT International Line, which operates as a world-wide liner shipping agency business with headquarters in Asia. TTT started its Hong Kong operations with a few staff and one office in early 1980's and has expanded to over 400 staff in 20 offices in Hong Kong and China in 1996. TTT provides a round-the-world shipping service connecting the Far East, North America, North Europe, the Middle East, Intra-Asia, and especially China and Hong Kong. Supplementary and associated services include international forwarding, land transportation (especially China and Hong Kong), container haulage, container port operation, and container leasing, etc.

TTT canvasses cargo to load on board ships. In order to avoid any delays, TTT have to generate, prior to and after the ship's departure, a large quantity of different types of time-related shipping documentation (e.g. shipping order, container inter-charge, bills of lading, cargo and freight manifest, etc.). The development of an efficient telecommunication infra-structure within its 20 offices in Hong Kong and China as well as in communicating with other ports is very important.

Shipping is an international business with strong competition from local, regional and global lines.

Case Study Analysis

The chosen Business Unit from organisation #64 was found to be the China Services Department of the organisation. Its China operations have established many branch offices and the major role of IT is to build telecommunication infrastructure - this is a very typical case in Technology-led organisations. However, further discussions with the Senior Manager, MIS (to be abbreviated as MIS manager) has led to the author's belief that this business unit may not be entirely suitable for the purpose of case study analysis because most of the IT professionals, users and managers are mainland staff in China rather than staff in Hong Kong. This variation will make the unit of analysis very

different from the other cases. Hence, another Business Unit was chosen - the Intra-Asia Services Department within TTT.

Once again, three senior managers (general manager, senior manager-export, and MIS manager) completed the three questionnaires (A, B, C respectively) in October 1995. The results of the embedded survey also indicated that the Intra-Asia business unit is also a Technology-led case though the China operations may be more typical. Therefore, the data presented in this analysis is different from those of organisation #64.

The author was also granted access to some of their internal documents (e.g. the organisation Chart, mission statement, background of the organisation and its branch offices, etc.). The findings from the questionnaires and their respective Charts were compiled and then returned to the respondents for review and comments. The author arranged individual interviews (more formal) with the managing director and the MIS manager in November 1995 to January 1996. A list of interview questions was sent to each interviewee one week prior to the interview. Follow-up phone calls were also made to confirm the findings. Further discussions were also held with the manager in finance and accounting, as well as the BPR manager. (Remarks: four Business Units had completed the questionnaires with outcome of their alignment types being shown in Chart 8.5.5. Due to time constraints at present, the results from only one Business Unit is illustrated in this case study.)

### 8.5.1 Strategic Business Planning (SBP)

Organisational mission statement for TTT and departmental mission statement have been formulated. The SBP team members include the managing director, two directors and a general manager. Although there is no formal method in SBP, a top-down planning approach, with major inputs from the headquarters (TTT) and the managing director of TTT, is supported by bottom-up consultations from managers of SBUs on implementation issues. The annual SBP is a formal planning process and its coverage is usually three years. The duration for SBP is usually two to three months and a minor revision takes place in the mid-year.

*1.1 Are there any means to exploit technology opportunities for business benefits in SBP?*

There is no formal approach method to exploit technology opportunities for business benefits in SBP but the managing director is well aware of technology opportunities in the industry.

*1.2 What sorts of inputs are required from the IT manager?*

There is no direct inputs from the MIS manager. However, the managing director is indirectly assuming the role of CIO. He is well aware of the IT opportunities for the shipping industry and he is very active in initiating new BPR projects using IST as an enabler.

*1.3 Analysis of STROBE*

There has been a steady increase in STROBE scores both in the past three years and in next three years as shown in Chart 1.3. Aggressiveness and Proactiveness scores are relatively stable with the exceptions of short term changes. The headquarters control the minimum price levels but decided to set a lower price for three months at the end of 1995, which affected current Aggressiveness scores. Also, the implementation of a few new customer services as part of their BPR projects in 1995 have increased the current Proactiveness scores. Major changes are seen in the Analysis, Defensiveness and Futurity scores. They are using more Analyses from management and accounting systems in order to assist their day-to-day decision making processes. Their Defensive behaviour focuses on cost reduction and motivation of staff to provide better service to customers. Their Futurity effort focuses on increased bookings via better forecasting and tracking of 'valued' customers.

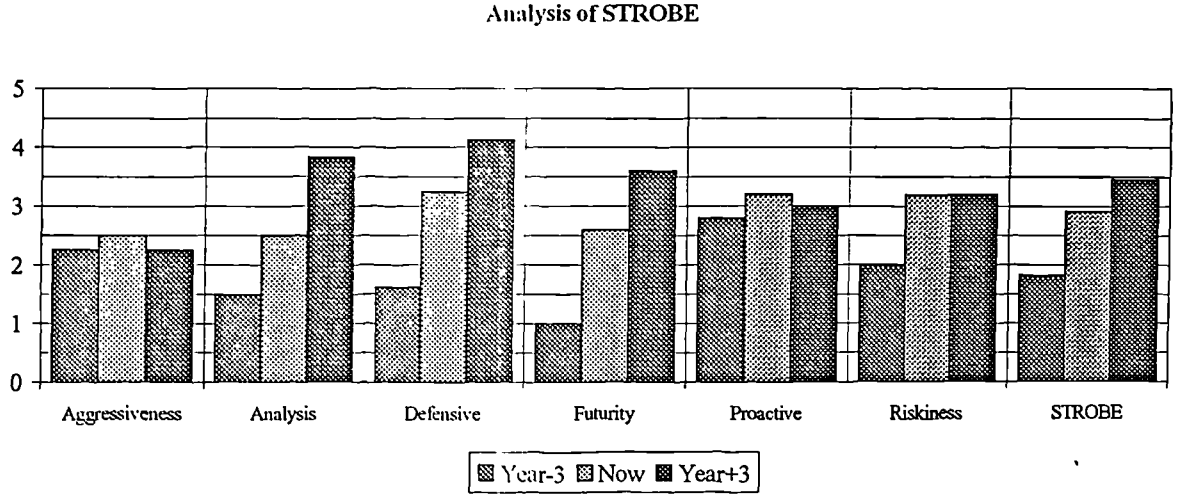


Chart 1.3: Analysis of STROBE

### 8.5.2 Information Systems Strategic Planning (ISSP)

The annual ISSP is a formal planning process and its coverage is usually one to two years. The duration for ISSP is usually one month. The ISSP team members include the managing director, two directors, a general manager and the MIS manager.

*2.1 What are the major Objectives and Coverage of ISSP?*

The managing director revealed that the mission of IS service is to support and enhance business operations. The major ISSP objectives are to identify current and future information needs for the organisation that reflect close alignment of business and IST strategies, objectives and functions. The MIS manager considered that his role in ISSP is to introduce state-of-art technology and to establish a sound IT infra-structure. Capacity planning is included in ISSP. Informal communication between the MIS manager and user managers is the only means of getting inputs for ISSP. Also, linkage of application and networks is considered as an important outcome of ISSP.

*2.2 What sorts of inputs are required from the strategic business plans or planners?*

Ad-hoc and informal inputs are often passed from the managing director to the MIS manager. The MIS manager sometimes finds it difficult to handle these ad-hoc inputs without further discussions with the managing director, who is often too busy.

*2.3 Are there any means to guide the implementation of IS plans?*

Short term project planning is the only means to co-ordinate the implementation of IS plans.

*2.4 Analysis of STROIS*

There has been a steady increase in STROIS scores both in the past three years and in next three years as shown in Chart 2.4.1. The pattern of STROIS follows STROBE to a certain extent with more rapid increase in Analysis, Defensiveness and Futurity as well as stable Aggressiveness and Proactiveness. Since shipping is an information intensive industry, effective use of MIS (Analysis) to generate various types documents and control reports for routine decision making (e.g. load calculation and re-routing) is essential and important. MIS is also heavily used in cost control (Defensiveness). The BPR study initiated more IS support for their future operations (Futurity), especially in customer service.

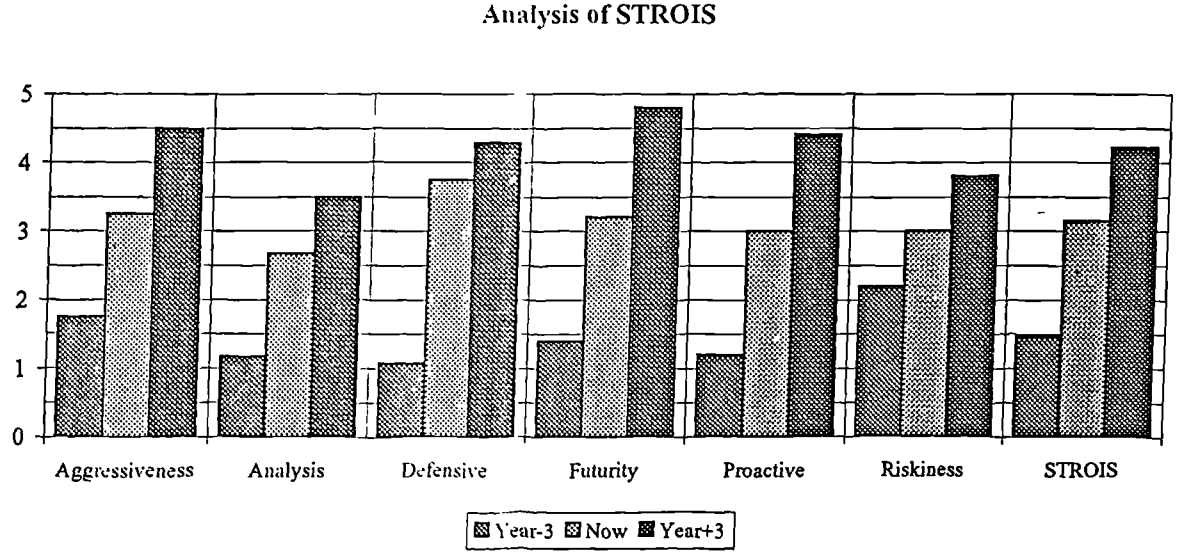


Chart 2.4: Analysis of STROIS

*2.5 Review of ISSP*

It can be observed from Chart 2.5 that the MIS manager considered ISSP as very important especially Integration of ISSP with Strategic Business Planning, Coverage of ISSP, and Adequacy of Resources for ISSP. However, the effectiveness of planning was constrained by the limited IS knowledge of the senior managers to define their business information requirements and the limited business knowledge of IT staff.

While the MIS manager ranked ISSP success as "(4) - successful but can be improved", the Operations Manager ranked it as "(3) - some benefits which can hardly be achieved without ISSP". However, the General Manager considered the ISSP process as being operational or project-based planning rather than strategic planning and he ranked ISSP success as "(2) - some benefits but did not need ISSP to achieve them".

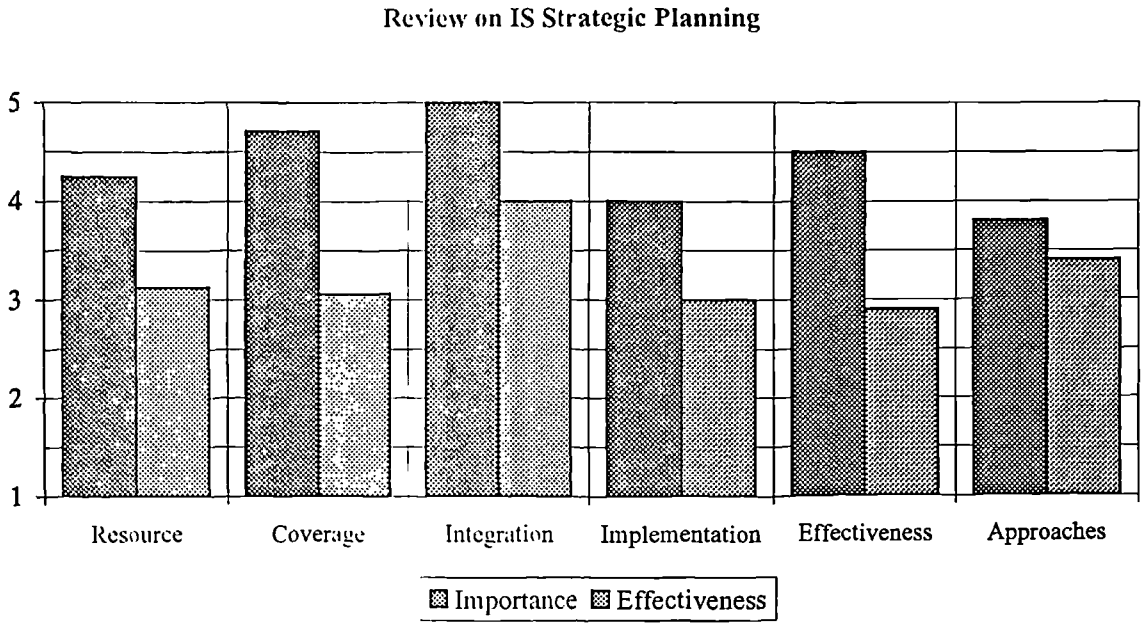


Chart 2.5: Review of ISSP

### 8.5.3 Link between SBP and ISSP

*3.1 What are the facilitators and inhibitors for the effective link between SBP and ISSP?*

Top management (managing director) tend to suppress conflicts among departments and act as mediators to share values, communicate benefits of SBP/ISSP to departments, and consider SBP/ISSP as an important learning process for the organisation. The managing director has requested that managers of various SBUs should have a good awareness of the role of IST in the organisation.

The organisation has introduced relational database, client/server architecture and scanning systems in the past three years, they are planning to develop enterprise-wide data models. IBM's Business System Planning (BSP) is being adapted for use in ISSP.

*3.2 Has your organisation encountered any benefits/problems resulting from the good/poor linkage between SBP and ISSP?*

Both the managing director and the MIS manager have observed a few cases in the organisation where good linkage between SBP and ISSP had led to systems (e.g. centralised electronic storage of incoming fax and direct phone enquiry system) that helped to reduce cost and provide better customer service but poor linkage had resulted in the development of some stand-alone and short-live systems. The managing director has increased the investments on IST. The MIS manager was appointed to head the MIS department three years ago.

*3.3 Has your organisation considered any comparative business advantage as a guide to IS strategies?*

Both the managing director and the MIS manager considered that the managing director is well aware of the comparative business advantage as a guide to IS strategies mainly on project-by-project basis.

### 8.5.4 Information Systems Success

*4.1 What criteria are being used to determine the success of your IS services?*

The managing director determined the success of IS by the level of IS support to basic business functions; management decision making via DSS/EIS and customers' satisfaction via IT enabled services. The MIS manager determined the success of IS by the level of user satisfaction; cost-cutting and increased business benefits.

There is no formal method in measuring the success/benefits of IS. The managing director has initiated several IT-enabled reengineering projects (mainly supported by networking, database and scanning systems). He revealed impressive BPR benchmarks ranging from 20% savings to 10 times in productivity gains, apart from benefits in sales and marketing.

The managing director, MIS manager, BPR manager and the general manager of finance and accounting all consider that the IT infra-structure and IS service for basic operations is successful but further developments in MIS and Strategic systems are required.

As shown in Chart 4.1, there is substantial improvement of both IS products (mainly IT infra-structure such as telecommunication, fourth-generation language, database management system and office automation) and relative IS service as indicated by both the MIS manager and the senior manager in their questionnaires. However, the user managers consider that there is no improvement in IS service in the past three years, especially the capability of the MIS staff in helping senior managers to define their business information requirements.

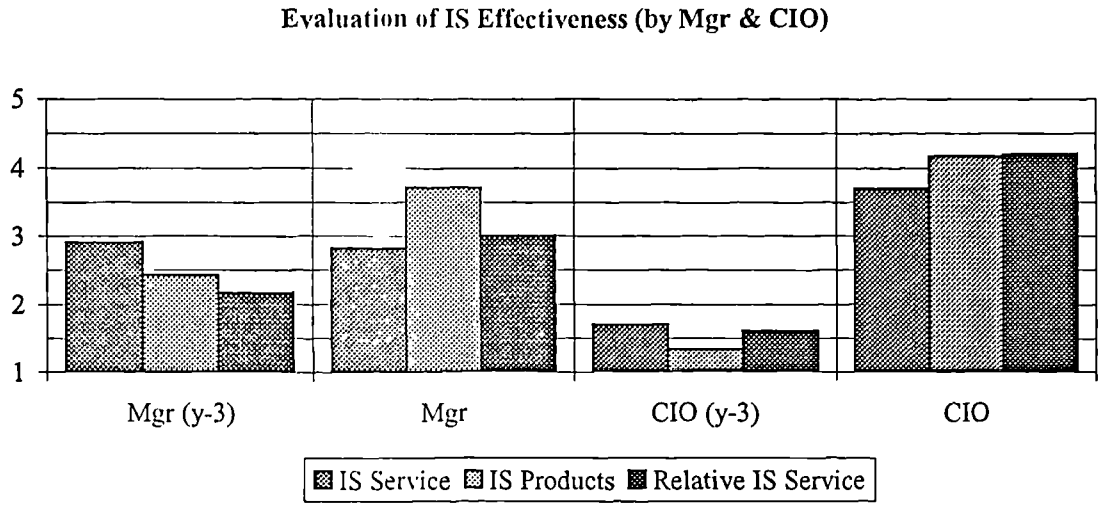


Chart 4.1: IS Success

*4.2 IS Application Portfolio*

The domination of IS applications in "high potential of Strategic Grid" and "level 2 of MIT's portfolio" were mainly due to their transition in the introduction of client/server systems as well as the transfer/conversion from COBOL to Oracle database and SQL. The CIO expected that more applications would change from "high potential" to "factory" and from "level 2" to "level 3" and "level 4".

