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Strategic Information Systems Control Practices in New Zealand

**A thesis presented in partial fulfilment
of the requirements for the degree of
Doctor of Philosophy
in Management at Massey University**

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Abstract

A very important issue for companies is how well its Information Systems (IS) strategy supports its business strategy and direction. Strategic control of IS strategies is concerned with the monitoring, reviewing and maintenance of IS strategies from a strategic perspective, to ensure that IS strategies are performing well in terms of supporting the business strategy and direction in current and future business and information technology circumstances. The purpose of this study was to investigate strategic IS control practices of New Zealand organizations and to measure their level of effectiveness. A field survey of 123 New Zealand organizations provided the data for the study. The results show about 85% of NZ organizations practising IS planning also practice strategic oriented control over their IS plans, and with varying degrees of effectiveness. Three strategic IS control approaches have been identified: cybernetic, ad hoc, and a combined approach of both cybernetic and ad hoc. The cybernetic and combined approaches were found more than adequate, while the ad hoc is found to be just adequate. Strategic IS control is found to significantly influence the organizational IS plan performance. The study has identified five obstacles that work against the current practice of strategic IS control as follows (in order of significance): (1) lack of time, (2) lack of knowledge and/or expertise, (3) lack of tools, (4) difficulty of the task of strategic IS control, and (5) lack of funding. The variable industry competitiveness is found to be related to organizational intensity of IS use. The study also suggested further research recommendations to improve strategic IS control practice.

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Chapter One

Introduction

1.1 Background

Information technology (IT) has become an attractive resource for many organizations in the last two decades. It has proved to have the potential for improving organizational efficiency and effectiveness (Porter, 1985; Earl, 1993; Ward, 1990; O'Brien, 1996; Applegate et al., 1996; McNurlin, Sprague, Jr. and Ralph, 1998). However, the task of planning and implementing information systems (IS) and technology can be complex and expensive, and consequently there have been success and failure stories of IS planning in practice (McNurlin, et al., 1998). Hatten and Hatten (1997) report that in many organizations IS plans are still not making significant impact in terms of achieving substantial competitive advantages.

The effective acquisition and utilisation of information systems and technology resources and how well the strategic IS plan performs in supporting business strategy have become very critical issues for organizations. This is especially the case for organizations operating in a competitive environment or using IT intensively (Brancheau and Wetherbe, 1987; Daniels, 1994; Hatten and Hatten, 1996; Watson, et al., 1997).

Strategic control as a step in strategic IS management involves the monitoring of IS strategy performance against the organizational environment, and the review and

evaluation of IS strategy, to ensure that such strategy is always capable of supporting the direction and strategic objectives of the business.

Research by Galliers (1995) and Lederer and Sethi (1995) during the 1990s has shown that problems emerging during the strategic IS management lifecycle, changes in organizational environment, or ineffective IS planning or implementation processes could render an IS plan or individual IS applications invalid or obsolete. It is reported by McNurlin (1998) that the issues that make IS planning difficult are aligning business plans and IS plans, rapidly changing technologies, IT infrastructure development, and others.

It has also been reported by Baker (1995) that either of the following reasons could render an IS strategy inappropriate, invalid or obsolete:

- the IS application is not chosen correctly by the IS planning process, i.e. inadequate IS planning process, or
- the continuous changes in an organization's environment, including both the business and information technology environment.

The major cause of an inadequate or ineffective IS planning process is the IS function's internal problems or issues related to planning and implementation activities in the strategic IS management process (Galliers,1995; Lederer and Sethi, 1995). The issues and changes that emerge from the organizational and information technology environment external to the IS function, such as changes to industry, government

regulations, organizational structure, corporate plans or functional strategies within the organization, can also impact on IS plans success and performance. One can therefore conclude that the success of strategic IS plans is influenced by two groups of issues, coming from two directions:

- Issues related to strategic IS planning and implementation, and
- Issues and changes that emerge from the business and information technology environment external to the IS function.

Depending on the extent of their implications, the influencing factors can individually or collectively reduce the level of IS plan performance and its chance of success, and this situation can consequently lead to failure of IS plans and applications. Therefore, to maintain a good level of performance and success for strategic IS plans and the strategic IS management process, it is necessary to monitor and review both the strategic IS plans and the process that produces them. This discussion has led to the formulation of the following research problem, research objectives and research questions.

1.2 Research Problem, Objectives, and Questions

It is evident that a successful IS strategy depends greatly on the effective monitoring, review and improvement of the IS strategy and planning process. To achieve this, organizations must address inherent problems in their strategic IS control processes. To aid organizations in this endeavour, efforts should be made towards improving the theory

and practice of strategic IS control processes. Accordingly this study has the following objectives:

1. to examine the extent of strategic IS control practices.
2. to identify the approaches used in current strategic IS control practices.
3. to measure the level of effectiveness of current approaches of IS strategic control in practice.
4. to identify obstacles that work against strategic IS control practices.
5. to measure the impact of strategic IS control effectiveness on IS plan performance.
6. to examine the existence of any strong preference among responding organizations from different categories of secondary variables, for a special type of strategic IS control approach. The secondary variables considered in the study are:

Industry type

Industry competitiveness

Organizational intensity of IS use

Organizational size

Organizational structure

7. to measure the strength of relationship between industry type and level of organizational intensity of IS use, and
8. to measure the strength of relationship between industry competitiveness level and level of organizational intensity of IS use.

To achieve the research objectives outlined above, we need to answer the following research questions:

1. What is the extent of strategic IS control in NZ organizations?
2. What approaches are used in strategic IS control practice?
3. How effective are the strategic IS control approaches?
4. What obstacles exist that work against strategic IS control practices?
5. What is the level of impact of strategic IS control effectiveness on strategic IS plan performance?
6. What is the strength of relationship between industry type and strategic IS control used?
7. What is the strength of relationship between industry competitiveness and strategic IS control used?
8. What is the strength of relationship between organizational intensity of IS use and strategic IS control used?
9. What is the strength of relationship between organizational size and strategic IS control used?
10. What is the strength of relationship between organizational structure and strategic IS control used?
11. What is the strength of relationship between industry type and organizational intensity of IS use?
12. What is the strength of relationship between industry competitiveness and organizational intensity of IS use?

Answering these questions will enable us, to a greater extent, to prescribe appropriate solutions and recommendations for improving current strategic IS control practices.

Despite evidence of the importance of strategic control in strategic IS management, it has enjoyed very little attention from IS researchers. The motive of this study is to fill the research gap by investigating strategic control in strategic IS management in order to achieve higher quality and effective strategic IS management. For the purpose of the study, a model for describing the strategic control process is proposed (see Figure 2.4).

This research will investigate current strategic IS control practices in New Zealand, and measure the level of effectiveness of the approaches used. This is expected to enhance our understanding both of the nature and level of effectiveness of current strategic IS control practices in New Zealand, and of the obstacles facing current strategic IS control practices and practitioners.

1.3 Research Method

The study uses the survey as an instrument for data collection because it is more practical than other methods for achieving our research objectives, and allows access to a more diverse population than other methods of data collection (Sekaran, 1992). It provides a higher degree of generality about the phenomena under study. The survey results will also lay the foundations for carrying out further detailed research using other methods such as the case study. Questionnaires were distributed to 509 New Zealand

organizations, ranging from moderate to large, of which 123 have responded. Details of the research methodology are explained in Chapter Three.

1.4 Findings of the Study

Based on the data, three approaches to strategic IS control, have been identified: the cybernetic approach, the ad hoc approach, and the combined cybernetic and ad hoc approach. The results show about 85% of organizations practising IS planning also practise strategic-oriented control over their strategic IS plans one way or another, and with varying degrees of effectiveness. However, on average, the cybernetic and combined approaches of strategic IS control are found to be more effective than the ad hoc approach. Also, strategic IS control is found to influence the strategic IS plan performance significantly.

1.5 Organization of the Report

Chapter Two will discuss the literature review. Chapter Three outlines the research method that will be designed and adopted in this study. Chapter Four presents the results of the survey study in terms of tables and graphs, and Chapter Five will implement the statistical analysis based on the collected data, and will discuss the results of the data analysis. Chapter Six finishes the report with conclusions and recommendations for future research efforts.

Chapter Two

Literature Review

2.1 Introduction

Having established the research problem, motivation, and importance of this research, this chapter aims to establish a theoretical foundation for this study. First, the literature review outlines the concepts of control in general management, in strategic management, and in strategic IS management in particular. Second, it reviews earlier work on the subject matter of the study. Accordingly, this chapter is organized into five sections.

Sections 2.2 and 2.3 introduce the concepts of management control and its approaches respectively. Section 2.4 examines strategic management and strategic control. Section 2.5 discusses the issue of strategic IS management process and approaches. Section 2.6 concludes the chapter with research issues including: research problem, objectives, questions, variables and hypotheses. Section 2.7 summarizes the chapter.

2.2 Management Control

The purpose of this section is to examine the control concept from a managerial perspective. The concept of management control is very old, identified by Fayol (1949) as one of the five principal functions of management. In general terms, management control means simply “keeping things on track”, (Merchant, 1985). Merchant's definition

of management control is based on three implicit assumptions. First, that something must exist (the controlled thing) that needs to be kept on track. Second, that a relevant reference target must exist, with which the controlled “thing” is required to be consistent. Third, there must be a control process that is concerned with monitoring the status of some aspect(s) of the controlled “thing”, and then taking the action(s) needed for keeping the controlled “thing” consistent with the target. For example, project implementation can be controlled with respect to time, cost, and scope. However, this definition of management control is very general.

Mockler (1970) earlier defined management control as:

a systematic effort by business management to compare performance to predetermined standards, plans or objectives, in order to determine whether performance is in line with these standards and presumably in order to take any remedial action required to see that human and other corporate resources are being used in the most effective and efficient way possible in achieving corporate objectives. (p.14).

Mockler’s definition is more detailed and focused than Merchant’s definition given above. It explains briefly what is involved in the control process in terms of: comparing the performance of a certain aspect(s) of the managerial issue under control with predetermined standards or targets and the purpose of management control. However, this definition restricts management control to comparing actual performance with the standard, and making adjustments where necessary.

Leiper (1989) improved on Mockler's definition of management control by highlighting two important facets of the control function, and emphasised the link between the controlling element and other elements of the organizational management system. Leiper (1989) defined managerial control in terms of the role played by the controller as "checking the *state* and monitoring the *performance* of the organization or some part of it, and recording the information for attention in the coordinator element and subsequently for possible action by other elements in the organization's management systems: planner, leader, assembler" (p.108).

Management control is also defined by Anthony et al. (1984), as "the process by which managers ensure that resources are obtained and used effectively and efficiently in the accomplishment of the organization's goal" (p. 10). Anthony et al.'s definition can be considered as representing management control in terms of the purpose and nature of the process.

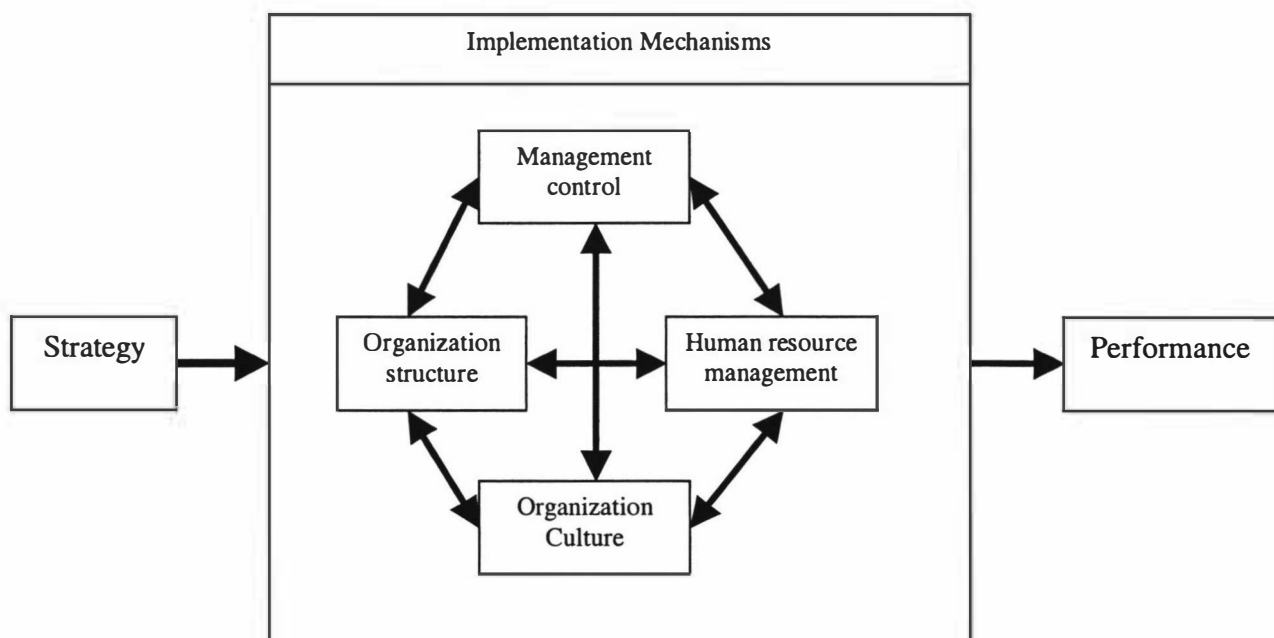
Later on, Anthony and Govindarajan (1995) redefined management control as "the process by which managers influence other members of the organization to implement the organization's strategies" (p. 8). This definition is focused more on strategy implementation as the purpose of management control, and the nature and approach of control is also defined by the ability of an organization to manipulate and influence human behaviour to facilitate the implementation of strategies.

Anthony and Govindarajan (1995), further specified the elements of the management control process as:

- communication
- motivation, and
- evaluation.

Figure 2.1 depicts a diagram developed by Anthony and Govindarajan (1995). This diagram clearly indicates that strategy implementation is very much influenced by management control mechanisms, human resource management, organizational culture, and organization structure. This definition of management control is more limited to strategy implementation and focuses on the human side in the control process.

Figure 2.1 A Framework for Strategy Implementation (Anthony and Govindarajan, 1995, p. 11)



In the light of the above discussion, we consider management control in this study as an aspect of the managerial function concerned with the assurance that organizational resources are utilised as per the plans and focused on achieving certain organizational objectives.

2.2.1 Control Levels

The management function of control permeates all different levels of management. At the strategic planning level, management control is applied from a strategic perspective. At the tactical planning level, management control is applied from a financial perspective, and finally at the operational planning level, management control is applied from the perspective of quality and timeliness of output. Management control applied at the strategic level of management is called *strategic control* in the literature. Our study is concerned with the practice of management control at the strategic IS management level.

Similarly, control can be depicted at different hierarchical levels in information systems management, and applied with different perspectives and different approaches, as shown in Table 2.1. At the strategic level of IS planning, for example, management control is applied from a strategic perspective, whereas at the strategic IS tactical level, management control is applied from a time and cost control perspective. At the tactical IS management level (systems development and implementation of the IS strategy), budgetary control and project control schedules are predominantly used. Finally, at the

IS operations and maintenance level, quality control and job control schedules are used to ensure the achievement of higher quality and timeliness of information systems output. The following section examines six management control approaches found in management literature.

Table 2.1 Management Control in IS Management

Perspective	IS Management Level
Strategic IS Control	Strategic IS Management
Project Management & Budgetary Control	Tactical IS Management
Quality Control, Access Control & Jobs Schedules	Operations IS Management

2.3 Management Control Approaches

Control can be approached differently in different situations. Carroll (1987) has grouped control approaches as follows:

- 1. cybernetic control
- 2. agency-based control

3. psychological control
4. structural control
5. sociological control.

In addition to the above identified control approaches the researcher believes it is also possible that control in organizational functions is applied in an ad hoc manner. This belief is based on the researcher's understanding of management concepts and observations of managerial work in a number of organizations. The ad hoc control approach is not based on concrete and well-defined performance measures, but instead, random and less formal monitoring and reviewing procedures are used to maintain a better level of performance of a managerial process for instance. In the ad hoc control approach, standard target value may exist but not be formally defined, and the measures of the control object are not defined or used.

2.3.1 Cybernetic Control

Cybernetic management control is based on the mechanical cybernetic control model applied in the field of industrial dynamics. Wheelen and Hunger (1984) proposed a model that describes the mechanical/physical cybernetic control system, as consisting of six principle components/operations:

1. the existence of a control object (variable)
2. establish a standard target value of the control object
3. continuously measure (monitoring) the control object

4. compare between actual and standard target values of the control object
5. take corrective action to keep the actual value of control object (i.e., actual performance) in line with the standard target value if the actual value of the control object exceeds tolerance, and
6. establish information flow from 3 to 4 and 4 to 5.

For instance, if physical cybernetic control is applied to the room temperature, then the six operations of the thermostat-based control system are:

1. the existence of a control object which is the room temperature
2. set up standard target room temperature
3. continuously measure (monitoring) the actual temperature in the room
4. compare between actual and standard target room temperatures
5. take corrective action to keep the room temperature in line with the standard target room temperature if the actual room temperature value exceeds tolerance, and
6. establish information flow from 3 to 4, and from 4 to 5.

Schoderbek (1990) applied the concepts of physical cybernetic control to the process of control in organizational management. Implicit controllers in management systems, in the view of Schoderbek (1990), are subsystems whose main functions are to keep some behavioural variables of the focal or operating system within predetermined limits. The author further proposed a management control system consisting of four basic subsystems (elements):

- a control object, or the variable to be controlled
- a detector, or scanning subsystem
- a comparator
- an effector, or action-taking subsystem.

The control object is the variable of the system's behaviour chosen for scanning (or monitoring) and control. The predetermined standard target value(s) of the control object is assumed to be available to the comparator. The above proposed control system lacks one other important element of control, that is the feedback loop(s) to allow the output data of the comparator (the results of the comparison between the actual measures and standard measures) to feed into the effector. Accordingly, the effector will then be able to act to stabilise the control object.

The monitoring and comparison operations generate information that could lead to a corrective action. The corrective action depends on the situation under control. The cybernetic control model specifies control activities and steps in a systematic manner. It may be regarded as highly generic as it is applicable to various management situations. Cybernetic control concepts are applied in management in general, but are also used widely in management accounting (Horngren, 1986). The definitions of management control given by Mockler (1970) and Leiper (1989), in section 2.2, are based on the principles of the cybernetic control model. However, to increase its validity, the cybernetic management model of control requires that: the control object must be

measurable; the measurement and comparison are carried out properly; and the feedback information is communicated accurately and in a timely manner.

2.3.2 Agency-Based Control

Agency theory is founded by Weber (1947) who believes that an organization is a special type of social relationship administered by people who are not the bureaucrats of the organization. These people act as agents for the owners or stakeholders. The owners delegate control-related authorities and power in specific amounts and formats to the managers.

Agency-based control is more concerned with providing managers with the necessary power and authority to ensure the objectives of the principle stakeholders are achieved. It is not concerned, however, with how managers control implemented strategies from a strategic perspective.

2.3.3 Psychological Control

Psychological control is based on the psychological dominance of one person over another through rewards and punishments. Tannenbaum (1968) views psychological control as the ability of an organization to manipulate available human resources for the satisfaction of needs. Thus organizational behaviour can be influenced by applying psychological control over employees in the organization. Psychological control is more

concerned with controlling the performance of individuals through manipulating their behaviour via a system of rewards and punishments.

Psychological control does not consider controlling for strategy performance, as such. However, it is possible to use this approach as secondary to another control approach in the control process.

2.3.4 Structural Control

Structural control is described by Carroll (1987) as the way in which an organization relates to its external environment by limiting the effects of external influences on its key organizational components. Organizations using structural control are characterised by the existence of carefully defined organizational components that deal with specific external influences. Chandler (1962) views organizational structure as a control mechanism that channels environmental influences into specific organizational components.

Structural control has been used in practice as a control tool at the business level as many organizations carry out restructuring to cope with the external and internal environment and to maximise organizational performance and/or improve efficiency. Structural control, therefore, can be applied at the strategic IS management level as a corrective measure in conjunction with another control approach such as cybernetic control or the ad hoc control approach described earlier.

2.3.5 Sociological Control

Ouchi (1979) views organizations as social groups similar to clans. He describes, sociological control as "clan mechanisms" defined as informal social structures that can contribute to control. These informal social structures represent the values, attitudes, and beliefs that exist among clan members or organization members. In other words, the informal social structures represent the organization culture. Proponents of the sociological control such as Kanter (1983), Williamson (1970), and Ouchi (1979) argued that organization culture can influence and limit employees' actions, and thus it can contribute to organizational control.

Sociological control may be considered as supporting control mechanism for management control at all levels of management. Therefore, this approach may be integrated with another approach in the control process.

2.3.6 Implications for the proposed research

In terms of organizational management, all the above six control approaches involve, to a certain extent, some kind of monitoring and reviewing activities of the organizational performance. Their focus and perspective differ significantly, however, especially in the way the monitoring, reviewing and the corrective action(s) are decided. These

differences can have implications for the way management control or strategic control is practised in organizations:

- it is possible that control is carried out based on using formal performance measures and planned monitoring and review.
- it is possible that control is carried out based on ad hoc or not planned performance monitoring and review, as mentioned in Section 2.3 above.
- it is possible that more than one control approach can be used by managers to control a managerial issue in an organization.
- the other four control approaches (agency-based control, psychological control, structural control, or sociological control) could influence the strategic control process through the way corrective actions are taken during either of the cybernetic or ad hoc control approaches.

The literature of strategic management and strategic control will be examined in the following section.

2.4 Strategic Management and Strategic Control

This section discusses the concept of strategy, the strategic management process and the essence of strategic control in the strategic management process.

2.4.1 Strategy

Basically, for an organization to succeed, it is important that it sets itself a set of goals and/or objectives that creates the direction for future operations. To achieve these organizational objectives, the organization must develop a meaningful and effective plan that defines the course of action and the allocation of the necessary resources to fulfil the organizational objectives. The integration of organizational objectives and the plan of action produce the organization's strategy or plan. There is no general agreement in the literature on what the term strategy or strategy formulation means. For example, Ansoff (1965) describes a strategy as the formulation of basic organizational missions, purposes and objectives; policies and program strategies to achieve them; and the methods needed to ensure that strategies are implemented to achieve organizational ends.

Steiner (1979) believes that strategy formulation involves the interpretation of the environment and the development of consistent patterns in streams of organizational decisions. Although there are differences among the authors in defining what a strategy is, Anthony and Govindarajan (1995), believe that "strategies describe the general direction in which an organization plans to go to attain its goals" (p. 264). In the early 1960s, Andrews introduced the concept of strategy as the process by which executives evaluate organization's strengths and weaknesses against the opportunities and threats present in the environment.

One of the old proponents of the traditional view of strategy making, Chandler (1962) viewed strategy as the process of determining the basic long-term goals and objectives of

an enterprise, and the adoption of courses of actions and the allocation of resources necessary for achieving these goals. Chandler assumes that a strategy is the outcome of a rational planning process. However, another perspective was later suggested by Mintzberg (1978), who argued that strategy development may not necessarily follow a rational planning process. A strategy may just emerge. Mintzberg (1978) sees “emergent strategy as a pattern in a stream of decisions and actions” (p. 934). Based on his research on the work of chief executive officers, Mintzberg believes, that sometimes, even in the absence of formal planning, an organizational strategy can emerge (i.e. emergent strategy) from the grassroots of the organization as a result of a reasoned decision-making process by executive managers, based on the given circumstances at the time.

The case, narrated by Pascal (1984), of Honda Motors’ entry into the U.S motorcycle market represents a good example of Mintzberg’s view. Honda Motors in 1959 had an “intended” strategy (i.e. through a rational process) to gain a good market share of the U.S. motorcycle market, starting in Los Angeles.

Initially, Honda Motors had an intended strategy that focused on marketing certain kinds of motorcycles. The strategy was not successful, since the market situation was different from what was expected. Consequently, a new emergent strategy was formed by Honda’s executive managers. This responded more accurately to the market needs, and was therefore successful. However, from a control perspective, the Honda Motors case represents strategic control, because it involves changing the intended strategy (or taking

a corrective action) in response to the actual market circumstances, to ensure the achievement of organizational objectives.

In other words, according to Mintzberg, during the course of strategy implementation, changing organizational circumstances force executives to review their intended strategies and produce new adjusted strategies (emergent strategies). Emergent strategies are a result of rethinking intended strategies to maintain capability and effectiveness in the current and future circumstances of an organization. Mintzberg's ideas therefore define the issue of the monitoring and reviewing aspects of the intended strategy, to maintain its capability to achieve strategic organizational objectives.

Strategy Retold: Recent Views on Strategy

In the above discussion, two views of strategy were presented, specifically, the rational view of strategy by Chandler (1962), and the emergent (evolving) strategy by Mintzberg (1978). To follow up with more recent views, the article by Whipp (1999) has presented a discussion of the strategy concept through four stages or sections that deal with four issues or aspects of the strategy concept.

The first stage was to explore the social construction of and roots of the term strategy and its derivatives. The second stage was concerned with the examination of the way in which the study of strategy has been pursued and its consequent intellectual evolution.

The second issue discussed and highlighted the long debate between the economic and social views of strategy.

Stage three considered discussing some of the issues that has little treatment in the literature such as the differences between US and European strategic approaches. The fourth stage sets out the challenges which the strategy domain faces in the form of empirical research objects and their attendant problems. Among the above four stages, the first two are related to our discussion of a strategy.

According to Whipp (1999), the emergent (evolving) strategy by Mintzberg (1978) came about as a reaction against the mechanistic conception of strategy in the 1970's. Later on, in the 1980's, Best (1990) believes that Porter provided a new way of thinking in terms of strategy making that suit better the higher industry competition pressures that face companies in the 1980's and till now. Porter (1980) offered his new scheme of "generic strategies" of cost leadership and differentiation. The 1980's has also centred around the concepts of "strategic intent" which is the linking of narrow commercial actions with the broad aspirations of the firm (Prahalad and Hamel 1985), and the creation of "global strategies" to satisfy global competition.

These views are regarded by Whipp (1999) as the economically oriented views of strategy. The other view of the strategy concept is the social view according to Whipp (1999). One example of the social view is presented by Barry and Elmes (1997) who

view strategy as a process very similar to story making and story narration. Therefore, strategy making according to Barry and Elmes views is an art rather than science.

Barry and Elmes emphasised more on the communications aspect of a strategy making. They see writing the strategy efficiently has a great impact on its acceptance and success by top managers in an organisation. According to their article, the authors' intent was not to deny the economic view of strategy, but actually to provide strategy theorists and practitioners with an additional interpretive dimension. While the social view of strategy may be thought of as representing a qualitative approach for strategy making, the economic view represents the quantitative approach for strategy making.

The narrative view of strategy is originated and supported by other authors such as Gardner (1995) who concluded from his study of 20th century leaders that:

The formidable challenge confronting the visionary leader is to offer a story, and an embodiment, that builds on the most credible of past syntheses, revisits them in light of present concerns, leaves open a space for future events, and allows individual contributions by the persons in the group. (p.56)

Barry and Elmes (1997) believe that from a narrative perspective, the successful strategic story may depend less on tools as comprehensive scanning, objective planning, or control feedback systems and more on whether it stands out from other organizational stories, and persuasions. The authors believe what the story revolves around, how it is put

together, and the way it is told determine whether it becomes one worth listening to, remembering and acting upon.

I do not entirely agree with the authors' view. The narrative view is very much based on communications skills, which is a key issue in strategy selling, but it does not replace environmental scanning, proper planning and feedback loops in strategy making. Especially recent advances in business methods and technology made strategy making an even more complex task.

Gnyawali, Stewart, and Grant (1997) view strategy as an outcome of an organizational learning process within the strategy making process. The organizational learning process according to the authors' view accumulates knowledge in strategic planning and consequently enhances strategic decisions. The learning process is actually supported by virtue of efficient feedback loops mechanisms existing between the strategic process and the review of strategy as shown in Figure 2.4.

To prove the validity of their thinking, the authors examined how organizational knowledge is created and used in organizations. A rich organization simulation experiment was constructed in organizational setting, to study relationships among organizational learning processes, decision contexts, organizational knowledge, and decision outcomes. The outcome of the simulation supported their proposition.

Strategy Levels

A strategy can exist in an organization at three levels: the corporate level, the business unit, and the function level, and they are called: corporate strategy, business strategy and functional strategy respectively (Robson, 1997). The corporate strategy is intended and articulated for the entire organization. At this level, the general direction of the organization is defined in terms of strategic objectives for the whole organization, and the plan of action to achieve them. Corporate strategies are likely to be growth, stability or defence, according to Robson (1997).

Business strategy is developed for the business group, usually called as strategic business unit (SBU) within the organization. The business strategy is developed based on the corporate strategy, since it should support and follow the direction and objectives of the corporate strategy. In other words, business strategies must be consistent with and supportive of the corporate strategy. Functional strategy is developed for a specific function within the business unit in an organization. A business unit within an organization may have a set of functional strategies. Business strategies aim to maximise the use of available resources in order to contribute to the business strategy. The following section discusses the strategic management process in terms of its components and the kind of analytical tools used.