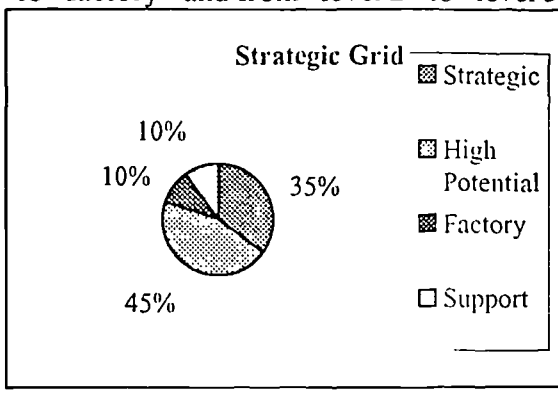


Chart 4.2.1: Strategic Grid

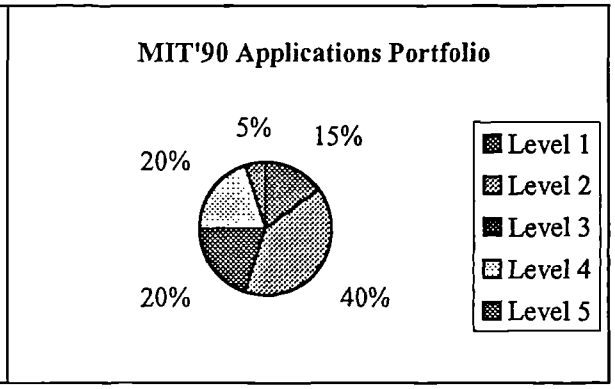


Chart 4.2.2: MIT's Application Portfolio

### 8.5.5 Recommendations

Based on the findings from questionnaire analysis and case study interviews, the ISSP effectiveness and IS Success characteristics of TTT are summarised in Table 49 while the strategic orientation chart is shown in Chart 8.5.5

| Perceived ISSP Effectiveness | Perceived IS Success |
|---|---|
| More Effective Indicators<br>(no obvious item)<br><br>Less Effective Indicators<br>1. Business strategies not clearly defined<br>2. Poor communications between IS planners and business planners<br>3. Inadequate analysis of end-user computing requirements | More Satisfied with or Better in<br>1. IS staff to customise/develop systems<br>2. IS contribution to operational efficiency<br><br>Less Satisfied with or Weak in<br>1. Inadequate quality of IS Services in supporting the Business<br>2. Inadequate application of IS to advance CSFs<br>3. End-users' ability is Inadequate in defining business information requirements<br>4. IS not delivered on-time<br>5. IS not delivered within budget |

*Table 49 : Configurational Characteristics (Technology-led Case)*

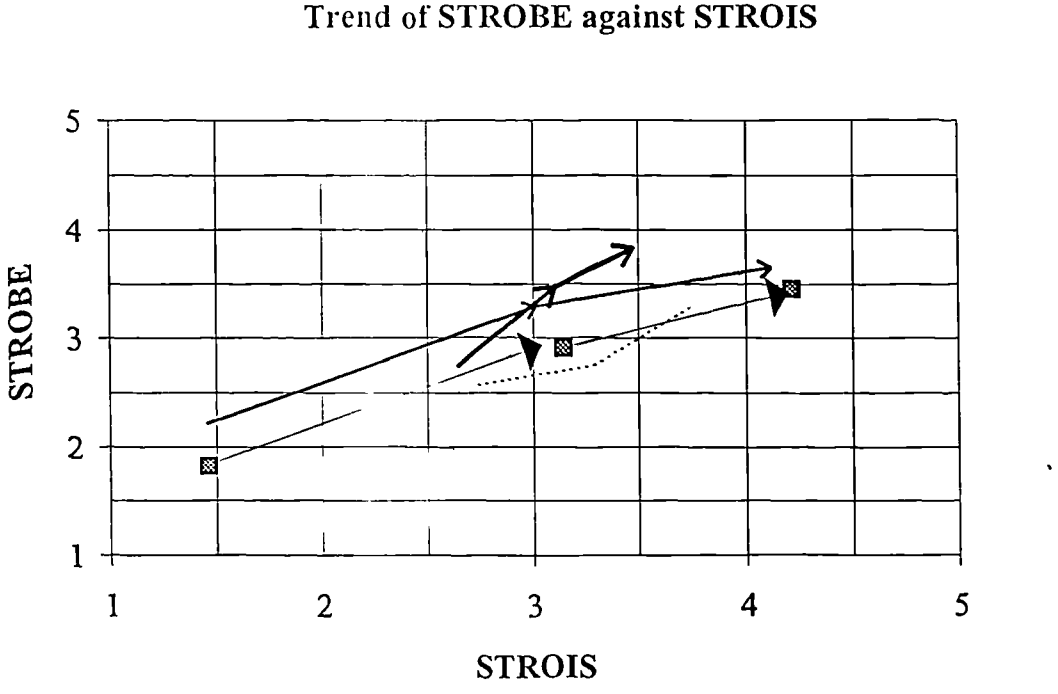


Chart 8.5.5: Trend of STROBE vs. STROIS for Four Business Units

| Business Unit: | Intra-Asia (TTT) | China operations | Accounting | Local Transport |
|---|---|---|---|---|
| Legend in Chart: | ——→ | ..... | ——→ | ——→ |
| Alignment Type (3 years ago) | Conservative | Conservative | Conservative | Conservative |
| Alignment Type (current year) | Technology-led | Technology-led | Business-strategy-led | Organisation-led |
| Alignment Type (3 years ahead) | Organisation-led | Organisation-led | Organisation-led | Organisation-led |

As shown in Chart 8.5.5, TTT has migrated from the Conservative classification (low in both STROBE and STROIS) three years ago to the Centre and is expecting to move towards the Organisation-led classification (high in both STROBE and STROIS) in the next years. In fact, several new IT infrastructural components have been developed, such as client/server systems, Internet and Intranet, Oracle database and SQL, and Imaging systems. Apart from transaction processing systems and office automation systems, there are limited end-user computing activities and decision support systems. Consequently, application systems have become more efficient but not effective! Hence, the managing director predicts that TTT is more likely moving towards the Technology-led environment (low STROBE but high STROIS) in the next three years, owing to the major constraints of the limited IS knowledge of the senior managers to enhance information management and the limited business knowledge of IT staff. It is interesting to note that the movements of the alignment positions of all four business units are moving from "conservative" through the "middle-fit" zone around the centre and then proceed to the "organisation-led".

Although there are no formal methods in business strategy planning nor IS strategy planning in TTT, the managing director is the major driving force in the formulation of both business strategies and IS strategies. The perceived success of IS in TTT is mainly due to top management support, especially the managing director. The managing director is concerned about the demand on his time in indirectly assuming the role of CIO, as well as in providing the major "linkage" between business strategies and IS plans at the same time. The managing director is well aware of the need for better SBP and ISSP in order to support the rapid growth of the business operations in both Hong Kong and China. He has encouraged his senior and middle-level managers to learn

more about information management and IS through sponsoring his managers to attend MScIS courses and by arranging some in-house MIS and management workshops for his managers and IT staff. This move is consistent with "learning from IT literacy to organisational development" as advocated by Earl (1992).

While it would seem reasonable to advocate more extensive management training in IT, senior management may view this differently in the Hong Kong context where job mobility is extremely high and less training is often viewed as an incentive to higher turnover. The managing director is genuinely committed to management training but at the same time expects a minimum of 12 hours per day from the senior staff. Given the highly competitive environment in which the company operates, he has to ensure they have a technology advantage but cannot guarantee the user expertise to maintain pace. This company may therefore be one of the few who can assume the role of "technology-led" with success.

## 8.6 Conclusions from Multiple Case Study Analyses

| Organisation : Item | BBB | CCC | OOO | TTT |
|---|---|---|---|---|
| CIO reporting to | General manager | CEO | CEO | CEO |
| CIO's involvement in business planning | No direct involvement but with informal discussion with managers of SBUs | No direct involvement but with informal discussion with the CEO | Member of planning team | No direct involvement but with informal discussion with the CEO |
| Strategic business planning process | Formal | Informal | Formal | Formal |
| Coverage of business planning | 5 years | 1-2 years | 5 years | 2 years |
| ISSP Process | Informal | Informal | Formal | Informal |
| Coverage of ISSP | 1-2 years | ad-hoc | 5 years | ad-hoc |
| ISSP Approach | budget driven and business-led | reactive | Theme-based exploration | reactive |
| ISSP Success | Average | Successful | Successful | Successful |
| IS Success | Average | Good | Very Good | Good |

*Table 50: Summary of Findings from Multiple Case Study Analyses*

### 8.6.1 Strategic Business Planning (SBP)

Many SISP studies (Earl 1993, Lederer & Mendelow 1986 and Bowman et al. 1983) have raised a concern that the availability of (formal) business plans for SISP cannot be assumed nor their communication to the concerned managers. This is particularly true from the case study analyses as only OOO's CIO has ready access to the business plans. The other three CIOs do not have direct access to the business plans and have to obtain indirect inputs either from the CEO or other senior managers.

### 8.6.2 Information Systems Strategic Planning (ISSP)

| Organisation | BBB | CCC | OOO | TTT |
|---|---|---|---|---|
| Coverage of ISSP planning | 1-2 years | ad-hoc | 5 years | ad-hoc |
| ISSP Process | Informal | Informal | Formal | Informal |
| ISSP Approach | budget driven | reactive | Theme-based exploration | reactive |
| ISSP Success | Average | Successful | Successful | Successful |

OOO follows the characteristics "organisational" approach in ISSP as advocated by Earl (1993). Both CCC and TTT are aware of the role of IST in the organisation and are satisfied with the reactive ISSP approach. However, BBB is more concerned about its ISSP process because of their high dependence on IT.

### 8.6.3 Link between SBP and ISSP

Based on the cases study analyses, the CIO's rank is seen as an important factor in providing the linkage between SBP and ISSP. Only the CIO from OOO (out of the four cases) who is holding the title of Deputy Director (equivalent to a general manager grade), has direct involvement in SBP. The informal inputs of business plans from the CEO or senior managers to the CIO are considered by the CIOs in both BBB and TTT to be ineffective (although better than nothing) and a constraint to effective ISSP. The CIOs want to participate in SBP.

### 8.6.4 Information Systems Success

As expected by the configurational theory, managers in OOO are highly satisfied with the success of IS services due to good alignment. Managers in BBB are not satisfied with IS services because the banking environment is demanding good IS service/support in order to compete but the IS department could not perform at the level as expected. The CEOs in both CCC and TTT are fully aware of the role of IS in their organisation and hence are satisfied with IS in general.

| Organisation | BBB | CCC | OOO | TTT |
|---|---|---|---|---|
| IS Success | Fair | Average/Good | Very Good | Average/Good |

### 8.6.5 Evaluation and Future Outlook

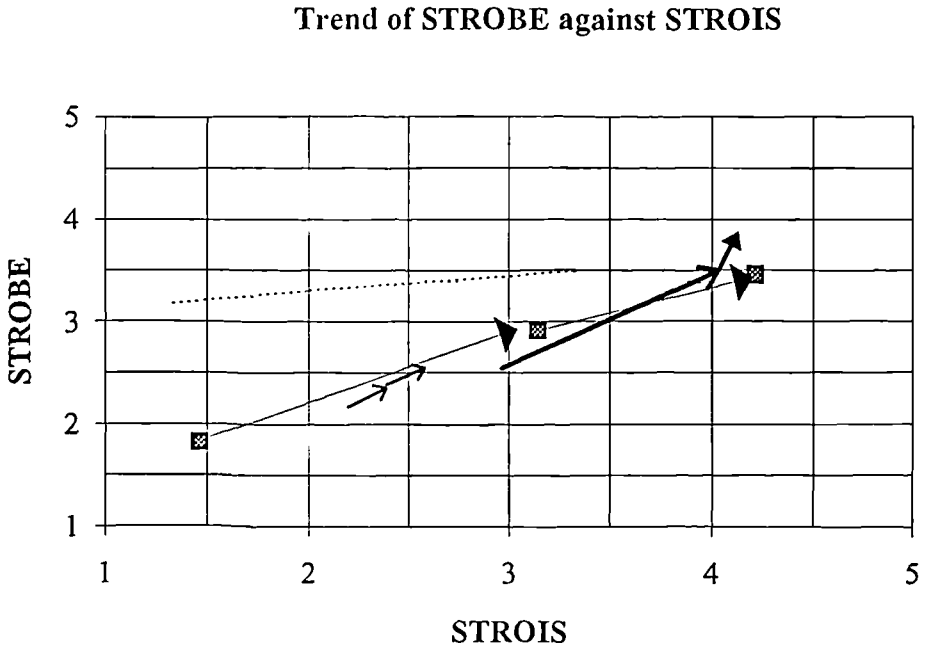


Chart 8.6.1: Trend of STROBE vs. STROIS for Four Cases

| Organisation: | BBB | CCC | OOO | TTT |
|---|---|---|---|---|
| Legend in Chart: | ..... | ——→ | ——→ | ——→ |
| Alignment Type (3 years ago) | Business-strategy-led | Conservative | Conservative | Conservative |
| Alignment Type (current year) | Business-strategy-led | Conservative | Organisation-led | Technology-led |
| Alignment Type (3 years ahead) | Organisation-led | Conservative | Organisation-led | Organisation-led |

*Table 51: Movement of Alignment Types in Four Cases*

It is interesting to note that with the exception of the business-strategy-led case, all the other three cases have passed through around the "middle-fit" zone in the chart.

Due to dissatisfaction with their previous IS services in BBB and TTT, these two organisations replaced their EDP Manager with a more senior MIS Manager (two and three years ago respectively). The MIS manager of BBB (business-strategic-led) has had slightly better banking application experience than its previous EDP manager (leading to better information management) but is more open-minded in accepting open-systems, packaged applications and outsourcing (leading to higher capability of IT services). The

MIS manager of TTT (technology-led) has had better IT knowledge than its EDP manager but limited business knowledge. These changes seem to reinforce their present configurational characteristics and to cater for their expected migration to the organisation-led configuration.

Conclusion from Case Study Analysis

IS strategic alignment is a complicated phenomena which cannot be easily evaluated without a deep understanding of the organisation and its processes in both business strategy planning and ISSP. Also, inputs from multiple stake-holders within the same organisation are necessary in order to assess the effect of alignment from multiple perspective.

There is not necessarily a single definition of "good" alignment but various types of alignment.

a) The cases support four types of alignment with very different configurational characteristics which may be appropriate.

b) Aligning within these four types can result in

1. a fit between STROBE and STROIS
2. a misfit between STROBE and STROIS
3. a misfit between strategy of alignment and the configurational needs
4. a fit between strategy of alignment and the configurational needs

c) The alignment chart for each case clearly illustrates "where they are" and "where they expect to go to". This directional guidance is perhaps more important than analysing the alignment fit.

Hence, the case study model provides a framework for analysis and diagnosis of IS strategic alignment and IS success. It also provides the basic guidelines for future IS strategy development. This will be discussed in the concluding chapter.

# CHAPTER 9 : CONCLUSIONS AND IMPLICATIONS FOR FUTURE RESEARCH

This chapter builds on from the analysis of the findings in the survey and multiple case study analyses in order to extend the research model. This is followed by a critical review of the research objectives, research model and the conclusions reached from the findings. It then identifies the theoretical and methodological contributions of this study. Following this, the implications, limitations and possible future extension of this study are discussed.

## 9.1 Extension of the Research Model

From the review of the multiple case study analyses and survey results, it is apparent that the original research model has been validated but also requires extension. The discussion of the extension of the model will come first before reviewing the research objectives and conclusions.

### 9.1.1 Enhancement of IS Strategic Alignment Configurational Model

Based on the findings from the survey and multiple case study analyses, a Middle-fit classification (as shown in Figure 17) may be added to cater for organisations which do not fit into the original four classifications. For example, the TTT case (which would have been classified as Middle-fit instead of Technology-led) reflects some characteristics of business-strategy-led, conservative and technology-led. This extension will provide a more accurate analysis of the five configurational types as argued below.

The research study on IS Strategic Alignment by Chan and Huff (Chan 1992, Chan and Huff 1993, Chan and Huff 1994) provided very vigorous research instruments and procedures. Based on statistical analysis in their study, they proved that peak performance (in both business performance and IS effectiveness) was positively related

to higher IS strategic fit (STROBE times STROIS) with high STROBE and high STROIS [Organisation-led configuration as advocated in this dissertation]. However, they treated high STROBE * low STROIS [Business-strategy-led] as equivalent to low STROBE * high STROIS [Technology-led]. Furthermore, these two alignment types were also treated as equivalent to the medium effect with medium STROBE * medium STROIS [Middle-fit] in their research. The development of the configurational theory in this dissertation is to explore the different characteristics in various alignment types. It can be further argued that there are different levels of alignment: conservative integration (Conservative); medium integration (Middle-fit) and high integration (Organisation-led).

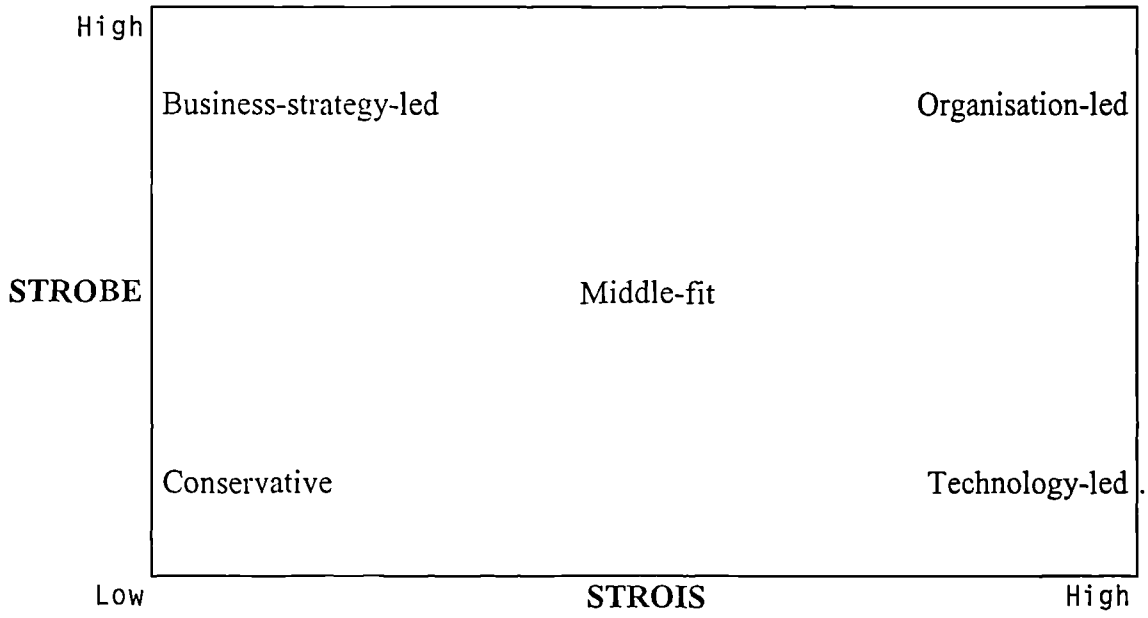


*Figure 17: Strategic Alignment Matrix based on STROBE vs. STROIS*

Based on Figure 17, the new "middle-fit" classification is derived from a medium range of 2.75 to 3.25 (5% of 5.00 from its mid-point of 3.00 in the 5-point Likert scale) in both STROBE and STROIS. There are 20 "middle-fit" organisations with the majority coming from "technology-led" (8) and "organisation-led" (6).

| Alignment Type: | B | C | O | T | M | Total |
|---|---|---|---|---|---|---|
| No. of Organisations under 4 Types : | 16 | 26 | 19 | 13 | - | 74 |
| No. of Organisations under 5 Types: | 14 | 22 | 13 | 5 | 20 | 74 |

In order to provide a preliminary assessment on the major changes in ISSP success and IS success with the new configuration. The re-arrangement of the data tables on "ISSP success" (Table 32) and "Overall satisfaction with IS service" (Table 38) to fit this new classification are shown in Table 52 and Table 53 respectively. This new "middle fit" group includes "conservative" organisations with relatively higher integration as well as "organisation-led" organisations with relatively lower integration. As a result of this extension, the original four alignment types will become more distinctive.

| B | C | O | T | Satisfaction with IS Service | B | C | O | T | M |
|---|---|---|---|---|---|---|---|---|---|
| 3.03 L | 3.23 | 3.63 h | 3.38 | a) by User Manager | 2.89 L | 3.18 LL | 3.77 h hh | 3.40 | **3.45 h** |
| 3.50 | 3.23 | 3.53 | 3.46 | b) by CIO | 3.50 | 3.14 | 3.62 | 3.40 | **3.50** |

(LSD test: "h" scores are greater than "L" scores within the Same Row at significance level .05 )
(LSD test: "hh" scores are greater than "LL" scores within the Same Row at significance level .05 )

*Table 52: Relationship of IS Strategic Alignment and IS Success*

| B | C | O | T | Success of ISSP | B | C | O | T | M |
|---|---|---|---|---|---|---|---|---|---|
| 3.06 h | 2.42 L | 3.32 h | 2.95 | a) by CEO/GM | 2.99 | 2.45 L | 3.46 h | 2.92 | **2.89** |
| 2.71 LL | 2.61 L | 3.47 h hh | 3.15 h | b) by User Manager | 2.74 LL | 2.53 L | 3.62 h hh | 3.44 h | **2.99 h LL** |
| 3.41 | 2.91 L | 3.58 h | 3.11 | c) by CIO | 3.39 h | 2.75 L | 3.54 h | 2.80 | **3.52 h** |

(LSD test: "h" scores are greater than "L" scores within the Same Row at significance level .05 )
(LSD test: "hh" scores are greater than "LL" scores within the Same Row at significance level .05 )

*Table 53: Relationship of IS Strategic Alignment and ISSP Success*

As expected, respondents from the new and more distinct "organisation-led" group scored higher in IS success (ranked by both user managers and CIOs in Table 9.1.1a) and ISSP success (ranked by CEO/GMs, user managers and CIOs in Table 9.1.1b) than their counterparts in the "organisation-led" group in the four-type classification.

Based on the new configurational model, the re-classification of the cases is shown in Table 9.1.1c. Having identified the various types of IS strategic alignment as illustrated by the revised classification of the case studies in 9.1.1 above, the following

section attempts to provide further guidelines for practising managers to select an "appropriate" type of alignment for their organisation.

| Organisation: | BBB | CCC | OOO | TTT |
|---|---|---|---|---|
| Alignment Type (3 years ago) | Business-strategy-led | Conservative | Conservative | Conservative |
| Alignment Type (current year) | Business-strategy-led | Conservative | Organisation-led | Middle-fit |
| Alignment Type (3 years ahead) | Organisation-led | Middle-fit | Organisation-led | Organisation-led |

*Table 54: Matching Capability and Alignment with New Configurations*

### 9.1.2 Selection of an Appropriate IS Strategic Alignment Configurational Model

Sabherwal and Kirs (1994) argue that IT capability resembles both technology components (e.g. computer and communication, hardware and software) and information processing capacity (e.g. structural mechanisms such as teams and committees). An interesting observation from both the survey and the multiple case study analyses, which supports the argument of Sabherwal and Kirs (1994), is that IS success is closely related to the adoption of a particular IS Strategic Alignment type which matches well with the IT capabilities of the organisation with respect to IT components (i.e. IT Department's Capability to Deliver Quality Systems) and information processing capability (i.e. Users' Knowledge and Experience in Information Management). Further research work on the proposed contingency model as shown in Figure 18 is considered to be worthwhile.

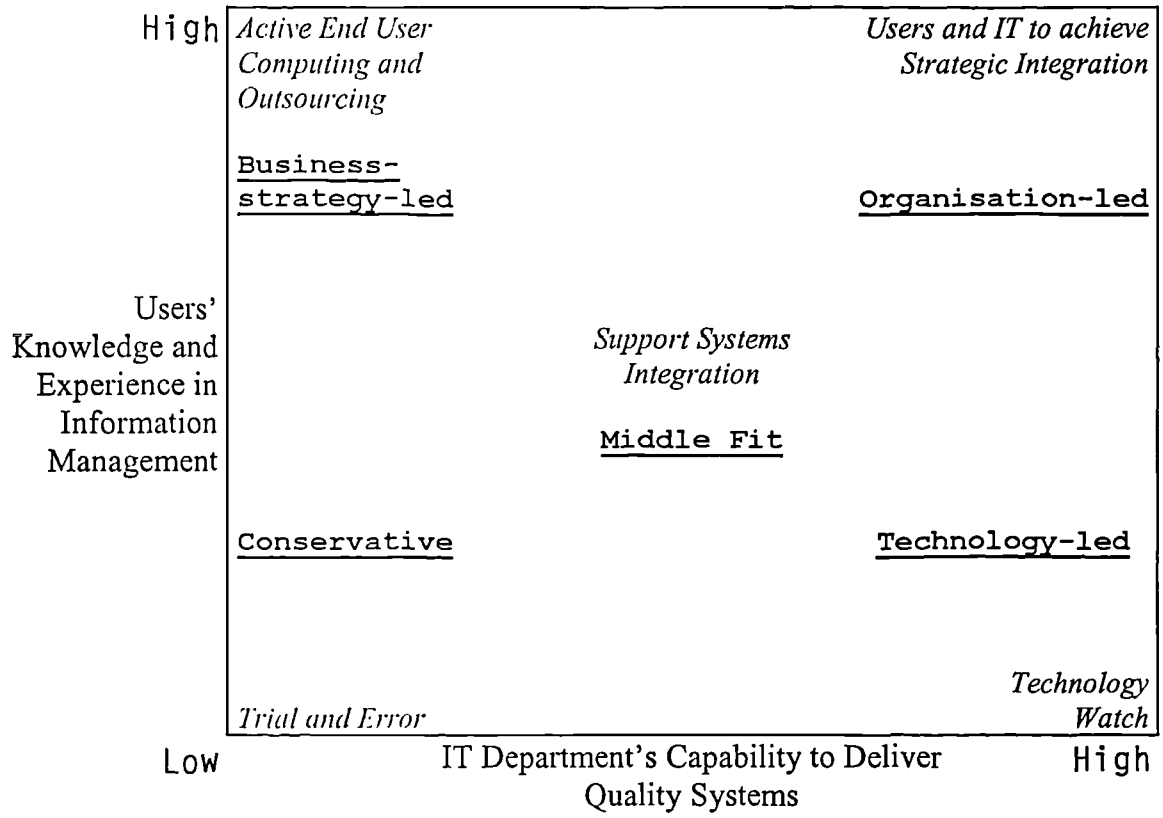


*Figure 18: Matching Capability and Alignment*

1. Business-strategy-led

*(Matching with strong Information Management experience but weak IT Capability)*

It can be argued that konwledgable users, who are capable in developing their own enterprise data models for their business, may become more actively involved in end-user computing when they cannot wait for the "poor" service from the IT department. Since the IT department is not performing as expected (especially if the industry is highly dependent on IT), users tend to "outsource" part or all of the IT functions. This is consistent with the strategy adopted by case BBB where they replaced the EDP manager with a Senior Manager - MIS, who has had better business/banking knowledge and is more open-minded in outsourcing part of the software development functions.

2. Conservative

*(Matching with weak Information Management experience and weak IT Capability)*

Organisations in this classification are weak in both Information Management and IT Capability. Trial and error as well as reactive planning and resource driven-planning (or "administrative" IS planning as advocated by Earl, 1993) proposition that are found to be common among Conservative organisations. This configuration may be suitable for organisations in a stable business environment and in an industry which is not highly dependent on IT (e.g. case CCC). However, this configuration is probably not stable for organisations either in a more competitive environment or where the industry is highly dependent on IT (e.g. cases BBB and TTT) and a change to business-strategy-led or middle-fit is more likely.

3. Organisation-led

*(Matching with strong Information Management experience and strong IT Capability)*

Since both end-users and the IT department are very capable in defining information requirements and delivering IS respectively, their successful joint effort in systems development will lead to a high level of business-IS integration. User managers and CIOs in the "Organisation-led" group ranked "End-users' ability in defining business information requirements" (which supports the argument of Sabherwal and Kirs, 1994 on the need for better information processing requirements) and "Quality of Inputs from Top Management to ISSP" (which supports Pyburn, 1983) respectively at significantly higher scores than managers from the other three alignment type groups. The case of OOO has illustrated that the high level of IS strategic integration with business has been achieved as a result of the manager's good information management experience and the high capability of IT in building quality systems. However, in view of the rapid increase in the complexity and demand for quality healthy-care services versus the potential

budget cuts in OOO, its CIO admitted that OOO may have to fallback to "middle-fit" if there is a severe cut in the IT budget after the expiration of its block grant from 1992-96.

4. Technology-led

*(Matching with weak Information Management experience but strong IT Capability)*

The IT department is capable of technology watch and building the necessary IT infrastructure. However, due to the limited knowledge and experience of end-users in information management and technology acceptance, there are limited IS applications that can be built on top of the IT infrastructure. In case TTT, new IT infrastructural components have been developed (e.g. client/server systems, Internet/Intranet, Oracle database/SQL, and Imaging systems) and application systems have become more efficient but not more effective!

It can be argued that this configuration is unstable (no matter whether the organisation is highly dependent on IT or not) because most [business] organisations do not expect the IT department to build up strength in technology, yet not contribute to the organisation. The reduction from thirteen organisations to five organisations with this new classification reinforces that the belief that the "technology-led" configuration is unstable. This argument is consistent with the polemic of Earl (1992): "not to treat IT in isolation, or, even worse, above the business". Hence, if the industry of the organisation is less dependent on IT, it is more likely that the organisation may change to the "conservative" configuration in view of potential IT budget cuts. Alternatively, if the industry is more dependent on IT, then it is more likely that the organisation may change to "middle-fit" or to "organisation-led" as when the organisation is building up its strength on information management.

5. Middle-fit

*(Matching with average/good Information Management experience and average/good IT Capability)*

It can be argued that this configurational type could either be a transition from "conservative" towards "organisation-led" (e.g. cases OOO and TTT) or as a stable configuration where there is a good fit between business and IS in a less demanding business environment (e.g. case CCC). The "middle-fit" configuration could also become a fallback position from the "organisation-led" group as in the case of OOO, whose CIO feels that they have to shift to a more conservative role if there is a budget cut.

Summary

All five alignment configurations may present an appropriate model for an organisation depending on :-

a) The extent of IT dependency within the organisation
b) Current IT capabilities
c) Users' knowledge and experience in information management.

As these factors change, it is important for organisations to learn how to realign to a more appropriate model in the most effective way. This may involve a strategy of change through more than one model using the "middle-fit" as a change vehicle. The specific factors and associated items which need to change have been clearly identified in Chapter 5 to assist organisations in the implementation of effective changes and the development of long-term strategies.

## 9.2 Conclusions of the Research and Study Contributions

Since research findings and a summary of their implications have been covered by Chapters 6-8, the conclusions in this chapter will be more succinct. The conclusions of the research are matched against the initial research objectives. This is followed by a review of the implications of the study in terms of research contributions and management practice in ISSP.

### 9.2.1 Review of Research Propositions

The four research propositions from section 3.6 are reviewed below:

**Proposition Set 1: Relative IS Success Among the four Alignment Types**

*P1.1 Organisations in the "business-strategy-led" group will have a relatively lower level of IS success because their demanding business environment is not matched with adequate support by IS.*

This proposition is strongly supported by the findings in Table 37, where User Managers indicated lower average scores in most of the IS Success items, especially those items associated with "Relative Quality of IS Service" (factor 1). This is also supported by the lower ranking on the "overall satisfaction with IS service" by User Managers as shown in Table 38.

*P1.2 Organisations in the "conservative" group will have a relatively lower level of IS Success because a high level of IS success may not be required by their less demanding business environment.*

This proposition is supported by the findings in Table 37, where User Managers indicated slightly lower average scores in most of the individual IS Success items. Also, User Managers' perception on the "overall satisfaction with IS service" (as shown in

Table 38.) was, on the whole, slightly better than their counterparts in the "business-strategy-led" group. This can be explained by their lower overall expectation of IS service. This proposition is also supported by the CEO/GMs in this group who indicated the lowest ranking on the "overall satisfaction with IS service" (as shown in Table 38).

*P1.3 Organisations in the "organisation-led" group will have a relatively higher level of IS Success because their demanding business environment is adequately supported by IS.*

This proposition is strongly supported by the findings in Table 37, where User Managers indicated a relatively higher average scores in most of the IS Success items, especially on "end-user's ability in defining business information requirements". Also, CEO/GMs, User Managers and CIOs in this group had the highest ranking on the "overall satisfaction with IS service" (as shown in Table 38).

*P1.4 Organisations in the "technology-led" group will have a relatively higher level of IS Success because their less demanding business environment is more than adequately supported by IS.*

This proposition is marginally supported by the findings in Table 37, where User Managers indicated a relatively higher average scores in certain individual IS Success items, especially in "relative contribution to operational efficiency" and "relative contribution to managerial effectiveness" (factor 1). However, this proposition is not supported by the CEO/GMs, User Managers and CIOs based on their average ranking on the "overall satisfaction with IS service" (as shown in Table 38).

**Proposition Set 2: Relative ISSP Effectiveness Among the four Alignment Types**

*P2.1 Organisations in the "business-strategy-led" group will be relatively more effective in ISSP because of the requirement by their demanding business environment.*

This proposition is supported by the findings in Table 23, where CIOs indicated a higher average scores in most of the ISSP items, especially on the five items associated with "Factor 2 : Quality of ISSP". Also, CEO/GMs, User Managers and CIOs in this group had the highest ranking on "ISSP success" as shown in Table 32.

*P2.2 Organisations from the "conservative" group will be relatively less effective in ISSP because their business environment may not demand a high level of IS planning.*

This proposition is strongly supported by the findings in Table 23, where CIOs indicated the lowest average scores in 41 out of 44 ISSP items. This proposition is also strongly supported by the findings in Table 32 where CEO/GMs, User Managers and CIOs in this group had the lowest ranking on "ISSP success".

*P2.3 (a) Organisations in the "organisation-led" group will be relatively more effective in ISSP because of the requirement by their demanding business environment.*

This proposition is strongly supported by the findings in Table 23, where CIOs indicated a much higher average scores in most of the ISSP items, especially on all the items associated with "Factor 4 : ISSP Team" and "Factor 7 : Implementation of IS Plan". This proposition is also strongly supported by the findings in Table 32 where CEO/GMs, User Managers and CIOs in this group had the highest ranking on "ISSP success".

*P2.3 (b) Organisations in the "organisation-led" group will have a relative higher level of alignment in the ISSP process because their demanding business environment is matched by more capable IS service.*

This proposition is supported by the findings from the Table 23, where CIOs indicated relatively higher ranking on "Better integration of business plans with IS plans" (under Factor 2 : Quality of ISSP). This proposition is also strongly supported by the findings from the case study analyses where the business plan of OOO contains a specific section on IS strategy.

*P2.4 Organisations in the "technology-led" group will be relatively less effective in ISSP because their business environment may not demand a high level of IS planning.*

This proposition is marginally supported by the findings from the Table 23, where CIOs indicated below average scores in most of the ISSP items though CIOs from the "conservative" group scored even lower.

### 9.2.2 Review of Research Objectives

The four research objectives proposed in Chapter 1 are reviewed below:

1. *"To develop composite models to analyse how well (selected) organisations align their IS strategies with business strategies."*

A composite model has been developed to identify how well organisations align their IS strategies with business strategies. The validity and scale reliability of the research constructs for STROBE (Venkatraman 1989) , STROIS (Chan 1992), ISSP process (adapted from Earl 1993; Premkumar & King 1994), and IS effectiveness (adapted from Synnott 1987; Galletta & Lederer 1989; Downs 1988), have been verified but more importantly the constructs have been extended through an analysis of different levels of fit as discussed in section 9.1.1.

2. *"To develop contingency models to explore particular circumstances under which different models of IS strategic alignment are more or less appropriate."*

The development of the IS strategic alignment configurational model to explore particular circumstances under which IS strategic alignment may be more effective, has been achieved. The findings from the survey indicates that Business-strategy-led, Conservative and Organisation-led organisations follow the configurational theory as proposed in section 3.3 while Technology-led organisations turn out to be less effective than that as originally expected from the configurational theory.

3. *"To evaluate whether IS strategic alignment will affect IS effectiveness and business performance."*

There is a positive relationship between IS strategic alignment and IS effectiveness whereby organisations in the Organisation-led group scored a significantly higher level of perceived "satisfaction with overall IS service" on average than their counterparts in Business-strategy-led organisations.

4. *"To evaluate whether ISSP will affect IS strategic alignment."*

There is a positive relationship between IS strategic alignment and ISSP success whereby organisations in the Organisation-led group scored a significantly higher level of "ISSP Success" on average than their counterparts in Business-strategy-led organisations. The relationship between IS strategic alignment is more obvious in the multiple case study analyses whereby the OOO (organisation-led) scored consistently higher rankings (Successful but can Improve) on ISSP success than the other three cases.

In short, the study objectives have been achieved. Further review on study contributions, limitations and future research direction follows

### 9.2.3 Implications for Research

1. This research has demonstrated the techniques to operationalise the measurement of the effect of IS strategic alignment based on the configurational model developed by the author. It also illustrates the match of business strategy and IS strategy with respect to its current strategic position (where you are?) as well as the direction and movements of the organisation towards the future (where do you want to go?). This gap analysis of the strategic planning path dependency supports the Resource-Based View (RBV), as argued by Collis and Montgomery (1995), that sees companies as very different collection of physical and intangible assets and capabilities. A greater number of resources cannot be imitated because of path dependency [or simply *where you want to go will have to depend on where you are at present*]. This study also incorporates a number of established models and provides an integrative framework of analysis from them.