2.4.2 The Strategic Management Process

The increasing popularity of the terms strategy and strategic planning in the 1960s led to further development of the concepts. According to Hussey (1998), Ansoff (1972) was first to introduce the term strategic management. Strategic management represents a logical extension of the older term strategic planning, as the latter implies the planning function only. Strategic management in Ansoff's view (1991) describes a new role for top managers. Ansoff wrote:

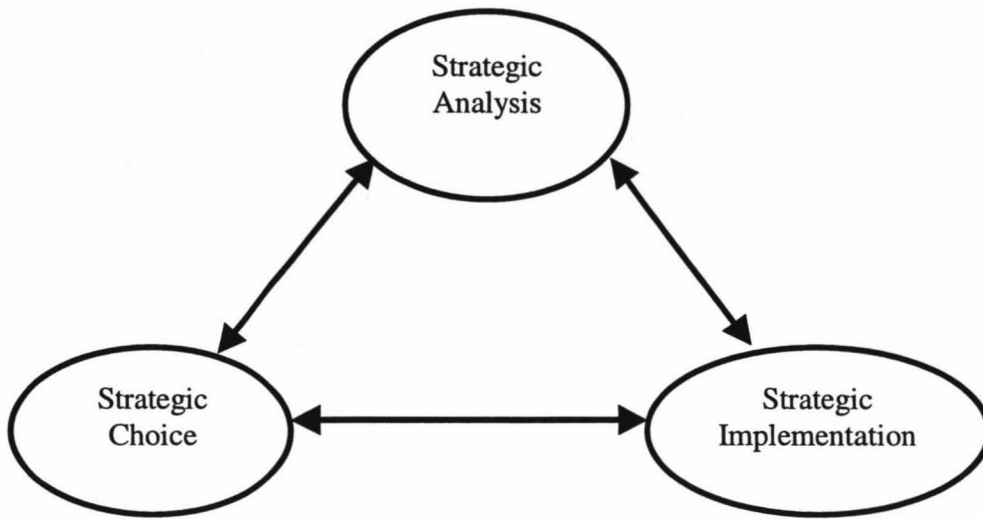
the new general management role required managers to assume a creative and directive role in planning and guiding the firm's adaptation to a discontinuous and turbulent future. It required entrepreneurial creation of new strategies for the firm, design of new organizational capabilities and guidance of the firm's transformation to its new strategic posture. It is this combination of these three firm-changing activities that became known as strategic management. (p. 7).

In contrast, Jonson and Scholes (1984) defined strategic management as:

the process that is concerned with deciding on strategy and planning how that strategy is to be put into effect. It can be thought of as having three main elements within it. There is strategic analysis, in which the strategist seeks to understand the strategic position of the organization. There is a strategic choice stage, which is to do with formulation of possible courses of actions, their evaluation, and the choice between them. Finally, there is a strategic implementation stage, which is to do with planning how the choice of strategy can be put into effect. (p. 10).

In general, the development of strategic plans involves setting the mission and strategic objectives of an organization and creating/implementing the best plan of action to achieve them. The implementation of strategic plans involves planning, co-ordinating, leading, and controlling the organizational resources to facilitate and maintain the execution of the intended strategic plan. Thus, control is part of strategy implementation, and it ensures that the strategy is capable of achieving organizational objectives and direction in current and future circumstances (Hill & Jones, 1994).

The strategic management model proposed by Johnson and Scholes is regarded as the best representation of the strategic management process (Robson, 1997). Johnson and Scholes's (1993) model clearly identifies the three main phases of strategic management namely: strategic analysis, strategic choice, and strategy implementation (Figure 2.2). These three phases are not linear, but they should be viewed as three interacting elements of a managerial process. However, this model represents a top-down view of strategic management, starting with strategic analysis and ending with strategic implementation.

Figure 2.2 Johnson and Scholes' Model of Strategic Management

2.4.2.1 Strategic Analysis

Strategic analysis is concerned with reaching an understanding of the organization's strategic position for the purpose of making a strategic choice for the future direction of the organization (Robson, 1997). That is, based on the achieved understanding of the organizational strategic position the strategic choice phase starts. Strategic choice involves making decisions about important aspects of the strategy to be formulated for the organization

This understanding of the organization's strategic position is achieved based on the analysis and assessment of three key areas in the organization, which are:

- environment
- values and objectives (culture), and
- resources.

Environmental analysis aims to build a picture of what is happening within and around the organization. During the environmental analysis, the focus is on understanding two important issues:

- internal capabilities, and
- external opportunities and threats facing the organization.

The purpose of studying these two environmental issues is to try to achieve what is called by Porter (1980), the “environment fit”. Environmental fit is achieved when the strategy is built based on the principle that an organization should be focusing on exploiting the environmental opportunities and blocking environmental threats in away that is consistent with the internal capabilities.

Robson (1997) suggested a process for environmental analysis that includes the following:

- audit the environmental influences
- assess the nature of the environment to judge whether it is simple or complex
- identify the key environmental forces using Porter’s five-forces model
- identify the competitive position using a life cycle analysis
- identify the key opportunities and threats using strengths, weaknesses, opportunities and threats (SWOT) analysis.

Robson's (1997) includes a discussion on the analytical tools used in each of the above steps of environmental analysis. However, Porter's five forces analysis model is presented here as an example of strategic analytical tools.

Porter's Five Forces Model

The 1970s and the 1980s saw many theoretical and empirical research efforts from researchers in the field of strategic planning, aimed at developing strategic planning models and exploring strategic planning in practice. King and Cleland (1978), Mintzberg (1978), Pearce and Robinson (1982), Rumlet (1980), and Porter (1985) are examples of researchers in this field. One of the distinguished contributions was by Michael Porter (1985), who developed a framework for understanding organizational strategic position, and applying competitive strategies. Porter's framework suggests that a firm can survive and succeed in the long run if it successfully develops strategies to confront the competitive forces that shape the structure of competition in its industry.

Usually, Porter's framework is applied during strategic analysis of the industry environment, since it is concerned with studying the influence of competitive forces on an organization. The five influencing competitive forces suggested by Porter's framework are:

- rivalry of competitors within its industry
- threats of new entrants into the industry
- threats of substitute products and services

- the bargaining power of customers
- the bargaining power of suppliers.

Basically, the purpose of performing the five forces model analysis is to identify opportunities and threats that can influence the competitive level of an organization. This is called the external environmental analysis. The purpose of the internal environmental analysis is to identify strengths and weaknesses of the organization. The external and internal organizational environmental analyses together form what is called the SWOT analysis, which stands for strengths, weaknesses, opportunities, and threats. SWOT analysis is a systematic analysis that, aims to define the relationship between the internal and external appraisal in strategic analysis (Robson, 1997).

Strategy and Objectives

According to Robson (1997), organizational strategic objectives serve three important functions:

- they provide a statement of the financial objectives
- they provide a product market focus for the business strategy of the organization
- they provide guidance for the development of individual functional strategies.

The question of analysing objectives in a strategic context is a complex task (Robson, 1997). The several groups of stakeholders in an organization, whose interests can conflict, can greatly influence the formulation of organizational objectives (Cyert and

March, 1992). Stakeholders analysis technique is used during strategic analysis for defining stakeholders' profiles and preferences.

Analysis of Organizational Resources

The third part of strategic analysis is to conduct an organizational resource analysis. The purpose of this analysis is to assess the internal capabilities and strengths represented by the available organizational resources. Johnson and Scholes (1993) suggest a process for resource analysis that includes the use of value chain analysis model suggested by Porter (1985), and the identification and analysing of key areas. The key areas that need attention during a resource analysis are:

- Product/Market
- Production
- Finance
- Technology
- Organization and human resources.

The end result of the suggested analysis process is an understanding of strategic capabilities.

Value Chain Analysis

Value chain analysis aims to assess the degree of efficiency and effectiveness of each of the key groups of activities involved in the chain of processes (value chain) that

contribute to producing the final product. Efficiency is the measure of how well the resources are being used in those activities involved in the value chain. Effectiveness is the measure of how well the resources are allocated to those activities involved in the value chain. The objective of value chain analysis is to identify strengths and weaknesses in relation to the value chain activities, which will subsequently contribute to establishing a better understanding of the whole picture of internal weaknesses and strengths of an organization.

Robson (1997) also suggested some more analysis models that can be used in resource analysis, including.

- financial performance assessment
- product portfolio analysis
- analysis of core competencies.

Robson provides a full discussion of these analyses.

2.4.2.2 Strategic Choice

This phase involves the generation, evaluation, and selection of strategic options based on the understanding of the organization's situation provided by the previous phase of strategic analysis. Johnson and Scholes (1993) identified three steps in the process of strategic choice.

- generation of options
- evaluation of options

- selection of options.

Generation of options involves the identification of potential courses of action. During the evaluation step, the list of identified strategic options will be tested for suitability (strategic fit), feasibility and acceptability. The selection of the strategy will be based on its merits. Robson has provided more detailed discussion of each of these three steps of strategic choice. However, the issue of generating strategic options is discussed under the following heading.

Generation of strategic options

Porter (1985) proposes that, to confront and control the five competitive forces in a particular industry, a firm can formulate a competitive strategy or a strategic plan based on one or more of the following generic strategies:

- cost leadership
- differentiation, or
- focus.

While the five competitive forces identified by Porter (1985) help strategic planners to define the organizational direction and strategic objectives, the three competitive strategies represent potential strategic options for achieving the strategic objectives.

Rackoff, Wiseman and Ulrich (1985) have proposed the strategic thrusts model for generating strategic opportunities. Their proposed model is well known as Wiseman's strategic thrusts, and it is an extension of Porter's ideas on competitive strategies. They

introduced a technique called the strategic option generator, which is a matrix that depicts strategic thrusts (rows) against strategic targets (columns), see Figure 2.3.

Strategic thrusts are moves or actions an organization can take to improve competitiveness level. The model classifies strategic thrusts into five types:

- Differentiation: producing distinguished products or services from competitors
- Cost: reducing cost for customers or by increasing costs for rivals
- Innovation: introducing fundamental change to the product or services that have advantages over rivals' products, and consequently attract new customers
- Growth: expand business geographically, that is, enter into new markets
- Alliance: forming marketing agreements or joint ventures.

The strategic thrusts model allows the analysis of the three strategic targets of the organization's industry, and makes the manager aware of the strategic action or choice the organization can take in its quest for competitive advantage. The analysis to fill the option grid is done by asking questions such as:

Can a strategic opportunity (or strategic option) be generated from differentiating the products or services we produce, for existing and new potential customers?

Can a strategic opportunity (or strategic option) be generated from lowering the cost of products or services for existing and new customers?

The identified strategic options will be further evaluated for strategic fit with the organization's environment, culture, and capabilities. Robson (1997) defined strategic fit

as the degree to which the strategic options being reviewed fit the situation identified during strategic analysis. Those strategic opportunities or options that have been classified as having a strategic fit will be further evaluated for strategic feasibility and desirability. Strategic feasibility assesses the extent to which the strategic option is practical from economic standpoint for the organization. Strategic desirability assesses the extent to which the strategic option is acceptable to the stakeholders (Robson, 1997).

Figure 2.3 Strategic option Generator proposed by Rackoff, Wisman, and Ulrich (1985), copied from (Robson, 1997)

	Strategic target		
Strategic thrust	Supplier	Customer	Competitor
Differentiation			
Low Cost			
Innovation			
Growth			
Alliance			

The Role of IS and IT in Strategic Choice

With respect to the role of information systems and technology, IS and IT can play a vital role in terms of supporting the business strategy and consequently help in the achievement of organizational strategic objectives. O'Brien (1993) believes the role of information technology in supporting the business strategic objectives can take three forms:

- improve operational efficiency
- build strategic IT resources
- promote business innovation.

Previous IS research has, also proved that IT was instrumental in achieving organizational strategies in practice (Ward, 1990; Earl, 1993; O'Brien, 1996; Applegate et al., 1996).

2.4.2.3 Strategic Implementation

Strategic implementation is the last phase of Johnson and Sholes' model of strategic management process. It is concerned with putting the chosen strategy into effect. The phase, according the Johnson and Sholes, should focus on three areas:

- resource planning
- organization structure, and
- people and systems.

Naturally, before starting strategy implementation, the first step that must be considered is the determination of the nature and quantity of resources required for successful implementation. Secondly, managers should review the existing organization structure in the light of the chosen strategy, to determine the structure's suitability for successful implementation, and to decide if changes are required. The last action that should be considered is to consider how the existing systems and people can best be organized to serve successful implementation of the chosen strategy.

While the model of Johnson and Scholes provides an excellent framework for understanding the strategic management process, the model pays very little attention to the issue of strategic control, despite its importance in the strategic management process. The next section discusses the concepts of and previous research work done on strategic control.

2.4.3 Strategic Control

Changes in business circumstances are likely to affect strategic plan performance attributes such as feasibility, consistency, capability, reliability or validity, and to reduce their ability to achieve the business strategic objectives. For example, if some variable(s) related to the five competitive forces of Porter (1985) mentioned above, change(s) significantly, the impact on the implemented strategic plan may be significant because old assumptions of the changed variable(s) will no longer apply. Therefore, it becomes necessary to monitor, review and update the strategic plans accordingly (Rumelt, 1980; Lorange, 1993; King & Cleland, 1978; Pearce & Robinson 1982).

In addition to monitoring and reviewing the performance of the strategy, King and Cleland (1978) argue that a planning system that does not have a strategy to review and improve the efficacy of strategic planning efforts in the organization is unlikely to achieve its fullest potential. Hill and Jones (1994) also believe that implementing a

strategy requires the adoption of appropriate organizational structures and control systems, and the existence of proper feedback loops.

The concept of strategic control is relatively new. As the focus of literature shifted from the traditional view of strategic planning to the broader view of strategic management, for example (Ansoff, 1979), little attention was given to the concept of management control from a strategic perspective. Bales (1977) described strategic control as the concern of a company president to assure that his organization is acting in a manner consistent with management's wishes. Lorange, Morton, and Ghoshal's (1986) provided a clearer but brief definition of strategic control. They defined it as "systematically monitoring the organization's progress along relevant strategic dimensions and modifying the organization's strategy on the basis of this evaluation" (p.1).

Pearce and Robinson (1982) suggest that in addition to the usual monitoring and controlling activities during the initial business strategy implementation, it is necessary to carry out a review and evaluation of the business strategy from a strategic perspective, which they refer to as *strategic control*. They contend that during strategic control, top management must focus on both the qualitative and quantitative dimensions of business strategy.

The qualitative dimension of strategy review and evaluation seeks to confirm or refute critical assumptions on which the strategy is based. Rumelt (1980) proposes four criteria with which to review and evaluate the critical assumptions of the current strategy:

Consistency, Consonance, Advantage and Feasibility. The quantitative dimension of review and evaluation, on the other hand, seeks to measure the impact of the business strategy on specific criteria relevant to the long-term objectives of the firm.

The results of the review and evaluation are fed back to the strategic management process in order not only to update the current strategy, but also to improve the strategy formulation process itself. Therefore, the existence of learning feedback loops is important as they make use of the relevant information resulting from the review of the strategy to improve the efficacy of the strategic management process.

Bungay and Goold (1991) argue that in addition to short-term financial budgetary measures, companies need some specific non-financial measures to be built into the control system to monitor their long-term strategies. They argue that a strategic control system ensures that the immense effort often put into preparing lengthy and detailed strategic plans is in fact translated into action, and that the learning process is consolidated in the strategic planning process.

Bungay and Goold's strategic control system is based mainly on the monitoring aspect of the business strategy performance, using proper performance measures (controls). They put less emphasis on the issue of monitoring the organizational internal and external environments to identify events or issues that could have a significant impact on either the current or future performance of a business strategy. Bungay and Goold have suggested four stages for creating a strategic control process in an organization.

- aligning appropriate structures
- building skills
- setting control targets
- dismantling the bureaucracy.

Based on their research results, Bungay and Goold (1991) proposed four reasons for developing and implementing strategic controls in an organization.

- strategic controls are means of clarifying what good performance is
- strategic controls confer an ability to make explicit trade-offs between profit and investment/growth
- strategic controls can be a way to introduce strategic 'stretch' as well as financial stretch, by the setting of competitive goals
- strategic controls allow management in the business unit and at the center to take action in more timely way, by giving an early warning if the situation of the business is deteriorating.

Strategic Issues Management System (SIMS)

Traditional strategic planning systems are often criticised for their lack of sensitivity and inability to deal with the discontinuities and crises that arise in a dynamic and turbulent internal and external organizational environment (Camillus & Datta, 1991). The strategic issues management system is put by the authors as an alternative strategic management

system, to minimise the probability of encountering strategic surprises or crises that may not be anticipated and defused in the traditional strategic planning process.

The strategic issues management system is described as a more flexible, dynamic and sensitive strategic management process. Thus, the SIMS system emphasises the importance of the process of identifying and categorising current and future strategic issues that might impact performance of the current strategy. The process of strategic issues identification is based on a continuous scanning and analysing of the organizational environment. The major difference between the traditional strategic planning system and the SIMS is that the former is periodical, while the latter is continuous.

Camillus and Datta (1991) believe that because of their shortcomings, traditional strategic planning systems and the newly suggested strategic issues management system will not be able to function effectively if they are operated separately. Therefore, the authors propose that to achieve a better strategic system, it is wise to integrate both the traditional and the SIMS systems. The authors believe that the SIMS model for strategic planning is important for the success of the strategic process in an organization. It is dynamic and continuous, and thus can sense strong and weak signals existing in the business environment and then evaluate their impact on the organization and respond effectively. It is more sensitive and responsive than the traditional planning systems.

The integrated strategic management system proposed by Camillus and Datta (1991) represents an approach to strategic management that incorporates a sensible model for environmental scanning both during the strategic process, and after the strategy is in action. However, the proposed integrated planning system applies the concept of control over the “clumsy” strategy, but from the perspective of monitoring the environment’s impact on the business alone.

Unlike Bungay and Goold (1991), Camillus and Datta (1991) give less importance to the issues of performance measurement and reviewing in strategic control. Therefore, the SIMS system does not incorporate a process for monitoring performance of the strategy, and consequently, it cannot be considered to be a comprehensive model for strategic management, as claimed, by the authors.

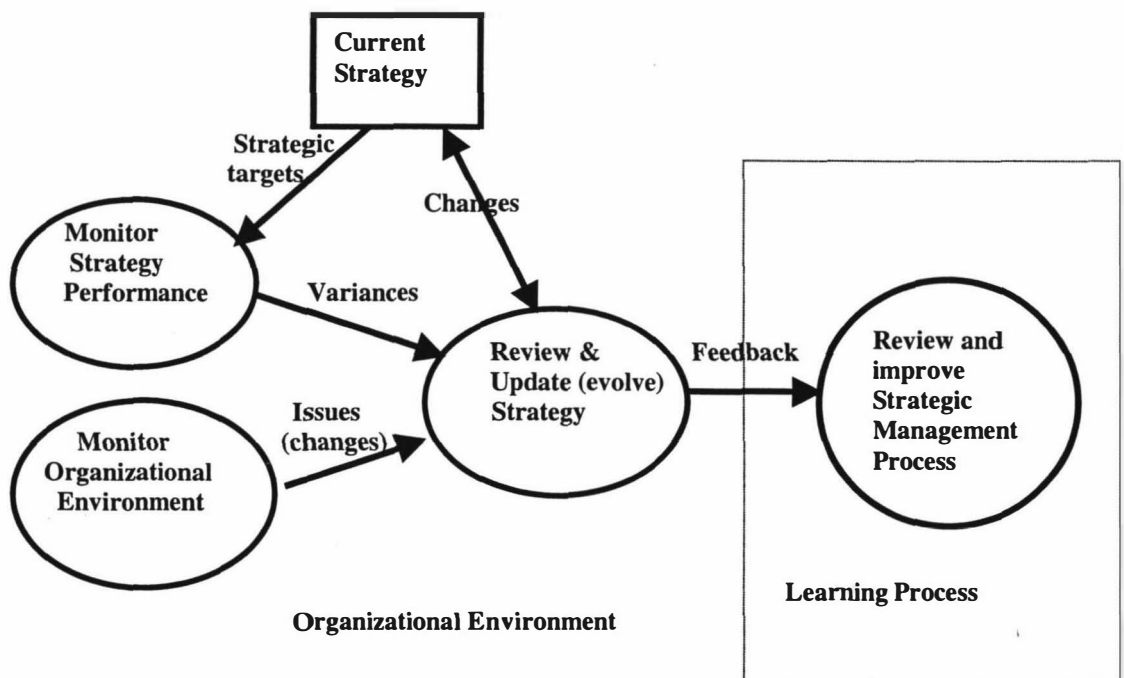
It appears that there is limited research in the area of developing a generic conceptual model that integrates and describes the basic processing elements and flow of information in a typical strategic control system. Also, to be able to build a measurement instrument for the research questionnaire, a model that describes strategic control process is needed. To satisfy these needs, the researcher proposes, based on the examination of the literature in the area of strategic management and control, a basic and general model that integrates and describes the principle elements of the ideal process of strategic control. The proposed model is shown in Figure 2.4. The data flow diagrams technique of systems analysis was used to draw the model.

From the proposed model in Figure 2.4, the principle elements of a typical strategic control process are:

- monitoring the internal and external business environment
- monitoring performance of strategy
- review of strategy
- review of strategic management process, and
- feedback loops.

The five sub-processes of strategic control are not linearly arranged but are integrated in a systematic fashion as shown in Figure 2.4. The model shows the main processing components and data flows existing in a basic strategic control process and the ways in which they are linked to each other.

Figure 2.4 A Proposed Model for the Strategic Control Process



Goold and Quinn (1990) conducted an exploratory study of the sorts of strategic control processes found in leading companies in the UK, to determine how effective these processes had been. The study also investigated the precision, explicitness and nature of strategic objectives; the rigour with which objectives are recorded and monitored; and the way in which rewards, sanctions and interventions are tied to achievement of planned objectives.

Goold and Quinn (1990) found that only 15 large organizations have established a strategic control system. In this survey, Goold and Quinn identified the following key issues for a strategic control system:

- the organization's strategic objectives should be clear and explicit
- the quality of strategic targets must be compatible with budgetary control targets
- the quality of rewarding, sanction and intervening management system
- the quality of thinking and assumptions on which the strategic objectives are based
- the level of rigidity and bureaucracy in the strategic control process. Large staff and lengthy reports should be avoided
- the level of commitment of top level management to the strategic control process.

The following are additional important issues for a successful strategic control system, which are suggested by the researcher based on the review of the literature of strategic control:

- use of computer based tools for documenting relevant information generated during strategic control process
- quality of strategic performance measures (indicators)
- relevance and timeliness of information generated from environmental scanning
- suitability of organization structures that facilitate and support the monitoring, review and evaluation of existing strategy, and speed up the information feedback loops and reporting.

The view discussed above by (Goold & Quinn, 1990) restrict the approach of strategic control in two principle activities: the monitoring of strategy performance, and the strategic review and evaluation of the strategy. The authors do not give enough attention to two important issues relevant to the process of strategic control, namely: (1) monitoring the business environment, and (2) feedback loops resulting from the strategic review process that help improve both the business strategy and the strategic process. In contrast, the proposed model in figure 2.4 treats environmental monitoring and feedback loops as principle components of the process of strategic control.

Since the strategic objectives, analysis and choice are based on business environment assumptions, the existence of a mechanism for the continuous monitoring of the business environment and the critical evaluation of the strategic assumptions are vital for the success of the strategic control process (Rumelt, 1980; Lorange, 1993). Also, in an effective strategic planning system, the issue of reviewing the strategic process with the focus on improvement must exist as a natural consequence of the review of the strategy.

This forms a learning process based on the high likelihood that strategic review of the strategy will produce valuable feedback information useful for improving the strategic planning system (King & Cleland, 1978).

The next section will provide an overview of the process of strategic IS management, and focuses the discussion on the issue of strategic control and its relevance to strategic IS management.

2.5 The Strategic Information Systems Management Process

Strategic IS planning has been defined by Lederer and Sethi (1988) as “the process of deciding the objectives for organizational computing and identifying potential computer applications which the organization should implement.” (p. 445). Lederer and Sethi’s definition is focused more on the planning issue of information systems and technology resources. Baker (1995), however, defined IS planning as follows:

Information systems planning involves the identification of prioritised information systems (IS) that are efficient, effective and/or strategic in nature together with the necessary resources (human, technical and financial), management of change considerations, control procedures and organizational structure. (p. 62)

We rather adopt this definition given by Baker (1995), which focuses on both the planning and implementation issues of strategic management of information systems and

technology resources. Because of the conceptual similarity and close link between strategic management and strategic IS management, the theory and practice of strategic control becomes relevant and applicable to strategic control in strategic IS management. Therefore, it is our intention to use the relevant strategic management concepts and models in the proposed study.

One of the concepts worth discussing in this section is the life cycle model of the strategic IS management process. According to Johnson and Sholes's (1993) strategic management process model, the life cycle of strategic IS management process can comprise three principle phases:

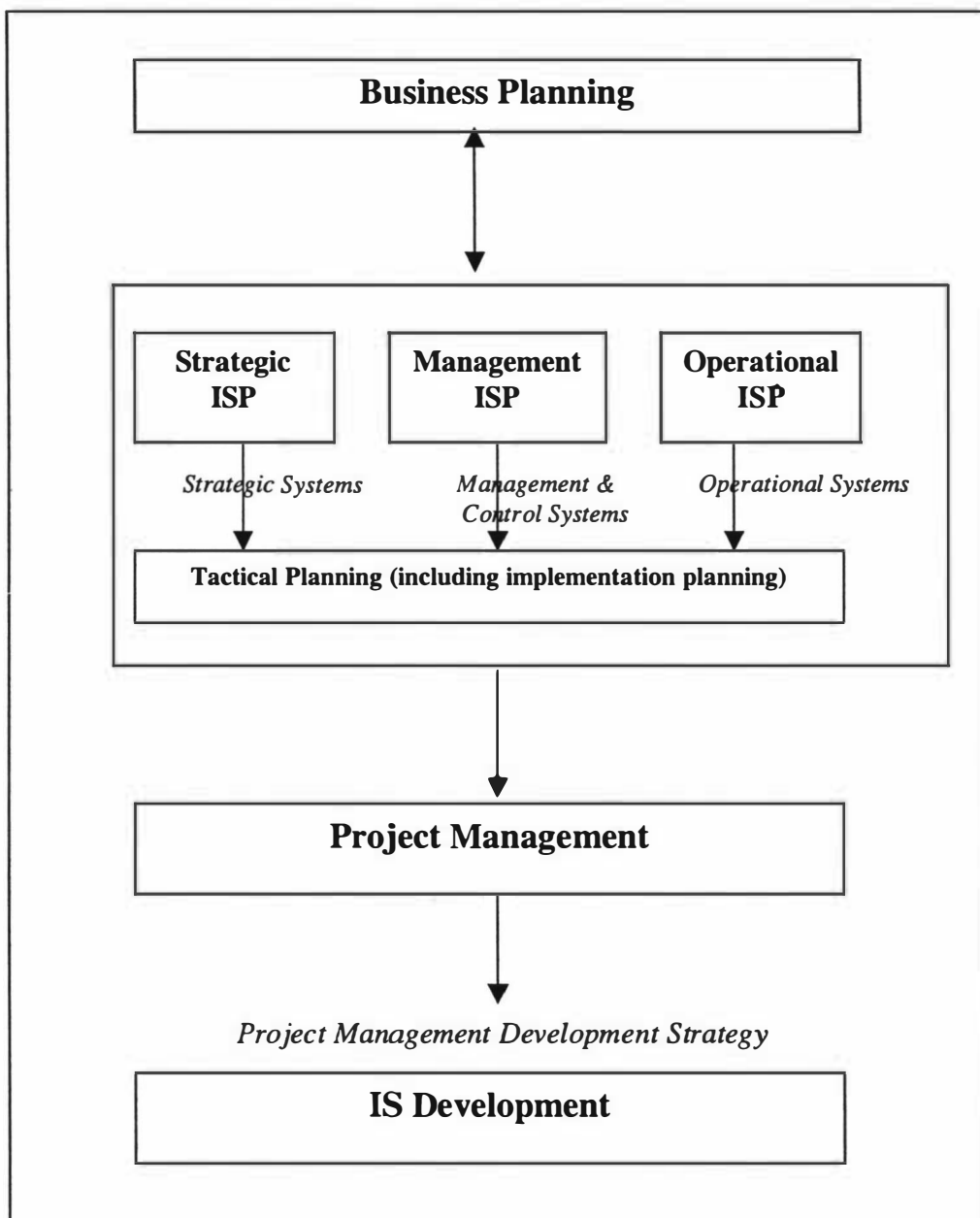
- strategic analysis
- strategic choice
- strategic implementation.

Strategic IS control is considered part of the strategic implementation phase.