2. This research has demonstrated the techniques to relate the effect of strategic alignment of business strategy and IS strategy on IS planning effectiveness and their possible impact on role of IS, IS effectiveness and business performance. It provides a structured framework for measurement and evaluation of a wide range of factors affecting both business and IS strategy. The common set of parameters provides an in-depth analysis of both STROBE and STROIS, it also makes their results comparable.

3. The use of multiple case study analyses adopted in this research has been found to be a worthwhile exercise. The use of graphical presentation of the questionnaire data from the embedded survey has made the results more easily understood by top management, CIOs and user managers (instead of complex mathematical models)

and enhanced discussion of these results and implications. The combination of both quantitative and qualitative analyses not only enhanced the verification of "alignment types" with responding managers but was also found to be extremely useful during case study interviews.

Furthermore, the establishment of good working relationships between the author and the managers participating in this research has been found to be an important factor in successful case study analyses, as the credibility and trust established through these interviews have led to a higher degree of openness and better quality of information being collected. The follow-up discussions between the author and the managers related to the author's evaluations of the findings have further enhanced the quality of the findings and evaluations. (As a continuing development of the working relationship, the author has been invited by one of the organisations as a consultant to run in-house ISSP workshops for their senior managers. Further research findings before and after ISSP workshops can also be obtained.)

4. This research involves managers at various levels and in different areas in order to collect relevant information from different perspectives - this is also a very practical and effective approach. Comparative analyses of inputs from various respondents have further enhanced the reliability and richness of the findings.

5. The research questionnaire has found to be a valuable tool through its structured and systematic approach for a comprehensive assessment on an organisation's strategic alignment, IS strategic planning and IS effectiveness as well as business performance for business enterprises. This is supplemented by interviews or participant-observation so that both internal and external validity could be strengthened. It has also allowed for a greater degree of data richness for qualitative analysis.

## 9.3 Limitations of Study and Future Research Initiatives

### 9.3.1 Limitations of Study

Since research on IS strategic alignment is a complex process and no one single research method is superior in all situations, any choice is a compromise. A number of potential limitations of this research are apparent and must be carefully considered in future investigations of the research model. These limitations are outlined below and some possible ways in which the current study as well as future research initiatives might overcome them are also addressed.

1. Sample Size: Due to the nature of the study and the complexity of the questionnaires as well as the requirement to have three completed sets of questionnaires within each organisation (from CEO or senior manager; user manager; and the CIO), it is impossible to conduct a typical mail survey. Instead, selected organisations were invited to participate in the survey. Hence, the sample may be biased instead of being random.

2. Single respondent instead of multiple respondents on each questionnaire type within the same organisation: Ideally, multiple respondents for each questionnaire type (i.e. at least two respondents for each of the three questionnaires) within the same organisation should be obtained in order to assess organisational inputs and reduce personal bias. However, this "more ideal" approach (e.g. with a complete set of six questionnaires) will further reduce the low response rates. Hence, a single respondent data from each of the three questionnaire types was obtained within the same organisation.

3. Questionnaires: Some parts of the existing research questionnaire are not entirely suitable for government sector or franchised operators unless some non-financial indicators could be added along-side the indicators on market competition. It is difficult to assess the real impact of alignment, ISSP, IS effectiveness, to business performance solely based on the perceptions of the executives. In order to improve the reliability of the findings from the survey, other sources of information such as annual reports and internal documents (especially business plans and IS plans) as well as interviews were obtained to provide supplementary analysis and evaluations.

4. Limited Construct Validity Tests: The principal component factor analysis and scale reliability the research constructs have been verified. However, due to the large number of factors and items in each of the research constructs and the small sample size at present, the interrelationship among various research constructs have not been thoroughly tested with more advanced statistical techniques such as Linear Structure Relation (LISREL). In order to overcome this problem, further tests could be applied when the sample size can be built up gradually. The author intends to continue the study over the next few years. He will continue to target organisations in Banking and Finance, Government departments, as well as Commerce and Trade so that different Alignment Models may be customised to these selected sectors.

5. Lack of Inputs on Business Performance: This is a common limitation in survey research in Hong Kong where managers tend to reveal less business information. In fact, this is expected in the research design and hence, evaluations of the impact of IS strategic alignment on business performance was not included as an essential part of this dissertation though it would be very desirable to include such analyses.

6. Multiple Case Study Analyses: Due to the resistance of most senior managers to attend interviews relating to the business strategy of their organisation, only one organisation from each of the four IS strategic alignment types was selected for detailed multiple case study analyses. In fact, the appointments with a CEO took two months and were rescheduled twice. Given more time, case study analysis in more organisations (e.g. at least two organisations in each of the four IS strategic alignment types) could further enhance the interpretative analysis of the various processes in business planning, IS planning and IS strategic alignment.

7. Longitudinal Studies: In a study of this nature, it is important to verify the findings over a period of time. At present, there is a 3-year forecast of change model and this needs to be reviewed over a minimum of a 3-year time period to identify whether such change does take place and if not why not. The study will therefore require replication in the same organisations (as standing sample sets).

### 9.3.2 Reflection on Future Appropriateness of the Methodology

Improvements to Current Research Methodology

The integrative approach of both survey and multiple case study analyses adopted in this research is seen as appropriate overall though the following improvement areas may be considered for future research :

a) To simplify the Questionnaires by dropping all data relating to 3 years ago (but to retain them in the embedded survey within multiple case study analyses).
b) To include the "middle fit" group in the analysis of the survey data and multiple case study analyses.
c) To include at least two organisations in each of the "five" alignment types

d) The survey may be based on a single sector (if there is enough support from organisations within the same sector, such as banking) in order to isolate the contextual influence among different sectors.

Future Research Methodology

While the author has attempted to improve the reliability of findings as adopted in the existing research methodology, it can be argued that no research methodology is perfect and that any chosen methodology is a compromise. The author hopes that the shortcomings in this research will encourage others to initiate more refined research into IS strategic alignment. For example, the action research approach (as discussed in chapter 4 and supported by Baskerville and Wood-Harper 1996) may be considered for a more focused study of the outcome and effectiveness of the alignment processes between business strategy planning with ISSP within a few organisations over a period of a few years.

### 9.3.3 Other Research Initiatives

Matching Business Unit Strategy and Functional Strategy

As an extension of IS strategy alignment, this research has demonstrated the basic mechanisms for exploring future research initiatives on the development and verification of strategic alignment configurational models for matching business unit strategy with line/functional strategy or core competencies. For example, the alignment of business unit strategy with human resource management strategy or with financial management strategy. This research initiative will broaden the scope of the configurational model on IS strategic alignment and would provide interesting analysis on resource-based alignment of functional strategy or core competencies with the

corporate strategies of organisations (which extends the arguments of resource-based strategy by both Hamel & Prahalad, 1994 and Collis & Montgomery, 1995).

Running ISSP Workshops as Basis for Organisational Development

ISSP can be seen as an organisational learning process (Earl 1993 and Galliers et al 1994). As part of this research study, the author has conducted ISSP workshops for a participating organisation. The author has also conducted case study analyses on four business units within an organisation (TTT), which has now retained the author to run IS management and ISSP workshops for their organisation.

The findings from these workshops will not only provide further guidelines on effective ISSP but also generate interesting findings to further explain the IT Capability (Sabherwal & Kirs 1994) and the IS Capability-based Alignment model as shown in Figure 18. This in-depth action research approach as discussed in chapter 4 and supported by Baskerville and Wood-Harper (1996) will further provide invaluable findings to enhance the configurational model of this research.

*** End of Main Text ***

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# APPENDIX 1 : LIST OF ORGANISATIONS

## Appendix 1 1 : Organisations by Industry and ISSP Success

| Org. | BU | Industry | Type | ISSP Success | | | | ISSP Process | | | IS Success | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | A | B | C | Avg | Imp | Eff | Avg | B | C | Avg |
| A1 | Accounting & Audit | Accounting & Audit | 2 | 4.0 | 4.0 | 5.0 | 4.33 | 3.96 | 2.74 | 3.35 | 3.72 | 4.21 | 3.97 |
| A2 | Accounting & Audit | Accounting & Audit | 2 | 2.0 | 3.0 | 3.0 | 2.67 | 3.52 | 3.15 | 3.34 | 2.32 | 2.89 | 2.61 |
| B1 | Marketing | Banking & Finance | 4 | 4.0 | 4.0 | 4.0 | 4.00 | 3.85 | 3.59 | 3.72 | 3.12 | 3.23 | 3.17 |
| B2 | General Insurance | Banking & Finance | 3 | 4.0 | 3.0 | 4.0 | 3.67 | 4.22 | 3.82 | 4.02 | 3.36 | 4.00 | 3.68 |
| B3 | Banking Group | Banking & Finance | 1 | 4.0 | 3.0 | 4.0 | 3.67 | 3.36 | 3.35 | 3.36 | 3.35 | 3.75 | 3.55 |
| B4 | HK Branch | Banking & Finance | 2 | 4.0 | 3.0 | 4.0 | 3.67 | 4.11 | 3.85 | 3.98 | 2.75 | 3.08 | 2.92 |
| B5 | Credit Service | Banking & Finance | 1 | 3.0 | 4.0 | 4.0 | 3.67 | 2.05 | 1.95 | 2.00 | 3.32 | 3.54 | 3.43 |
| B6 | General Insurance | Banking & Finance | 3 | 3.0 | 4.0 | 3.0 | 3.33 | 3.82 | 3.26 | 3.54 | 3.19 | 3.62 | 3.41 |
| B7 | Compliance Division | Banking & Finance | 2 | 4.0 | 2.0 | 4.0 | 3.33 | 3.59 | 3.83 | 3.71 | 3.06 | 3.40 | 3.23 |
| B8 | Retail Marketing | Banking & Finance | 1 | 3.4 | 2.6 | 4.0 | 3.33 | 4.52 | 3.58 | 4.05 | 2.55 | 3.10 | 2.82 |
| B9 | Accounting & Audit | Banking & Finance | 4 | 3.6 | 3.6 | 2.0 | 3.07 | 3.83 | 3.12 | 3.47 | 3.50 | 3.34 | 3.42 |
| B10 | Retail Banking | Banking & Finance | 1 | 2.0 | 3.0 | 4.0 | 3.00 | 3.68 | 3.84 | 3.76 | 2.84 | 3.34 | 3.09 |
| B11 | Group Insurance | Banking & Finance | 1 | 4.0 | 3.0 | 2.0 | 3.00 | 4.45 | 2.51 | 3.48 | 2.83 | 2.46 | 2.64 |
| B12 | Marketing | Banking & Finance | 4 | 2.0 | 4.0 | 2.0 | 2.67 | 2.74 | 2.34 | 2.54 | 3.55 | 3.10 | 3.32 |
| B13 | Operations | Banking & Finance | 2 | 2.0 | 2.0 | 2.0 | 2.00 | 2.35 | 2.35 | 2.35 | 3.19 | 2.85 | 3.02 |
| C1 | China Promotion | Commerce & Trade | 3 | 4.0 | 4.0 | 5.0 | 4.33 | 4.22 | 4.41 | 4.32 | 3.14 | 3.76 | 3.45 |
| C2 | H.K. Branch | Commerce & Trade | 1 | 4.0 | 4.0 | 4.0 | 4.00 | 4.70 | 4.08 | 4.39 | 3.98 | 3.75 | 3.87 |
| C3 | TT Co. Ltd. | Commerce & Trade | 3 | 4.0 | 3.0 | 4.0 | 3.67 | 3.85 | 3.25 | 3.55 | 3.62 | 3.74 | 3.68 |
| C4 | HH Co Ltd | Commerce & Trade | 1 | 2.5 | 3.8 | 4.0 | 3.43 | 3.16 | 2.84 | 3.00 | 3.64 | 3.59 | 3.62 |
| C5 | LL Co. Ltd. | Commerce & Trade | 4 | 4.0 | 2.0 | 4.0 | 3.33 | 4.30 | 3.60 | 3.95 | 3.75 | 4.24 | 3.99 |
| C6 | SS Co. Ltd. | Commerce & Trade | 4 | 3.0 | 3.4 | 3.4 | 3.27 | 3.62 | 2.24 | 2.93 | 2.73 | 2.68 | 2.70 |
| C7 | L. Co. Ltd. | Commerce & Trade | 1 | 3.0 | 3.0 | 3.0 | 3.00 | 3.77 | 3.41 | 3.59 | 3.28 | 3.29 | 3.29 |
| C8 | AA Co. Ltd. | Commerce & Trade | 1 | 3.0 | 3.0 | 3.0 | 3.00 | 3.81 | 2.6 | 3.21 | 2.99 | 3.59 | 3.29 |
| C9 | Advertising Agency | Commerce & Trade | 2 | 3.0 | 2.0 | 3.6 | 2.87 | 3.77 | 2.83 | 3.30 | 2.91 | 3.82 | 3.37 |
| C10 | T Co. Ltd. | Commerce & Trade | 1 | 2.0 | 3.0 | 3.0 | 2.67 | 4.41 | 2.92 | 3.66 | 2.99 | 2.98 | 2.99 |
| C11 | Publisher | Commerce & Trade | 1 | 2.0 | 2.0 | 4.0 | 2.67 | 3.48 | 3.66 | 3.57 | 2.22 | 2.92 | 2.57 |
| C12 | Corporate | Commerce & Trade | 4 | 2.0 | 3.0 | 3.0 | 2.67 | 3.49 | 2.54 | 3.01 | 2.85 | 3.17 | 3.01 |
| C13 | Asia Pacific Operations | Commerce & Trade | 2 | 2.0 | 2.0 | 2.0 | 2.00 | 3.96 | 3.06 | 3.51 | 3.36 | 3.25 | 3.31 |
| C14 | Men's & Ladies' Wears | Commerce & Trade | 2 | 2.0 | 2.0 | 2.0 | 2.00 | 4.16 | 2.39 | 3.28 | 3.02 | 3.73 | 3.37 |
| C15 | Operations | Commerce & Trade | 2 | 1.5 | 1.8 | 2.0 | 1.77 | 2.88 | 2.30 | 2.59 | 2.44 | 2.71 | 2.57 |
| C16 | HK Branch | Commerce & Trade | 1 | 2.0 | 1.0 | 1.5 | 1.50 | 4.06 | 2.67 | 3.37 | 1.49 | 2.96 | 2.23 |
| E1 | Library | Education | 3 | 4.0 | 3.0 | 4.0 | 3.67 | 4.28 | 3.36 | 3.82 | 3.01 | 2.49 | 2.75 |
| E2 | Div.of Humanities | Education | 2 | 2.0 | 2.0 | 4.0 | 2.67 | 3.75 | 3.69 | 3.72 | 3.29 | 4.10 | 3.70 |
| E3 | Open Learning | Education | 2 | 2.0 | 2.0 | 4.0 | 2.67 | 2.82 | 2.54 | 2.68 | 3.25 | 3.44 | 3.34 |
| E4 | Student Affairs Office | Education | 4 | 2.0 | 4.0 | 2.0 | 2.67 | 2.53 | 2.10 | 2.32 | 1.96 | 2.11 | 2.04 |
| E5 | Finance Office | Education | 2 | 2.0 | 2.0 | 3.0 | 2.33 | 3.78 | 3.84 | 3.81 | 3.24 | 3.65 | 3.45 |
| E6 | Personnel Office | Education | 2 | 1.0 | 1.0 | 1.0 | 1.00 | 3.82 | 1.47 | 2.65 | 1.75 | 1.89 | 1.82 |

(Align Type: 1=Business-strategy-led; 2=Conservative; 3=Organisation-led; 4=Technology-led)

## Appendix 1.1 : Organisations by Industry

(continued)