The continued and rapid growth and complexity of information technology during the 1980s and 1990s increased IS management challenges. Consequently, substantial research work has been carried out in strategic IS planning in particular and in IS management in general. A majority of the research efforts in the last two decades, e.g., Portor (1985), Wiseman (1988), Sullivan (1990), Earl (1993), King (1988), Mcfarlan (1984), mainly focused on developing strategic concepts, frameworks for theory building, models and methods of planning, and acquisition and deployment of information technology resources.

Baker (1995) proposed a model (see Figure 2.5) that describes the IS planning system in the organizational context. It represents a top down approach for IS planning. Baker's model assumes the existence of a business strategy and, based on it, an IS strategy can be

Figure 2.5 Information Systems Planning in Context (Baker, 1995)



developed at three levels: strategic, MIS, and operational; after which a tactical plan or implementation plan will be developed. IS project management and IS development can follow the development of an IS strategy.

Mcfarlan (1971) identified four reasons for information systems and technology resources planning in the organization:

- technology improvements
- scarcity of IS human resources
- scarcity of corporate resources, and
- a trend towards systems integration.

Mcfarlan's research has found evidence of a strong relationship between IS effectiveness and IS planning. Another reason for the importance of the planning issue for IT resources, not mentioned above, is the changing role of information technology in the last three decades. From the traditional role of supporting data processing and decision making, IT now supports the organization's strategic direction and initiatives.

Consequently, efficient and effective deployment of IT resources in the organization is now instrumental in its success. The issue of effective planning for IT is therefore becoming of great concern to both the chief executive officer and chief information officer in an organization (Galliers, 1987; Brancheau & Wetherbe 1987; Wilson, 1989; Watson et al., 1997).

Strategic planning for information technology requires the existence of an organizational strategy, and for IT resources to achieve maximum support for the organizational strategy, IS researchers believe the IS strategy needs to be strongly linked with the organizational strategy. Basically, a better match between the business and IS plans leads to better organizational performance. As a result of research evidence on the importance of the link between business and IS plans, a number of conceptual models for linking the IS plan to the organizational plan have emerged (Robson, 1997).

However, the increasing advances and complexity of information technology generated other concerns for IS/IT managers. For example, Frenzel (1999) reports that most researchers consistently find three issues that are very important for most organizations for their effective use of IT resources:

- using IT to improve productivity and quality of products and services
- creating or maintaining competitive advantages through information technology,
and
- redesigning business processes to support company strategy better.

These key issues represent the driving force for the effective and intensive use of IT to improve the organizational effectiveness in most organizations. To satisfy these issues, organizations have put more effort into IT, and spent huge financial resources on planning for the effective use of IT in their organizations. Earl (1993) show that strategic IS planning efforts in practice are focused on the following target areas:

- aligning investment in IS with business goals

- exploiting IT for competitive advantage
- directing efficient and effective management of IS resources
- developing technology policies and architectures.

To fulfil the needs of organizations interested in planning for IT resources, substantial IS research efforts in IS planning were directed to developing theoretical models for strategic IS planning, and methodologies for formulating strategic IS plans. In addition, other research efforts have been focused on issues such as IS plans implementation and the alignment between business and IS planning.

Based on his research in UK organizations, Earl (1993) has classified five strategic IS planning approaches. The author called the identified approaches:

- business-led
- method-driven
- administrative
- technological, and
- organizational.

The business-led approach is based on the assumption that strategic IS plans are merely built based on the business direction and plans. In this approach, business plans are analysed by IS senior staff such as the IS director or the IS planning team, to identify where information systems are most required to support the business plans. The resulting strategic IS plan is later presented to the board of management executives for discussion,

priority setting, and approval. The model shown in Figure 2.5 represents an example of such an approach.

The method-driven approach assumes that strategic IS planning is enhanced by the use of formal methods that generate intended strategies according to Mintzberg (1978). IS planning consultants are normally the main players in leading IS planning exercises according to such approach. However, business management in this case may not always be happy with the suggested set of IS strategic applications, since they may feel that they were not consulted closely during the planning exercise (Earl, 1993).

The administrative approach emphasises resource planning. In such an approach, IS application proposals are submitted by business units or departments to a planning committee who examines projects, viability, common system possibilities, and resources' requirements. The planning/steering committee makes all decisions and agrees on changes. This approach is criticised by respondents as not being strategic, since it lacks the strategic thinking dimension (Earl, 1993).

The technological approach for strategic IS planning is based on the assumption that an information systems-oriented model of the business is a necessary outcome of strategic IS planning exercise. Therefore, analytical formal models such as Entity Relationship Diagrams, Data Flow Diagrams and Object models, and Data Communications models may be used to produce an integrated business-wide model. This approach is usually time consuming and requires high levels of systems analysis knowledge and expertise,

and IS consultants are usually employed to perform this task. Earl (1993) finds that because of lack of management involvement in such approach, the resulting strategic IS plan and business model is not likely to gain a good level of business top management support.

Lastly, the organizational approach for strategic IS planning assumes that the IS function and the rest of the organization and its management should work in partnership. They must work in an integrated way during strategic IS planning to produce a useful strategic IS plan. This approach uses business-oriented analytical methods to analyse and deal with business problems, and to find the best information technology options to support business objectives. Earl (1993) found this approach is preferred more by organization managers as it involves user management and tries to utilise the organization's learnt experience and accumulated knowledge to solve their business problems, through the potential of currently available information technology.

The five approaches identified by Earl (1993) show the application of information systems and technology can be a complex and expensive operation, as it requires careful planning and implementation, and effective organization and co-ordination of substantial organizational resources. Rapid developments and advances in computers and telecommunications systems during the 1980s and onwards also made the planning and implementation of strategic IS plans even more difficult and problematic.

Despite of the substantial efforts made by IS researchers in regards to developing IS planning methodologies, Hatten and Hatten (1997) report that in many organizations IS plans are still not making significant impact in terms of achieving substantial competitive advantages. This indicates that for some reasons IS plans are lacking performance, and it means the outcome of IS planning process is not satisfactory.

The main reasons for strategic IS plans or individual IS applications becoming invalid or obsolete, according to Baker (1995), are changing business or IT environment or ineffective IS planning processes. During the 1990s, researchers such as Galliers (1995) and Lederer and Sethi (1995) investigated the reasons for failing IS strategies and the problems in applying the theory of IS planning and IS implementation successfully.

Galliers (1995) finds that organizations experience problems while carrying out strategic IS planning and IS implementation activities. He groups the problems and difficulties in applying the theory of strategic planning for IS in practice into four main categories:

- management involvement
- ascertaining an appropriate IS strategy
- assessment of benefits of strategic IS planning, and
- business and IS planning linkage.

Lederer and Sethi (1995), on the other hand, group the problems and difficulties into three categories:

- leadership issues

- implementation issues, and
- resources issues.

These “problems and difficulties” occur within the boundary of IS function in general and within strategic IS planning in particular. However, changes in the organizational environment such as changes to industry, government regulations, organizational structure, corporate plans or functional strategies within the organization, can also impact on IS plan success and performance. One can therefore conclude that the success of strategic IS plans is influenced by two groups of issues, coming from two directions:

- The problems or practical issues that are related to the practice of strategic IS management process within the IS function, that is, planning and implementation for IS, and
- The problems, issues and changes that emerge from the organizational and information technology environment external to the IS function.

The strategic IS management’s internal issues and the organization’s environmental factors affecting IS plan performance are depicted in Figures 2.6, 2.7 and 2.8. Depending on the extent of their implications, the influencing factors can individually or collectively reduce the level of IS plan performance and its chance of success, and consequently, this situation can lead to failure of IS plans and applications. Therefore, to maintain a good level of performance and success for strategic IS plans and the strategic IS management process, it is necessary to monitor and review both the strategic IS plans and the process that produces them.

Also, from a quality improvement perspective, to improve the chance of success of IS plans, it is necessary to improve the performance of the actual process that produces and implements the IS plans, that is, the strategic IS management process. Baker (1995), for instance, states that improving IS planning depends on the existence of effective feedback loop mechanisms in the IS planning process.

Figure 2.6 Strategic IS Management Issues Influencing Strategic IS plan Performance

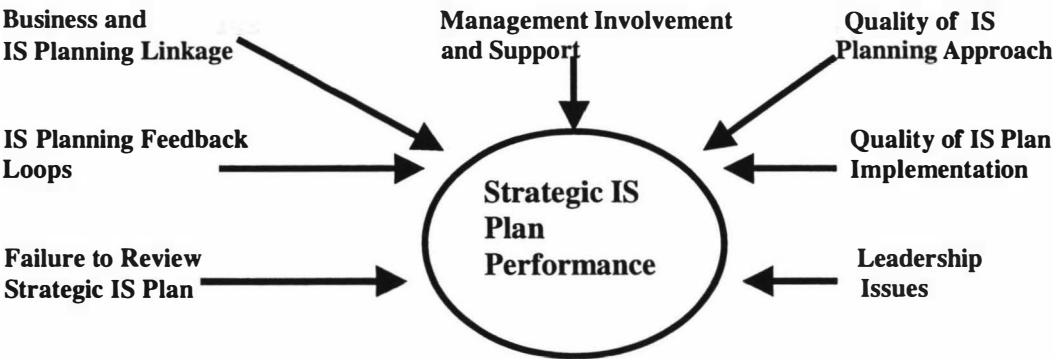
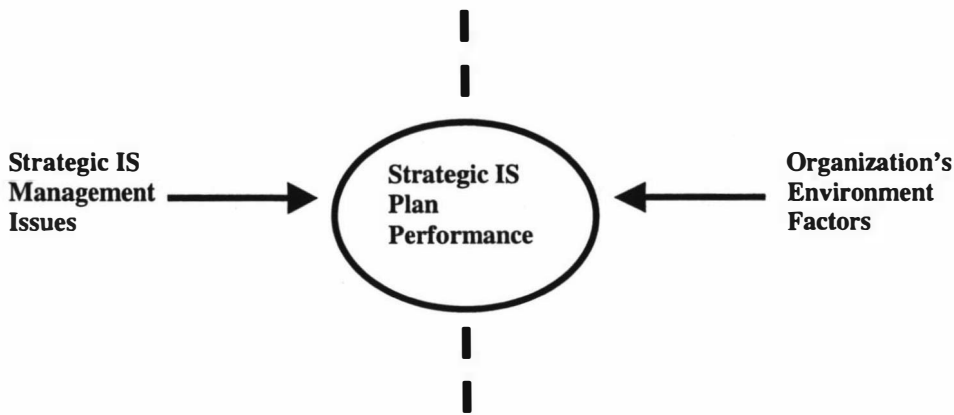


Figure 2.7 Organization's Environment Factors Influencing Strategic IS Plan Performance



Figure 2.8 Factors Influencing Strategic IS Plan Performance

Despite evidence of the importance of the strategic control function in the context of strategic IS management, there are so far very few studies of strategic control by IS researchers (e.g., Goold & Quinn, 1990; Bungay & Goold, 1991; Muralidharan, 1997).

Research in the past two decades concentrated more on developing models and approaches for IS planning and IS implementation, without paying much attention to the issue of monitoring and reviewing the IS plans and processes. For example, the strategic IS planning methodology suggested by Tozer (1988), has considered, although indirectly, the issue of reviewing the IS strategy during the IS strategy life cycle. Tozer believes that an IS strategy needs to respond to three types of circumstances:

- significant change to business needs,
- significant change to the opportunities offered by information technology, and
- the regular annual business planning cycle.

However, these suggestions are limited to the review and maintenance of the IS strategy only, ignoring the use of IS plan performance measures, and monitoring of the strategic IS management process that produces and implements the IS plan, especially identifying and resolving the problems that could emerge during the strategic IS management process life cycle was also ignored.

With regards to improving the link between the strategic business plan and strategic IS plan, Premkumar and King (1991) suggest the need for suitable organizational control mechanisms to ensure better communications between the strategic business planning and strategic IS planning. The link between strategic IS plans and strategic plans could also be improved if it was supported by feedback loop mechanisms existing in the strategic IS management process.

Baker (1995) argues strongly for further research on the issue of feedback loop mechanisms in IS planning. However, from a managerial perspective, feedback loop mechanisms are part of the management control system (Schoderbek 1990; Hill & Jones, 1994). It would therefore be wise to investigate the whole issue of strategic IS control rather than parts of it.

Moreover, Huysman, Fischer, and Heng (1994) support the existence of an organizational learning process within the IS planing process. The organizational learning process in IS planning is supported by virtue of efficient feedback loops mechanisms existing in the

strategic IS control process as shown in Figure 2.4. They also believe that the process of organizational learning should be regarded as a central component of IS planning.

2.6 Research Issues

2.6.1 Research Problem

Based on the above discussion, one can conclude the following research problem:

Failing strategic IS plans or strategic IS applications are the result of less effective strategic IS control against emerging problems in the strategic IS process, and against current and future business and IT circumstances.

2.6.2 Research Objectives

Addressing the problem of ineffective strategic IS control can be accomplished by improving the quality and effectiveness of the theory and practice of strategic IS control process. To achieve this end, it is necessary to review the theory of strategic control in both general strategic management and strategic IS management, and to investigate characteristics of current strategic IS control practices. Basically, strategic IS control practice may be characterised by the following two dimensions:

1. the extent of strategic IS control practice in an organization
2. the approach used in strategic IS control practice.

Another important factor in addressing the research problem is the determination of existing obstacles that work against the practice of strategic IS control, as this will guide the determination of the nature and level of required improvement in strategic IS control theory and practice. To ensure the research problem is valid, it is important to test the researcher's assumption, that strategic IS control has an impact on IS plan performance. Also, it is wise to measure strength of relationships between some important variables and the strategic IS control approach used. Since the researcher is located in New Zealand, and New Zealand country is regarded advanced in information technology, the scope of the study will include New Zealand organizations only. Therefore, the research objectives can be formalised as follows:

1. to examine the extent of strategic IS control practices.
2. to identify the approaches used in strategic IS control practices.
3. to measure the level of effectiveness of approaches of strategic IS control in practice.
4. to identify existing obstacles that work against strategic IS control practices.
5. to measure the impact of strategic IS control effectiveness on IS plan performance.
6. to examine the existence of any strong preference among responding organizations from different categories of secondary variables, for a special type of strategic IS control approach. The secondary variables considered in the study are:

Industry type

Industry competitiveness

Organizational intensity of IS use

Organizational size

Organizational structure, and

7. to measure the strength of relationship between industry type and level of organizational intensity of IS use.
8. to measure the strength of relationship between industry competitiveness level and level of organizational intensity of IS use.

2.6.3 Research Questions

To achieve the research objectives, we need to set up and answer the following research questions:

1. What is the extent of strategic IS control in NZ organizations?
2. What approaches are used in strategic IS control practice?
3. How effective are the strategic IS control approaches?
4. What obstacles exist that work against strategic IS control practices?
5. What is the level of impact of strategic IS control effectiveness on IS plan performance?
6. What is the strength of relationship between industry type and strategic IS control approach used?
7. What is the strength of relationship between industry competitiveness and strategic IS control approach used?

8. What is the strength of relationship between organizational intensity of IS use and strategic IS control approach used?
9. What is the strength of relationship between organizational size and strategic IS control approach used?
10. What is the strength of relationship between organizational structure and strategic IS control approach used?
11. What is the strength of relationship between industry type and organizational intensity of IS use?
12. What is the strength of relationship between industry competitiveness and organizational intensity of IS use?

2.6.4 Variables and Hypotheses

Variables

Based on the research questions, the study defines the following principle variables:

1. Extent of strategic IS control process
2. Type of strategic IS control approach
3. IS plan performance
4. Strategic IS control effectiveness.

The following variables are considered secondary.

- Industry type
- Industry competitiveness

- Organizational intensity of IS use
- Organizational size, and
- Organizational structure.

Strategic IS Control Approaches

The proposed model of strategic control shown in Figure 2.4, indicates that the basic activities of a strategic IS control process include:

- monitoring the organizational environment for any changes that could affect the planning assumptions on which individual strategic IS plans are based.
- reviewing and updating the strategic IS plan or the individual IS against changes in the organizational environment that have an effect on them.
- monitoring the performance of the strategic IS plan or individual strategic IS application against strategic objectives or targets. The purpose of this process is to evaluate whether the strategic IS plan is performing well in supporting business strategic objectives and direction of the organization. This monitoring process can occur in three ways: (1) monitoring based on performance measures of strategic IS plan; (2) ad hoc monitoring of strategic IS plan; or (3) mixed monitoring based on performance measures and ad hoc monitoring of strategic IS plans.

- reviewing the strategic IS process based on the feedback resulting from the IS plan review process to identify any weaknesses and problems in the strategic IS management process, so as to improve the strategic IS management process.
- examining feedback information in the IS planning system that results from the review process of the strategic IS plan, which includes progress and outcome information about IS applications already implemented, IS applications in the process of being implemented, and IS applications not yet implemented.

These activities may be performed in different forms, and within the framework(s) of strategic control approaches. Furthermore, the discussion of the implications of control approaches on the study, in Section 2.3.6 above, has generated the following conclusions:

- it is possible that control is carried out based on using formal performance measures and planned monitoring and review.
- it is possible that control is carried out based on ad hoc or not planned performance monitoring and review.
- it is possible that more than one control approach can be used by managers to control a managerial issue in an organization.
- the four control approaches (agency-based control, psychological control, structural control, or sociological control) could influence the strategic control process through the way corrective actions are taken during either of the cybernetic or ad hoc control approaches.

Hypotheses

H₁: The extent of strategic IS control practice in the sampled organizations is small

H₂: Possible approaches of strategic IS control:

- cybernetic strategic IS control
- ad hoc strategic IS control
- a combination of cybernetic and ad hoc strategic IS control.

H₃: Effectiveness level of strategic IS control approaches is low.

H₄: Strategic IS control influences IS plan performance significantly.

H₅ : Industry type influences strategic IS control approach significantly.

H₆ : Industry competitiveness influences strategic IS control approach significantly.

H₇ : Organizational intensity of IS use influences strategic IS control approach significantly.

H₈ : Organizational size of IS use influences strategic IS control approach significantly.

H₉ : Organizational structures influences strategic IS control approach significantly.

H₁₀ : Industry type influences organizational intensity of IS use significantly.

H₁₁ : Industry competitiveness influences organizational intensity of IS use significantly.

Because of the conceptual similarity between strategic management and strategic IS management, it is the researcher's intention to apply the model of strategic control shown in Figure 2.4, to the process of strategic IS control. The next section summarises the chapter.

2.7 Summary

Despite the importance of controlling strategic IS plans from a strategic perspective, little research work was found in the area of strategic control in an IS management context. In the above literature review, the following topics were discussed: management control; control approaches; strategic management and strategic control; strategic IS management and strategic control; proposed strategic IS control approaches.

The literature review focused more on the issue of strategic control, and discussed the strategic IS control issue in the light of strategic control in strategic management, as the concepts of strategic IS management are based on the theory of strategic management.

The literature review started by discussing the concept of management control, different views and definitions of management control were interpreted and compared, as were the levels of management control in general management and in IS management in particular. Following this, section 2.3 examined a number of management control approaches from the nature and applicability standpoints. The implications of these control approaches on the issue of strategic control were then described.

Section 2.4 of the literature review focused on the concepts and process of strategic management, and the issue of strategic control and its theoretical underpinnings, previous research, and its importance. Because of the lack of a general model to describe the strategic control process, a model for strategic control was proposed based on the theory

of strategic management, concepts of control and the evaluation of business strategies from a strategic perspective.

Section 2.5 gave an overview of the concepts of strategic IS management, and the issue of controlling IS plan performance from a strategic perspective. Section 2.6 concluded the chapter with the definition of the research problem, objectives, variables, and research questions.

Next chapter will proceed with the identification of a research strategy that defines the course of action towards achieving the research objectives.

Chapter Three

Research Method

3.1 Introduction

The discussion in Chapter Two of previous research pertaining to problems and issues in the application of strategic IS planning, concluded that failure of strategic IS plans or IS applications can be attributed to less effective strategic IS control over strategic IS management process, and organizational circumstances. In other words, strategic IS control can impact on IS plan performance.

After defining the research objectives, variables, and hypotheses in the previous chapter, this chapter discusses the research method that could be employed to conduct the research, and achieve the research objectives. Section 3.2 discusses the philosophical basis of the research methodology, and the justification for the survey questionnaire instrument. Section 3.3 examines the topic of operational measures development. Section 3.4 addresses the development of operational measures for the study. Then, section 3.5 addresses the data collection instrument.

The data collection section deals with the issues of the scope of the study, survey questionnaire design, unit of analysis, source of data, protection of respondents, pilot testing, survey administration, and data entry. Section 3.6 discusses the issue of the validity and reliability of the measures. Section 3.7 describes the statistical analysis

program to be used for presenting and analyzing the results of the study. Section 3.8 summarizes the chapter.

3.2 Philosophical Basis of the Methodology

After defining the research topic, research problem, objectives and questions, a research paradigm is addressed in order to achieve the research objectives. Paradigms, according to Kuhn (1962), are fundamental to the day-to-day work of any science. Gumesson (1991) describes a paradigm as a world view representing people's value judgments, norms, standards, frames of references, perspectives, ideologies, myths, theories and so on.

Paradigms in the human and social sciences help us understand phenomena; they advance assumptions about the social world, how science should be conducted, and what constitutes legitimate problems, solutions, and criteria of "proof" (Firestone, 1978; Gioia & Pitre, 1990; Kuhn, 1970). Paradigms, therefore, consist of concepts, assumptions and methods of conduct. More specifically, Filstead (1979), specified four objectives that a paradigm should accomplish:

1. serves as a guide to the professionals in a discipline, for it indicates what are the important problems and issues confronting the discipline
2. goes about developing an explanatory scheme (i.e. models and theories) that places these issues and problems in a framework that allows practitioners to try to solve them

3. establishes criteria for the appropriate “tools” to use in solving these disciplinary puzzles, and
4. provides an epistemology in which the preceding tasks can be viewed as principles for carrying out the “normal work” of the discipline. (p. 34)

The two widely discussed research paradigms in the literature are the qualitative and quantitative paradigms (Cresswell, 1994). They are often contested by researchers in the field (Phillips, 1987). Cresswell (1994) describes a qualitative study as a study that is designed to be consistent with the assumptions of a qualitative paradigm. He defines qualitative study as “an inquiry process of understanding a social or human problem, based on building a complex, holistic picture, formed with words, reporting detailed views of informants, and conducted in a natural setting” (p. 2).

Alternatively, Cresswell (1994) describes a quantitative study, as being consistent with the quantitative paradigm assumptions. It is defined as “an inquiry process into a social or human problem, based on testing a theory composed of variables, measured with numbers, and analyzed with statistical procedures, in order to determine whether the predictive generalizations of the theory hold true.” (p. 2).

Hirschman (1986) classified research methodologies into two categories: positivistic and humanistic (or naturalistic) paradigms. The positivistic framework is based on the assumption that the determination of cause and effect are the highest goals of science, and equates data integrity with the control afforded by laboratory experimentation

(Hirschman, 1986; Silverman, 1989). Bodgan and Taylor (1975) argue that the positivist seeks facts and causes, and the humanist is concerned with understanding human behavior from the actor's own frame of reference.

While the qualitative paradigm is based on the humanistic framework, the quantitative paradigm is based on the positivistic framework. Cresswell (1994) suggested five criteria for the selection between the qualitative and quantitative paradigms. The criteria are shown in Table 3.1. The first criterion of world's view is concerned with the researcher's comfort with the ontological, epistemological, axiological, rhetorical, and methodological assumptions of the particular paradigm.

The ontological issue is about what is-real. The quantitative paradigm regards reality as "objective", independent of the researcher. Therefore, there are things "out there" that can be measured objectively by using a questionnaire or some quantitative-based instruments. According to the qualitative paradigm, the reality can be established only by involving the researcher in the research situation.

The epistemological is concerned with the relationship of the researcher to that being researched. The quantitative paradigm holds that the researcher should remain distant and independent of that being researched, and this would control the researcher's bias. The qualitative paradigm, however, is different, in that it tries to make the researcher interact with the research situation, by being very close to reality. However, the bias factor may not be controlled as efficiently as in the case of quantitative paradigm. The

epistemological issue is very much related to the axiological issue of the role of values in a study. The researcher's values are not considered in the quantitative paradigm. That is, the researcher's interpretation of subjects responses are not considered. Whereas in the qualitative paradigm, the subject's responses are examined and interpreted by the researcher, logically the results are very much based on the researcher's values and previous background.

The rhetorical question is related to the language of research. In the case of quantitative paradigm, the language of writing the research must be impersonal and formal, for example, concepts and variables are well defined and specific. The language of qualitative studies is more personal, informal, and based on definitions that evolved during the study.

Based on the above-mentioned ontological, epistemological, axiological, and rhetorical issues, a methodology for guiding the process of research has emerged. The quantitative methodology evolved from the quantitative paradigm, where the researcher uses a deductive form of logic wherein theories and hypotheses are tested in a cause and effect order. Concepts, variables, and hypotheses are developed from the existing literature before the data collection study begins. In other words, the theory is previously developed in the literature, and the intent of the quantitative study is to develop generalizations, by testing the theory, that enable one to better predict, explain, and understand the related phenomenon (Cresswell, 1994).

Alternatively, the qualitative methodology uses inductive logic, in which the intent to develop a theory or pattern that helps explain the underlying phenomenon, based on particular cases or informants.

3.2.1 Methods and Paradigms

Each of the quantitative and qualitative paradigms is associated with a number of methods. Research methods associated with the quantitative paradigm are survey and experiments (or experimental designs) (Cresswell, 1994). The survey methods include:

- Cross-sectional survey and
- Longitudinal survey.

Experiments include:

- Random experimental design and
- Non-randomized experimental design (Keppel, 1991).

Research methods based on qualitative paradigm are:

- Ethnographies
- Critical ethnographies
- Grounded theory
- Case studies, and
- Phenomenological studies (Cresswell, 1994).
- Action research (Warmington, 1980).

Table 3.1 Reasons for Selecting a Paradigm (Cresswell, 1994; p. 6)

Criteria	Quantitative Paradigm	Qualitative Paradigm
Researcher’s worldview	A researcher’s comfort with the ontological, epistemological, axiological, rhetorical, and methodological assumptions of the quantitative paradigm	A researcher’s comfort with the ontological, epistemological, axiological, rhetorical, and methodological assumptions of the qualitative paradigm
Training and experience of the researcher	Technical writing skills, computer statistical analysis, library skills	Technical writing skills, computer statistical analysis, library skills
Researcher’s psychological attributes	Comfort with rules and guidelines for conducting research, low tolerance for ambiguity, time for a study of short duration	Comfort with lack of specific rules and procedures for conducting research, high tolerance for ambiguity; time for lengthy study
Nature of the problem	Previously studied by other researchers so that body of literature exists; known variables; existing theories	Exploratory research; variables unknown; context important; may lack theory base for study
Audience for the study (e.g., journal editors and readers, graduate committees)	Individuals accustomed to/supportive of quantitative studies	Individuals accustomed to/supportive of qualitative studies

3.2.2 Justification of the Survey

The survey method is chosen based on four reasons:

1. the researcher is more comfortable with the ontological, epistemological, axiological, rhetorical, and methodological assumptions of the quantitative paradigm (Cesswell, 1994)

2. the quantitative survey questionnaire method is more suited to answer our research questions, especially testing the relationship between strategic IS control and IS plan performance.
3. The access to IS managers in the form of interviews or the researcher being close to the process under study is sometimes obtrusive and not practical, because IS managers usually have no spare time to spend on the research study.
4. The use of qualitative methods such as case studies will increase the risk of failing to obtain the required data within the allowed time for the research.
5. The survey method allows access to more diverse population than other data collection methods, and therefore it provides a higher degree of generality about the phenomena under study.

The following section will discuss the issue of developing operational measures for measuring the study variables.

3.3 Operational Definition of Measures

In order to develop a measurement instrument for the purpose of this study, we intend to use the general model, shown in Figure 2.4, of the ideal strategic IS control process, which has been developed in the literature review chapter, section 2.4. The approach for developing a measurement instrument based on the proposed model of the process under study (strategic IS control) is called the normative approach (Segras and Varnaun 1998). Segras and Varnaun (1998) believe that this approach is more applicable to research

contexts if the literature and/or expert opinion can readily identify the standards of good practice.

In order to measure the research variables and test hypotheses, we need to develop a measurement instrument. Bouma (2000) states that after defining the concepts and selecting research variables, the next steps are to devise a measuring instrument and units of measurement (or the type of scale for measurement). However, due to the lack of research efforts in strategic IS control, an existing measurement instrument for measuring the three variables was not found in the literature. Therefore, it becomes necessary to develop a new measurement instrument for the purpose of the study. The study research variables are of a conceptual kind since they do not lend themselves directly to precise measurements.