| Org. | BU | Industry | Type | ISSP Success | | | | ISSP Process | | | IS Success | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | A | B | C | Avg | Imp | Eff | Avg | B | C | Avg |
| G1 | Inland Revenue | Government | 3 | 4.0 | 4.0 | 4.0 | 4.00 | 4.27 | 3.60 | 3.93 | 3.59 | 3.71 | 3.65 |
| G2 | Training Unit | Government | 2 | 3.0 | 4.0 | 4.0 | 3.67 | 4.19 | 3.69 | 3.94 | 3.02 | 4.15 | 3.58 |
| G3 | Library | Government | 2 | 3.0 | 4.0 | 4.0 | 3.67 | 4.00 | 3.79 | 3.90 | 3.24 | 3.75 | 3.49 |
| G4 | Immigration | Government | 1 | 4.0 | 3.0 | 4.0 | 3.67 | 3.96 | 3.25 | 3.60 | 3.01 | 3.89 | 3.45 |
| G5 | Trade Development | Government | 1 | 4.0 | 3.0 | 4.0 | 3.67 | 3.84 | 3.75 | 3.79 | 1.91 | 3.63 | 2.77 |
| G6 | Maintenance Division | Government | 2 | 3.4 | 3.4 | 4.0 | 3.60 | 4.09 | 3.57 | 3.83 | 3.26 | 4.16 | 3.71 |
| G7 | Survey Division | Government | 4 | 3.0 | 3.6 | 4.0 | 3.53 | 4.00 | 4.00 | 4.00 | 3.65 | 4.05 | 3.85 |
| G8 | IS Division | Government | 4 | 3.6 | 3.6 | 3.0 | 3.40 | 3.75 | 3.41 | 3.58 | 3.80 | 3.02 | 3.41 |
| G9 | Insurance Company Supervision | Government | 3 | 3.0 | 4.0 | 3.0 | 3.33 | 4.18 | 3.30 | 3.74 | 3.30 | 3.19 | 3.25 |
| G10 | Employee Compensation | Government | 2 | 3.0 | 3.0 | 4.0 | 3.33 | 4.68 | 2.70 | 3.69 | 2.57 | 3.31 | 2.94 |
| G11 | Liquid Waste Projects | Government | 2 | 3.0 | 3.0 | 3.0 | 3.00 | 3.86 | 2.04 | 2.95 | 3.03 | 3.71 | 3.37 |
| G12 | Judiciary | Government | 2 | 3.0 | 3.0 | 3.0 | 3.00 | 3.17 | 2.98 | 3.07 | 2.78 | 2.58 | 2.68 |
| G13 | Family and Child Welfare | Government | 3 | 3.2 | 1.8 | 2.4 | 2.47 | 2.87 | 2.39 | 2.63 | 3.13 | 3.18 | 3.15 |
| G14 | Labour Relations Division | Government | 2 | 2.0 | 2.0 | 2.0 | 2.00 | 3.80 | 2.62 | 3.21 | 2.88 | 3.66 | 3.27 |
| G15 | Labour Affairs | Government | 1 | 2.0 | 2.0 | 2.0 | 2.00 | 3.17 | 2.30 | 2.74 | 3.25 | 3.21 | 3.23 |
| G16 | Court Reporting | Government | 2 | 1.0 | 2.0 | 2.0 | 1.67 | 1.94 | 2.11 | 2.03 | 2.24 | 2.03 | 2.13 |
| H1 | Healthcare Industry | Hospital | 3 | 4.0 | 4.0 | 4.0 | 4.00 | 4.79 | 4.03 | 4.41 | 4.09 | 4.09 | 4.09 |
| H2 | M Hospital | Hospital | 2 | 3.0 | 3.0 | 3.0 | 3.00 | 3.30 | 3.11 | 3.20 | 3.10 | 3.38 | 3.24 |
| H3 | T Hospital | Hospital | 2 | 3.0 | 3.0 | 3.0 | 3.00 | 2.57 | 2.44 | 2.51 | 3.25 | 3.21 | 3.23 |
| I1 | HK Branch | IT | 1 | 4.0 | 4.0 | 4.0 | 4.00 | 3.99 | 3.12 | 3.56 | 3.57 | 3.75 | 3.66 |
| I2 | Asia Logistics/Systems | IT | 1 | 3.0 | 2.0 | 4.0 | 3.00 | 3.52 | 3.34 | 3.43 | 2.41 | 3.90 | 3.15 |
| I3 | HK Group | IT | 1 | 2.0 | 2.0 | 2.0 | 2.00 | 3.80 | 2.62 | 3.21 | 2.26 | 3.77 | 3.01 |
| M1 | HK Branch | Manufacturing | 1 | 4.0 | 3.0 | 4.0 | 3.67 | 4.59 | 3.8 | 4.21 | 2.33 | 3.03 | 2.68 |
| M2 | MM Industries | Manufacturing | 4 | 3.0 | 3.0 | 3.0 | 3.00 | 3.97 | 3.68 | 3.83 | 3.80 | 4.01 | 3.91 |
| M3 | Sales & Marketing | Manufacturing | 1 | 3.0 | 3.0 | 3.0 | 3.00 | 3.70 | 4.28 | 3.99 | 3.57 | 3.05 | 3.31 |
| M4 | Marketing | Manufacturing | 2 | 2.0 | 3.0 | 4.0 | 3.00 | 3.99 | 2.90 | 3.44 | 3.18 | 3.83 | 3.50 |
| M5 | China/HK Branch | Manufacturing | 2 | 2.0 | 3.0 | 3.0 | 2.67 | 3.56 | 3.01 | 3.28 | 3.23 | 2.39 | 2.81 |
| M6 | Greater China Marketing | Manufacturing | 3 | 2.0 | 3.0 | 2.0 | 2.33 | 4.77 | 4.77 | 4.77 | 2.90 | 2.22 | 2.56 |
| M7 | Engineering | Manufacturing | 2 | 2.0 | 2.0 | 2.0 | 2.00 | 3.00 | 1.83 | 2.42 | 2.13 | 2.91 | 2.52 |
| P1 | Property management | Property | 2 | 2.0 | 2.0 | 3.0 | 2.33 | 3.15 | 2.67 | 2.91 | 2.36 | 3.10 | 2.73 |
| P2 | Accounting & Finance | Property | 2 | 2.0 | 2.0 | 2.0 | 2.00 | 1.92 | 2.09 | 2.01 | 2.78 | 2.97 | 2.88 |
| T1 | Engineering | Transport/Storage | 3 | 4.0 | 4.0 | 4.0 | 4.00 | 3.73 | 3.54 | 3.64 | 3.54 | 3.44 | 3.49 |
| T2 | Shipping | Transport/Storage | 1 | 3.0 | 4.0 | 4.0 | 3.67 | 3.69 | 4.14 | 3.91 | 3.52 | 3.60 | 3.56 |
| T3 | China Services | Transport/Storage | 4 | 3.0 | 3.0 | 3.6 | 3.20 | 4.57 | 3.71 | 4.14 | 2.60 | 3.61 | 3.10 |
| T4 | Depots Administration | Transport/Storage | 2 | 3.0 | 3.6 | 2.0 | 2.87 | 3.75 | 2.92 | 3.33 | 3.30 | 3.31 | 3.30 |
| U1 | Customer Accounts | Utilities | 3 | 3.0 | 4.0 | 3.0 | 3.33 | 3.34 | 2.72 | 3.03 | 3.47 | 2.24 | 2.85 |
| U2 | Customer Service | Utilities | 3 | 2.0 | 3.0 | 3.0 | 2.67 | 2.68 | 2.04 | 2.36 | 3.11 | 2.58 | 2.84 |

(Align Type: 1=Business-strategy-led; 2=Conservative; 3=Organisation-led; 4=Technology-led)

## Appendix 1.2 : Organisations by Alignment Type (1&2) and ISSP Success

| Org. | BU | Industry | Align | ISSP Success | | | | ISSP Process | | | IS Success | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Type | A | B | C | Avg | Imp | Eff | Avg | B | C | Avg |
| C2 | H.K. Branch | Commerce & Trade | 1 | 4.0 | 4.0 | 4.0 | 4.00 | 4.70 | 4.08 | 4.39 | 3.98 | 3.75 | 3.87 |
| I1 | HK Branch ** | IT | 1 | 4.0 | 4.0 | 4.0 | 4.00 | 3.99 | 3.12 | 3.56 | 3.57 | 3.75 | 3.66 |
| T2 | Shipping | Transport/Storage | 1 | 3.0 | 4.0 | 4.0 | 3.67 | 3.69 | 4.14 | 3.91 | 3.52 | 3.60 | 3.56 |
| G4 | Immigration ** | Government | 1 | 4.0 | 3.0 | 4.0 | 3.67 | 3.96 | 3.25 | 3.60 | 3.01 | 3.89 | 3.45 |
| B3 | Banking Group | Banking & Finance | 1 | 4.0 | 3.0 | 4.0 | 3.67 | 3.36 | 3.35 | 3.36 | 3.35 | 3.75 | 3.55 |
| M1 | HK Branch | Manufacturing | 1 | 4.0 | 3.0 | 4.0 | 3.67 | 4.59 | 3.83 | 4.21 | 2.33 | 3.03 | 2.68 |
| G5 | Trade Development | Government | 1 | 4.0 | 3.0 | 4.0 | 3.67 | 3.84 | 3.75 | 3.79 | 1.91 | 3.63 | 2.77 |
| B5 | Credit Service | Banking & Finance | 1 | 3.0 | 4.0 | 4.0 | 3.67 | 2.05 | 1.95 | 2.00 | 3.32 | 3.54 | 3.43 |
| C4 | HH Co Ltd | Commerce & Trade | 1 | 2.5 | 3.8 | 4.0 | 3.43 | 3.16 | 2.84 | 3.00 | 3.64 | 3.59 | 3.62 |
| B8 | Retail Marketing | Banking & Finance | 1 | 3.4 | 2.6 | 4.0 | 3.33 | 4.52 | 3.58 | 4.05 | 2.55 | 3.10 | 2.82 |
| M3 | Sales & Marketing | Manufacturing | 1 | 3.0 | 3.0 | 3.0 | 3.00 | 3.70 | 4.28 | 3.99 | 3.57 | 3.05 | 3.31 |
| C7 | L. Co. Ltd. | Commerce & Trade | 1 | 3.0 | 3.0 | 3.0 | 3.00 | 3.77 | 3.41 | 3.59 | 3.28 | 3.29 | 3.29 |
| B10 | Retail Banking ** | Banking & Finance | 1 | 2.0 | 3.0 | 4.0 | 3.00 | 3.68 | 3.84 | 3.76 | 2.84 | 3.34 | 3.09 |
| I2 | Asia Logistics/Systems | IT | 1 | 3.0 | 2.0 | 4.0 | 3.00 | 3.52 | 3.34 | 3.43 | 2.41 | 3.90 | 3.15 |
| C8 | AA Co. Ltd. | Commerce & Trade | 1 | 3.0 | 3.0 | 3.0 | 3.00 | 3.81 | 2.61 | 3.21 | 2.99 | 3.59 | 3.29 |
| B11 | Group Insurance | Banking & Finance | 1 | 4.0 | 3.0 | 2.0 | 3.00 | 4.45 | 2.51 | 3.48 | 2.83 | 2.46 | 2.64 |
| C10 | T Co. Ltd. | Commerce & Trade | 1 | 2.0 | 3.0 | 3.0 | 2.67 | 4.41 | 2.92 | 3.66 | 2.99 | 2.98 | 2.99 |
| C11 | Publisher | Commerce & Trade | 1 | 2.0 | 2.0 | 4.0 | 2.67 | 3.48 | 3.66 | 3.57 | 2.22 | 2.92 | 2.57 |
| I3 | HK Group | IT | 1 | 2.0 | 2.0 | 2.0 | 2.00 | 3.80 | 2.62 | 3.21 | 2.26 | 3.77 | 3.01 |
| G15 | Labour Affairs | Government | 1 | 2.0 | 2.0 | 2.0 | 2.00 | 3.17 | 2.30 | 2.74 | 3.25 | 3.21 | 3.23 |
| C16 | HK Branch | Commerce & Trade | 1 | 2.0 | 1.0 | 1.5 | 1.50 | 4.06 | 2.67 | 3.37 | 1.49 | 2.96 | 2.23 |
| A1 | Accounting & Audit ** | Accounting & Audit | 2 | 4.0 | 4.0 | 5.0 | 4.33 | 3.96 | 2.74 | 3.35 | 3.72 | 4.21 | 3.97 |
| G2 | Training Unit | Government | 2 | 3.0 | 4.0 | 4.0 | 3.67 | 4.19 | 3.69 | 3.94 | 3.02 | 4.15 | 3.58 |
| G3 | Library | Government | 2 | 3.0 | 4.0 | 4.0 | 3.67 | 4.00 | 3.79 | 3.90 | 3.24 | 3.75 | 3.49 |
| B4 | HK Branch | Banking & Finance | 2 | 4.0 | 3.0 | 4.0 | 3.67 | 4.11 | 3.85 | 3.98 | 2.75 | 3.08 | 2.92 |
| G6 | Maintenance Division | Government | 2 | 3.4 | 3.4 | 4.0 | 3.60 | 4.09 | 3.57 | 3.83 | 3.26 | 4.16 | 3.71 |
| B7 | Compliance Division | Banking & Finance | 2 | 4.0 | 2.0 | 4.0 | 3.33 | 3.59 | 3.83 | 3.71 | 3.06 | 3.40 | 3.23 |
| G10 | Employee Compensation | Government | 2 | 3.0 | 3.0 | 4.0 | 3.33 | 4.68 | 2.70 | 3.69 | 2.57 | 3.31 | 2.94 |
| M4 | Marketing | Manufacturing | 2 | 2.0 | 3.0 | 4.0 | 3.00 | 3.99 | 2.90 | 3.44 | 3.18 | 3.83 | 3.50 |
| H2 | M Hospital | Hospital | 2 | 3.0 | 3.0 | 3.0 | 3.00 | 3.30 | 3.11 | 3.20 | 3.10 | 3.38 | 3.24 |
| G11 | Liquid Waste Projects | Government | 2 | 3.0 | 3.0 | 3.0 | 3.00 | 3.86 | 2.04 | 2.95 | 3.03 | 3.71 | 3.37 |
| G12 | Judiciary | Government | 2 | 3.0 | 3.0 | 3.0 | 3.00 | 3.17 | 2.98 | 3.07 | 2.78 | 2.58 | 2.68 |
| H3 | T Hospital | Hospital | 2 | 3.0 | 3.0 | 3.0 | 3.00 | 2.57 | 2.44 | 2.51 | 3.25 | 3.21 | 3.23 |
| C9 | Advertising Agency | Commerce & Trade | 2 | 3.0 | 2.0 | 3.6 | 2.87 | 3.77 | 2.83 | 3.30 | 2.91 | 3.82 | 3.37 |
| T4 | Depots Administration | Transport/Storage | 2 | 3.0 | 3.6 | 2.0 | 2.87 | 3.75 | 2.92 | 3.33 | 3.30 | 3.31 | 3.30 |
| E2 | Div.of Humanities | Education | 2 | 2.0 | 2.0 | 4.0 | 2.67 | 3.75 | 3.69 | 3.72 | 3.29 | 4.10 | 3.70 |
| E3 | Open Learning | Education | 2 | 2.0 | 2.0 | 4.0 | 2.67 | 2.82 | 2.54 | 2.68 | 3.25 | 3.44 | 3.34 |
| M5 | China/HK Branch | Manufacturing | 2 | 2.0 | 3.0 | 3.0 | 2.67 | 3.56 | 3.01 | 3.28 | 3.23 | 2.39 | 2.81 |
| A2 | Accounting & Audit | Accounting & Audit | 2 | 2.0 | 3.0 | 3.0 | 2.67 | 3.52 | 3.15 | 3.34 | 2.32 | 2.89 | 2.61 |
| E5 | Finance Office | Education | 2 | 2.0 | 2.0 | 3.0 | 2.33 | 3.78 | 3.84 | 3.81 | 3.24 | 3.65 | 3.45 |
| P1 | Property management | Property | 2 | 2.0 | 2.0 | 3.0 | 2.33 | 3.15 | 2.67 | 2.91 | 2.36 | 3.10 | 2.73 |
| C13 | Asia Pacific Operations | Commerce & Trade | 2 | 2.0 | 2.0 | 2.0 | 2.00 | 3.96 | 3.06 | 3.51 | 3.36 | 3.25 | 3.31 |
| C14 | Men's & Ladies' Wears | Commerce & Trade | 2 | 2.0 | 2.0 | 2.0 | 2.00 | 4.16 | 2.39 | 3.28 | 3.02 | 3.73 | 3.37 |
| G14 | Labour Relations Division | Government | 2 | 2.0 | 2.0 | 2.0 | 2.00 | 3.80 | 2.62 | 3.21 | 2.88 | 3.66 | 3.27 |
| B13 | Operations | Banking & Finance | 2 | 2.0 | 2.0 | 2.0 | 2.00 | 2.35 | 2.35 | 2.35 | 3.19 | 2.85 | 3.02 |
| M7 | Engineering | Manufacturing | 2 | 2.0 | 2.0 | 2.0 | 2.00 | 3.00 | 1.83 | 2.42 | 2.13 | 2.91 | 2.52 |
| P2 | Accounting & Finance | Property | 2 | 2.0 | 2.0 | 2.0 | 2.00 | 1.92 | 2.09 | 2.01 | 2.78 | 2.97 | 2.88 |
| C15 | Operations | Commerce & Trade | 2 | 1.5 | 1.8 | 2.0 | 1.77 | 2.88 | 2.30 | 2.59 | 2.44 | 2.71 | 2.57 |
| G16 | Court Reporting | Government | 2 | 1.0 | 2.0 | 2.0 | 1.67 | 1.94 | 2.11 | 2.03 | 2.24 | 2.03 | 2.13 |
| E6 | Personnel Office | Education | 2 | 1.0 | 1.0 | 1.0 | 1.00 | 3.82 | 1.47 | 2.65 | 1.75 | 1.89 | 1.82 |

(Alignment Type: 1=Business-strategy-led; 2=Conservative)

## Appendix 1.3 : Organisations by Alignment Type (3 & 4) and ISSP Success

| Org. | BU | Industry | Align | ISSP Success | | | | ISSP Process | | | IS Success | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Type | A | B | C | Avg | Imp | Eff | Avg | B | C | Avg |
| C1 | China Promotion | Commerce & Trade | 3 | 4.0 | 4.0 | 5.0 | 4.33 | 4.22 | 4.41 | 4.32 | 3.14 | 3.76 | 3.45 |
| H1 | Healthcare Industry ** | Hospital | 3 | 4.0 | 4.0 | 4.0 | 4.00 | 4.79 | 4.03 | 4.41 | 4.09 | 4.09 | 4.09 |
| G1 | Inland Revenue | Government | 3 | 4.0 | 4.0 | 4.0 | 4.00 | 4.27 | 3.60 | 3.93 | 3.59 | 3.71 | 3.65 |
| T1 | Engineering | Transport/Storage | 3 | 4.0 | 4.0 | 4.0 | 4.00 | 3.73 | 3.54 | 3.64 | 3.54 | 3.44 | 3.49 |
| B2 | General Insurance | Banking & Finance | 3 | 4.0 | 3.0 | 4.0 | 3.67 | 4.22 | 3.82 | 4.02 | 3.36 | 4.00 | 3.68 |
| C3 | TT Co. Ltd. | Commerce & Trade | 3 | 4.0 | 3.0 | 4.0 | 3.67 | 3.85 | 3.25 | 3.55 | 3.62 | 3.74 | 3.68 |
| E1 | Library | Education | 3 | 4.0 | 3.0 | 4.0 | 3.67 | 4.28 | 3.36 | 3.82 | 3.01 | 2.49 | 2.75 |
| G9 | Insurance Company Supervision | Government | 3 | 3.0 | 4.0 | 3.0 | 3.33 | 4.18 | 3.30 | 3.74 | 3.30 | 3.19 | 3.25 |
| B6 | General Insurance | Banking & Finance | 3 | 3.0 | 4.0 | 3.0 | 3.33 | 3.82 | 3.26 | 3.54 | 3.19 | 3.62 | 3.41 |
| U1 | Customer Accounts | Utilities | 3 | 3.0 | 4.0 | 3.0 | 3.33 | 3.34 | 2.72 | 3.03 | 3.47 | 2.24 | 2.85 |
| U2 | Customer Service | Utilities | 3 | 2.0 | 3.0 | 3.0 | 2.67 | 2.68 | 2.04 | 2.36 | 3.11 | 2.58 | 2.84 |
| G13 | Family and Child Welfare | Government | 3 | 3.2 | 1.8 | 2.4 | 2.47 | 2.87 | 2.39 | 2.63 | 3.13 | 3.18 | 3.15 |
| M6 | Greater China Marketing | Manufacturing | 3 | 2.0 | 3.0 | 2.0 | 2.33 | 4.77 | 4.77 | 4.77 | 2.90 | 2.22 | 2.56 |
| B1 | Marketing ** | Banking & Finance | 4 | 4.0 | 4.0 | 4.0 | 4.00 | 3.85 | 3.59 | 3.72 | 3.12 | 3.23 | 3.17 |
| G7 | Survey Division | Government | 4 | 3.0 | 3.6 | 4.0 | 3.53 | 4.00 | 4.00 | 4.00 | 3.65 | 4.05 | 3.85 |
| G8 | IS Division | Government | 4 | 3.6 | 3.6 | 3.0 | 3.40 | 3.75 | 3.41 | 3.58 | 3.80 | 3.02 | 3.41 |
| C5 | LL Co. Ltd. | Commerce & Trade | 4 | 4.0 | 2.0 | 4.0 | 3.33 | 4.30 | 3.60 | 3.95 | 3.75 | 4.24 | 3.99 |
| C6 | SS Co. Ltd. | Commerce & Trade | 4 | 3.0 | 3.4 | 3.4 | 3.27 | 3.62 | 2.24 | 2.93 | 2.73 | 2.68 | 2.70 |
| T3 | China Services ** | Transport/Storage | 4 | 3.0 | 3.0 | 3.6 | 3.20 | 4.57 | 3.71 | 4.14 | 2.60 | 3.61 | 3.10 |
| B9 | Accounting & Audit | Banking & Finance | 4 | 3.6 | 3.6 | 2.0 | 3.07 | 3.83 | 3.12 | 3.47 | 3.50 | 3.34 | 3.42 |
| M2 | MM Industries | Manufacturing | 4 | 3.0 | 3.0 | 3.0 | 3.00 | 3.97 | 3.68 | 3.83 | 3.80 | 4.01 | 3.91 |
| C12 | Corporate | Commerce & Trade | 4 | 2.0 | 3.0 | 3.0 | 2.67 | 3.49 | 2.54 | 3.01 | 2.85 | 3.17 | 3.01 |
| B12 | Marketing | Banking & Finance | 4 | 2.0 | 4.0 | 2.0 | 2.67 | 2.74 | 2.34 | 2.54 | 3.55 | 3.10 | 3.32 |
| E4 | Student Affairs Office | Education | 4 | 2.0 | 4.0 | 2.0 | 2.67 | 2.53 | 2.10 | 2.32 | 1.96 | 2.11 | 2.04 |