A conceptual variable, according to Sekaran (1992), is a variable that is more nebulous and does not lend itself to exact physical measurement like human body weight, height, or organizational size. However, measuring a conceptual variable may be addressed by reducing the variable's abstract concept(s) into its observable characteristics or behaviors (Sekaran, 1992). Reducing abstract concepts of variables so that they can be measured is called operationalizing the concepts. Sekaran defined operational definition as "operationally defining a concept so that it becomes measurable, is achieved by looking at the behavioral dimensions, facets, or properties denoted by the concept, and categorizing these into observable elements. This involves a series of steps" (p. 150).

Sekaran gave further example to illustrate how a concept is operationally defined.

Example: operational definition of the concept achievement motivation

To be able to operationally define the concept achievement motivation, one needs to answer the question: what observable behavioral dimensions, facets or characteristics would we expect to find in people high in achievement motivation? The author suggests that such people would probably have the following five typical broad characteristics, which might be called dimensions:

- They would be driven by work (level of drive by work).
- They keep thinking about their work (level of concern of their work).
- They would prefer to work on their own (preference to work alone).
- They would like to be engaged in challenging tasks (preference of challenging tasks).
- They would like feedback on their task performance (request for task performance feedback).

Now, one needs to ask the question: are we able to measure the defined dimensions quantitatively by using their observable characteristics? If yes, then we stop there, otherwise we need to examine the dimension further on and break it down further to its elements. The author finds the dimensions need further breakdown to identify their observable elements. For example, the first characteristic or dimension of high achievement motivation “driven by work” can be measured by the use of three observable elements:

- Be constantly working.

- Be reluctant to leave the work environment (i.e., reluctant to take time off work).
- Preserve if they face some setbacks.

The second dimension “level of concern about work” can be measured by two elements:

- Thinking of work at home.
- Workers do not have hobbies.

The third dimension “They would prefer to work on their own” can be measured by the elements:

- Swears under ones breath when mistakes occur.
- Does not like to work with slow or inefficient people.

The fourth dimension “They would like to be engaged in challenging tasks” can be measured by the elements:

- Opts to do a challenging rather than a routine job.
- Opts to do moderate, rather than overwhelming challenges.

The fifth dimension “They would like feedback on their task performance” can be measured by the elements:

- Asks for feedback on how the job has been done.
- Is impatient for immediate feedback.

The above elements are observable behaviors, and would lend themselves to measurements either by observation or by using closed ended questions. For instance, the number of hours employees engage themselves in work related activities during work hours, and beyond working hours at work, can reflect, partly if not completely, the first

dimension “level of drive by work”. Accordingly, one or more questions can be formulated based on elements defined to capture the employees’ response, which reflect the measurement of the particular concept’s dimension. Then, by integrating the responses of all dimensions of a concept, a final measurement value for the conceptual variable can be achieved.

Usually, the nature of the element for which the question is asked will determine the form of measurement value provided by the subject’s answer. Therefore, the subject’s answer or response to the question is specific, and can take different forms depending on the nature of the underlying element. These designed forms of measurements are called scales. Scales are classified into four types as follows:

- nominal
- ordinal
- interval
- ratio.

Nominal Scale

A nominal scale allows a researcher to classify subjects into mutually exclusive and collectively exhaustive set (finite set) of categories or groups, which represent the values of the variable (Sekaran, 1992). For example, the gender variable can be assigned values: 1 to denote male subjects, and 2 to denote female subjects. Here, we have two categories

or values (1 or 2) the gender variable can take. So, this categorization will also allow a researcher to calculate the percentage of male and female subjects of the selected sample.

Ordinal Scale

The ordinal scale allows a researcher to classify and order rank subjects in ordered and well-defined categories. For example, the conceptual variable “key issues in assessing a marriage partner” can be measured by asking subjects to rank the categories from 1 to n by importance.

The ordinal scale not only allows us to categorize subjects into certain categories, but also taps the difference between the categories. However, the ordinal scale does not give any indication of the magnitude of the differences among the ranks (Sekaran, 1992).

Interval Scale

An interval scale allows a researcher not only to categorize subjects into certain categories, and tap the difference between categories, but it also measures the magnitude of the differences in the preferences among the subjects (Sekaran, 1992). Usually, interval scales are achieved by using a point scale

Ratio Scale

The ratio scale allows a researcher to compare between the subject's answers or responses, by calculating the ratio of differences between the values of the variable. This feature is due to the fact that, the ratio scale allows for the variable to take absolute values from 0 to any meaningful number (Sekaran, 1992).

The chosen scales for the study

The scales most suited to categorize and measure the study variables based on the quantitative paradigm, specifically the survey questionnaire, are the nominal and interval scales. The use of these scales makes the analysis of data after collection easier than using open-ended questions that are based on the qualitative paradigm.

3.4 Operational Definition of the Study Variables

The proposed model for strategic control, shown in Figure 2.4, is based on the concepts and principles of strategic control in strategic management. By the application of the proposed model in the context of strategic information systems management function in an organization, strategic IS control may be described as including the following five principle mechanisms:

- monitoring performance of IS strategy
- monitoring organizational environment
- review and evaluation of IS strategy from a strategic perspective

- feedback loops, and
- review and improvement of strategic IS management process.

The five mechanisms of strategic IS control are not linearly arranged but are integrated in a systematic fashion. The model of strategic control, in Figure 2.4, shows the main processing components and data flows of a typical strategic IS control function and the ways in which they are linked to each other. However, organizations that do not utilize feedback information and loops to review and improve the process of strategic IS planning, are considered as having less effective strategic IS control processes. Since the IS literature lacks of a measurement instrument for the study variables, the proposed model of strategic control will be used to guide the process of developing the measurement instrument for the purpose of the study.

3.4.1 Study Variables

The following are principle variables:

1. Extent of strategic IS control practice
2. Approach of strategic IS control practice
3. IS plan performance
4. Strategic IS control effectiveness.

The following variables are considered secondary.

- Industry type

- Industry competitiveness
- Organizational intensity of IS use
- Organizational size, and
- Organizational structure.

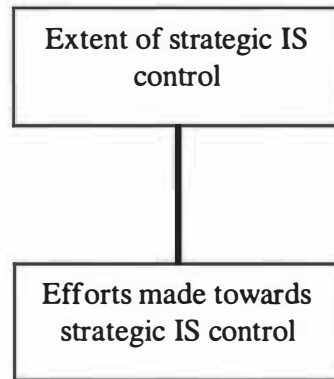
3.4.2 Measuring Extent of Strategic IS Control Practice

The variable “the extent of strategic IS control practice” may be measured based on an observable behavior such as the nature of effort made towards the issue of strategic IS control in an organization. The nature of effort is classified into four types:

- thinking of establishing a process of strategic IS control
- proposing a process of strategic IS control
- currently developing a process of strategic IS control, or
- a process for strategic IS control has already been established.

Figure 3.1 depicts in a diagrammatical form, how measuring the extent of strategic IS control practice depends on the nature of efforts made towards the issue of strategic IS control.

To measure the existence of efforts made so far in relation to establishing a strategic IS control process in an organization, a nominal scale can be used, with values 1 to 4. The four values of the scale will classify organizations into four groups:

Figure 3.1 Elements of the extent of strategic IS control

- thinking of establishing a strategic IS control process
- proposing a strategic IS control process
- developing a strategic IS control process, or
- strategic IS control has been established.

The percent of responding organizations falling in the last two categories (i.e., strategic IS control process is being developed or it has been established) will be considered as representing the extent of strategic IS control practice in New Zealand.

3.4.3 Identifying Approaches of Strategic IS Control

The approach used in strategic IS control practice may be characterized as shown in Figure 3.2 by the following three dimensions:

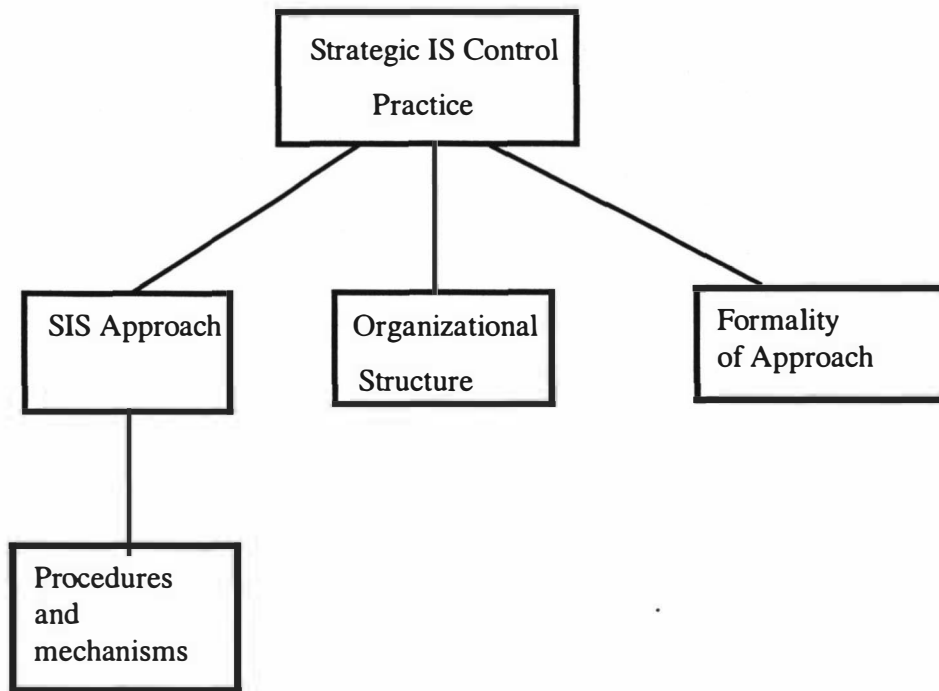
- the nature of process or approach of strategic IS control used
- the organization structure of strategic IS control, and
- the formality of the process of strategic IS control.

The process element of a strategic IS control practice can be described by the level of conformity to the proposed model for the ideal strategic control process, shown in Figure 2.4. The approach for measuring a managerial process, based on the proposed model of the process under study, is called normative approach (Segras and Varnaun 1998). Segras and Varnaun (1998) believe that this approach is more applicable to research contexts if the literature and/or expert opinion can readily identify the standards of good practice.

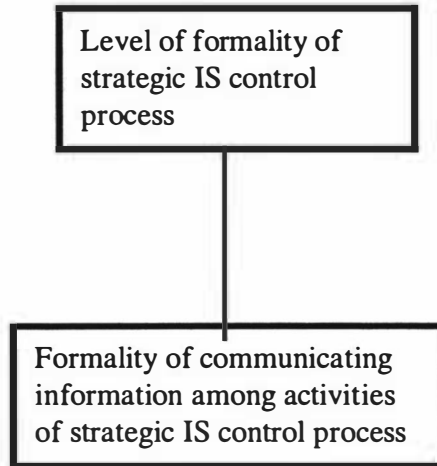
According to the normative approach, the process can be measured as to how much the principle procedures are conforming to the principle procedures of the ideal process model. A nominal scale can be used to confirm the existence of the procedures of strategic IS control process in the practising organization. Recall the principle procedures of the ideal model, in Figure 2.4, are:

- monitoring performance of IS strategy
- monitoring organizational environment
- review and evaluation of IS strategy from a strategic perspective
- feedback loops, and
- review and improvement of strategic IS management process.

In Figure 2.4, information flows between the sub-processes or procedures of a strategic IS control process represent input and output elements between the five sub-processes.

Figure 3.2 Elements of strategic IS practice

The procedures and mechanisms are represented by the five principle procedures of strategic control described in Figure 2.4. The formality level of strategic IS control approach can be measured by the extent to which an organization is using formal procedures for communicating information related to their strategic IS control system. Figure 3.3 shows a hierarchy structure of the suggested elements. A three point rating scale will be used for measuring the level of formality of strategic IS control approach. The three point scale is categorized, ranging from “1” being “Informal”, “2” being “Semi-formal”, and “3” being “Formal”.

Figure 3.3 Measuring formality of strategic IS control process

organizational behavior exhibited in an existing strategic IS control process can be characterized by understanding:

- the position or level of those IS staff members involved in carrying out the procedures of strategic IS control
- the reporting structure
- the level of authority delegated to responsible staff members in relation to strategic IS control process, and
- the level of knowledge and skills of responsible staff members
- the culture of teamwork environment.

3.4.4 Evaluation of organizational Effectiveness

Organizational effectiveness is an issue that has a special importance for top managers of organizations, as it relates to the future survival and position of the organization within

the industry. Therefore, it is natural that top managers of an organization would be very interested to know how effective their organization is, and also how effective those key business functions or business processes are. Based on the awareness of their level of effectiveness, organizations can better plan their efforts to improve their future competitive position.

In evaluating organizational effectiveness, research studies in organizational sciences have adopted different approaches or models to suit their circumstances. According to McDonald and Micikas (1994), the main models for evaluating organizational effectiveness are:

- goal attainment
- process
- systems resources and
- constituency satisfaction.

In the goal-based approach, the level of goal achievement by the organization represents the level of organizational effectiveness, and the goal statement is used as a criterion for effectiveness. The goal-based approach is based on the concept that organizational effectiveness represents the extent to which the organization has achieved its objectives by utilising its limited resources and implementing its operations to the best of their ability.

In the process approach, effectiveness is equated with the internal and well-managed processes and procedures of the organization. The systems resource approach evaluates organizational effectiveness based on the organization's ability to exploit its internal and external environment to gain the required resources. Finally, in the constituencies satisfaction approach, effectiveness is judged by the ability of an organization to address the needs of its constituencies or partners (stakeholders). More detailed discussion may be found in McDonald and Micikas (1994) and Cameron (1987).

McDonald and Micikas (1994) believe that each of these models can be useful under certain organizational circumstances, but each may be insufficient by itself to explain effectiveness under all organizational conditions. This implies that measuring organizational effectiveness requires using more than one of those approaches listed above. This may not be practical, since the use of more than one approach will result in involving more than one respondent in the study, which will reduce the response rate, and consequently reduce the chance of achieving a successful study.

Zummuto (1982) believes that organizational effectiveness depends on the ability of the organization to fulfil the needs and expectations of its strategic constituencies. In the context of the strategic IS control process, effectiveness of the process depends on its ability to address the needs and expectations of its strategic constituencies or partners, who are the top management of the organization.

The constituency satisfaction component of strategic IS control may be measured by the level of satisfaction of the business top management with the outcome of the strategic IS control process. However, the enquiry from top executive managers in the organization may not be practical, as top managers' time is very limited, and it is most likely that only a few top managers will respond to the enquiry. Therefore, this will reduce the response rate and consequently could cause the study to fail.

3.4.5 Measuring Strategic IS Control Effectiveness

Segras and Van (1998) report that IS research literature reveals that four approaches have been used to measure the success of strategic IS planning process. The four approaches are:

- goal-centered judgment
- comparative judgment
- normative judgment
- improvement judgment.

Discussing the approaches used for measuring a process related to strategic IS control process, such as the IS planning process, will be useful, especially when the strategic IS control process is part of the IS planning process. Before proposing a measurement instrument to evaluate strategic IS control effectiveness, a comparison between the approaches used in measuring general organizational effectiveness and the effectiveness of the IS planning processes will be useful for drawing a measurement instrument suitable

to measure the study variable “strategic IS control effectiveness”. As mentioned above, it is reported by McDonald, and Micikas, (1994) that main models for evaluating organizational effectiveness are:

- goal attainment
- process
- systems resources
- constituencies satisfaction.

The goal-centered judgment approach reported by Segras and Varun Grover is similar to the goal attainment approach of organizational effectiveness classified by McDonald, and Micikas, (1994). The goal-centered judgment approach evaluates the degree of attainment of the IS planning process in relation to set targets. In such an approach, the question is asked, to what extent are the multiple objectives (goals) of IS planning fulfilled?. Whereas, according to the goal attainment-approach, the level of organizational effectiveness is reflected by the level of goal achievement by the organizational process, and the goal statement is used as a criterion for effectiveness. Furthermore, the goal-centered approach is actually measuring effectiveness via measuring the outcome of the implemented IS plan, which is the output of the IS planning system.

The approach used for measuring organizational effectiveness that compares to the normative judgment approach, is the process-based approach. In the process approach, effectiveness is equated with the internal and well-managed processes and procedures of

the organization. The normative judgment approach for evaluating IS planning success is based on the question: How does the IS planning system performance compare against that of a theoretically ideal system?. Segras and Varnaun (1998) believe that this approach is more applicable to research contexts if the literature and/or expert opinion can readily identify the standards of good planning systems.

The comparative judgment approach compares the effectiveness of a particular system with other similar systems, typically in similar organizations (Earl 1989). The question here is: How does our IS planning system performance compare with similar systems operating in comparable organizations?”. Lastly, the improvement-judgment approach is based on the idea of evaluating how the planning system has adapted to changing organizational circumstances?

Based on the above discussion, the following two approaches can be used in combination to measure the effectiveness of strategic IS control practice:

- the process-based (normative judgment), and
- goal attainment.

The researcher adopted a combined approach based on the view of McDonald, and Micikas, (1994) that the above two suggested approaches may not be sufficient to explain or evaluate the effectiveness of strategic IS control process, if applied independently. Therefore, developing a measurement for the purpose of the study that depends only on a single approach to effectiveness is not adequate. Furthermore, including the two

approaches to measuring effectiveness, we achieve a richer and more reliable instrument for measuring the effectiveness level of strategic IS control.

According to the goal-attainment approach, the effectiveness of the strategic IS control process may be measured by the extent to which the objectives of the strategic IS control process have been achieved. With the process approach, the strategic IS control effectiveness level may be measured by the degree to which the strategic IS control process conforms to the principles and critical success factors (CSFs) of the ideal strategic IS control process. Thus, the effectiveness level of a strategic IS control process may be measured by using the following dimensions:

- The degree of conformity between the strategic IS control process and the principle elements and CSFs of the ideal strategic control process shown in Figure 2.2.
- The extent to which the goals of strategic IS control are achieved by the approach used in the strategic IS control process.

Therefore, the criteria for evaluating effectiveness level of strategic IS control in the IS function in an organization depend on two elements:

- The degree of conformity of the IS control practice with the principle elements and key success factors of the ideal model of strategic control shown in Figure 2.4.

- The level of achievement of strategic IS control objectives as perceived by strategic IS management.

The main goals of strategic IS control function in an organization are:

- Ensuring that the IS strategy is always adequate and capable of supporting the direction and strategic objectives of the organization.
- Ensuring that strategic IS management process is always adequate and improving.

The degree of conformity between the principle elements of the strategic IS control process and the principle elements of the ideal model of the IS strategic practice will include the following elements:

- The existence of an IS strategy performance monitoring mechanism
- The existence of a review mechanism for the IS strategy
- The existence of a business and IT environment monitoring mechanism
- The existence of a review mechanism for the strategic IS management process
- The existence of a feedback loop mechanism from the review of the IS strategy mechanism to the review of the strategic IS management process.

The key success factors related to the ideal model of strategic IS control practice are:

1. Predicting future events in the business environment (Baker 1995)
2. Accuracy of monitoring information
3. Timeliness of monitoring information (Babcock 1991)
4. Timeliness of the review process (Babcock 1991)

5. Speed and ease of paperwork and communications (Goold & Quinn 1990)
6. The value of information generated from both the environmental monitoring process and the IS plan performance monitoring process (Goold & Quinn 1990)
7. The use of documentation tools during Strategic IS control (Goold & Quinn 1990)
8. Degree of improvement in strategic IS management process (King 1978)
9. Validation of changes to the strategic IS plan before implementation
10. Management of strategic IS control process.

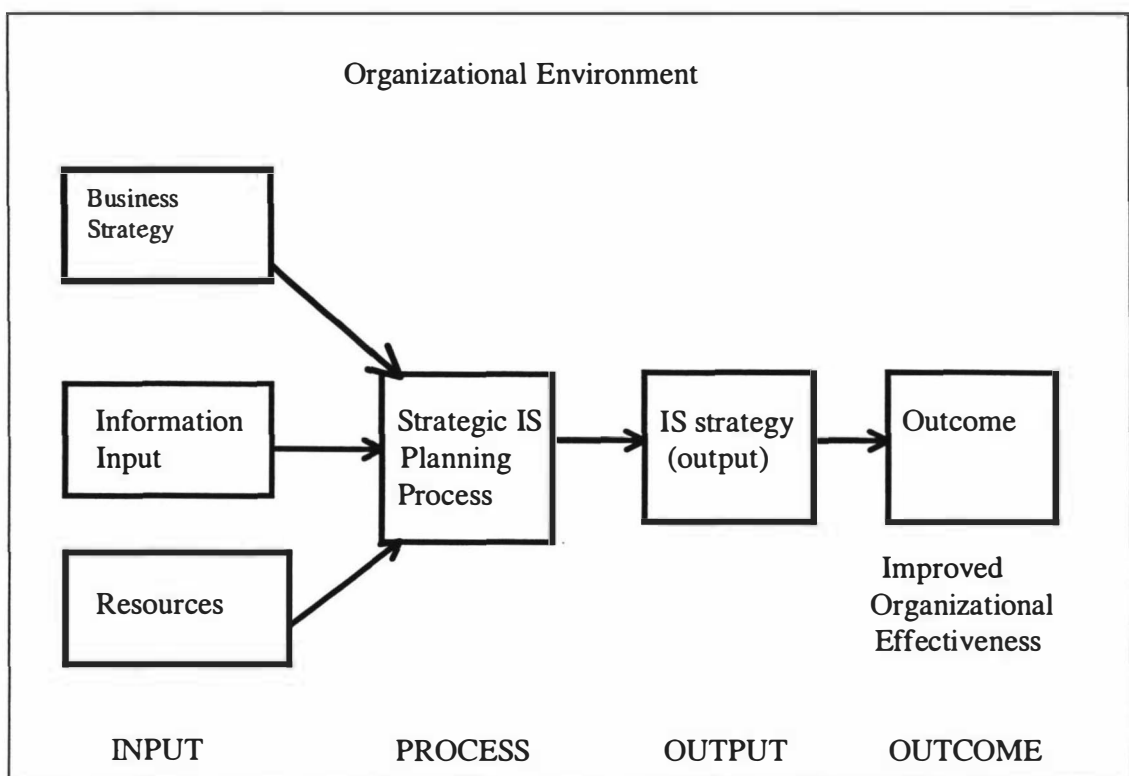
The above success factors are identified based on the researcher's views, and the views and research work of Goold and Quinn 1990; Bungay and Goold 1991; Babcock 1991; Baker 1995. A nominal scale and an interval 5-point scale will be used to measure the above elements of strategic IS control effectiveness.

A similar strategy for developing a measurement instrument to evaluate IS planning effectiveness has been adopted by King (1988) (see Figure 3.4), which depicts the input-process-output model proposed by King (1988), to evaluate IS planning effectiveness. The strategic IS management process represents the process that produces the IS strategy, and the IS strategy itself represents the output of the strategic IS management process. The outcome component can partially if not totally reflect the effectiveness level of strategic planning process.

As shown in Figure 3.4, strategic IS planning produces an output, which is the IS strategy. The newly produced strategy will have an outcome that produces an effect in the

organization. The outcome component can partially if not totally reflect the effectiveness level of strategic planning process. Finally, the strategic planning process operates within the business organizational environment. The model, in Figure 3.4, is the input-process-output model, proposed by King (1988) in an investigation to assess IS planning effectiveness.

Figure 3.4 Input-process-output model for Strategic IS planning King (1988)



3.4.6 Measuring IS Plan Performance

Despite the importance of the issue of IS plan performance, in the IS literature there exists little work on how an IS plan performance is measured.

Segars (1998) made efforts in relation to measuring strategic IS planning process success or effectiveness. His measurement model is based on four observable and measurable dimensions:

- alignment
- analysis
- cooperation, and
- improvement in capabilities.

It is generally accepted that alignment between business planning and IS planning is a success factor for the IS planning process. Measuring the extent of the linkage and support the IS plan can make towards the business plan and objectives is an important factor in evaluating IS planning success. Accordingly, a higher level of consistency between the IS plan and business plan can lead to higher performance level of the IS plan. Therefore, consistency attribute of an IS plan can be used as one of the dimensions to measure IS plan performance.

The analysis dimension of the Segars model is related to the activity of analyzing and understanding the information needs of an organization effectively during the IS plan development and implementation. The level of validity of an IS plan reflects the level of correctness and completeness of IS plan components and details. The validity of an IS plan, therefore, can be used as a dimension to measure IS plan performance. The cooperation dimension of Segars's model is reflected in the level of agreement

concerning the development priorities, implementation schedules, and managerial responsibilities in relation to the IS plan. A higher level of cooperation increases the chance of the success of the IS plan and consequently improves its performance.

Improvement in the capabilities dimension of Segars's model is based on the assumption made by (Venkatraman and Ramanujam 1987), that the improvement in the IS planning process over time reflects IS planning effectiveness. Also, how the process of IS planning has adapted to changing circumstances over time is an important issue in improving the capabilities of the IS planning process (Segars, 1997). Accordingly, the capability of an IS plan to adapt to the changing circumstances of the organization can reflect, to a certain extent, the level of performance of the IS plan.

Based on the above discussion of Segars model for measuring the IS planning process success and the concepts of benchmarking, the performance level of an IS plan can be evaluated based on assessing the IS plan performance characteristics. The variable IS plan performance has the following characteristics:

- Feasibility
- Validity
- Consistency
- Capability
- Reliability

The feasibility of a strategic IS plan is concerned with the question of the practicality of implementing the IS plan in the organization. Validity is more concerned with the correctness and accuracy issues of the IS plan and that the plan is valid in the current and future business circumstances. Consistency is how much is the strategic IS plan(s) consistent with the strategic Business plan. Capability represents the ability of the strategic IS plan(s) to support strategic business plan(s), and adapt to the changing circumstances of the organization. Reliability is concerned with the reliability of the strategic IS plan(s) when confronting/dealing with changes in the current and future business environment assumptions. A 5-point interval scale will be used to evaluate the level of each of the above performance measures of an IS plan.

3.5 Data Collection

Since there exists in IS literature very little information on strategic IS control practices in general, this study is designed to provide information about current practices of strategic IS control in New Zealand and their level of effectiveness, and to test the relationship between strategic IS control and IS plan performance. In section 3.2.2, the survey questionnaire instrument was found more appropriate for the purpose of the study than the case study method for the following reasons:

1. the researcher is more comfortable with the assumptions of the quantitative paradigm as explained in Section 3.2.1.
2. the quantitative survey questionnaire method is more suited to test the relationship between strategic IS control and IS plan performance.

3. access to IS managers through interviews or the actual presence of the researcher sometimes obtrusive and not practical, because IS managers usually have no spare time to sacrifice to the research study.
4. the use of qualitative methods such as case studies will increase the risk of failing to obtain the required data within the allowed research time.
5. the survey method allows access to more diverse population than other data collection methods, and therefore provides a higher degree of generality about the phenomena under study.

In addition, the intended survey questionnaire is expected to produce a description of the current practice of strategic IS control, which in turn will lay foundations for further research using the case study method to achieve an in-depth analysis of specific issues in strategic IS control. Having chosen the survey method, a survey questionnaire must be developed to collect the data. The next section will discuss the design of the survey questionnaire instrument.

Because the strategic IS control process exists in the IS function in an organization, it is wise to collect data about the IS function profile in the selected organizations. It is also our intention to collect data about the industry type and competitiveness level of each organization included in the sample. This will allow us to find whether strategic IS control is approached in a significantly different manner among different industry types or at different industry competitiveness levels.

3.5.1 Scope of the Study

Since there is a dearth of research initiatives on strategic IS management in general and strategic IS control in particular in New Zealand, a local cross-sectional survey questionnaire is conducted to achieve the research objectives. The sample of selected organizations includes those large and medium organizations that use information technology intensively, as the likelihood that these organizations are practicing strategic IS management and control is high. Examples of such organizations are banking, insurance, local government, telecommunications, or education institutions. Also, including organizations from different industry types in the sample, will allow us to identify any pattern that may exist between industry types and strategic IS control approach.

3.5.2 Questionnaire Design

The purpose of the questionnaire is to capture the views and perceptions of IS managers and/or senior IS staff in relation to measuring the study variables:

- Extent of strategic IS control practice
- Approach of strategic IS control practice
- IS plan performance
- Strategic IS control effectiveness
- Industry type
- Industry competitiveness

- Organizational intensity of IS use
- Organizational size
- Organizational structure.

The questionnaire is developed based on the operational measures discussed in section 3.4. The questionnaire consists of 14 pages, and is organized to include seven parts apart from the introduction page. The introduction explains the purpose of the survey, useful definitions, ethics notice, and instructions on filling in the questionnaire. Part one includes 10 questions that cover the collection of demographic data. Part two includes four questions that measure the degree of existence of strategic IS control process in the sample organizations.

Part three of the questionnaire has nineteen questions that deal with the question of identifying strategic IS control approaches used in responding organizations. This part is divided into five sections:

- Strategic IS performance monitoring
- Monitoring organizational environment
- Strategic IS review
- Organizational behavior of strategic IS control, and
- Formality of strategic IS control.

Part Four includes fifteen questions designed to measure the level of effectiveness of strategic IS control practice. Part five includes one question relating to the identification

of primary obstacles that work against strategic IS control practices. Finally, part six includes one question that gives the respondent the option to make comments about any of the questionnaire' topic.

The questionnaire consists of 48 questions, most of which are using nominal, interval and ratio scales. The intention was to minimize the open ended questions, as they are expected to reduce the response rate of the sample organizations. The questionnaire in its entirety, including all the above-mentioned parts, can to be found in Appendix B.1. Attached to the questionnaire are the personalized covering letter and an information sheet. The purpose of the survey was expressed in the covering letter, using Massey University letterhead, and was addressed to the managing director of IS/IT function, see Appendix A.1.

To increase the response rate, the following steps were considered:

1. A reminder letter with another questionnaire was sent to each of the non-responding organizations six weeks after the original mailing found in Appendix A.1.
2. The questions format, content and structure were made simple and clear.
3. Most of the questions were closed ended, which meant they simply required ticking or circling.
4. A minimum number of open-ended questions were used.

3.5.3 Unit of Analysis

The unit of analysis adopted in the proposed study is any organization that uses information technology intensively and/or is operating in a highly competitive industry environment in New Zealand, since the likelihood that these organizations are practising strategic IS management and control is high. Examples of such organizations are banking institutions, insurance companies or telecommunications firms. For the purpose of the study, only medium and large size organizations are included in the selected sample. The questionnaire was mailed directly to the director or chief information officer, to answer the questions and respond to the researcher. The next subsection deals with the data collection procedures.

3.5.4 Source of Data

The primary data, represented by the views of IS managers or IS senior staff members were gathered through the survey questionnaire, which was mailed to the IS or IT functions in 509 New Zealand organizations. The sample organizations had been selected by judgment mainly from the *New Zealand Business Who's Who* (published by New Zealand Financial press limited 2000). The sample organizations were selected on the basis that they were expected to have an established IS or IT function. Therefore, only medium and large New Zealand organizations with 50 or more employees are included in the sample.

The sample includes nearly all New Zealand organizations that use information intensively or operate in a competitive business environment such as banking, education, insurance, local authorities and government departments.

3.5.5 Protection of Respondents

All necessary measures have been taken to ensure complete confidentiality of respondents. Respondents are identified only by unique numbers and only aggregate results will be reported. A master list is created to include the names, addresses and telephone numbers of respondents and their corresponding code numbers. The master list is kept in a locked file, that has been available only to the researcher, and the master list will be destroyed at the earliest possible time after all data are processed. The following section discusses the issue of pilot testing the survey questionnaire instrument.

3.5.6 Pilot Testing

Before implementing the questionnaire, the author thought to pilot the completed questionnaire to establish face validity, and improve the format and content of the included questions, (Cresswell 1994). The question of pilot testing the survey questionnaire was addressed by presenting the initial proposed questionnaire to a number of experienced staff members in IS and management empirical research from the College of Business, Massey University. Consequently, the draft questionnaire was reviewed,

refined and approved by the supervisors before finalizing and mailing it to selected organizations.

Furthermore, a special one-page questionnaire was developed to capture the participant's assessment of the main questionnaire. Then ten copies of the participant's assessment questionnaire were attached and sent with the main questionnaire to the first ten organizations selected randomly from the original sample of 509 organizations. A sample of the participant's assessment questionnaire is shown in Appendix A. Three copies of the participant's assessment questionnaire were returned, and the assessment of the questionnaire was found as adequate, despite of the length of the main questionnaire.

3.5.7 Survey Administration

Once the questionnaire had been finalized and printed, the Ethics Committee approval, mailing, and data entry could start. This section starts with the process of Ethics committee approval, mailing the questionnaire to selected organizations in New Zealand, and then to the data entry stage.

The author applied for approval from the Ethics Committee by filling in the appropriate forms and included documentation such as:

- the final version of the questionnaire
- covering letter
- information sheet, and

- source of sample organizations.

The Ethics committee approved the application in August 2000. The letter of approval from the Ethics Committee is shown in Appendix A. Following the approval, the list of selected organizations was given unique identification numbers. The identification of each organization in the sample was entered on the questionnaire so that the responding organization is identified by a unique number only, and its name became confidential during the data entry and analysis. The secretary of the Department of Management produced a set of labels for the selected organizations. The questionnaires were organized in a proper envelopes and posted to the sample of 509 NZ organizations.

During the six weeks period after the first mailing of the survey questionnaire, only 85 acceptable responses were returned. After six weeks, another mail out was organized but with a reminder letter in stead of the original covering letter, including the information sheet, and a copy of the main questionnaire, and posted out only to the non responding organizations of the original sample. A sample of the reminder letter is shown in Appendix A.2.

After the second set of questionnaires were sent to the non-responding organizations, another 38 acceptable returns were received. Therefore, the acceptable returned questionnaires reached 123 out of 509, making up a response rate of 24%.

Arrangements for Storage and Security, Return, Disposal or Destruction of Data

All necessary measures have been taken to ensure complete confidentiality of respondents. Respondents have been identified only by unique code numbers, and only aggregate results were reported. A master list included the names, addresses and telephone numbers of respondents and their corresponding code numbers. The master list is kept in a locked file. The master list was made available only to the researcher, and will be destroyed at the earliest possible time after all data have been processed. The following subsection discusses the issue of the validity and reliability of measures.

3.6 Validity and Reliability of Measures

It is important to ensure that the suggested measures which were developed to measure the variables of the study are both reliable and valid. Reliability and factor analysis are complimentary procedures in scale construction and definition, (Coakes and Steed 1990). To ensure used measures are reliable, that is the items or questions used to measure the conceptual variable of concern are internally consistent, the most commonly used test is Cronbach's alpha test, (Bryman and Cramer 1997).

Cronbach's alpha test will be conducted on the data of the variables strategic IS control effectiveness and IS plan's performance. The results are shown in the data analysis in Chapter Four. On the other hand, the principle components factor analysis is used to test

the validity of the suggested measures, that is to ensure the suggested measures accurately measure the variables they are intended to measure. The principle components factor analysis will be carried out on each of the variables, strategic IS control effectiveness and IS plan performance respectively. The results of this kind of factor analysis on these variables are shown in the data analysis Chapter Four. The following section outlines the statistical data analysis that will be used to produce the results and to analyze the data.

3.7 Data Analysis

The Statistical Package for Social Sciences (SPSS) used commonly by social science researchers is utilized for the data entry, tabulation and analysis of the collected raw data from the returned questionnaires. The distribution of the research variables was represented using frequency tables, bar charts, and/or histograms. In addition, a measure of correlation between the dependent and independent variables is used to measure the degree of relationship between strategic IS control effectiveness and IS plan performance.

Since all of the study variables are categorical type variables, the appropriate correlation test that will be used in the study is the Spearman rank correlation. The results of the survey questionnaire will be presented in chapter Four in terms of tables, histograms, and graphs. The results of the statistical data analysis will also be presented in Chapter Four, and the discussion of the results will be dealt with in Chapter Five. The next section summarizes this chapter.

3.8 Summary

The literature review has revealed little empirical evidence of research efforts related to studying strategic IS control practices. The purpose of this chapter is to design the research method that will be used to achieve the research objectives and to answer the research questions. To achieve this, a research method has been outlined and discussed. In the beginning of the chapter the philosophical basis of the research methodology, and the justification for the survey questionnaire instrument were addressed.

The survey questionnaire method was chosen for the collection of the required data from a sample of organizations in New Zealand. The survey instrument was chosen as it is practical and it allows access to a more diverse population than other data collection methods, and therefore provides a higher degree of generality about the phenomena under study. Since very little research on strategic IS control had been carried out in New Zealand before, a locally focused cross-sectional survey questionnaire was conducted. In addition, mainly descriptive statistical analysis and correlation analysis will be used to produce a description of the current practice of strategic IS control in New Zealand.

In addition, one research hypothesis was articulated that represents the author's argument that strategic IS control can impact on the level of IS plan performance. Subsequently, a measurement instrument has been developed to measure the defined variables and developing the survey questionnaire. Relevant issues such as obtaining approval from the Massey University Ethics Committee, protection of respondents, reliability and validity of

the measures, and the intended statistical data analysis were also addressed. The chapter also discussed the administration of procedures adopted to implement the questionnaire and to achieve a better response rate from the sample organizations. In the next chapter, the data analysis results and the results of the questionnaire will be presented.

Chapter Four

Data Analysis and Results

4.1 Introduction

SPSS (Statistical Program for Social Scientists), version 10, was used for data analysis from which a number of summary statistics such as tables, percentages, and bar charts, have been generated. Section 4.2 explores the reliability and validity of the operational measures used in the questionnaire instrument. Section 4.3 presents the demographic results pertaining to the respondents, IS function, IS planning, and responding organizations' characteristics. Section 4.4 describes the identified approaches of strategic IS control and how were they identified. In section 4.5, the levels of effectiveness of the identified approaches are presented.

Section 4.6 discusses the correlation and regression analysis used to test the influence of the independent variable (strategic IS control effectiveness) on the dependent variable (IS plan performance). Section 4.7 presents the current obstacles facing strategic IS control practice. Section 4.8 presents the results of cross-tabulations between some important secondary study variables and the type of strategic IS control approach. Finally, section 4.9 summarizes the chapter.

The objectives of the research are:

- to determine the extent of strategic IS control practices in New Zealand organizations

- to identify the approaches of strategic IS control used by the sampled organizations
- to determine the level of effectiveness of identified strategic IS control approaches
- to identify current obstacles that work against strategic IS control practices
- to determine the level of impact of strategic IS control on IS plan performance
- to examine the existence of any strong preference among responding organizations from different categories of secondary variables, for a special type of strategic IS control approach. The secondary variables considered in the study are:

Industry type

Industry competitiveness

Organizational intensity of IS use

Organizational size

Organizational structure, and

- to measure the strength of relationship between industry type and level of organizational intensity of IS use.
- to measure the strength of relationship between industry competitiveness level and level of organizational intensity of IS use.

This study statistically describes some important characteristics of strategic IS control practices and processes in the sampled organizations. Data were gathered through the survey questionnaire. Questionnaires were sent to the IS or IT units in 509 organizations

selected by judgment from the *New Zealand Business Who's Who* (published by New Zealand Financial Press Limited, 2000). The questionnaire was sent to nearly all New Zealand organizations that use information systems intensively (such as high education, local authorities and government departments) and to organizations that operate in highly competitive industrial environments. A total of 123 questionnaires were returned out of 509, giving a response rate of 24%. The achieved response rate may be regarded as reasonable considering the length of the questionnaire.

4.2 Data Analysis

4.2.1 Reliability Analysis

The study variables, strategic IS plan performance and strategic IS control effectiveness, were measured using multi-item measures. As mentioned in the research method chapter (Section 3.6), when developing measures for a conceptual variable it is important to test the goodness (validity and reliability) of developed measures. To ensure that the proposed measures are good enough for the study variables, two principle tests are necessary: the reliability test and the validity test.

The reliability of a measure indicates the stability and internal consistency with which the instrument measures the concept. The stability of a measure is its ability to remain stable over time. The internal consistency of a measure is indicative of the homogeneity of the items in the measure that tap the construct (Sekaran, 1995). Sekaran states that a measure is internally consistent if the items of a measure are capable of independently measuring

the same concept so that the respondents attach the same overall meaning to each item. Since the internal consistency test is considered sufficient to test a measure's reliability in social science empirical research, this approach was adopted in the study.

Two available reliability tests can be used to test the internal consistency of an operational measure for a concept: Cronbach's alpha, and split half (Sekaran, 1995). However, the most commonly used test is Cronbach's alpha, based on the average correlation between items of the measure within a test if the items are standardised (Coakes & Steed, 1999). The developed measures for both variables are standardised, since all items of the measures use the same seven-point rating scale through out the questionnaire. The Cronbach's alpha test, therefore, was chosen for the reliability test.

The results of Cronbach's alpha values for the variables strategic IS control effectiveness and IS plan performance are 0.9349 and 0.8674 respectively, which are very close to the value of one (see Figure 4.1). This indicates that the two measures developed for strategic IS control effectiveness and IS plan performance are reliable.

4.2.2 Validity Analysis

The validity of a measure is concerned with ensuring that the developed measure is actually measuring the concept it is set out to measure, and not something else. In other words, validity is concerned with the correctness and accuracy of the developed measure.

Sekaran (1995) grouped validity tests into three major headings: content validity; criterion-related validity; and construct validity.

Figure 4.1 Cronbach's Alpha values for testing the reliability of developed measures of the research variables strategic IS control effectiveness and IS plan performance

***** Method 1 (space saver) will be used for this analysis *****

R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)

Variable: Strategic IS Control Effectiveness

Reliability Coefficients

N of cases = 64.0

N of items = 20

Alpha = .9155

Variable: Strategic IS Plan Performance

Reliability Coefficients

N of Cases = 70.0

N of Items = 5

Alpha = .8674

Content validity is concerned with the assurance that the developed measure includes an adequate and representative set of items that would tap the concept it is intended for. That is, the more the scale items represent the domain or universe of the concept being measured, the greater the content validity (Sekaran, 1995). Criterion-related validity is concerned with the ability of a measure to differentiate between individuals on the basis of a criterion. The criterion-related validity test is needed when the measure is intended

for two or more groups of individuals. Construct validity testifies how well the results obtained from the use of the measure fit the theories around which the test is designed.

Since the measures of this study are newly developed, and are intended for one group of individuals, I will use the content validity test. Usually, the principle factor components analysis is used to assess a measure's validity (Coakes & Steed, 1999).

Principle Components Factor Analysis for Strategic IS Control Effectiveness Measure

The principle components analysis was applied to the data scores collected to measure the variable strategic IS control effectiveness, and the generated results are shown in Tables 4.1 to 4.7 and Figure 4.2 below. An examination of the correlation matrix, in Table 4.1, shows that a considerable number of correlations exceed 0.3: therefore the matrix is suitable for factoring (Coakes & Steed, 1999). Table 4.2 displays the total variance explained at three stages. At the initial stage it shows the factors and their associated eigenvalues, the percentage of variance explained, and the cumulative percentages. In reference to the eigenvalues, four factors would be extracted because they have eigenvalues greater than 1, and the percentage of variations they explained is 63.9%.

A minimum factor loading acceptable was put at 0.45. Four components (clusters) were extracted (Table 4.6, the Rotated Component Matrix) as follows:

1. Management of strategic IS (SIS) control process includes:

- Controlling SIS control process
- Organizing SIS control process
- Directing SIS control process
- Planning SIS control process
- Coordinating SIS control process, and
- SIS management process improvement from learning.

The element (Quality of documentation) will be removed from the cluster because it has a loading factor of 0.401 which is less than 0.45.

2. Timeliness and speed of strategic IS control process includes:

- Timely Org. environment information
- Timely SIS plan review
- Timely SIS plan performance information
- Speed of paper work in SIS control process
- Informed about developments in Org. environment, and
- Ease of communications of SIS control information.

3. Value of monitoring information in strategic IS control process includes:

- IS plan performance monitoring information value
- Org. environment information value
- Accuracy level of Org. environment information,
- Testing changes in the IS plan.

- - - - - F A C T O R A N A L Y S I S - - - - -

Variable: Strategic IS Control Effectiveness

Table 4.1 Correlation Matrix

	Predicti on of future change s	Conting ency plannin g for future change s	Accura cy Level of Org. environ ment informat ion	Timely Org. environ ment informat ion	Timely SIS plan perform -ce monit oring informat ion	Informat ed about develop ment s in Org. environ ment	Timely SIS plan review	Timely chang es in SIS plan	Speed of paper work in SIS control	Perfo man ce monit oring informat ion value	Org enviro nment informat ion value	Qualit y of docu menta tion	Testing Chang es in the IS plan	SIS mana geme nt proces s impro vement from learnin g	Planni ng SIS control proces s	Organi zing SIS control proces s	Directin g SIS control proces s	Coordi nating SIS control proces s	Controll ing SIS control proces s	Ease of commu nicatio ns of SIS control informat ion
Prediction of future changes	1.000	.428	.376	.178	.384	.518	.330	.419	.489	.355	.442	.095	.136	.334	.194	.331	.142	.351	.183	.399
Contingency planning for future changes	.428	1.000	.268	.214	.214	.343	.340	.544	.361	.329	.375	.226	.165	.438	.373	.410	.339	.484	.359	.209
Accuracy Level of Org. environment information	.376	.268	1.000	.470	.387	.463	.305	.333	.464	.455	.506	.118	.227	.313	.341	.400	.316	.406	.324	.457
Timely Org. environment information	.178	.214	.470	1.000	.650	.386	.637	.372	.596	.388	.289	.205	.170	.321	.326	.378	.439	.344	.298	.419
Timely SIS plan performance monitoring information	.384	.214	.387	.650	1.000	.441	.492	.222	.572	.373	.368	.061	.221	.199	.202	.153	.223	.249	.097	.394
Informed about developments in Org. environment	.518	.343	.463	.386	.441	1.000	.622	.432	.549	.310	.377	.160	.251	.297	.139	.239	.251	.355	.264	.609
Timely SIS plan review	.330	.340	.305	.637	.492	.622	1.000	.455	.634	.297	.202	.267	.249	.491	.215	.358	.341	.374	.315	.522
Timely changes in SIS plan	.419	.544	.333	.372	.222	.432	.455	1.000	.535	.485	.333	.209	.329	.459	.438	.517	.426	.399	.287	.365
Speed of paper work in SIS control	.489	.361	.464	.596	.572	.549	.634	.535	1.000	.503	.437	.198	.265	.311	.367	.446	.320	.417	.287	.539
Performance monitoring information value	.355	.329	.455	.388	.373	.310	.297	.485	.503	1.000	.682	.122	.429	.401	.401	.366	.370	.373	.421	.194
Org environment information value	.442	.375	.506	.289	.368	.377	.202	.333	.437	.682	1.000	.143	.368	.210	.319	.325	.363	.396	.334	.306
Quality of documentation	.095	.226	.118	.205	.061	.160	.267	.209	.198	.122	.143	1.000	.134	.199	.149	.292	.335	.333	.195	.174
Testing Changes in the IS plan	.136	.165	.227	.170	.221	.251	.249	.329	.265	.429	.368	.134	1.000	.467	.337	.271	.256	.362	.282	.215
SIS management process improvement from learning	.334	.438	.313	.321	.199	.297	.491	.459	.311	.401	.210	.199	.467	1.000	.516	.591	.412	.537	.574	.411
Planning SIS control process	.194	.373	.341	.326	.202	.139	.215	.438	.367	.401	.319	.149	.337	.516	1.000	.692	.541	.631	.578	.293
Organizing SIS control process	.331	.410	.400	.378	.153	.239	.358	.517	.446	.366	.325	.292	.271	.591	.692	1.000	.663	.708	.659	.429
Directing SIS	.142	.339	.316	.439	.223	.251	.341	.426	.320	.370	.363	.335	.256	.412	.541	.663	1.000	.601	.760	.416

control process																				
Coordinating SIS control process	.351	.484	.406	.344	.249	.355	.374	.399	.417	.373	.396	.333	.362	.537	.631	.708	.601	1.000	.594	.371
Controlling SIS control process	.183	.359	.324	.298	.097	.264	.315	.287	.287	.421	.334	.195	.282	.574	.578	.659	.760	.594	1.000	.468
Ease of communication s of SIS control information	.399	.209	.457	.419	.394	.609	.522	.365	.539	.194	.306	.174	.215	.411	.293	.429	.416	.371	.468	1.000

4. Planning for strategic IS control process includes:

- Prediction of future changes
- Contingency planning future changes, and
- Timely changes in SIS plan.

The Scree Plot in Figure 4.2 graphically displays the eigenvalues for each factor and would suggest there is only one predominant factor. The eigenvalue of the predominant factor number 1, is 8.087, see Table 4.2. It is clear from Table 4.3, that the Bartlett test of sphericity is significant and that the Kaiser-Meyer-Olkin measure of sampling adequacy is far greater than 0.6. It is also evident from the communalities correlation matrix in Table 4.4, that all the correlations are close to or greater than 0.5 a part from two items, namely, quality of documentation and testing changes in the IS plan.

Table 4.2 Variance calculations

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Total Variance Explained
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	
1	8.087	40.437	40.437	8.087	40.437	40.437	40.437
2	2.156	10.780	51.216	2.156	10.780	51.216	51.216
3	1.377	6.887	58.104	1.377	6.887	58.104	58.104
4	1.168	5.841	63.945	1.168	5.841	63.945	63.945
5	.975	4.875	68.820				68.820
6	.948	4.740	73.560				73.560
7	.865	4.323	77.883				77.883
8	.639	3.195	81.078				81.078
9	.606	3.028	84.106				84.106
10	.542	2.709	86.815				86.815
11	.494	2.472	89.287				89.287
12	.403	2.016	91.303				91.303
13	.361	1.804	93.106				93.106
14	.303	1.517	94.624				94.624
15	.262	1.310	95.933				95.933
16	.224	1.119	97.052				97.052
17	.183	.917	97.969				97.969
18	.173	.866	98.835				98.835
19	.133	.665	99.500				99.500
20	.100	.500	100.000				100.000

Extraction Method: Principal Component Analysis.

Table 4.3 KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.831
Bartlett's Test of Sphericity	Approx. Chi-Square	753.674
	df	190
	Sig.	.000

Table 4.4 Communalities

Communalities		
	Initial	Extraction
Predication of future changes	1.000	.689
Contingency planning for future changes	1.000	.630
Accuracy Level of Org. environment Information	1.000	.508
Timely Org. environment information	1.000	.774
Timely SIS plan performance monitoring information	1.000	.695
Informed about developments in Org. environment	1.000	.682
Timely SIS plan review	1.000	.748
Timely changes in SIS plan	1.000	.579
Speed of paper work in SIS control	1.000	.700
Performance monitoring information value	1.000	.752
Org environemnt information value	1.000	.735
Quality of documentation	1.000	.255
Testing Changes in the IS plan	1.000	.353
SIS management process improvement from learning	1.000	.568
Planning SIS control process	1.000	.659
Organising SIS control process	1.000	.763
Directing SIS control process	1.000	.723
Coordinating SIS control process	1.000	.676
Controlling SIS control process	1.000	.722
Ease of communications of SIS control information	1.000	.577

Extraction Method: Principal Component Analysis.

Table 4.5 shows the matrix of loadings or correlations between variables and components of measures. According to Coakes and Steed (1999), pure variables have loadings (correlations) of .3 or greater on only one component (factor). Complex variables may have high loadings on more than one component or factor, and they make interpretation of output difficult. Rotation, may therefore be necessary.

Table 4.6 shows the Varimax rotation components matrix that reduces the numbers of complex variables and enhances interpretation. It is obvious from the Table 4.6 that the components have less items, and most of the loadings in components (factors) 1, 2, 3 and 4 have higher values (more than of .5). Table 4.7 also indicates that the four components have correlation values of more than 0.617.

The results of the principle factor analysis are indicative of the content validity of the developed measure for the construct strategic IS control effectiveness. Therefore, both the Cronbach's alpha test and the principle component analysis confirm the goodness (reliability and validity) of the developed instrument for measuring the variable strategic IS control effectiveness.

Table 4.5 Component Matrix (Factor Matrix)**Component Matrix^a**

	Component			
	1	2	3	4
Organising SIS control process	.747	-.438		
Coordinating SIS control process	.743	-.346		
Speed of paper work in SIS control	.740	.386		
Directing SIS control process	.684	-.414		
Timely changes in SIS plan	.683			.322
SIS management process improvement from learning	.678			
Timely SIS plan review	.670	.342	-.418	
Controlling SIS control process	.670	-.490		
Ease of communications of SIS control information	.654		-.323	
Performance monitoring information value	.653		.517	
Planning SIS control process	.651	-.460		
Timely Org. environment information	.643	.308	-.320	-.404
Informed about developments in Org. environment	.631	.466		
Accuracy Level of Org. environment Information	.630			
Org environment information value	.610		.568	
Contingency planning for future changes	.586			.498
Predication of future changes	.556	.320		.454
Testing Changes in the IS plan	.473		.302	
Quality of documentation	.338			
Timely SIS plan performance monitoring information	.538	.555		-.308

Extraction Method: Principal Component Analysis.

a. 4 components extracted.

Table 4.6 Rotated Component Matrix**Rotated Component Matrix^a**

	Component			
	1	2	3	4
Controlling SIS control process	.813			
Organising SIS control process	.812			
Directing SIS control process	.794			
Planning SIS control process	.728		.347	
Coordinating SIS control process	.716			
SIS management process improvement from learning	.636			.338
Quality of documentation	.401			
Timely Org. environment information		.798		
Timely SIS plan review		.758		.304
Timely SIS plan performance monitoring information		.751	.358	
Speed of paper work in SIS control		.676	.309	.334
Ease of communications of SIS control information	.340	.632		
Informed about developments in Org. environment		.629		.518
Performance monitoring information value			.791	
Org environment information value			.787	
Accuracy Level of Org. environment Information		.442	.500	
Testing Changes in the IS plan			.498	
Predication of future changes				.734
Contingency planning for future changes	.360			.687
Timely changes in SIS plan	.373			.574

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 7 iterations.

Component 1 refers to management of strategic IS (SIS) control process

Component 2 refers to timeliness and speed of strategic IS control process

Component 3 refers to value of monitoring information in strategic IS control process

Component 4 refers to planning for strategic IS control process

Figure 4.2 Principle Components Graph (strategic IS control effectiveness)

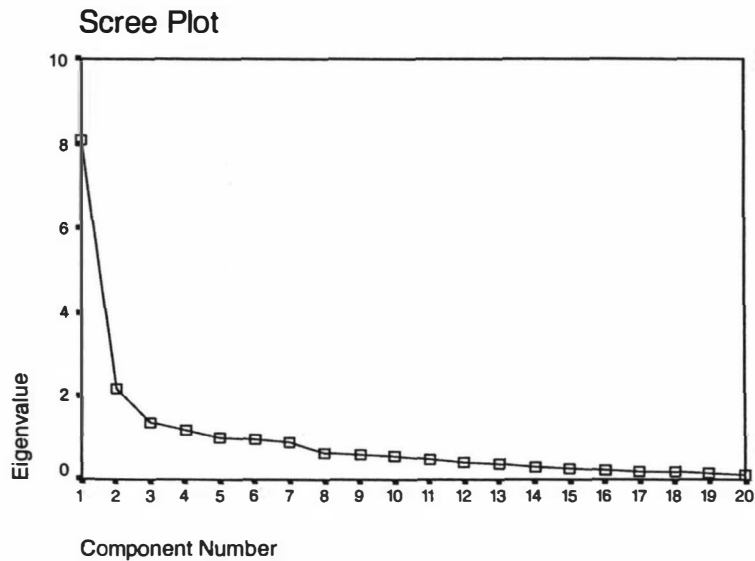


Table 4.7 Component Transformation Matrix

Component Transformation Matrix				
Component	1	2	3	4
1	.617	.535	.419	.397
2	-.732	.654	.074	.179
3	-.284	-.472	.802	.232
4	-.055	-.253	-.420	.870

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

Principle Components Factor Analysis for IS plan Performance Measure

The principle components analysis was applied to the data scores collected to measure variable IS plan performance, and the generated results are shown below in Tables 4.8 to 4.12 and Figure 4.3. An examination of the correlation matrix, in Table 4.8, shows that a considerable number of correlations exceed 0.3: therefore, the matrix is suitable for factoring (Coakes & Steed, 1999).

Table 4.9 displays the total variance explained at three stages. At the initial stage, it shows the factors and their associated eigenvalues. The percentage of variance is explained, and the cumulative percentages. In reference to the eigenvalues, it is expected that one factor would be extracted because it has eigenvalue greater than 1. If one factor is extracted, then %66.401 would be explained.

The Scree Plot in Figure 4.3 graphically displays the eigenvalues for each factor, and would suggest there is only one predominant factor. The eigenvalue of the predominant factor number 1, is 3.320, see Table 4.9. It is clear from Table 4.10, that the Bartlett test of sphericity is significant and that the Kaiser-Meyer-Olkin measure of sampling adequacy is far greater than 0.6. It is also evident from the communalities correlation matrix in Table 4.11 that all the correlations are close to or greater than 0.5.

The results of the principle factor analysis are indicative of the content validity of the developed measure for the construct IS plan performance. Therefore, both the Cronbach's alpha test and the principle component analysis confirm the goodness (reliability and validity) of the developed instrument for measuring the variable IS plan performance.