(Alignment Type: 3=Organisation-led; 4=Technology-led)

## Appendix 2 : Alignment Type based on STROBE and STROIS by Organisation

| Organisation : | A1 | A2 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | B8 | B9 | B10 | B11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alignment Type : | 2 | 2 | 4 | 3 | 3 | 2 | 3 | 3 | 1 | 1 | 4 | 1 | 1 |
| | | | | | | | | | | | | | |
| Aggressiveness | 2.25 | 4.75 | 3.75 | 4.75 | 3.25 | 3.00 | 2.50 | 3.75 | 3.50 | 3.50 | 2.50 | 4.00 | 4.25 |
| Analysis | 3.60 | 3.80 | 3.20 | 2.80 | 3.20 | 3.20 | 3.80 | 3.60 | 3.60 | 3.60 | 2.00 | 3.00 | 2.80 |
| Defensiveness | 2.75 | 1.75 | 2.50 | 3.75 | 3.50 | 3.00 | 3.75 | 3.25 | 3.25 | 3.00 | 2.25 | 3.00 | 3.75 |
| Futurity | 2.00 | 2.60 | 3.00 | 4.00 | 3.40 | 3.20 | 2.20 | 3.40 | 3.40 | 3.40 | 3.00 | 3.20 | 3.60 |
| Proactiveness | 1.60 | 2.20 | 2.60 | 4.20 | 3.20 | 3.00 | 4.40 | 3.40 | 3.40 | 2.60 | 3.20 | 4.40 | 4.00 |
| Riskiness | 2.60 | 1.60 | 2.40 | 2.00 | 2.40 | 2.00 | 2.40 | 2.60 | 1.20 | 2.60 | 2.80 | 2.20 | 2.40 |
| STROBE | 2.47 | 2.78 | 2.91 | 3.58 | 3.16 | 2.90 | 3.18 | 3.33 | 3.06 | 3.12 | 2.63 | 3.30 | 3.47 |
| | | | | | | | | | | | | | |
| Aggressiveness | 1.00 | 1.00 | 2.00 | 1.00 | 2.00 | 1.50 | 1.75 | 3.00 | 3.00 | 1.25 | 3.25 | 1.00 | 1.00 |
| Analysis | 3.33 | 2.83 | 3.83 | 4.00 | 3.00 | 2.83 | 3.67 | 3.67 | 2.67 | 2.50 | 4.00 | 2.67 | 3.83 |
| Defensive | 3.75 | 3.50 | 3.75 | 4.25 | 3.75 | 3.50 | 3.50 | 3.50 | 3.00 | 2.75 | 3.75 | 2.25 | 3.50 |
| Futurity | 2.40 | 1.00 | 3.60 | 3.80 | 3.00 | 2.60 | 3.40 | 3.60 | 2.80 | 2.40 | 3.80 | 1.80 | 3.40 |
| Proactive | 3.00 | 1.40 | 3.80 | 3.20 | 3.40 | 2.60 | 3.20 | 3.40 | 3.00 | 2.40 | 3.20 | 1.80 | 2.00 |
| Riskiness | 1.00 | 1.00 | 3.60 | 2.80 | 3.00 | 2.20 | 3.00 | 3.20 | 3.00 | 1.20 | 3.40 | 2.40 | 1.00 |
| STROIS | 2.41 | 1.79 | 3.43 | 3.18 | 3.03 | 2.54 | 3.09 | 3.39 | 2.91 | 2.08 | 3.57 | 1.99 | 2.46 |

| Organisation : | B12 | B13 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alignment Type : | 4 | 2 | 3 | 3 | 3 | 1 | 4 | 4 | 3 | 3 | 2 | 2 | 1 |
| | | | | | | | | | | | | | |
| Aggressiveness | 3.25 | 3.00 | 4.00 | 3.50 | 3.50 | 3.25 | 1.25 | 3.00 | 3.50 | 3.25 | 4.25 | 3.75 | 4.50 |
| Analysis | 2.60 | 2.40 | 2.60 | 3.00 | 2.80 | 3.80 | 2.20 | 2.60 | 3.80 | 4.00 | 2.60 | 3.00 | 3.60 |
| Defensive | 2.50 | 2.75 | 2.75 | 3.00 | 2.75 | 2.75 | 1.75 | 2.50 | 3.00 | 3.00 | 2.75 | 3.50 | 3.50 |
| Futurity | 3.20 | 3.00 | 3.40 | 4.60 | 3.20 | 2.60 | 1.40 | 3.00 | 3.00 | 3.20 | 2.80 | 2.20 | 3.40 |
| Proactive | 2.80 | 2.60 | 3.40 | 3.60 | 3.40 | 2.80 | 2.60 | 3.20 | 3.20 | 3.60 | 2.80 | 3.60 | 3.80 |
| Riskiness | 2.20 | 2.60 | 2.20 | 1.80 | 2.80 | 3.20 | 2.20 | 2.80 | 2.60 | 3.80 | 2.80 | 2.00 | 2.00 |
| STROBE | 2.76 | 2.73 | 3.06 | 3.25 | 3.08 | 3.07 | 1.90 | 2.85 | 3.18 | 3.48 | 3.00 | 3.01 | 3.47 |
| | | | | | | | | | | | | | |
| Aggressiveness | 4.75 | 2.75 | 3.00 | 2.00 | 4.00 | 1.00 | 4.50 | 3.00 | 2.50 | 3.00 | 1.00 | 3.75 | 1.00 |
| Analysis | 4.50 | 2.83 | 3.50 | 4.17 | 4.00 | 2.50 | 4.17 | 3.33 | 3.67 | 3.33 | 3.33 | 2.67 | 1.67 |
| Defensiveness | 4.00 | 2.50 | 3.25 | 3.50 | 4.00 | 2.00 | 4.00 | 3.25 | 3.50 | 3.25 | 3.25 | 3.00 | 2.25 |
| Futurity | 4.80 | 2.40 | 3.00 | 2.80 | 3.80 | 1.00 | 4.40 | 3.80 | 3.00 | 2.60 | 3.80 | 2.80 | 1.00 |
| Proactiveness | 3.80 | 2.20 | 3.00 | 3.00 | 4.00 | 1.40 | 4.40 | 3.00 | 2.80 | 3.00 | 3.40 | 2.00 | 1.00 |
| Riskiness | 3.40 | 2.40 | 3.00 | 3.00 | 4.00 | 1.00 | 4.20 | 2.80 | 2.80 | 3.20 | 1.00 | 3.40 | 1.00 |
| STROIS | 4.21 | 2.51 | 3.13 | 3.08 | 3.97 | 1.48 | 4.28 | 3.20 | 3.04 | 3.06 | 2.63 | 2.94 | 1.32 |

## Appendix 2 : Alignment Type based on STROBE and STROIS by Organisation
(continued)

| Organisation : | C12 | C13 | C14 | C15 | C16 | E1 | E2 | E3 | E4 | E5 | E6 | G1 | G2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alignment Type : | 4 | 2 | 2 | 2 | 1 | 3 | 2 | 4 | 4 | 2 | 2 | 3 | 2 |
| | | | | | | | | | | | | | |
| Aggressiveness | 3.50 | 2.50 | 2.25 | 3.00 | 2.75 | 3.75 | 3.25 | 3.25 | 2.50 | 3.25 | 3.00 | 4.00 | 3.00 |
| Analysis | 2.80 | 2.80 | 2.80 | 3.00 | 3.60 | 3.80 | 2.20 | 2.40 | 2.20 | 1.00 | 2.00 | 3.40 | 2.20 |
| Defensiveness | 3.00 | 2.50 | 2.25 | 2.25 | 3.00 | 4.00 | 3.00 | 3.25 | 1.50 | 2.50 | 1.25 | 3.25 | 3.25 |
| Futurity | 2.60 | 2.80 | 2.40 | 1.60 | 3.00 | 3.60 | 3.20 | 3.00 | 2.80 | 2.20 | 1.80 | 3.60 | 3.60 |
| Proactiveness | 3.80 | 2.60 | 2.80 | 3.20 | 3.20 | 3.60 | 2.40 | 3.00 | 1.60 | 1.00 | 1.40 | 3.80 | 3.00 |
| Riskiness | 2.00 | 2.60 | 2.80 | 2.40 | 2.60 | 2.20 | 3.00 | 2.80 | 2.80 | 3.20 | 2.00 | 2.00 | 3.00 |
| STROBE | 2.95 | 2.63 | 2.55 | 2.58 | 3.03 | 3.49 | 2.84 | 2.95 | 2.23 | 2.19 | 1.91 | 3.34 | 3.01 |
| | | | | | | | | | | | | | |
| Aggressiveness | 2.00 | 2.00 | 1.25 | 3.00 | 1.25 | 3.00 | 1.00 | 2.75 | 3.00 | 1.00 | 1.00 | 3.00 | 1.50 |
| Analysis | 3.33 | 2.67 | 2.50 | 1.83 | 1.50 | 4.00 | 3.50 | 2.67 | 3.50 | 3.50 | 2.00 | 4.17 | 3.17 |
| Defensiveness | 3.75 | 2.50 | 2.00 | 2.25 | 1.50 | 4.50 | 4.00 | 3.75 | 4.00 | 3.25 | 1.75 | 4.25 | 3.75 |
| Futurity | 3.40 | 2.60 | 2.60 | 2.80 | 1.20 | 3.80 | 3.40 | 3.00 | 3.60 | 3.20 | 1.40 | 3.80 | 3.40 |
| Proactiveness | 3.40 | 3.00 | 2.80 | 3.60 | 1.00 | 3.20 | 2.20 | 2.40 | 4.40 | 1.60 | 1.00 | 3.80 | 3.00 |
| Riskiness | 3.40 | 3.40 | 2.80 | 2.80 | 1.20 | 3.00 | 2.60 | 3.60 | 3.00 | 1.80 | 1.00 | 3.60 | 2.60 |
| STROIS | 3.21 | 2.69 | 2.33 | 2.71 | 1.28 | 3.58 | 2.78 | 3.03 | 3.58 | 2.39 | 1.36 | 3.77 | 2.90 |

| Organisation : | G3 | G4 | G5 | G6 | G7 | G8 | G9 | G10 | G11 | G12 | G13 | G14 | G15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alignment Type : | 1 | 1 | 1 | 2 | 4 | 4 | 3 | 2 | 2 | 2 | 4 | 2 | 1 |
| | | | | | | | | | | | | | |
| Aggressiveness | 4.25 | 3.50 | 4.25 | 3.25 | 2.75 | 4.50 | 4.25 | 2.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| Analysis | 2.60 | 3.60 | 3.40 | 2.80 | 2.20 | 2.20 | 3.60 | 1.60 | 2.40 | 2.20 | 3.40 | 1.80 | 3.60 |
| Defensiveness | 2.75 | 3.50 | 4.00 | 2.75 | 1.75 | 3.25 | 3.50 | 2.00 | 2.00 | 1.50 | 2.50 | 2.75 | 2.50 |
| Futurity | 4.00 | 3.40 | 4.00 | 3.20 | 2.20 | 3.80 | 4.00 | 2.80 | 3.20 | 2.60 | 3.00 | 3.80 | 3.20 |
| Proactiveness | 2.40 | 3.40 | 3.20 | 1.40 | 2.80 | 2.60 | 2.80 | 1.40 | 2.20 | 1.80 | 3.00 | 2.00 | 3.80 |
| Riskiness | 3.20 | 2.00 | 2.40 | 2.80 | 2.20 | 2.20 | 2.60 | 2.00 | 1.80 | 2.60 | 2.40 | 2.00 | 2.40 |
| STROBE | 3.20 | 3.23 | 3.54 | 2.70 | 2.32 | 3.09 | 3.46 | 2.05 | 2.52 | 2.37 | 2.97 | 2.64 | 3.17 |
| | | | | | | | | | | | | | |
| Aggressiveness | 1.00 | 3.75 | 2.00 | 2.00 | 1.00 | 1.00 | 3.00 | 1.00 | 1.00 | 1.00 | 3.25 | 1.00 | 1.00 |
| Analysis | 3.50 | 2.67 | 2.00 | 2.67 | 3.67 | 3.83 | 3.33 | 3.67 | 3.17 | 2.00 | 3.17 | 1.67 | 3.00 |
| Defensiveness | 4.00 | 2.50 | 2.25 | 3.00 | 3.75 | 3.75 | 3.25 | 3.00 | 3.75 | 3.25 | 3.50 | 2.25 | 3.00 |
| Futurity | 3.00 | 2.00 | 2.00 | 3.00 | 3.60 | 4.00 | 3.60 | 4.20 | 3.00 | 2.80 | 2.80 | 1.00 | 3.20 |
| Proactiveness | 1.60 | 2.60 | 2.00 | 3.00 | 3.80 | 3.40 | 3.00 | 1.20 | 2.20 | 1.80 | 3.40 | 1.20 | 2.00 |
| Riskiness | 1.40 | 2.00 | 2.00 | 1.80 | 3.00 | 2.80 | 2.80 | 1.60 | 3.00 | 2.00 | 3.20 | 1.20 | 3.20 |
| STROIS | 2.42 | 2.59 | 2.04 | 2.58 | 3.14 | 3.13 | 3.16 | 2.44 | 2.69 | 2.14 | 3.22 | 1.39 | 2.57 |

## Appendix 2 : Alignment Type based on STROBE and STROIS by Organisation (continued)

| Organisation : | G16 | H1 | H2 | H3 | I1 | I2 | I3 | M1 | M2 | M3 | M4 | M5 | M6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alignment Type : | 2 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 4 | 1 | 2 | 2 | 3 |
| | | | | | | | | | | | | | |
| Aggressiveness | 3.50 | 4.25 | 4.00 | 3.50 | 3.50 | 4.25 | 3.50 | 3.25 | 3.75 | 3.50 | 4.00 | 1.00 | 3.50 |
| Analysis | 2.40 | 4.00 | 2.40 | 2.20 | 4.20 | 3.40 | 3.60 | 3.80 | 4.00 | 3.60 | 3.00 | 2.50 | 2.80 |
| Defensive | 2.75 | 4.00 | 2.00 | 2.00 | 3.50 | 3.00 | 3.25 | 2.50 | 1.75 | 3.00 | 3.00 | 3.25 | 2.00 |
| Futurity | 2.80 | 4.00 | 4.60 | 3.60 | 3.40 | 3.60 | 2.80 | 2.60 | 2.80 | 2.80 | 2.60 | 2.20 | 3.40 |
| Proactive | 2.20 | 4.00 | 2.40 | 3.40 | 3.40 | 3.40 | 2.80 | 4.20 | 2.80 | 3.40 | 2.80 | 3.80 | 3.60 |
| Riskiness | 2.20 | 2.60 | 2.40 | 2.40 | 2.80 | 2.60 | 4.00 | 3.00 | 2.40 | 2.80 | 2.40 | 2.20 | 2.80 |
| STROBE | 2.64 | 3.81 | 2.97 | 2.85 | 3.47 | 3.38 | 3.33 | 3.23 | 2.92 | 3.18 | 2.97 | 2.43 | 3.02 |
| | | | | | | | | | | | | | |
| Aggressiveness | 1.00 | 2.75 | 1.00 | 1.00 | 2.00 | 1.25 | 2.00 | 1.00 | 3.00 | 2.25 | 2.25 | 2.75 | 3.75 |
| Analysis | 3.00 | 4.00 | 3.50 | 3.17 | 4.00 | 2.17 | 3.33 | 2.17 | 3.17 | 3.33 | 2.83 | 3.00 | 4.00 |
| Defensive | 2.75 | 4.00 | 2.75 | 2.75 | 3.50 | 2.75 | 2.75 | 3.00 | 3.50 | 3.00 | 4.00 | 2.75 | 3.75 |
| Futurity | 3.00 | 4.00 | 3.20 | 2.20 | 3.00 | 1.40 | 3.00 | 2.00 | 3.00 | 2.80 | 2.80 | 2.40 | 3.60 |
| Proactive | 1.60 | 4.00 | 2.80 | 2.60 | 2.80 | 1.20 | 1.80 | 2.00 | 2.80 | 2.60 | 2.60 | 2.00 | 3.00 |
| Riskiness | 2.80 | 4.00 | 3.00 | 3.00 | 2.60 | 1.00 | 2.20 | 1.00 | 3.00 | 2.80 | 2.80 | 2.00 | 3.00 |
| STROIS | 2.36 | 3.79 | 2.71 | 2.45 | 2.98 | 1.63 | 2.51 | 1.86 | 3.08 | 2.80 | 2.88 | 2.48 | 3.52 |

| Organisation : | M7 | P1 | P2 | T1 | T2 | T3 | T4 | U1 | U2 |
|---|---|---|---|---|---|---|---|---|---|
| Alignment Type : | 2 | 3 | 2 | 3 | 3 | 4 | 2 | 3 | 3 |
| | | | | | | | | | |
| Aggressiveness | 2.75 | 3.25 | 2.50 | 2.75 | 4.00 | 3.25 | 3.25 | 3.75 | 3.50 |
| Analysis | 2.80 | 3.20 | 2.80 | 3.80 | 4.20 | 3.40 | 2.40 | 2.60 | 3.20 |
| Defensive | 1.25 | 2.75 | 2.50 | 2.75 | 3.25 | 3.00 | 3.25 | 2.75 | 3.00 |
| Futurity | 2.00 | 3.00 | 3.00 | 3.20 | 2.80 | 3.00 | 2.80 | 4.00 | 2.80 |
| Proactive | 2.60 | 3.60 | 2.80 | 3.00 | 3.80 | 2.60 | 2.20 | 2.60 | 4.20 |
| Riskiness | 2.20 | 2.20 | 2.80 | 2.80 | 2.80 | 2.00 | 2.60 | 3.00 | 2.40 |
| STROBE | 2.27 | 3.00 | 2.73 | 3.05 | 3.48 | 2.88 | 2.75 | 3.12 | 3.18 |
| | | | | | | | | | |
| Aggressiveness | 2.00 | 2.00 | 1.75 | 3.25 | 2.00 | 3.00 | 1.75 | 2.75 | 2.50 |
| Analysis | 2.50 | 2.50 | 1.67 | 4.00 | 3.33 | 3.50 | 3.67 | 3.50 | 3.33 |
| Defensive | 2.25 | 4.00 | 2.00 | 4.00 | 4.00 | 3.50 | 2.75 | 3.50 | 3.25 |
| Futurity | 2.20 | 3.40 | 1.80 | 4.00 | 3.40 | 3.20 | 3.20 | 3.00 | 3.00 |
| Proactive | 1.00 | 4.20 | 1.20 | 4.00 | 2.60 | 3.40 | 2.00 | 3.60 | 2.80 |
| Riskiness | 1.00 | 3.40 | 1.60 | 3.80 | 3.00 | 2.80 | 3.00 | 4.00 | 3.60 |
| STROIS | 1.83 | 3.25 | 1.67 | 3.84 | 3.06 | 3.23 | 2.73 | 3.39 | 3.08 |