----- F A C T O R A N A L Y S I S -----

Variable: IS Plan Performance

Table 4.8 Correlation Matrix

Variables	SMEAN(FE ASSIS)	SMEAN(CA PPLAN)	SMEAN(VA LDPLAN)	SMEAN(RE LIPLAN)	SMEAN(CO NSPLAN)
SMEAN(FEASSIS)	1.000	.541	.593	.555	.364
SMEAN(CAPPLAN)	.541	1.000	.665	.729	.614
SMEAN(VALDPLAN)	.593	.665	1.000	.674	.400
SMEAN(RELIPLAN)	.555	.729	.674	1.000	.613
SMEAN(CONSPLAN)	.364	.614	.400	.613	1.000

Table 4.9 Extraction Method: Principal Component Analysis
Total Variance Explained

	Initial Eigenvalue s			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.320	66.401	66.401	3.320	66.401	66.401
2	.705	14.094	80.495			
3	.439	8.771	89.266			
4	.272	5.441	94.707			
5	.265	5.293	100.000			

Table 4.10 KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.837
	Approx. Chi-Square	181.076
Bartlett's Test of Sphericity		
	Df	10
	Sig.	.000

Table 4.11 Extraction Method: Principal Component Analysis
Communalities

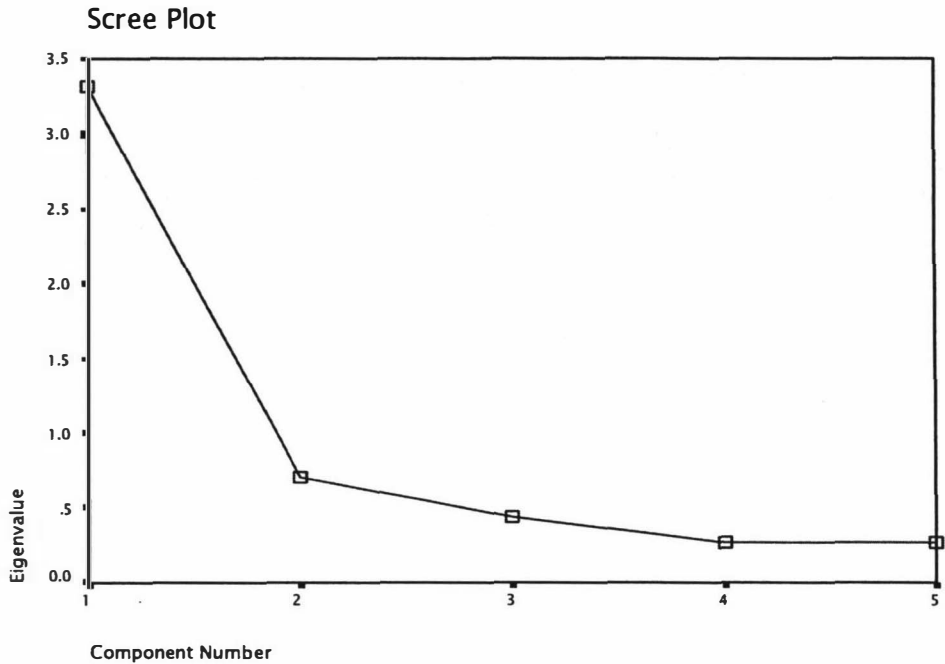
	Initial	Extraction
SMEAN(FEASSIS)	1.000	.551
SMEAN(CAPPLAN)	1.000	.776
SMEAN(VALDPLAN)	1.000	.681
SMEAN(RELIPLAN)	1.000	.785
SMEAN(CONSPLAN)	1.000	.527

Table 4.12 Component Matrix
Component Matrix

	Component
	1
SMEAN(RELIPLAN)	.886
SMEAN(CAPPLAN)	.881
SMEAN(VALDPLAN)	.825
SMEAN(FEASSIS)	.742
SMEAN(CONSPLAN)	.726

Extraction Method: Principal Component Analysis.
1 component extracted.

Figure 4.3 Principle Components Graph (IS plan performance)



4.3 Demographic Findings

This major section of the study results contains the demographic findings, which are divided into four groups. Groups one and two represent the respondents and their organizational characteristics. Groups three and four represent IS functions and strategic IS control characteristics in responding organizations. The four groups:

- respondents (IS managers) characteristics
- organization's characteristics
- IS function's characteristics, and
- strategic IS control process characteristics.

4.3.1 Respondents’ Characteristics

The respondents’ characteristics consists of respondents’ gender and years of managerial experience in IS management. The respondents’ characteristics results are shown Table 4.13 below. These results were also produced in graphic format using bar charts, as shown in Figures C.1 and C.2 in Appendix C. The gender distribution of respondents is found to be 82% male and 18% female.

The IS managerial experience distribution of respondents is found to be generally uniform over the number of years. As shown in Table 4.13, the percentage of responding IS managers is distributed uniformly over the range of years of IS managerial experience which is around 20%. The Table also shows that most respondents (85%) have 4 or more years of IS managerial experience, which gives more confidence in respondents’ answers.

Table 4.13 Respondents’ characteristics

Gender						
Gender						
Gender	Male		Female			
%	82		12		100	
Years of IS Managerial Experience						
Years	1-3	4-6	7-10	11-14	15 or more	
%	15	23	18	22	22	100

4.3.2 Organizational Characteristics

Organizational characteristics include variables that represent some important features of those organizations that have strategic IS control. Variables include: the organization's size, structure, authority level, industry type, and competitiveness level. The findings shown in Table 4.14 represent percentage distributions of size, structure, authority level (decentralization level), industry type and level of organization's competitiveness respectively. Around 82% of organizations that use strategic IS control are large (151 employees or more), and 18% are medium and small size organizations. Around 33% of organizations have a functional structure, and 52% have a divisional structure.

The level of authority or decentralization in the Table indicates that about 21% employ a centralized, organizational structure, 27% employ moderately centralized structure, and 52% employ a more decentralized structure. Table 4.17 also shows that organizations are evenly distributed over several Industry types, and about 75% of organizations are operating in industry environments ranging from competitive to very competitive. The results are also presented in Appendix C, but in a graphic format using bar charts, as shown in Figures C.3, C.4, C.5, C.6 and C.7 respectively.

Table 4.14 Organizational Characteristics

Number of employees	1-10	11-50	51-100	101-150	151-200	201 or more	Total		
Percentage %	0	7	4	7	10	72	100%		
Organization’s Structure									
Structure Type	Functions	Products	Divisions	Companies	Others	Total			
Percentage %	32	8	53	5	2	100			
Authority Level (Decentralisation Level)									
Level	Minimum	Little	Below Average	Moderate	Above Average	Good	Maximum	Total	
Percentage %	7	7	7	27	25	20	7	100%	
Industry Type									
Type	Finance	Education	Manufacturing	Health	Insurance	Government	Local Government	Other	Total
Percentage %	4	14	24	6	14	12	12	14	100%
Industry Competitiveness									
Level	Not Competitive	Least Competitive	Somewhat Competitive	Average	Above Average	Competitive	Very Competitive	Total	
Percentage %	18	3	4	5	18	30	22	100	

4.3.3 Information Systems Function’s Characteristics

IS function’s results include two groups of findings that represent:

- IS planning and use of strategic IS control, and
- IS function’s variables, such as IS size, intensity of IS use, and IS planning period, in those organizations that use strategic IS control.

Table 4.15 shows 72% of the sample organizations currently have IS planning systems, and 28% do not. Table 4.16 shows that among the group of organizations that have IS planning, 85% have strategic IS control imbedded in the system, and 15% do not. However, most of those organizations that do not currently have strategic IS control mechanisms use mainly traditional financial or budgetary control in their strategic IS implementation.

Table 4.15 Strategic IS planning in New Zealand

Group	Count	%
Strategic IS planning	89	72
No Strategic IS planning	34	28
Total	123	100.00

The results in Tables 4.15 and 4.16 shows that the percentage of organizations using strategic IS control is relatively high (61% of sampled organizations, or 85% of the 72%

of total number of sampled organizations). This contradicts Hypothesis One (Section 2.6.4) shown below:

H₁: Extent of strategic IS control processes in practice is low.

Table 4.16 Strategic IS Control in New Zealand

Group	Count	Percentage %
Strategic IS Control	76	85
No Strategic IS Control	13	15
Total	89	100

Information systems function characteristics include variables that represent some other aspects of IS functions in organizations with strategic IS control processes. These variables include: IS function size, intensity of IS use, and IS planning period. As shown in Table 4.17, about 70% of IS functions employ one to 20 IS staff. Intensity of IS use is presented in Figure C.9, which indicates that 80% of organizations use information systems more intensively.

Figure 4.17 indicates that most strategic IS control organizations (97%) plan for IS on a short-term (1 to 2 years) to medium-term (3 to 5 years) basis, and very few (3%) plan on longer term (6 to 10 years) basis. The results are also presented in Appendix C, but in a graphical format using bar charts, as shown in Figures C.8, C.9, and C.10 respectively.

Table 4.17 IS Function Characteristics

Information Systems Function Characteristics							
IS Function Size							
Number of Employees	1-20	21-40	41-60	61-80	81-100	101 or more	Total
%	70	10	8	4	2	6	100
Intensity of IS use							
Level	Little Use	Below Average	Average Use	Above Average	Intensive	Very Intensive	Total
%	2	4	16	27	33	18	100
IS Planning Period							
Period in years	1-2	3-5	6-9	10 or more	Total		
%	44	53	2	1	100		

4.3.4 Strategic IS Control Characteristics

Table 4.18 shows that about 72% of organizations, with strategic IS control, do not follow any particular strategic control model, and about 28% follow a formal model that consists of a set of steps that guides the control process. Table 4.18 also indicates that 30% of these organizations focus on reviewing only the strategic IS plan, while 70% focus on a review of the entire strategic IS management process.

Table 4.18 Characteristics of Strategic IS Control Process

Strategic IS Control Characteristics		
Use of Formal Model for Strategic IS Control Process		
% Organizations using a formal model	% Organizations NOT using a formal model	Total
22	78	100
Review of IS Plan and Strategic IS Management Process		
Review of IS plan	Review of IS Plan and Strategic IS Management Process	Total
30	70	100
Existence of Feedback Mechanisms in Strategic IS Management Process		
% Organizations using Feedback Mechanisms	% Organizations NOT using Feedback Mechanisms	Total
80	20	100

Table 4.18 also shows about 20% of organizations using strategic IS control have some kind of a learning process in their strategic IS processes supported by the existence of feedback mechanisms flowing from the review of IS plan outcome to the IS planning process. The details in Table 4.18 are also shown in graphical form in Figures C.11, C.12, and C.13 respectively.

4.4 Approaches of Strategic IS Control

As suggested in Section 3.4.3, that the approaches used in strategic IS control may be classified based on the normative approach (Segras & Varnaun 1998). According to the normative approach, it is possible to measure how much the used procedures/mechanisms conform to the principle procedures/mechanisms of the ideal process model.

The principle procedures of the ideal model for strategic IS control in Figure 2.4 are:

- monitoring performance of IS strategy
- monitoring organizational environment
- review and evaluation of IS strategy from a strategic perspective
- feedback loops, and
- review and improvement of strategic IS management process.

In Figure 2.4, information flows between sub-processes or procedures of the strategic IS control process represent input and output elements between the five sub-processes. As also suggested in Section 3.4.3, a nominal scale was used to confirm the existence of the procedures of strategic IS control process in the responding organization.

Based on the collected data, (from the corresponding nominal scale in the strategic IS control practice section of the questionnaire), three approaches of strategic IS control have been identified:

- cybernetic control approach
- ad hoc approach, and

- cybernetic and ad hoc approach.

The cybernetic strategic IS control approach involves monitoring and reviewing the achievement of strategic targets based on proper measurement of the strategic performance of a strategic IS plan.

The ad hoc strategic IS control approach, on the other hand, involves monitoring and reviewing the achievement of strategic targets on the basis of an ad hoc monitoring and estimation of the strategic performance of a strategic IS plan.

The combination of cybernetic and ad hoc strategic IS control is an approach where monitoring of performance of strategic IS plans is based on using proper performance measurements as well as ad hoc monitoring. Table 4.19 shows the percentage distribution of the identified control approaches among the sampled organizations. Figure C.14 includes a bar chart that represents the results of Table 4.19 graphically.

Table 4.19 Percentage Distribution of Strategic IS Control Approaches

Type of Strategic IS Control	Percentage
Cybernetic	14
Ad hoc	38
Combined (Cybernetic and Ad hoc) Approach	48
Total	100

In Table 4.18, 78% of organizations are shown to lack a documented model that describes the steps and procedures involved in a strategic IS control process. Table 4.20 shows a

cross-tabulation between the use of a documented model in strategic IS control and the type of strategic IS control approach used. The Table indicated that about three-quarters (78%) of organizations using strategic IS control are not following a model or a method for implementing the processes of their strategic IS control systems.

The results of identified approaches, mentioned above, confirm Hypothesis Two (H₂ stated in Section 2.6.4), which states that possible approaches of current strategic IS control processes are:

- cybernetic strategic IS control
- ad hoc strategic IS control, and
- combined cybernetic and ad hoc strategic IS control.

Table 4.20 Strategic IS control Approach and the use of a model

		Type of strategic IS control approach			Total
		Cybernetic control	Ad hoc control	Cybernetic& Ad hoc control	
Strategic IS control documented model	No	6	24	26	56
	Yes	4	4	9	17
Total		10	28	35	73

Table 4.21 shows the level of formality of each type of strategic IS control approach used. The formality level of approach represents the extent to which an organization is using formal procedures to communicate information related to their strategic IS control system, (see Section 3.4.3, and Figure 3.4).

Table 4.21 indicates that most organizations using the cybernetic or the combined approaches implement it in a formal or semiformal way. On the other hand, most of the organizations that use the Ad hoc approach use it in a semiformal or an informal way.

Table 4.22 shows both the average monthly person/hours used by strategic IS control and also the average number of staff used by strategic IS control approaches. The figures in the Table indicate that more time and staff are used in the cybernetic or combined strategic IS control approaches than are used in the ad hoc control approach. The findings in Table 4.21 are also shown in Figures C.14 and C.15 in Appendix C.

Table 4.21 Formality level of Strategic IS control approach

		Type of SIS control approach			Total
		Cybernetic control	Ad hoc control	Cybernetic & Ad hoc control	
Formality level of SIS control approach	Formal	2	5	8	15
	Semi-Formal	8	18	22	48
	Informal		4	4	8
Total		10	27	34	71

Table 4.22 Use of Time and Human Resources in Strategic IS Control Approach

	Strategic IS Control Approach		
Time/Staff	Cybernetic	Ad hoc	Cybernetic & Ad hoc Approach
Average Monthly Person/Hours	5.8	4.3	4.9
Average Number of Staff	2.2	2.1	2.3

Table 4.23 shows the staff members responsible for the process of strategic IS control in the three approaches of strategic IS control. The Table indicates that most of the time the CIO (chief information officer) or a group of IS and business senior staff members are responsible for managing the process of strategic IS control. This is true for all the three control approaches.

Table 4.24 shows the staff member in the organization to whom strategic IS control staff members report. The Table shows that in the three control approaches, most organizations using strategic IS control, report to the chief information officer (CIO) or the chief executive officer (CEO).

Table 4.25 shows the level of authority given to staff members responsible for strategic IS control in each of the three approaches of strategic IS control. The Table indicates that in most organizations, in all three approaches, the given level of authority to the staff members responsible for strategic IS control ranges from moderate to maximum. In other words, in most organizations the level of authority given to staff working in strategic IS

control processes is higher than average. The following section presents results on the variable strategic IS control effectiveness.

Table 4.23 Type of Strategic IS Control Approach and Staff Responsible for Strategic IS Control process

SIS Control Approach	Responsibility for Strategic IS Control					Total
	CIO (Chief Executive Officer)	IS Planning Officer	Group of Senior IS Staff	Group of Senior IS and Business Staff	Others	
Cybernetic control	6	0	2	3	1	12
Ad hoc control	8	7	4	8	3	30
Cybernetic & Ad hoc control	13	6	3	5	3	30
Total	27	13	9	16	7	72

Table 4.24 Type of Strategic IS Control Approach and Reporting Structure of Staff responsible for Strategic IS Control process

	Strategic IS Control Staff Report to					Total
SIS Control Approach	CIO (Chief Information Officer)	Report to CEO (Chief Executive Officer)	Chief Accountant or Financial Officer	IT Strategic Planning Committee	Others	
Cybernetic control	1	6	3	1	1	12
Ad hoc control	8	11	5		1	25
Cybernetic & Ad hoc control	6	12	11	2	1	32
Total	15	29	19	3	3	69

Figure 4.25 Strategic IS Control Approach and Authority Level of Staff Responsible for Strategic IS Control

	Authority Level Given to Strategic IS Control Staff							Total
Type of SIS control approach	Minimum authority			Moderate Authority			Maximum authority	
Cybernetic control		1	2	3	2	2		10
Ad-hoc control	1	1	6	6	5	7	2	28
Cybernetic-Ad hoc control		2	9	7	7	8	2	35
Total	1	4	17	22	14	25	4	73

4.5 Effectiveness of the Strategic IS Control Approaches

The effectiveness of the strategic IS control approach is found by calculating the mean value of all answers to the seven-point rating scale of the measure's items (questions).

The effectiveness of a particular approach for strategic IS control is found by calculating the average of effectiveness level values of all organizations using this particular approach. This value is then translated into the corresponding value on a seven-point scale developed for measuring strategic IS control effectiveness. The seven-point scale ranges from one being inadequate, (2 = little adequate, 3 = below average adequate, 4 = adequate, 5 = more than adequate, 6 = effective), to seven being very effective. The average effectiveness values and corresponding scale values for the three types of strategic IS control approaches are shown in Table 4.26.

Table 4.26 Strategic IS Control Approaches and their Level of Effectiveness

Strategic IS control approach	Number of practising organizations	Mean value of effectiveness level	Standard deviation	Scale value of effectiveness level
Cybernetic control	10	5.03	0.43	5 = more than adequate
Ad hoc control	28	4.56	0.83	4 = Adequate
Cybernetic & Ad hoc control	35	4.81	0.85	5 = more than adequate

The values in Table 4.26 indicate the cybernetics strategic IS control approach is found more than adequate, the ad hoc control approach is adequate, and the combined cybernetics and ad hoc approach is more than adequate.

As shown in Table 4.26, the effectiveness level of strategic IS control approaches are found adequate and more than adequate, but not reaching 6 (as being effective) on the seven point effectiveness scale explained above. This result confirms Hypothesis Three (Section 2.6.4) shown below:

H₃: Effectiveness level of strategic IS control practice is low.

4.6 IS Plan Performance and Strategic IS Control Effectiveness

In the introduction and literature review, it has been assumed that effective control of the IS strategy and planning process from a strategic perspective is important for achieving better IS plan performance. This assumption statement was translated into hypothesis four H₄ in Section 2.6.4, which is:

H₄ : Strategic IS control influences IS plan performance significantly.

To test H₄, a null hypothesis is needed, which is:

H₄ (0): Strategic IS control does not influence IS plan performance.

4.6.1 Correlation Analysis

Correlation and regression analysis was used to test H₄ mentioned above, to determine the degree of influence by strategic IS control effectiveness on IS plan performance. Since the concerned variables are both based on point scale measures, then the Spearman

rank correlation coefficient is the appropriate coefficient to use (Coakes & Steed, 1999). The calculated Spearman rank correlation coefficient of the relationship between strategic IS control effectiveness and IS plan performance is 0.619 which is positive and close to one, as shown in Table 4.27.

Since the value of the generated correlation coefficient (0.619) is close to one and very significant with 0.01 level, (i.e. 99% confidence level), then the relationship between the two variables can be considered as very strong and positive, and the null hypothesis, H_4 (0), is rejected. This indicates that the independent variable strategic IS control

Table 4.27 Calculation of Spearman Rank Correlation between the strategic IS plan performance and strategic IS control effectiveness

		Value	Asymp. Std Error	Approx. T	Approx. Sig.
Interval by Interval	Pearson's R	.727	.064	8.923	.000
Ordinal by Ordinal	Spearman Correlation	.619	.083	6.636	.000
Number of Valid Cases		73			

** Correlation is very significant at 0.01 level (2-tailed).

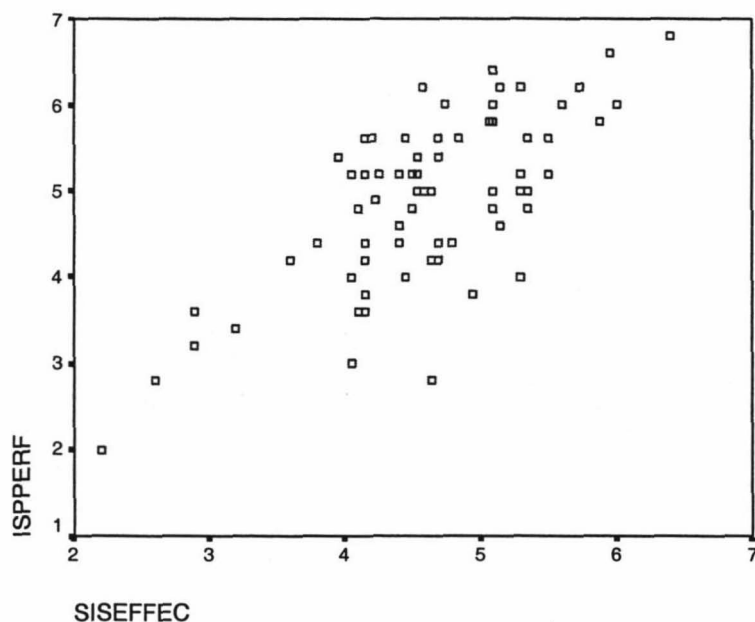


Figure 4.4 Scatter diagram of IS plan Performance and Strategic IS Control Effectiveness

effectiveness has a strong, positive influence on the dependent variable IS plan performance. That is, more effective strategic IS control increases the performance of an IS plan, and consequently increases the chance of IS plan success.

This finding is supported by the scatter diagram in Figure 4.4, which indicates the existence of a strong, positive relationship between strategic IS control effectiveness and the IS plan performance. This strong and positive relationship emphasizes the importance of an effective strategic IS control process to achieve a higher level of strategic IS plan performance.

4.6.2 Regression Analysis

The degree of influence on IS plan performance by the variable strategic IS control effectiveness may also be measured by regression analysis. The linear regression analysis may be utilised if the relationship between the dependent and independent variables is found to be linear, based on the scatter diagram between the two variables. The scatter diagram in Figure 4.4 depicts a scatter of points that are close to a line, which allows the use of regression analysis. The results of the linear regression model are shown in Tables 4.28 and 4.29. The R square value of 0.529 in Table 4.28 indicates about 53% of the variations in the dependent variable IS plan performance can be explained by the variable strategic IS control effectiveness. Table 4.29 also indicates that t value is significant, which means that strategic IS control significantly influences the IS plan performance.

Table 4.28 Regression Model Summary

Model	R	R Square	Adjusted Square	R	Std. Error of the Estimate
1	.727	.529	.522		.6632

Predictors: (Constant), SISEFFEC

Dependent Variable: ISPPERF

Table 4.29 Coefficients of the Regression Model, Dependent Variable: ISPPERF

		Standardized Coefficients	t	Sig.
Model		Beta		
1	(Constant)		1.610	.112
Independent Variable	SISEFFEC	.727	8.923	.000

4.7 Obstacles Against Strategic IS Control Practices

The major obstacles against the strategic IS control practices of the sampled organizations are depicted in Table 4.30. Table 4.30 is generated based on the questionnaire data and by using the SPSS tool. In the questionnaire, five obstacles were assumed as existing against the four sub-processes of the proposed model of the strategic IS control process (Figure 2.4):

- Lack of time
- Lack of funding
- Lack of tools
- Lack of knowledge and expertise
- Difficulty of the task of strategic IS control.

The above obstacles were questioned, as shown in Table 4.30, against each of the proposed four sub-processes of the strategic IS control process. The four sub-processes are:

- Organizational environment monitoring
- Performance monitoring
- Review of strategic IS plan
- Review of strategic IS management process.

The respondents' answers were then counted and stated in Table 4.30, by the SPSS tool. Based on the results of Table 4.30, the mean and standard deviation values were then calculated for each of the assumed five types of obstacles over the four sub-processes of

the strategic IS control process. Then the obstacles were ranked, in Table 4.31, based on their mean values to show them in order of significance.

Table 4.30 Frequency distribution of obstacles against strategic IS control Activities

Obstacle	Variable	Count	%
Lack of time in Org env. monitoring	ORGENVP2	41	14.5
Lack of funding in Org env. monitoring	ORGENVP1	7	2.5
Lack of tools in Org env. monitoring	ORGENVP3	14	5.0
Lack of knowledge/expertise in Org env. monitoring	ORGENVP4	9	3.2
Monitoring Org environment is difficult	ORGENVP5	7	2.5
Lack of funding in performance monitoring	PERFMP1	5	1.8
Lack of time in performance monitoring	PERFMP2	44	15.6
Lack of tools in performance monitoring	PERFMP3	9	3.2
Lack of knowledge/expertise in performance	PERFMP4	7	2.5
Strategic IS monitoring is difficult	PERFMP5	5	1.8
Lack of funding in SIS plan review	SISPREV1	4	1.4
Lack of time in SIS plan review	SISPREV2	46	16.3
Lack of tools in SIS plan review	SISPREV3	2	.7
Lack of knowledge/expertise in SIS plan	SISPREV4	10	3.5
Strategic review of SIS plan is difficult	SISPREV5	4	1.4
Lack of funding in SIS management process	SISMREV1	2	.7
Lack of time in SIS management process review	SISMREV2	45	16.0
Lack of tools in SIS management process review	SISMREV3	3	1.1
Lack of knowledge/expertise in SIS process	SISMREV4	10	3.5
SIS management process review is difficult	SISMREV5	8	2.8
Total responses		282	100.0

Table 4. 31 Mean and Standard Deviation Values of Obstacles in Strategic IS Control

Obstacle	Mean	Standard Deviation
Lack of Time	44	3.75
Lack of Knowledge and Expertise	9	2.45
Lack of Tools	7	9.67
Difficult Task	6	3.18
Lack of Funding	4.5	3.6

4.8 Cross-tabulation and Correlation Analysis Results

The data collected from the responding organizations include data pertaining secondary variables that can be related to the type of strategic IS control approach used. The variables are:

Industry type

Industry competitiveness

Intensity of IS use

Organizational size

Organizational structure

The purpose of the cross-tabulation and correlation analysis is to explore the existence of a strong preference among the responding organizations, in different categories of the above secondary variables, to adopt certain strategic IS control approach. The same cross-tabulation and correlation analyses were used to examine the strength of the relationship between the above variables such as industry type and intensity of IS use, and between industry competitiveness and intensity of IS use.

4.8.1 Industry Type and Strategic IS Control Approach

Because of the common characteristics of organizations operating in the same industry type, it is possible that these organizations prefer some approach(s) of strategic IS control over other approaches. To examine this possibility, the author used the cross-tabulation and correlation analysis to test for the existence of any pattern or strong relationship

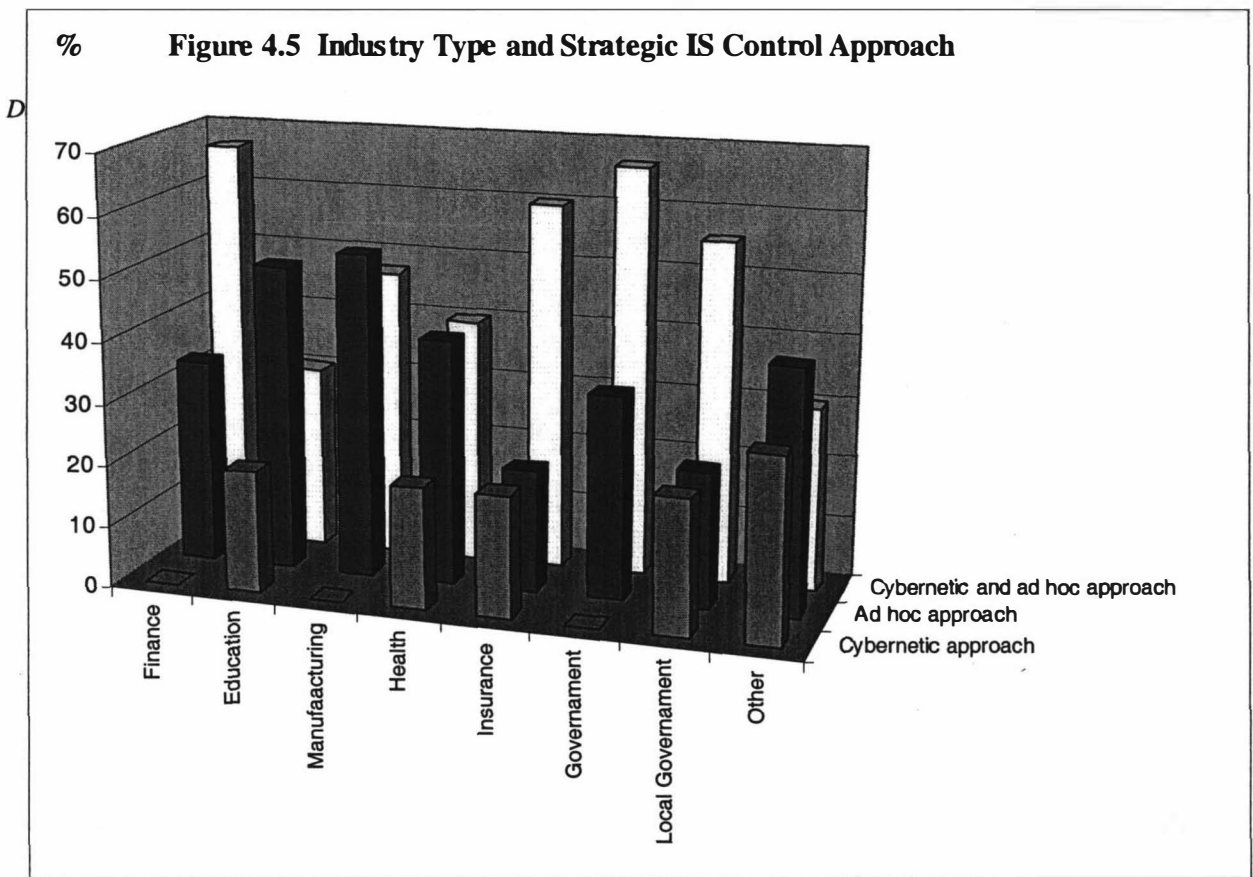
between some of the secondary variables such as the type of industry, industry competitiveness, intensity of IS use, and the type of strategic IS control approach used.

Table 4.32 shows the percentages of organizations in certain industry types using certain approaches of strategic IS control. For example, the intersection of the industry type and the ad hoc strategic IS control approach, represents the percentage of organizations operating in finance industry that use the ad hoc strategic IS control approach (around 33%). Similarly, the figure 66.6% under the Cybernetic and ad hoc approach, indicates that 66.6% of organizations operating in the finance industry use the combined cybernetic and ad hoc strategic IS control approach.

A graphic multiple-bar chart was generated and is shown in Figure 4.5. The chart reveals that more organizations operating in industry types such as finance, insurance, government, and local government, prefer to use the combined cybernetics and ad hoc approach when dealing with the issue of strategic IS control, whereas, organizations operating in industry types such as education, manufacturing, and health, are divided evenly between the ad hoc and combined strategic IS control approaches. This means, there is not exist a strong preference among industry types towards a particular control approach.

Table 4.32 Cross-Tabulation between Industry Type and Strategic IS Control Approach

		Type of IS control Approach			Total
Industry type		Cybernetic Control	Ad-hoc Control	Cybernetic & Ad-hoc Control	
Finance	Count		1	2	3
	% within industry type		33.3%	66.7%	100.0%
Education	Count	2	5	3	10
	% within industry type	20.0%	50.0%	30.0%	100.0%
Manufacturing	Count		9	8	17
	% within industry type		52.9%	47.1%	100.0%
Health	Count	1	2	2	5
	% within industry type	20.0%	40.0%	40.0%	100.0%
Insurance	Count	2	2	6	10
	% within industry type	20.0%	20.0%	60.0%	100.0%
Government	Count		3	6	9
	% within industry type		33.3%	66.7%	100.0%
Local Government	Count	2	2	5	9
	% within industry type	22.2%	22.2%	55.6%	100.0%
Other	Count	3	4	3	10
	% within industry type	30.0%	40.0%	30.0%	100.0%
	Count	10	28	35	73
Total	% within industry type	13.7%	38.4%	47.9%	100.0%



This is supported by the resulting value of Spearman rank correlation coefficient -0.033 (Table 4.33) which shows the relationship between the two variables to be very weak. The value of Spearman rank correlation coefficient (-0.033) is generated to test the null hypothesis $H_5(0)$: that industry type does not influence the type of strategic IS control approach used. Since the value of the generated correlation coefficient (-0.033) is less than 0.5 and close to zero, then the relationship between the two variables can be considered as very weak, and the null hypothesis, $H_5(0)$, is accepted. This indicates that the independent variable industry type has very weak influence on the strategic IS control approach used.

Table 4.33 Calculation of Correlation between Industry Type and Type of Strategic IS Control Approach

			Industry type	Type of SIS control approach
Spearman's rho	Industry type	Correlation Coefficient	1.000	-.033
		Sig. (2-tailed)		.779
		N	73	73
	Type of SIS control approach	Correlation Coefficient	-.033	1.000
		Sig. (2-tailed)	.779	
		N	73	73

4.8.2 Industry Competitiveness and Strategic IS Control Approach

Because of the common characteristics of organizations operating in a similar competitive environment, it is possible that organizations operating at the same competitive level may use the same kind of strategic IS control approach. Table 4.34 shows the percentages of organizations operating in certain competitive environment using certain approaches of strategic IS control. For example, the cell that crosses the average competitiveness level and the ad hoc strategic IS control approach represent the percentage (25%) of organizations operating in an average competitive environment, that use the ad hoc strategic IS control approach. Similarly, the figure 75.0% under the cybernetic and ad hoc approach, indicates the percentage of organizations operating in an average competitive level environment that use the combined cybernetic and ad hoc strategic IS control approach.

Table 4.34 Cross-Tabulation between Industry Competitiveness and Strategic IS Control

		Type of SIS control approach			Total
Industry Competitiveness		Cybernetic Control	Ad hoc control	Cybernetic & Ad hoc control	
Not Competitive	Count	1	4	8	13
	% within industry competitiveness	7.7%	30.8%	61.5%	100.0%
Least Competitive	Count		1	1	2
	% within industry competitiveness		50.0%	50.0%	100.0%
Somewhat Competitive	Count		2	1	3
	% within industry competitiveness		66.7%	33.3%	100.0%
Average	Count		1	3	4
	% within industry competitiveness		25.0%	75.0%	100.0%
Above Average	Count	1	6	6	13
	% within industry competitiveness	7.7%	46.2%	46.2%	100.0%
Competitive	Count	7	10	5	22
	% within industry competitiveness	31.8%	45.5%	22.7%	100.0%
Very Competitive	Count	1	4	11	16
	% within industry competitiveness	6.3%	25.0%	68.8%	100.0%
	Count	10	28	35	73
	% within industry competitiveness	13.7%	38.4%	47.9%	100.0%

A graphic multiple-bar chart was also generated (Figure 4.6) for the two variables. Figure 4.6 reveals that a higher percentage of organizations operating in average or highly competitive environments prefer to use the combined approach when dealing with

strategic IS control issues, whereas about the same percentages of organizations operating in a less competitive environment tend to use the ad hoc or combined type of strategic IS control approach.

This indicates that there is no strong preference by organizations operating in certain industry competitive environments for a special approach to strategic IS control. This is supported by the resulting value of Spearman rank correlation coefficient -0.058 (Table 4.35) which shows the relationship between the two variables to be very weak. The value of Spearman rank correlation coefficient (-0.058) is generated to test the null hypothesis $H_6(0)$: that industry competitiveness does not influence the type of strategic IS control approach used. Since the value of the generated correlation coefficient (-0.058) is less than 0.5 and close to zero, then the relationship between the two variables can be considered as very weak, and the null hypothesis, $H_6(0)$, is accepted. This indicates that the independent variable industry competitiveness has very weak influence on the strategic IS control approach used.

%

Figure 4.6 Competitiveness Level and Strategic IS Control Approach

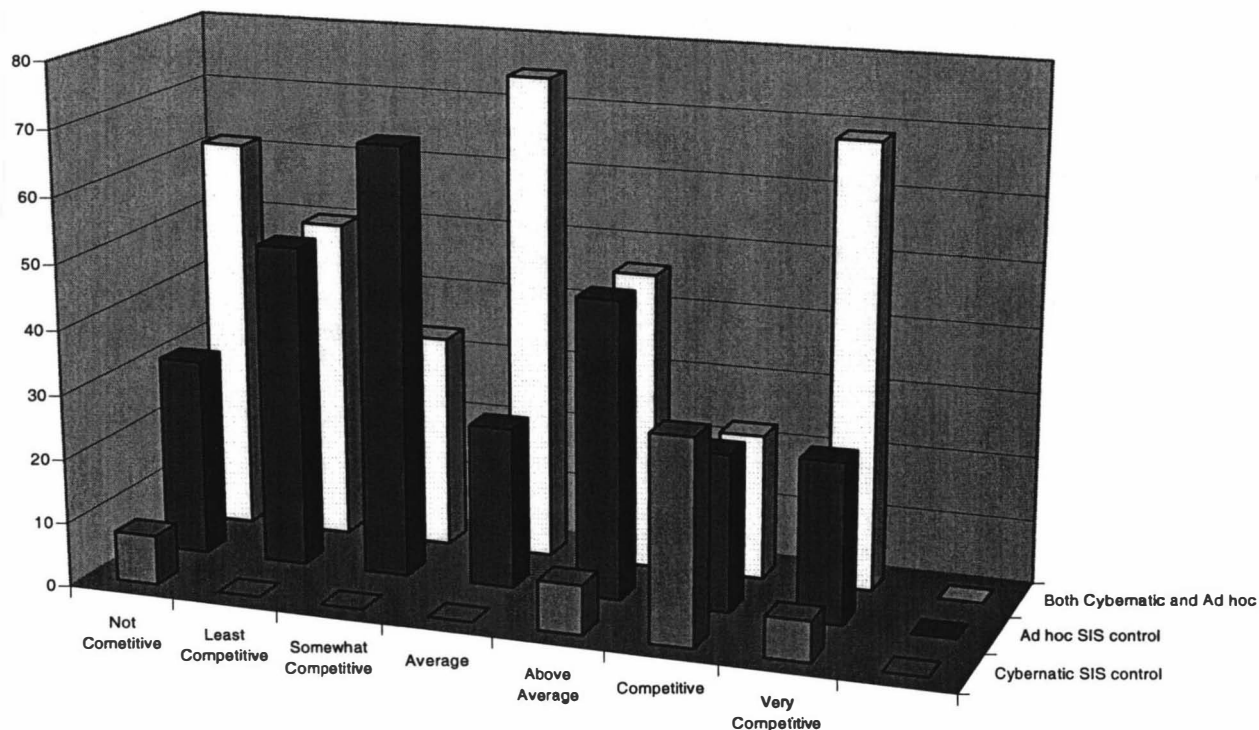


Table 4.35 Calculation of Co elation between Industry Competitiveness and Type of Strategic IS Control Approach

			Industry Competitiveness	Type of SIS control approach
Spearman's rho	Industry Competitiveness	Correlation Coefficient	1.000	-.058
		Sig. (2-tailed)	.	.624
		N	73	73
	Type of SIS control approach	Correlation Coefficient	-.058	1.000
		Sig. (2-tailed)	.624	.
		N	73	73

4.8.3 Organizational Structure and Strategic IS Control Approach

Table 4.36 shows a cross-tabulation between the types of strategic IS control approach and organizational structure. The Table indicates that most organizations (84%) are based on the divisional or functional organizational structure. About two-thirds of these organizations are adopting the Cybernetics or Combined Cybernetic & Ad hoc control approaches, whereas one-third adopt the Ad hoc control approach.

Table 4.36 Strategic IS control approaches and organizational structure

	Organization Structure					Total
Strategic IS Control Approach	Functions	Products	Divisions	Companies	Other	
Cybernetic control	4	1	5			10
Ad hoc control	8	4	13	2	1	28
Cybernetic & Ad hoc control	12	1	20	2		35
Total	24	6	38	4	1	73

However, the value of Spearman rank correlation coefficient 0.048 (Table 4.37) is generated to test the null hypothesis $H_7(0)$: that organization structure does not influence the type of strategic IS control approach used. The resulting value of Spearman rank correlation coefficient .048 is close to zero, therefore the relationship between the two variables can be considered as very weak, and the null hypothesis, $H_7(0)$, is accepted. This indicates that there is no strong preference by organizations adopting certain organizational structure for a special approach to strategic IS control.

Table 4.37 Calculation of Correlation Between Organizational Structure and Type of Strategic IS Control Approach

			Organization Structure	Type of SIS control approach
Spearman's rho	Organization Structure	Correlation Coefficient	1.000	.048
		Sig. (2-tailed)		.688
		N	73	73
	Type of SIS control approach	Correlation Coefficient	.048	1.000
		Sig. (2-tailed)	.688	
		N	73	73

4.8.4 Organizational Size and Strategic IS Control Approach

Table 4.38 shows a cross-tabulation between the type of strategic IS control approach and organizational size. The Table indicates that most organizations (90%) have more than 100 employees. About two-thirds of these organizations adopt the Cybernetics or Combined Cybernetic & Ad hoc control approaches, whereas one third adopt the Ad hoc control approach.

However, the value of Spearman rank correlation coefficient 0.139 (Table 4.38) is generated to test the null hypothesis H_0 (0): that organization size does not influence the type of strategic IS control approach used. The resulting value of Spearman rank correlation coefficient .139 is close to zero, therefore the relationship between the two variables

Table 4.38 Strategic IS control approaches and organizational size

	Organization Size						Total
Strategic IS Control Approach	1-10	11-50	51-100	101-150	151-200	201 or more	
Cybernetic control			1	1	1	7	10
Ad hoc control	1	2	1	2	4	18	28
Cybernetic & Ad hoc control		2		2	3	28	35
Total	1	4	2	5	8	53	73

Table 4.39 Calculation of Correlation Between Organizational Size and Type of Strategic IS Control Approach

			Type of SIS control approach	Organization Size
Spearman's rho	Type of SIS control approach	Correlation Coefficient	1.000	.139
		Sig. (2-tailed)		.241
		N	73	73
	Organization Size	Correlation Coefficient	.139	1.000
		Sig. (2-tailed)	.241	
		N	73	73

can be considered as very weak, and the null hypothesis, $H_0(0)$, is accepted. This indicates that there is no strong preference by organizations that have certain organizational size for a special approach to strategic IS control.

4.8.5 Intensity of IS Use and Strategic IS Control Approach

A cross-tabulation of the relationship (Table 4.40) shows the percentages of those organizations with certain intensity levels of IS use and the approach of strategic IS control used. For example, the figure 3.6% in the cell that crosses the little IS use level and the ad hoc strategic IS control approach, represents the percentage of organizations that use IS very little and use the ad hoc strategic IS control approach. Similarly, the figure 28.6% under the cybernetic and ad hoc approach and very intensive IS use, indicates the percentage of organizations that use IS very intensively, and use the combined cybernetic and ad hoc strategic IS control approach.

A graphic multiple-bar chart was also generated to show the relationship between organizational intensity of IS use and the strategic IS control approach used. Figure 4.7 reveals that organizations with a certain intensity level of IS are distributed evenly over the type of strategic IS control approach used.

The value of Spearman rank correlation coefficient 0.091 (Table 4.41) is generated to test the null hypothesis H_0 (0): that organizational intensity of IS use does not influence the type of strategic IS control approach used. The resulting value of Spearman rank correlation coefficient .091 is close to zero, therefore the relationship between the two variables can be considered as very weak, and the null hypothesis, H_0 (0), is accepted. This indicates that there is no strong preference by organizations with a certain organizational intensity level of IS use for a special approach to strategic IS control.

Table 4.40 Cross-tabulation between Information Systems Use and Type of SIS control approach

			Type of SIS control approach			Total
			Cybernetic control	Ad hoc control	Cybernetic control	
Information Systems Use	Little Use	Count		1		1
		% within type of SIS control approach		3.6%		1.4%
	Below Average	Count			2	2
		% within type of SIS control approach			5.7%	2.7%
	Average Use	Count		8	4	12
		% within type of SIS control approach		28.6%	11.4%	16.4%
	Above Average	Count	3	8	9	20
		% within type of SIS control approach	30.0%	28.6%	25.7%	27.4%
	Intensive Use	Count	6	8	10	24
		% within type of SIS control approach	60.0%	28.6%	28.6%	32.9%
	Very Intensive	Count	1	3	10	14
		% within type of SIS control approach	10.0%	10.7%	28.6%	19.2%
	Total	Count	10	28	35	73
		% within type of SIS control approach	100.0%	100.0%	100.0%	100.0%

Figure 4.7 IS Use and Strategic IS Control Approach

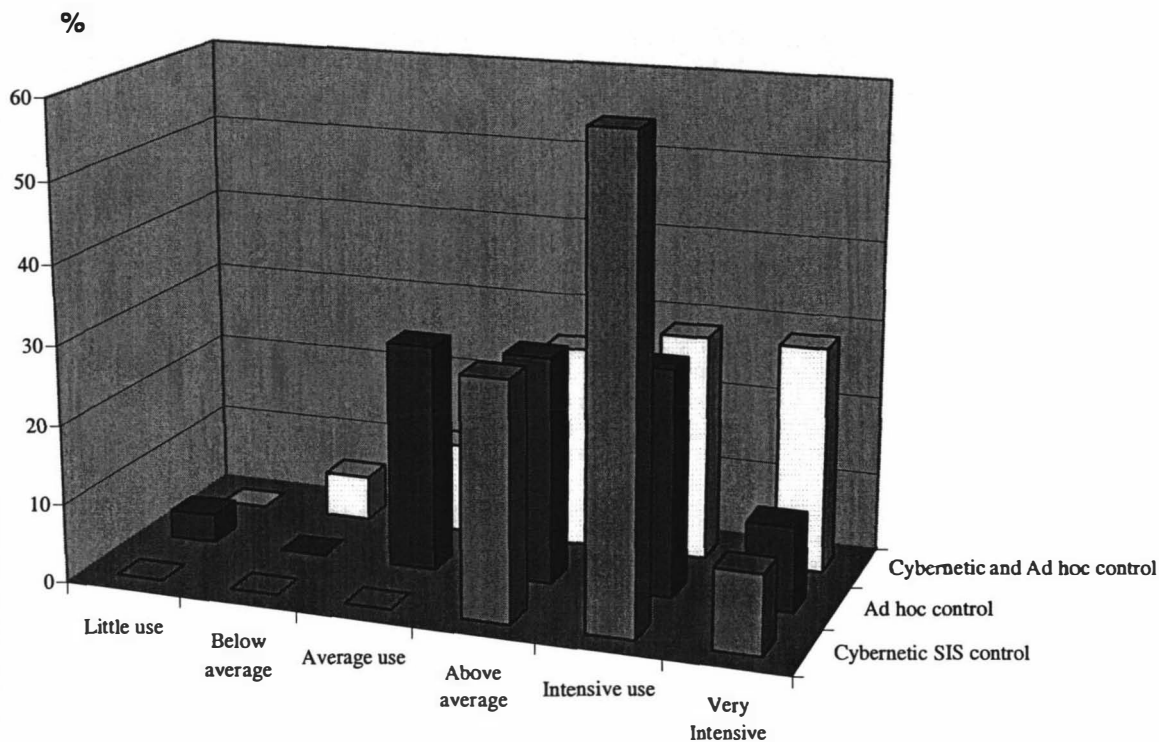


Table 4.41 Calculation of Co elation between Info mation Systems Use and Type of Strategic IS Cont ol Approach

			Type of SIS control approach	Information Systems Use
Spearman's rho	Type of SIS control approach	Correlation Coefficient	1.000	.091
		Sig. (2-tailed)	.	.443
		N	73	73
	Information Systems Use	Correlation Coefficient	.091	1.000
		Sig. (2-tailed)	.443	.
		N	73	73

4.8.6 Industry Type and Intensity of IS Use

The relationship between industry type and intensity of an organization's use of information systems was also explored. A cross-tabulation of the relationship in Table 4.42 shows the percentages of organizations operating in a certain industry type and having a level of IS use. For example, the figure 100% in the cell that crosses the finance industry type and intensive use of IS represents the percentage of finance organizations that use IS intensively. In comparison to finance industry type, only 29.4% of manufacturing organizations use IS intensively.

A graphic multiple-bar chart of the cross-tabulation between industry type and intensity level of IS use reveals that most industry types, except for manufacturing and health, use IS intensively or very intensively. The resulting value of Spearman rank correlation coefficient -0.033 is close to zero (see Table 4.43), which shows the relationship between the two variables is very weak.

This indicates that there is no strong pattern of IS use by organizations of a special industry type.

The value of Spearman rank correlation coefficient (-0.033) is generated to test the null hypothesis $H_{10}(0)$: that industry type does not influence organizational intensity of IS use. The resulting value of Spearman rank correlation coefficient -0.033 (see Table 4.43) is close to zero, therefore the relationship between the two variables can be considered as very weak, and the null hypothesis, $H_{10}(0)$, is accepted.

Table 4.42 Cross-Tabulation between Industry type and Information Systems

		Information Systems Use						Total
		Little Use	Below Average	Average Use	Above Average	Intensive Use	Very Intensive	
Industry type	Finance					3		3
	%					100		100
	Education			2	4	3	1	10
	%			20	40	30	10	100
	Manufacturing	1		3	3	5	5	17
	%	5.8		17.6	17.6	29.4	29.4	100
	Health			2	3			5
	%			40	60			100
	Insurance			1	2	3	4	10
	%			10	20	30	40	100
	Government		1	3	1	1	3	9
	%		11.11	33.33	11.11	11.11	33.33	100
	Local Government			1	3	4	1	9
	%			11.11	33.33	44.44	11.11	100
				10	30	40	10	
	Other		1		4	5		10
	%		10		40	50		100
Total		1	2	12	20	24	14	73

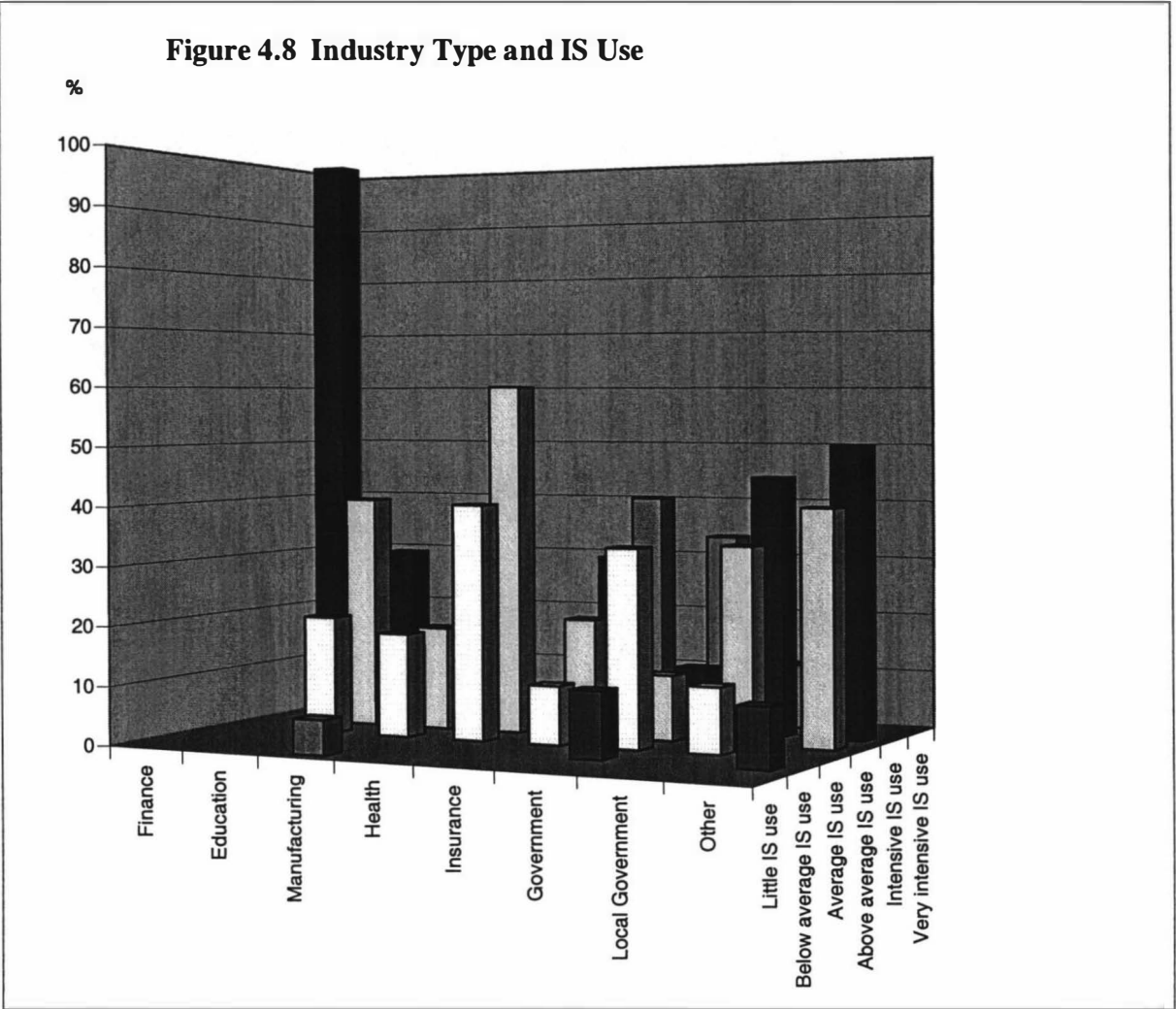


Table 4.43 Calculation of Correlation between Information Systems Use and Industry Type

			Information Systems Use	Industry type
Spearman's rho	Information Systems Use	Correlation Coefficient	1.000	-.033
		Sig. (2-tailed)		.782
		N	73	73
	Industry type	Correlation Coefficient	-.033	1.000
		Sig. (2-tailed)	.782	
		N	73	73

4.8.7 Industry Competitiveness and Intensity of IS Use

There is a general agreement in the IS literature that IS plays a significant role in achieving higher competitive levels for organizations. The strength of the relationship between the intensity of IS use and the industry competitiveness level was explored, shown in Table 4.44.

Table 4.44 A Cross-Tabulation Between Industry Competitiveness and Information Systems Use

			Information Systems Use						Total
			Little Use	Below Average	Average Use	Above Average	Intensive Use	Very Intensive	
Industry Competitiveness	Not Competitive	Count		1	2	5	2	3	13
		% within industry competitiveness		7.7%	15.4%	38.5%	15.4%	23.1%	100.0%
	Least Competitive	Count				1	1		2
		% within industry competitiveness				50.0%	50.0%		100.0%
	Somewhat Competitive	Count				2	1		3
		% within industry competitiveness				66.7%	33.3%		100.0%
	Average	Count			1	2	1		4
		% within industry competitiveness			25.0%	50.0%	25.0%		100.0%
	Above Average	Count	1	1	6	2	3		13
		% within industry competitiveness	7.7%	7.7%	46.2%	15.4%	23.1%		100.0%
	Competitive	Count			3	5	9	5	22
		% within industry competitiveness			13.6%	22.7%	40.9%	22.7%	100.0%
	Very Competitive	Count				3	7	6	16
		% within industry competitiveness				18.8%	43.8%	37.5%	100.0%
Total		Count	1	2	12	20	24	14	73
		% within industry competitiveness	1.4%	2.7%	16.4%	27.4%	32.9%	19.2%	100.0%

Table 4.44 reveals that a higher percentage of organizations operating in highly competitive environments have higher intensity level of IS use.

The value of Spearman rank correlation coefficient 0.360 (Table 4.45) is generated to test the null hypothesis H_{11} (0): that industry competitiveness level does not influence organizational intensity of IS use. The resulting value of Spearman rank correlation coefficient 0.360 is significant with 0.01 level, (i.e. 99% confidence level), therefore the relationship between the two variables can be considered as positive and very strong, and the null hypothesis, H_{11} (0), is rejected.

Table 4.45 Non-parametric Spearman Correlations Results between Industry competitiveness and Intensity of IS Use

			Information Systems Use	Industry Competitiveness
Spearman's rho	Information Systems Use	Correlation Coefficient	1.000	.360
		Sig. (2-tailed)		.002
		N	73	73
	Industry Competitiveness	Correlation Coefficient	.360	1.000
		Sig. (2-tailed)	.002	
		N	73	73

** Correlation is significant at 0.01 level (2-tailed).

4.9 Summary

The purpose of this chapter was to establish the reliability and validity of our data to ensure the questionnaire used is appropriate, and to use the appropriate statistics to test the research hypotheses.

The major results of the study are as follows:

- around 72% of New Zealand organizations practise strategic IS planning
- around 85% of IS planning group are practising strategic IS control
- the identified main approaches used for strategic IS control are cybernetic, ad hoc, and the combined cybernetic and ad hoc approach
- the evaluation of the level of effectiveness of these three approaches reveals that the cybernetic and combined approaches are more than adequate, and the ad hoc is just adequate
- the main obstacles currently facing strategic IS control are lack of time, lack of knowledge and expertise and lack of tools
- the relationship between industry type and strategic IS control approach is found to be weak
- the relationship between industry competitiveness and strategic IS control approach is found to be weak
- the relationship between intensity of IS use and strategic IS control approach is found to be weak
- the relationship between organizational structure and strategic IS control approach is found to be weak

- the relationship between organizational size and strategic IS control approach is found to be weak
- the relationship between industry type and intensity of IS use is found to be weak
- the relationship between industry competitiveness level and intensity of IS use is found to be strong.