# Appendix 3 : Questionnaires

## Appendix 3.1: Covering Letter for Distribution of Questionnaires

**The Hong Kong Polytechnic University**

**Department of Computing**

Hung Hom, Hong Kong

Louis Ma
Assistant Professor
Phone : (852) 2766-7292
Fax : (852) 2774-0842
Email: cslouis@comp.polyu.edu.hk

Mr.Sample
Finance Director
Sample Electronics Ltd.

15 November 1995

Dear Mr. Sample,

Thank you very much for your support for my doctoral research on IS Strategic Planning,

I have attached one set of 3 questionnaires for you or your staff to kindly complete them :-

**Questionnaire A** : to be completed by a Senior Executive (e.g. CEO, General Manager, or Strategic Planner) who is familiar with the Business Strategy, Financial, Market and Business Performance of the chosen Business Unit.

**Questionnaire B** : to be completed by a Senior Executive whose area of responsibility (e.g. Marketing, Operations) makes use of the organisation's Information Systems. The Business focus is on the chosen Business Unit.

**Questionnaire C** : to be completed by a Senior Executive who is in-charge of Information Systems/Technology in the chosen Business Unit

Please be assured that your responses will be treated with the strictest confidence. Furthermore, I shall be pleased to compile the appropriate charts and summary of IS strategic alignment in your organisation. Thank you very much for your participation in this study.

Please do not hesitate to discuss further on the subject.

I wish you and your organisation every success in your endeavours.

Your sincerely,

Louis Ma

Attached : 3 questionnaires

## Appendix 3.2: Questionnaire A (for CEO/GM)

**Evaluating Business and Information Systems Strategies**

**Questionnaire A**

- to be completed by a Senior Executive (e.g. CEO, General Manager, or Strategic Planner, etc.) who is familiar with the Business Strategy, Financial, Market and Business Performance of the chosen Business Unit : _____

Formulating and implementing effective business strategies is a major challenge for senior executives. Incorporating appropriate information systems strategies to support/enhance business strategies is another major challenge. This study addresses both issues by matching the strategic orientation of your business unit against the strategic orientation of your information systems that support/enhance your business strategies. Information Systems Strategic Planning may be defined as "the process of deciding the objectives for organisational computing and identifying potential computer applications which the organisation should implement".

Your participation in this study will be greatly appreciated. Please answer each question in this questionnaire. This should take about 15 minutes. Most questions can be answered by either "circling" or "filling in a number" of your choice. There are no right or wrong answers. Further comments and suggestions are most welcome.

Please be assured that your responses will be treated with the strictest confidence. Thank you very much for your participation in this study.

Please "circle" appropriate choice(s) and/or fill in answers.

1. Your Responsibility associated with Information Systems (IS) or Information Technology (IT) :-
   a) Immediate Supervisor of Head of IS/IT
   b) IT Steering Committee Member
   c) Others, please specify : _____

2. Personal Involvement in Strategic Business Planning :
   a) Member of Planning Team
   b) Approval of Strategic Business Plans
   c) Advisory
   d) No Involvement
   e) Others, please specify : _____

3. Personal Involvement in IS Strategic Planning :
   a) Member of Planning Team
   b) Approval of IS Strategic Plans
   c) Advisory
   d) No Involvement
   e) Others, please specify : _____

## Part A : Importance of Business Goals

For each of the following indicators on the importance of business goals, please indicate the level of importance of the business goal, on average, over the past three years, with the 5-point scale below.

| *1* | *2* | *3* | *4* | *5* |
|---|---|---|---|---|
| *Not Important* | | *Moderately Important* | | *Extremely Important* |

[ ] 1. Revenue Growth Rate
[ ] 2. Return on Investment
[ ] 3. Return on Sales
[ ] 4. Effective Business Strategies
[ ] 5. Effective Information Systems Strategies
[ ] 6. Effective Information Systems Services

## Part B : Relative Business Performance

For each of the following business performance indicators, please indicate your best estimate of the chosen business unit's position relative to its major competitors (e.g. top 5 firms), on average, over the *past three years*, with the 5-point scale below.

| *1* | *2* | *3* | *4* | *5* |
|---|---|---|---|---|
| - - | - | | + | ++ |
| *Much Worse than Competition* | | *Neither Worse nor Better than Competition* | | *Much Better than Competition* |

[ ] 1. Revenue Growth
[ ] 2. Market Share gains
[ ] 3. Net Profits
[ ] 4. Return on Investment
[ ] 5. Financial Liquidity
[ ] 6. Service/Product Quality
[ ] 7. Quality of Information Systems Services in supporting the Business

## Part C : Usage of Analytical Models and Techniques for Management Decisions

Please indicate the extent of usage (with the 5-point scale below) for each of the following management techniques, analytical models and management systems in the chosen business unit.

| 3 years ago | Current year | 3 years ahead | *1* | *2* | *3* | *4* | *5* |
|---|---|---|---|---|---|---|---|
| | | | *Never Used* | *Occasionally Used* | *Frequently Used* | *Extensively Used* | *Always Used* |
| [ ] | [ ] | [ ] | 1. Management information and control systems | | | | |
| [ ] | [ ] | [ ] | 2. Manpower planning | | | | |
| [ ] | [ ] | [ ] | 3. Performance appraisal of senior managers | | | | |
| [ ] | [ ] | [ ] | 4. Cost control systems | | | | |
| [ ] | [ ] | [ ] | 5. Production/operations management techniques | | | | |
| [ ] | [ ] | [ ] | 6. Forecasting key indicators of operations | | | | |
| [ ] | [ ] | [ ] | 7. Tracking significant general trends | | | | |
| [ ] | [ ] | [ ] | 8. "What-if" analysis of critical issues | | | | |

## Part D : Strategic Orientation of Business Enterprise

Please indicate the extent, with the 5-point scale below, to which you agree with each of the following statements on your organisation's strategic orientation as it relates to your chosen business unit.

| Realised/Actual Strategies | | Strategic Direction | *1* | *2* | *3* | *4* | *5* |
|---|---|---|---|---|---|---|---|
| | | | - - | - | | + | ++ |
| 3 years ago | Current year | 3 years ahead | *Strongly Disagree* | | *Neither Agree nor Disagree* | | *Strongly Agree* |

| | | | | |
|---|---|---|---|---|
| [ ] | [ ] | [ ] | 1. | We sacrifice short-term profitability to gain market share. |
| [ ] | [ ] | [ ] | 2. | We frequently cut prices to increase our market share. |
| [ ] | [ ] | [ ] | 3. | We have a strong preference to set prices below competition. |
| [ ] | [ ] | [ ] | 4. | We seek market share positions at the expense of cash flow. |
| [ ] | [ ] | [ ] | 5. | We emphasise effective coordination among our functional areas (e.g. marketing, finance, and operations). |
| [ ] | [ ] | [ ] | 6. | We require a great deal of factual information to support our day-to-day decision making. |
| [ ] | [ ] | [ ] | 7. | When confronted with major decisions, we typically develop thorough analyses. |
| [ ] | [ ] | [ ] | 8. | We emphasise on forming partnership with major suppliers. |
| [ ] | [ ] | [ ] | 9. | We emphasise on forming partnership with major distributors and agents. |
| [ ] | [ ] | [ ] | 10. | We emphasise on forming partnership with major customers. |
| [ ] | [ ] | [ ] | 11. | We emphasise on product/service quality. |
| [ ] | [ ] | [ ] | 12. | We emphasise on forming strategic alliances with competitors. |
| [ ] | [ ] | [ ] | 13. | Our criteria for resource allocation generally reflect long-term considerations. |
| [ ] | [ ] | [ ] | 14. | We emphasise long-term research to provide us with future competitive edge. |
| [ ] | [ ] | [ ] | 15. | We have made significant modifications to the technologies in our business operations. |
| [ ] | [ ] | [ ] | 16. | We are constantly seeking new opportunities related to the present operations. |
| [ ] | [ ] | [ ] | 17. | We are usually the first ones to introduce new products/services in our market(s). |
| [ ] | [ ] | [ ] | 18. | We are constantly on the look out for business that can be acquired. |
| [ ] | [ ] | [ ] | 19. | We preempt our competitors by expanding our capacity ahead of them. |
| [ ] | [ ] | [ ] | 20. | Our operations in later stages of life cycle are strategically eliminated. |
| [ ] | [ ] | [ ] | 21. | Our new projects are approved on a *stage-by-stage* basis rather than with *blanket* approval. |
| [ ] | [ ] | [ ] | 22. | Our mode of operations is generally more risky than our competitors. |
| [ ] | [ ] | [ ] | 23. | We usually adopt a conservative view when making major decisions. |
| [ ] | [ ] | [ ] | 24. | We tend to support projects where the expected returns are certain. |
| [ ] | [ ] | [ ] | 25. | Our business operations have generally followed the "tried and true" paths. |
| [ ] | [ ] | [ ] | 26. | Information systems and technology (IS) are critical to our success. |
| [ ] | [ ] | [ ] | 27. | Firms have to invest heavily in IS, if they wish to compete in our industry. |
| [ ] | [ ] | [ ] | 28. | Our business managers are aware of potential business opportunities created by IS. |
| [ ] | [ ] | [ ] | 29. | Our IS managers are aware of potential business opportunities created by IS. |
| [ ] | [ ] | [ ] | 30. | Our business strategy is clearly defined. |
| [ ] | [ ] | [ ] | 31. | Our IS strategy is clearly defined. |

## Part E : Satisfaction with Business Performance

Please indicate your level of satisfaction on the business unit's performance, on average, over the past three years, with the 5-point scale below.

| *1* | *2* | *3* | *4* | *5* |
|---|---|---|---|---|
| - - | - | | + | ++ |
| *Highly Dissatisfied* | | *Neither satisfied nor dissatisfied* | | *Highly Satisfied* |

[ ] 1. Revenue Growth Rate
[ ] 2. Return on Investment
[ ] 3. Return on Sales
[ ] 4. Outcome of Strategic Business Planning
[ ] 5. Outcome of IS Strategic Planning
[ ] 6. Strategic Business Planning Process
[ ] 7. Information Systems Strategic Planning Process
[ ] 8. Information Systems Services

## Part F : Overall Assessments on Information Systems Strategic Planning (ISSP)

How successful has ISSP been in your chosen business unit? (please circle on the *scale* below with each "-" = "0.2" and comment)

1 - - - - 2 - - - - 3 - - - - 4 - - - - 5

| Failure | Some Benefits But did Not Need ISSP to Achieve them | Some Benefits which can Hardly be Achieved Without ISSP | Successful but can improve | Highly Successful |
|---|---|---|---|---|

Major criteria for success/failure : _____

_____

_____

*** **Thank you very much for your participation in this study** ***

Name : _____ Organisation : _____

Department : _____ Position : _____

You are welcome to provide additional comments :-

## Appendix 3.3: Questionnaire B (for User Manager)

**Evaluating Business and Information Systems Strategies**

**Questionnaire B**

- to be completed by a Senior Executive whose area of responsibility (e.g. Marketing, Operations) makes use of the organisation's Information Systems. The Business focus is on the chosen Business Unit : _____

Formulating and implementing effective business strategies is a major challenge for senior executives. Incorporating appropriate information systems strategies to support/enhance business strategies is another major challenge. This study addresses both issues by matching the strategic orientation of your business unit against the strategic orientation of your information systems that support/enhance your business strategies. Information Systems Strategic Planning may be defined as "the process of deciding the objectives for organisational computing and identifying potential computer applications which the organisation should implement".

Your participation in this study will be greatly appreciated. Please answer each question in this questionnaire. This should take about 15 minutes. Most questions can be answered by either "circling" or "filling in a number" of your choice. There are no right or wrong answers. Further comments and suggestions are most welcome.

Please be assured that your responses will be treated with the strictest confidence. Thank you very much for your participation in this study.

Please "circle" appropriate choice(s) and/or fill in answers.

1. Your responsibility associated with Information Systems (IS) or Information Technology (IT):
   a) Immediate Supervisor of Head of IS/IT
   b) IT Steering Committee Member
   c) Others, please specify : _____

2. Personal Involvement in Strategic Business Planning (SBP) :
   a) Member of Planning Team
   b) Approval of Strategic Business Plans
   c) Advisory
   d) No Involvement
   e) Others, please specify : _____

3. Personal Involvement in IS Strategic Planning :
   a) Member of Planning Team
   b) Approval of IS Strategic Plans
   c) Advisory
   d) No Involvement
   e) Others, please specify : _____

## Part A : Satisfaction with IS Service

Please indicate your level of satisfaction with IS service of your chosen business unit with the 5-point scale below.

| *1* | *2* | *3* | *4* | *5* |
|---|---|---|---|---|
| - - | - | | + | ++ |
| *Highly Dissatisfied* | | *Neither satisfied nor dissatisfied* | | *Highly Satisfied* |

| 3 Years Ago | Current Year | A.1 Satisfaction with Information Systems Service |
|---|---|---|
| [ ] | [ ] | 1. Technical expertise of IS staff in general |
| [ ] | [ ] | 2. Ability of IS staff to specify IS requirements |
| [ ] | [ ] | 3. Ability of IS staff to customise (e.g. develop in-house) systems |
| [ ] | [ ] | 4. End-users' ability in defining business information requirements |
| [ ] | [ ] | 5. IS delivered on-time |
| [ ] | [ ] | 6. IS delivered within budget |
| [ ] | [ ] | 7. IS contribution to operational efficiency |
| [ ] | [ ] | 8. IS contribution to managerial effectiveness |
| [ ] | [ ] | 9. IS contribution to improving Profitability |
| [ ] | [ ] | 10. Effectiveness of IS Strategic Planning Process |
| [ ] | [ ] | 11. Overall satisfaction with IS services |

| 3 Years Ago | Current Year | A.2 Satisfaction with Information Systems products |
|---|---|---|
| [ ] | [ ] | 1. Database |
| [ ] | [ ] | 2. Computer hardware platforms |
| [ ] | [ ] | 3. Communications and networking platforms |
| [ ] | [ ] | 4. Systems software platforms |
| [ ] | [ ] | 5. Systems development tools |
| [ ] | [ ] | 6. End-user computing tools |
| [ ] | [ ] | 7. Office Automation products |

## Part B : Relative Quality of IS Services

For each of the following IS performance indicators, please indicate your best estimate of the chosen business unit's position relative to its major competitors (e.g. top 5 firms) with the 5-point scale below.

| *1* | *2* | *3* | *4* | *5* |
|---|---|---|---|---|
| - - | - | | + | ++ |
| *Much Worse than Competition* | | *Neither Worse nor Better than Competition* | | *Much Better than Competition* |

| 3 Years Ago | Current Year | Relative Quality of Information Systems Services |
|---|---|---|
| [ ] | [ ] | 1. Application of IS to advance *Critical Success Factors* [*CSF are the few areas in which performance must be good if the organisation is to continue to exist and prosper*] |
| [ ] | [ ] | 2. IS contribution to operational efficiency |
| [ ] | [ ] | 3. IS contribution to managerial effectiveness |
| [ ] | [ ] | 4. Functional Quality of IS (IS applications in supporting our business requirements) |
| [ ] | [ ] | 5. Technical Quality of IS (IT infrastructure in enhancing our IS applications) |
| [ ] | [ ] | 6. Alignment of IS Plans with Business Needs |

## Part C : Strategic Orientation of Information Systems (IS)

The part reviews your organisation's strategic orientation of IS in your chosen business unit. Please indicate the extent (with the 5-point scale below) to which you agree with each of the following statements.

| Realised/Actual Strategies | | Strategic Direction | *1* | *2* | *3* | *4* | *5* |
|---|---|---|---|---|---|---|---|
| | | | - - | - | | + | ++ |
| 3 years ago | Current year | 3 years ahead | *Strongly Disagree* | | *Neither Agree nor Disagree* | | *Strongly Agree* |

### C.1 Role of Information Systems in our Business Unit

[ ] [ ] [ ] 1. Information systems and technology (IS) are critical to our success.
[ ] [ ] [ ] 2. Firms have to invest heavily in IS, if they wish to compete in our industry.
[ ] [ ] [ ] 3. Our business managers are aware of potential business opportunities created by IS.
[ ] [ ] [ ] 4. Our IS managers are aware of potential business opportunities created by IS.
[ ] [ ] [ ] 5. Our IS strategy is clearly defined.

### C.2 The Information Systems being used in our Business Unit :-

[ ] [ ] [ ] 1. improve our management information and control systems.
[ ] [ ] [ ] 2. improve our manpower planning.
[ ] [ ] [ ] 3. provide analysis for performance appraisal of senior managers.
[ ] [ ] [ ] 4. provide cost control information.
[ ] [ ] [ ] 5. enhance production/operations management techniques.
[ ] [ ] [ ] 6. provide forecasts on key indicators of operations.
[ ] [ ] [ ] 7. provide tracking on significant general trends.
[ ] [ ] [ ] 8. provide "what-if" analysis of critical issues.
[ ] [ ] [ ] 9. provide impact analysis on decrease in short-term profitability to gain market share.
[ ] [ ] [ ] 10. provide impact analysis on cutting prices to increase our market share.
[ ] [ ] [ ] 11. provide impact analysis on setting prices below competition.
[ ] [ ] [ ] 12. provide impact analysis on market share positions on cash flow.
[ ] [ ] [ ] 13. support effective coordination among our functional areas (e.g. marketing, finance, and operations).
[ ] [ ] [ ] 14. provide a great deal of factual information to support our day-to-day decision making.
[ ] [ ] [ ] 15. help us to develop thorough analyses in response to major decisions
[ ] [ ] [ ] 16. provide us with information on our suppliers.
[ ] [ ] [ ] 17. provide us with information on our distributors and agents.
[ ] [ ] [ ] 18. provide us with information on our customers.
[ ] [ ] [ ] 19. provide our suppliers with information on our business.
[ ] [ ] [ ] 20. provide our distributors and agents with information on our business.
[ ] [ ] [ ] 21. provide our customers with information on our business.
[ ] [ ] [ ] 22. allow our suppliers to have on-line access to our business information.
[ ] [ ] [ ] 23. allow our distributors and agents to have on-line access to our business information.
[ ] [ ] [ ] 24. allow our customers to have on-line access to our business information.
[ ] [ ] [ ] 25. enhance our product/service quality.

## Part C : Strategic Orientation of Information Systems (IS) (cont.)

The part reviews your organisation's strategic orientation of IS in your chosen business unit. Please indicate the extent (with the 5-point scale below) to which you agree with each of the following statements.

| Realised/Actual Strategies | | Strategic Direction | *1* | *2* | *3* | *4* | *5* |
|---|---|---|---|---|---|---|---|
| | | | - - | - | | + | ++ |
| 3 years ago | Current year | 3 years ahead | *Strongly Disagree* | | *Neither Agree nor Disagree* | | *Strongly Agree* |

C.3 The Information Systems being used in our Business Unit :-

| | | | | |
|---|---|---|---|---|
| [ ] | [ ] | [ ] | 1. | enhance our strategic alliances with competitors. |
| [ ] | [ ] | [ ] | 2. | help us in resource allocation to reflect long-term considerations. |
| [ ] | [ ] | [ ] | 3. | help our long-term research for future competitive edge. |
| [ ] | [ ] | [ ] | 4. | are up-to-date through frequent modifications to the technologies used. |
| [ ] | [ ] | [ ] | 5. | help us to seek new opportunities related to the present operations. |
| [ ] | [ ] | [ ] | 6. | help us to introduce new products/services in our market(s). |
| [ ] | [ ] | [ ] | 7. | help us to look out for business that can be acquired. |
| [ ] | [ ] | [ ] | 8. | help us to expand our capacity ahead of our competitors. |
| [ ] | [ ] | [ ] | 9. | help us to eliminate our operations in later stages of life cycle. |
| [ ] | [ ] | [ ] | 10. | provide analysis for approval of our new projects on a stage-by-stage basis. |
| [ ] | [ ] | [ ] | 11. | provide comparisons of risk factors of operations against that of our competitors'. |
| [ ] | [ ] | [ ] | 12. | provide conservative analysis for supporting our major decisions. |
| [ ] | [ ] | [ ] | 13. | provide information on the expected returns of our projects. |
| [ ] | [ ] | [ ] | 14. | provide information on outcome of "tried and error" for various business scenarios. |

## Part D : Overall Assessments on Information Systems Strategic Planning (ISSP)

How successful has ISSP been in your chosen business unit? (please circle on the *scale* below with each "-" = "0.2" and comment)

| 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 | | | | |
|---|---|---|---|---|
| Failure | Some Benefits But did Not Need ISSP to Achieve them | Some Benefits which can Hardly be Achieved Without ISSP | Successful but can improve | Highly Successful |

Major criteria for success/failure :

_____

_____

_____

***** Thank you very much for your participation in this study *****

Name : _____ Organisation : _____

Department : _____ Position : _____

You are welcome to provide additional comments :-

## Appendix 3.4: Questionnaire C (for CIO)

**Evaluating Business and Information Systems Strategies**

**Questionnaire C**

- to be completed by a Senior Executive who is in-charge of Information Systems/Technology in the chosen Business Unit : _____

Formulating and implementing effective business strategies is a major challenge for senior executives. Incorporating appropriate information systems strategies to support/enhance business strategies is another major challenge. This study addresses both issues by matching the strategic orientation of your business unit against the strategic orientation of your information systems that support/enhance your business strategies. Information Systems Strategic Planning may be defined as "the process of deciding the objectives for organisational computing and identifying potential computer applications which the organisation should implement".

Your participation in this study will be greatly appreciated. Please answer each question in this questionnaire. This should take about 20 minutes. Most questions can be answered by either "circling" or "filling in a number" of your choice. There are no right or wrong answers. Further comments and suggestions are most welcome.

Please be assured that your responses will be treated with the strictest confidence. Thank you very much for your participation in this study.

Please "circle" appropriate choice(s) and/or fill in answers.

1. Your responsibility associated with Information Systems (IS) or Information Technology (IT):
   a) Head of IS/IT
   b) Immediate Supervisor of Head of IS/IT
   c) Immediate Subordinate of Head of IS/IT
   d) IT Steering Committee Member
   e) Others, please specify : _____

2. Personal Involvement in Strategic Business Planning :
   a) Member of Planning Team
   b) Approval of Strategic Business Plans
   c) Advisory
   d) No Involvement
   e) Others, please specify : _____

3. Personal Involvement in IS Strategic Planning (ISSP) :
   a) Member of Planning Team
   b) Approval of IS Strategic Plans
   c) Advisory
   d) No Involvement
   e) Others, please specify : _____

## Part A : Satisfaction with IS Service

Please indicate your level of satisfaction with IS service of your chosen business unit with the 5-point scale below.

| *1* | *2* | *3* | *4* | *5* |
|---|---|---|---|---|
| - - | - | | + | ++ |
| *Highly Dissatisfied* | | *Neither satisfied nor dissatisfied* | | *Highly Satisfied* |

| 3 Years Ago | Current Year | A.1 Satisfaction with Information Systems Service |
|---|---|---|
| [ ] | [ ] | 1. Technical expertise of IS staff in general |
| [ ] | [ ] | 2. Ability of IS staff to specify IS requirements |
| [ ] | [ ] | 3. Ability of IS staff to customise (e.g. develop in-house) systems |
| [ ] | [ ] | 4. End-users' ability in defining business information requirements |
| [ ] | [ ] | 5. IS delivered on-time |
| [ ] | [ ] | 6. IS delivered within budget |
| [ ] | [ ] | 7. IS contribution to operational efficiency |
| [ ] | [ ] | 8. IS contribution to managerial effectiveness |
| [ ] | [ ] | 9. IS contribution to improving Profitability |
| [ ] | [ ] | 10. Effectiveness of IS Strategic Planning Process |
| [ ] | [ ] | 11. Overall satisfaction with IS services |

| 3 Years Ago | Current Year | A.2 Satisfaction with Information Systems products |
|---|---|---|
| [ ] | [ ] | 1. Database |
| [ ] | [ ] | 2. Computer hardware platforms |
| [ ] | [ ] | 3. Communications and networking platforms |
| [ ] | [ ] | 4. Systems software platforms |
| [ ] | [ ] | 5. Systems development tools |
| [ ] | [ ] | 6. End-user computing tools |
| [ ] | [ ] | 7. Office Automation products |

## Part B : Relative Quality of IS Services

For each of the following IS performance indicators, please indicate your best estimate of the chosen business unit's position relative to its major competitors (e.g. top 5 firms) with the 5-point scale below.

| *1* | *2* | *3* | *4* | *5* |
|---|---|---|---|---|
| - - | - | | + | ++ |
| *Much Worse than Competition* | | *Neither Worse nor Better than Competition* | | *Much Better than Competition* |

| 3 Years Ago | Current Year | Relative Quality of Information Systems Services |
|---|---|---|
| [ ] | [ ] | 1. Application of IS to advance *Critical Success Factors* [*CSF are the few areas in which performance must be good if the organisation is to continue to exist and prosper*] |
| [ ] | [ ] | 2. IS contribution to operational efficiency |
| [ ] | [ ] | 3. IS contribution to managerial effectiveness |
| [ ] | [ ] | 4. Functional Quality of IS (IS applications in supporting our business requirements) |
| [ ] | [ ] | 5. Technical Quality of IS (IT infrastructure in enhancing our IS applications) |
| [ ] | [ ] | 6. Alignment of IS Plans with Business Needs |

## Part C : Review on IS Strategic Planning

This part reviews your perception on the Importance of and Effectiveness in IS strategic planning in your chosen business unit. For each statement or activity, please **fill-in** the respective level of importance and effectiveness using the 5-point scale below.

**Importance** : current level of importance in your chosen business unit
**Effectiveness** : current level of performance or achievement in your chosen business unit

| *1* | *2* | *3* | *4* | *5* |
|---|---|---|---|---|
| - - | - | | + | ++ |
| Extremely **Low** | | *Neither Low nor High* | | Extremely **High** |

| Importance | Effectiveness | C.1 Adequacy of Resources for IS Strategic Planning |
|---|---|---|
| [ ] | [ ] | 1. Number of IS planners |
| [ ] | [ ] | 2. Expertise of IS planners |
| [ ] | [ ] | 3. Expertise of the Leader of IS strategic planning team |
| [ ] | [ ] | 4. Adequate Top Management Involvement |
| [ ] | [ ] | 5. Adequate User Involvement |
| [ ] | [ ] | 6. Quality of Inputs from Top Management |
| [ ] | [ ] | 7. Quality of Inputs from Users |
| [ ] | [ ] | 8. Funding for the IS strategic planning Process |

| Importance | Effectiveness | C.2 Coverage of IS Strategic Planing Process |
|---|---|---|
| [ ] | [ ] | 1. Review/Revise charter/mission of IS/IT department |
| [ ] | [ ] | 2. Explore opportunities for gaining competitive advantage from IS |
| [ ] | [ ] | 3. Assess internal strengths and weakness of our current IT environment |
| [ ] | [ ] | 4. Assess impact of future IT environment and its effect on our business unit |
| [ ] | [ ] | 5. Assess business opportunities and threats associated with IS |
| [ ] | [ ] | 6. Analyse enterprise data modelling requirements |
| [ ] | [ ] | 7. Analyse corporate database requirements |
| [ ] | [ ] | 8. Analyse hardware and software requirements |
| [ ] | [ ] | 9. Analyse telecommunications requirements |
| [ ] | [ ] | 10. Analyse role of end-user computing |
| [ ] | [ ] | 11. Select and prioritise application systems portfolio |
| [ ] | [ ] | 12. Analyse human resource requirements for the IS department |
| [ ] | [ ] | 13. Analyse human resource requirements for user departments in applying IT |
| [ ] | [ ] | 14. Assess hardware and software markets for formulating acquisition plans |
| [ ] | [ ] | 15. Review alternative strategies |
| [ ] | [ ] | 16. Analyse resource constraints and contingency plans |
| [ ] | [ ] | 17. Review, feedback and refinement of plans |
| [ ] | [ ] | 18. Others, please specify : |

| Importance | Effectiveness | C.3 Business Integration Mechanisms for ISSP |
|---|---|---|
| [ ] | [ ] | 1. Interaction between business planners and IS planners. |
| [ ] | [ ] | 2. Participation of IS managers in strategic business planning. |
| [ ] | [ ] | 3. Quality of Inputs from strategic business planning to IS strategic planning. |

**Part C : Review on IS Strategic Planning** (cont.)

This part reviews your perception on the Importance of and Effectiveness in IS strategic planning in your chosen business unit. For each statement or activity, please **fill-in** the respective level of importance and effectiveness using the 5-point scale below.

**Importance** : current level of importance in your chosen business unit
**Effectiveness** : current level of performance or achievement in your chosen business unit

| *1* | *2* | *3* | *4* | *5* |
|---|---|---|---|---|
| -- | - | | + | ++ |
| Extremely **Low** | | *Neither Low nor High* | | Extremely **High** |

| Importance | Effectiveness | | C.4 Implementation of IS Strategic Plan |
|---|---|---|---|
| [ ] | [ ] | 1. | Top Management Commitment |
| [ ] | [ ] | 2. | Funding for the implementation of IS plan |
| [ ] | [ ] | 3. | Staffing for the implementation of IS plan |
| [ ] | [ ] | 4. | Re-structuring the chosen business unit for the implementation of IS plan |
| [ ] | [ ] | 5. | Re-designing major business processes for the implementation of IS plan |
| [ ] | [ ] | 6. | Approval of new systems follows recommendations of IS plan |

| Importance | Effectiveness | | C.5 Effectiveness of IS Strategic Planing |
|---|---|---|---|
| [ ] | [ ] | 1. | Better Communications with Top Management |
| [ ] | [ ] | 2. | Users can better appreciate the role and benefits of IS |
| [ ] | [ ] | 3. | Better integration of business plans with IS plans |
| [ ] | [ ] | 4. | Better appreciation of the business unit's overall Information Needs |
| [ ] | [ ] | 5. | Better IT investments decisions |
| [ ] | [ ] | 6. | Better assessment of future IT Environment |
| [ ] | [ ] | 7. | Better technology infra-structural paths & policies |
| [ ] | [ ] | 8. | Greater exploitation of IS opportunities for gaining competitive edge |
| [ ] | [ ] | 9. | Better planning and control of human, software and hardware resources |
| [ ] | [ ] | 10. | Improvements on IS strategy planning processes |

| Importance | Effectiveness | | C.6 IS Strategic Planning Approaches |
|---|---|---|---|
| [ ] | [ ] | 1. | Business led : business to drive technology and systems plans will emerge from business plans |
| [ ] | [ ] | 2. | Method driven : best method to produce best plans |
| [ ] | [ ] | 3. | Resource driven : determine investment portfolio or budget driven |
| [ ] | [ ] | 4. | Technology driven : determine IS/IT architecture |
| [ ] | [ ] | 5. | Organisational : learning processes with partnership among various teams |

| C.7 Which Methods have your chosen business unit used in developing IS/IT Strategies; When and Why? | When | Comments : e.g. Why they are used ? Are they useful ? etc. |
|---|---|---|
| 1. Critical Success Factors analysis | | |
| 2. Growth/Maturity of IT Application (e.g. Nolan's model) | | |
| 3. Strategic Grid | | |
| 4. Enterprise Modelling | | |
| 5. Information Engineering | | |
| 6. In-house business strategy | | |
| 7. In-house applications' search & prioritisation | | |
| 8. Business Systems Planning (IBM's BSP) | | |
| 9. Method/1 (Arthur Anderson's) | | |
| 10. Others, please specify : | | |

## Part D : Analysing IS Applications Portfolio

### D.1 Information Systems Strategic Grid

Please classify your major IS applications [in %] in the following matrix, the sum of the 4 quadrants should be 100%.

| Strategic Impact of Planned Application Development Portfolio | Low Strategic Impact of Existing Operating Applications | High Strategic Impact of Existing Operating Applications |
|---|---|---|
| High | [ %] HIGH POTENTIAL<br>IS Applications are currently useful and may be important in achieving future success | [ %] STRATEGIC<br>IS Applications are critical to sustaining current and future business strategy. |
| | IS Applications are useful but not critical to success.<br>[ %] SUPPORT | IS Applications are vital to the successful operations of the chosen business unit. However, they are not part of future strategic operations.<br>[ %] FACTORY |

### D.2 Information Systems Focus

Please classify your major IS applications [in %] by the 5-level IS focus in the following table, the sum of the 5 levels should be 100%.

| Level | IS Focus | Brief Descriptions | % of Applications |
|---|---|---|---|
| 1 | Local Exploitation | Automation of stand-alone functions | |
| 2 | Internal Integration | IT platform for integrating internal business activities | |
| 3 | Business Process Redesign | IT as major drivers for re-engineering internal business processes | |
| 4 | Business Network Redesign | Electronic integration for exchange of business among multiple participants in a business network, e.g. ATM, Electronic Data Interchange (EDI) | |
| 5 | Business Scope Redefinition | IS Applications enlarge or shift business scope, or even form a new business. e.g. SABRE in America Airline | |

**Part E : IS/IT Department** (to be completed by the Head of IS/IT, if necessary)

1. Current year IS/IT Operating Budget in your chosen business unit : HK$____ million

2. Distribution of IS budget between Software and Hardware/Equipment :

   Software _____ % Hardware _____ % Total: 100%

3. Distribution of software budget between Development and Maintenance :

   Development _____% Maintenance _____% Total: 100%

4. Distribution of software budget between In-house and Vendor-supplied software :

   In-house _____% Vendor-supplied _____% Total: 100%

5. No. of full-time equivalent IS staff in the chosen business unit : _____

6. The Head of IS/IT has been :
   (a) in the IS/IT industry for ____ years
   (b) with this chosen business unit for ____ years
   (c) in this Position for ____ years

7. Title of the Head of IS/IT : _____

8. Title of the individual whom the Head of IS/IT reports to _____

**Part F : Overall Assessments on Information Systems Strategic Planning (ISSP)**

How successful has ISSP been in your chosen business unit? (please circle on the *scale* below with each "-" = "0.2" and comment)

| 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 | | | | |
|---|---|---|---|---|
| Failure | Some Benefits But did Not Need ISSP to Achieve them | Some Benefits which can Hardly be Achieved Without ISSP | Successful but can improve | Highly Successful |

Major criteria for success/failure : _____

_____

_____

*** **Thank you very much for your participation in this study** ***

Name : _____ Organisation :

_____

Department : _____ Position :

_____

You are welcome to provide additional comments :-