Chapter Five

Discussion

5.1 Introduction

The objectives of this study (as mentioned in Section 2.6.2) were:

1. to examine the extent of strategic IS control practices.
2. to identify the approaches used in strategic IS control practices.
3. to measure the level of effectiveness of approaches of strategic IS control in practice.
4. to identify obstacles that work against strategic IS control practices.
5. to measure the impact of strategic IS control effectiveness on IS plan performance.
6. to examine the existence of any strong preference among responding organizations from different categories of secondary variables, for a special type of strategic IS control approach. The secondary variables considered in the study are:

Industry type

Industry competitiveness

Organizational intensity of IS use

Organizational size

Organizational structure

7. to measure the strength of relationship between Industry type and level of organizational intensity of IS use, and

8. to measure the strength of relationship between Industry competitiveness level and level of organizational intensity of IS use.

From these objectives, the following research questions were developed:

1. What is the extent of strategic IS control in NZ organizations?
2. What approaches are used in strategic IS control practice?
3. How effective are the IS strategic control approaches?
4. What obstacles exist that work against strategic IS control practices?
5. What is the level of impact of strategic IS control effectiveness on strategic IS plan performance?
6. What is the strength of relationship between industry type and strategic IS control used?
7. What is the strength of relationship between industry competitiveness and strategic IS control used?
8. What is the strength of relationship between organizational intensity of IS use and strategic IS control used?
9. What is the strength of relationship between organizational size and strategic IS control used?
10. What is the strength of relationship between organizational structure and strategic IS control used?
11. What is the strength of relationship between industry type and organizational intensity of IS use?

12. What is the strength of relationship between industry competitiveness and organizational intensity of IS use?

This chapter discusses the study results presented in the previous chapter. The chapter will focus on five areas: (1) the extent of strategic IS control in responding organizations; (2) the approaches of strategic IS control and their effectiveness, and the kind of obstacles that hinder strategic IS control processes; (3) the relationship between strategic IS plan and strategic IS control effectiveness; (4) an analysis of the type of strategic IS control approach and some relevant secondary variables (*Industry type, Industry competitiveness, Intensity of IS use, Organizational size, Organizational structure*); and (5) the limitations of the study.

5.2 Strategic IS Control in New Zealand

The results, in Chapter Four, show that many responding organizations (72%) use strategic IS planning, and 85% of those with strategic IS planning processes have control as a step in the planning process (Table 4.15). Thus, the first research question (*what is the extent of strategic IS control practices?*) is answered. This moderately high percentage of responding organizations using strategic IS control (85%) reflects high maturity level of existing IS planning processes in New Zealand organizations. This high percentage of existing strategic IS control processes found could be due to the fact that high percentage of responding organizations, about 75%, are operating in either competitive or highly competitive industry environments (Table 4.14).

Table 4.14 also shows more than half (53%) the responding organizations use a divisional organizational structure, 33% use functional structure, and the rest use other structures such as products and company structures. The Table also shows that 79% of responding organizations give management moderate to maximum authority levels. This indicates that most responding organizations employ decentralized organizational structure.

The higher percentage of responding organizations using strategic IS control in New Zealand, is in consonance with the expectations made by Goold and Quinn (1990), who, in their study of strategic control carried out in the U.K in 1990, found a very low percentage of organizations using strategic control. They expected this percentage to increase during the 1990s.

Table 4.18 shows that about 78% of organizations using strategic IS control do not use a formal model consisting of a set of well-defined steps and procedures that guide their strategic IS control processes, and about 22% do use a formal model. The Table also indicates that 30% of strategic IS control organizations focus on reviewing only the strategic IS plan, while 70% focus on reviewing both the strategic IS plan and strategic IS management process. This is consistent with the results in the same Table (4.18), which shows that 80% of strategic IS control organizations have a learning process involving feedback loops mechanisms flowing between the review of IS plans and strategic IS management processes.

These findings are consistent with the views of King and Cleland (1978), and Baker (1995), and others who emphasised the importance of reviewing strategic planning processes to generate useful feedback information for learning and improving the strategic process itself. Baker (1995) argued for further research into the area of feedback loops mechanisms in IS planning. The high percentage number (70%) of responding organizations using feedback loops in strategic IS control processes encourages further research using the case-study method, for instance, and aiming for identification of the types of feedback mechanisms and their effectiveness as suggested by Baker (1995).

In fact, the issues of feedback loops, control and learning are related, in that feedback loops are part of systems control, and organizational learning is the logical result of the control process. In the context of IS planning, the organizational learning view in the IS planning process has further support in IS literature. Earl (1993) has carried out research to evaluate strategic IS planning approaches and found the organizational-led approach was the most effective of five approaches for IS planning. He found that organizational learning is evident in the organizational-led approach, especially during the implementation of IS plans.

Moreover, Huysman et al. (1994) argued strongly in their article for an organizational learning perspective on IS planning. The authors' argument is based on the consideration that knowledge and experience unfold while using IS/IT applications. They presented a case study where strategic IS plans are evolving as a result of incremental organizational

learning. They too called for further research into the investigation of organizational learning in IS planning.

With regards to the IS functions characteristics of responding organizations, the study found that most responding organizations (70%) employ 1 - 20 staff in their IS/IT functions. The range seems small, especially when 85% of responding organizations are large (over 101 employees). This may be due to the recent advances in software development methods and tools that reduce the need for large number of IS professionals such as analysts, programmers or software engineers.

Table 4.17 shows that about half of responding organizations (44%) plan for IS on a short-term basis (between 1 - 2 years); 53% plan on long term basis (3 - 5 years period); and 3% plan on very long-term basis (6 and more years).

5.3 Strategic IS control Approaches, Effectiveness, and Obstacles

To answer research question two, *what approaches are used in current strategic IS control practices?*, the study in Section 2.6.4 suggests Hypothesis Two (H₂). Hypothesis Two assumes that in practice, the possible approaches for strategic control of an IS plan may take three forms: the cybernetic control, the ad hoc control and the combined approach (using both the cybernetic and ad hoc approaches). The findings of the study do

not reject H_2 , in that all responding organizations using strategic IS control were found to use one of the assumed control approaches.

Table 4.18 shows that 14% of the responding organizations use the cybernetic approach, 38% use the ad hoc approach, and 48% use the combined cybernetic and ad hoc approaches. This indicates that most organizations use the combined approach. The reason for the high percentage of responding organizations using the ad hoc approach alone (38%) or in combination with the cybernetic approach (48%), may be because the ad hoc approach does not use performance measures, and consequently requires less time for collecting data for an IS plan performance and then comparing it with the set-out strategic objectives/targets.

The three strategic IS control approaches reflect to a greater extent the way managers handle their strategic IS control. Ad hoc monitoring is based on collecting information on actual performance both formally and informally. Therefore, the ad hoc approach allows IS managers to speed up the monitoring/scanning of the organizational environment and the monitoring and reviewing of the IS plans' performance. However, to save time, some managers may prefer to carry out a balanced approach by using performance measures for the monitoring of some aspects of the IS plan performance and using the ad hoc monitoring for other aspects.

These results of strategic IS control approaches contribute to the theory of strategic IS management in terms of the three categories of strategic IS control approaches in New

Zealand organizations: the cybernetic approach, the ad hoc approach, and the combined cybernetic and ad hoc approach. The implication for IS practice is that IS practitioners can use the proposed model of strategic control in Figure 2.4 as well as the criteria used for evaluating effectiveness level of strategic IS control processes, as a guide to design strategic IS control processes in their organizations.

Since the study did not investigate detailed characteristics and activities of IS approaches, particularly performance measures, further research may be needed to investigate weaknesses of the identified approaches and suggest improvements. The possibility of merging or integrating strategic IS control approaches with the IS planning methodologies may also be a useful topic for further research. The researcher believe that the issue of developing performance measures in the monitoring and reviewing of IS plans is of vital importance, because measuring the performance of IS plans must be done accurately to make strategic IS control achieve its objectives effectively.

Performance measures can be developed to measure the extent to which an IS plan is achieving the set-out strategic objectives in the IS plan. For example, two kinds of performance measures, impact and align performance measures, may be classified based on the two broad approaches of strategic IS planning: the impact approach and the align approach, which were categorized by Lederer and Sethi (1995). The impact approach entails the identification of a set of information systems applications that can give the organization a competitive advantage. It involves innovation and creativity in using

information technology to create new business strategies that aim to build barriers against new entrants, change the basis of competition, or build in switching costs.

The align approach on the other hand, entails the development of an organization-wide information architecture of IS applications to guide the creation of large databases and computer systems to support current business strategies. Performance measures can also be developed to measure the extent of achievement of the aligned business strategic objectives as a result of the implemented IS plan. Therefore, further research is needed to investigate the characteristics of performance measures of IS plans, how are they developed in practice, and propose systematic methods for developing them.

Strategic IS control Effectiveness and Obstacles against Strategic IS Control Processes

To answer research question three, *How effective are the strategic IS control approaches?*, the study suggests Hypothesis Three (H_3) (Section 2.6.4). H_3 assumes that in practice, strategic IS control processes are not effective. The results of evaluating strategic IS control (Table 4.26) in responding organizations, found that strategic IS control approaches are simply adequate or just more than adequate, but not effective. This does not reject H_3 , which assumes effectiveness level of strategic IS control practice is low.

The above results show that none of the three approaches were effective. This indicates that strategic IS control practices are not achieving their objectives completely. Moreover, this result is consistent with the argument in Section 2.6.1, that failing strategic IS plans or strategic IS applications are the result of ineffective strategic IS control. The contribution of the developed instrument, in Section 3.4.5, for measuring the effectiveness level of strategic IS control processes or approaches is that this instrument can provide a set of guidelines for practitioners to improve their current or proposed strategic IS control processes.

To answer research question four, *What obstacles exist that work against strategic IS control practices?*, the study assumed five types of obstacles that could hinder the processes of strategic IS control in responding organizations. These were:

Lack of time

Lack of funding

Lack of tools

Lack of knowledge and expertise

The difficulty of strategic IS control.

The order of significance, of obstacles that work against strategic IS control processes, was found to be:

Lack of time

Lack of knowledge and expertise

Lack of tools

Difficulty of the task of strategic IS control, and
Lack of funding.

The order of significance of the obstacles, in Table 4.31, is obtained from the calculated ranking, which was based on the mean and standard deviation values of the respondents' answers on the assumed five obstacles. Table 4.31 indicates that the major obstacle is the lack of time, which has a mean value of 44 over the four sub-processes of strategic IS control in the proposed model (Figure 2.4), and a standard deviation of 3.75. The mean value of 44 represents 62% of responding organizations that regard the lack of time as an obstacle. The associated low value of standard deviation indicates small differences (i.e., general agreement) among respondents' answers about lack of time as an obstacle that exists in the four principle sub-processes of strategic IS control.

The significance of "lack of time" stems from the nature of IS managers' work. Usually, IS managers are very busy because they lead one of the most demanding and active functional areas in the organization, providing computing services to all other functional areas.

Lack of knowledge and expertise is next in importance. This indicates that high percentage of IS managers believe they have the knowledge and expertise to practise strategic IS control in their organization but may be finding that time is the problem. Many IS managers believe that availability of tools is less important than time. Such

tools include documentation software and group decision support systems such as electronic meeting, and are not yet integrated in one computer-based system environment.

IS manager respondents found the difficulty of strategic IS control task a minor problem; that is, they believe strategic IS control is simple but probably time consuming. The last obstacle, lack of funding, was found to be least important, although funding is usually a major obstacle in most issues in an organization.

The identification of obstacles that work against strategic IS control processes will enable IS researchers to focus their efforts on finding solutions to eliminate the effects of these obstacles, and eventually to improve the effectiveness of strategic IS control processes. For example further research can focus on how to save the IS managers' time and reach speedy and timely decisions and actions in relation to strategic IS control activities in organizations. The researcher believes that it is quite possible to save the IS manager' time by developing a specialised and integrated decision support system (DSS) to support the strategic IS control process or the major parts of it.

A decision support system is defined by a number of researchers (Gorry and Scott-Morton, 1971; Little, 1970; Alter, 1980; Moore and Chang, 1980; Bonczek et al.; 1989; Keen, 1980; Turban and Aronson, 2001). The most recent definition by Turban and Aronson (2001) represents the most comprehensive and accurate definition of a DSS application. They defined a DSS application as an approach (or methodology) for supporting decision-making. It uses an interactive, flexible, adaptable computer-based

information system (CBIS), especially developed for supporting the solution for a specific non-structured management problem. It uses data, provides an easy user interface, and can incorporate the decision maker's own insights.

Turban and Aronson (2001) added that a DSS system supports all phases of the decision making process and may include a knowledge component. Finally, a DSS can be used by a single user on a PC, or it can be Web-based for use by many people at several locations.

Actually, the process of strategic IS control represents a non-structured problem or process, since it involves monitoring the IS plan performance to improve it and increase its chance of success. The improvement process requires identifying IS plan performance problems and finding solutions for solving them, which in turn involves decision making. Therefore, strategic IS control represents a very suitable application area for using a DSS system.

The DSS system has a number of benefits, some of which help managers to reach quality and timely decisions. Therefore, a DSS system will not only improve the efficiency of strategic IS control in terms of time saving, but it will also improve the effectiveness of the process in terms of helping managers to reach quality decisions and in supporting the timeliness of those decisions.

Such a specialized DSS is expected to reduce lack of time significantly, since it allows users (IS managers) to develop IS plan performance measures and collect data on them much faster, than completing the same task manually.

Furthermore, organizations using the ad hoc control approach will most likely be encouraged to use the DSS to save the managers' time. As far as the lack of expertise and knowledge is concerned, IS researchers and instructors need to pay more attention to the issue of strategic IS control in their research work, when teaching courses in strategic IS management, or when writing textbooks on strategic IS management. Promoting research in strategic IS control will also lead to improved knowledge and skills of both IS graduate students and IS practitioners.

Finally, in order to improve strategic IS control further, the researcher suggests further detailed studies of the reasons for ineffective strategic IS control processes. The identification of such reasons will allow IS researchers to propose solutions for them. Next section will discuss the results measuring the strength of relationship between strategic IS control effectiveness and IS plan performance.

5.4 IS Plan Performance and Strategic IS Control

Effectiveness

It has been argued earlier in the study (Section 2.6.1) that strategic control of the IS plan can influence IS plan performance and success. Consequently the research question,

What is the degree of impact of strategic IS control effectiveness on IS plan performance?, was formulated. To answer this question, Hypothesis Four (H_4) assumes that strategic IS control has an impact on IS plan performance. In Section 4.5, the results of correlation and regression analyses, (Tables 4.27, 4.28 and 4.29) did not reject H_4 and rejected the null hypothesis $H_4 (0)$.

The existence of a strong relationship between the dependent variable (IS plan performance) and the independent variable (strategic IS control effectiveness), supports the researcher's view stated in the research problem in Section 2.6.1, which argues that strategic IS control influences IS plan performance significantly. The strong positive relationship between the IS plan performance and strategic IS control effectiveness emphasizes the importance of establishing an effective strategic IS control process to ensure the achievement of a successful IS plan.

The implication of this result is very important to both IS managers and business top managers, since it is related to the success and performance of IS plans that play a vital role in supporting the direction and strategic objectives of organizations (Porter, 1985; Earl, 1993; Ward, 1990). Therefore, the significant influence of strategic IS control on IS plan performance will add an important result/outcome to IS knowledge, and allow IS practitioners to focus their efforts on the key issue of establishing an effective strategic IS control process.

5.5 Relationships Between the Secondary Variables and the Strategic IS Control Approaches used

As mentioned earlier in the literature review (Section 2.6.2) the study has a secondary objective, which is to explore relationships between some important secondary variables and the strategic IS control used. These considered relevant variables are:

- Industry type
- Industry competitiveness
- Organizational structure
- Organizational size
- Organizational intensity level of IS use.

Section 4.8 presented the results of the cross-tabulation correlation analyses, which aimed to explore any strong relationship between the type of strategic IS control approach and some important relevant secondary variables. The results of the cross-tabulation and correlation analyses, (Tables 4.32 to 4.43) show no clear pattern or strong relationships between the above-mentioned secondary variables and the strategic IS control approaches used.

However, responding organizations operating in more competitive environments, or using IS intensively, such as finance and insurance, have shown preferences for using the strategic IS control based on the cybernetic or combined approach, over the ad hoc approach. Also, organizations in education, manufacturing and health industries, which

operate in less competitive industry environments, and use IS less intensively, have shown preference to use a more informal and less time-consuming approach, such as the ad hoc approach. This is because organizations operating in higher competitive environments or using IS more intensively will be more interested in using a proper approach based on proper measures for monitoring and reviewing their IS plans.

The correlation analysis (Section 4.7.5) found a strong relationship between the competitiveness of the industry in which an organization operated and the organizational intensity of IS use. This result indicates that most responding organizations operating in higher competitive industry environments tend to use IS intensively. This also supports the view of researchers such as (Lederer and Sethi, 1995; Earl, 1993; Portor 1985), that the use of information systems and technology play a significant role in organizations operating in highly competitive industries. However, the correlation analysis found a weak relationship between industry type and organisational intensity of IS use.

5.6 Limitations of the Study

Two limitations may be identified in this study. First, it is possible that data collected from organizations include an element of response bias because the study uses a single informant or respondent for practical reasons. Secondly, since some concepts are very difficult to measure objectively, some of the survey questions are of a subjective rather than objective nature. However, given the overwhelming support from the results of the

statistical analysis, in terms of the reliability and validity of used measures, these limitations do not seem to negate the results and conclusions of the study.

Chapter Six

Conclusions and Recommendations for Future Research

6.1 Conclusions

A review of the literature in Chapter Two led to the formulation of research problem, research questions, and research objectives. The discussion in that chapter of previous research pertaining to problems and issues in the application of strategic IS planning concluded with the proposition that failure of strategic IS plans or IS applications can be attributed to less effective control over both the strategic IS plan and strategic IS management process from a strategic perspective (strategic IS control). In other words, strategic IS control can influence IS plan performance.

Basically, this study has sought to make a contribution to the theory and practice of strategic IS planning by addressing the problem of ineffective strategic IS control. The problem can be addressed by improving the strategic IS control processes. To achieve this end, the following activities or objectives were suggested in Chapter Two:

1. to examine the extent of strategic IS control practices
2. to identify the approaches used in strategic IS control practices
3. to measure the level of effectiveness of approaches of IS strategic control in practice
4. to identify obstacles that work against strategic IS control practices
5. to measure the impact of strategic IS control effectiveness on IS plan performance

6. to examine the existence of any strong preference among responding organizations from different categories of secondary variables, for a special type of strategic IS control approach. The secondary variables considered in the study are:

Industry type

Industry competitiveness

Organizational intensity of IS use

Organizational size

Organizational structure

7. to measure the strength of relationship between industry type and level of organizational intensity of IS use, and
8. to measure the strength of relationship between industry competitiveness level and level of organizational intensity of IS use.

The actions suggested above led to the formation of the following research questions:

1. What is the extent of strategic IS control in NZ organizations?
2. What approaches are used in strategic IS control practice?
3. How effective are the IS strategic control approaches?
4. What obstacles exist that work against strategic IS control practices?
5. What is the level of impact of strategic IS control effectiveness on strategic IS plan performance?
6. What is the strength of relationship between industry type and strategic IS control used?

7. What is the strength of relationship between industry competitiveness and strategic IS control used?
8. What is the strength of relationship between organizational intensity of IS use and strategic IS control used?
9. What is the strength of relationship between organizational size and strategic IS control used?
10. What is the strength of relationship between organizational structure and strategic IS control used?
11. What is the strength of relationship between industry type and organizational intensity of IS use?
12. What is the strength of relationship between industry competitiveness and organizational intensity of IS use?

To answer the study research questions, Chapter Three suggested the questionnaire instrument for data collection. A survey questionnaire was constructed, and sent to 509 NZ organizations from which 123 responded to make up the data that produced the study results. Chapter Four analyzed and presented the findings without drawing any conclusions.

Chapter Four started by analysing the goodness (reliability and validity) of the developed measures to assess the two research variables, strategic IS control effectiveness and IS plan performance. To achieve this end, reliability and validity analyses were applied to the operational measures used in the questionnaire instrument. While Cronbach's alpha was used to test for reliability, the principles components factor analysis was used to test

the validity of the proposed measures. The results of these reliability and validity analysis were presented in Section 5.2. The results of the applied reliability and validity analyses have shown that the developed measures for both research variables mentioned above, are found to be reliable and valid measures.

Based on the literature of strategic planning and managerial control, a general model (Figure 2.4) was proposed to describe the process of strategic control. The model was used as the basis for developing the survey instrument. The proposed model represents an important contribution as it depicts graphically the elements or sub-processes of a strategic control process, and the information flow between them. The model provides a general framework and guide for IS practitioners to build new strategic IS control processes or rectify old ones. However, the proposed model does not provide information on how performance measures of strategic IS plans are formulated. Further research, is therefore needed to investigate characteristics and types of performance measures and the best way to develop them.

Also, as a result of the study, three strategic IS control approaches have been identified: cybernetic, ad hoc, and a combined approach of both cybernetic and ad hoc. The cybernetic strategic IS control approach involves monitoring and reviewing the achievement of strategic targets based on proper performance measures of the strategic IS plan. Ad hoc strategic IS control approach, on the other hand, involves monitoring and reviewing the achievement of strategic targets on the basis of an ad hoc monitoring and estimation of actual performance of a strategic IS plan. The combination of cybernetic and ad hoc strategic IS control is an approach where monitoring of performance of

strategic IS plans is based on using proper performance measurements as well as ad hoc monitoring.

All identified approaches of strategic IS control involve monitoring and reviewing the performance of strategic IS plans from a strategic perspective, and monitoring the internal and/or external business and IT environment. It has been found that most of the strategic IS control processes used by the responding organizations implement regular reviews on the strategic IS plans as part of their annual planning cycles. However, some of the organizations that implement regular reviews implement additional unplanned reviews in response to relevant changes or events in the business environment that can have significant impact on the performance of their strategic IS plans.

It has also been found, that 70% of organizations that review their IS plans, review their strategic IS management process as well, and with the presence of information feedback loops. This is consistent with the result that 80% of responding organizations that use strategic IS control have a learning process that uses feedback loops flowing from the review of IS plans back to other phases of the strategic IS management process, namely strategic analysis, strategic choice and strategic implementation. Other kind of feedback loops include reviews of information flowing between the phases of the strategic IS management process itself.

These results of strategic review and learning processes (feedback loops) motivate further research in the area of understanding how the review of IS plans and strategic IS process is done in practice, and the nature and types of those feedback loops that exist in strategic

IS management. Such research will identify weaknesses and suggest improvements, or suggest better reviewing methods and better feedback loops mechanisms. This is supported by Baker (1995) who called for further research into feedback loops mechanisms in the IS planning process.

The cybernetic and combined approaches are to be found more than adequate, while the ad hoc is found to be just adequate. This explains why, according to the study results, most organizations operating in highly competitive industry environments or using IS intensively prefer to use the cybernetic or combined control approaches. The measuring instrument suggested by the study can be used by organizations to benchmark their own strategic IS control processes, in order to identify weaknesses and then elevate improve them.

The construct strategic IS control effectiveness is strongly related to the IS plan performance, which supports the researcher's view that effective strategic IS control could dramatically increase IS plan performance or success. This result emphasises the importance of using strategic IS control in a strategic IS management system to increase the chances of achieving more effective strategic IS plans. Therefore, this result represents a major contribution to both IS researcher and IS practitioners.

For IS researchers, the result motivates them to focus their further research on, for example, ways of improving strategic IS control approaches, and developing models of implementing them. For IS practitioners, the importance of strategic IS control to IS plan

performance motivates them to put more emphasis on establishing effective strategic IS control processes to ensure a greater chance for achieving high performing IS plans.

A cross-tabulation and correlation analysis was carried out between the industry competitiveness levels in which the responding organizations operate and the strategic IS control approach used. The cross-tabulation indicate that responding organizations, that are operating in a higher competitive industry prefer to use the cybernetic or combined strategic IS control approaches rather than the less effective ad hoc approach. However, the correlation analysis between the two variables indicates a weak relationship between industrial competitiveness and strategic IS control approach used.

Similar cross-tabulation and correlation analysis is carried out between other relevant secondary variables such industry type, intensity of IS use, organizational structure, organizational size and the type of strategic IS control approach used, and their results were discussed in Chapter Five. The results show there is not strong relationship between industry type and strategic IS control approaches used, or between organizational intensity of IS use and the strategic IS control approaches used.

The relationship between industry type and organisational intensity of IS use is found to be weak. The last correlation analysis was carried out to measure the relationship between industry competitiveness and the intensity of IS use in responding organizations. The relationship between the variables is to be found strong, which indicates that most organizations operating in higher competitive industry environment use IS and IT intensively. This result affirms the important role information systems and technology

can play in competition, and advocates the common perception that the use of IS and IT in organizations is vital for increasing organizational effectiveness and competitiveness.

Furthermore, the study has identified five obstacles that work against the practice of strategic IS control; three were most important. The first, in order of significance, was the lack of time, then lack of knowledge and/or expertise, and third, lack of tools. The results also reveal that most organizations lack a model for guiding the process of strategic IS control. This result contributes to focusing IS research efforts on important issues to improve strategic IS control effectiveness.

Since the results of this study are based on a good size sample of mainly large organizations, and the instrument used was found valid and reliable, the results can therefore be generalised to all New Zealand organizations that currently use strategic IS control processes. The researcher also believes the study results can be generalised to organizations operating overseas in advanced countries, such as Australia, Canada, UK or USA, where IS planning is very common. However, similar studies, with the same objectives, should be carried out to compare the findings and verify the researcher's view.

Two limitations may be identified in this study. First, it is possible that data collected from organizations include an element of response bias because the study uses a single informant or respondent for practical reasons. Secondly, since some concepts are very difficult to measure objectively, some of the survey questions are of a subjective rather than objective nature. However, given the overwhelming support from the results of the

statistical analysis, in terms of the reliability and validity of used measures, these limitations do not seem to negate the results and conclusions of the study.

In summary, the contributions of the study are:

1. The proposed model for strategic control, in Figure 2.4, provides a general framework for strategic IS control.
2. These results of examining strategic IS control approaches contribute to the theory of strategic IS management in terms of knowing how IS managers in New Zealand organizations handle the issue of strategic IS control.
3. These results of the strategic review and learning processes (feedback loops) motivate further research into the area of understanding how the review of IS plans and strategic IS processes are carried out in practice, and the nature and types of feedback loops that exist in strategic IS management.
4. The instrument developed to evaluate the effectiveness level of strategic IS control approaches, represents a contribution to IS researchers. This instrument can be used in other countries and to compare the results with the results found in New Zealand .
5. The strong relationship found between strategic IS control effectiveness and the IS plan performance emphasises the importance of using strategic IS control in a strategic IS management system. This result represents a major contribution to both IS researcher and IS practitioners. It motivates further research into improving strategic IS control approaches.

6. The results of identifying and ranking existing obstacles that work against strategic IS control practices represent another important contribution to IS research. They guide and help focus IS research efforts on suggesting solutions to reduce the obstacle
7. The strong relationship found between the variables industry competitiveness and organizational intensity of IS use affirms the importance of information systems and technology in competition.

Implications of the study contributions to IS practitioners are:

1. The proposed model for strategic control, in Figure 2.4, can help IS practitioners to build strategic IS control processes or to rectify old ones.
2. The identified three approaches of strategic IS control will inform IS practitioners about the different methods of applying strategic control in IS planning.
3. The instrument developed to evaluate the effectiveness level of strategic IS control approaches can be used as a criterion or a benchmarking model for IS practitioners to evaluate their current strategic IS processes in their organizations, to identify weaknesses and, to suggest improvements.
4. The strong relationship found between strategic IS control and IS plan performance will alert IS practitioners of the fact that control of IS plans from a strategic perspective is a key issue and requires great attention.

6.2 Recommendations for Future Research

The obstacles identified suggest further research may be possible in the following areas:

- An investigation of the kind of performance measures used in strategic IS control processes, and how are they defined and implemented, to identify any shortcomings, and to suggest improvements. This kind of study will produce a model to be used for developing performance measures of strategic IS plans.
- An in-depth investigation of how strategic IS plans and strategic IS management process are reviewed and maintained in practice, and the nature and use of feedback information generated from the review process. The identification of the reasons for ineffective mechanisms in strategic IS control processes will allow IS researchers to propose solutions for improving them.
- A study to develop a general and detailed model to guide the strategic IS control process. The proposed model in Figure 2.4 may serve as starting point for such a study.
- A research study to investigate the possibility of embedding strategic IS control approaches or mechanisms within IS planning methodologies.
- An investigation of the possibility of developing a computer-based system, such as a decision support system (DSS), to help document and manage the activities of monitoring and reviewing both strategic IS plans and the strategic IS management process. The proposed DSS will help IS managers to identify problems and solve them during the strategic IS management process.

Eventually, such a DSS environment will save time and improve the performance of senior IS staff, who are responsible for the strategic IS control process.

The researcher recommends that IS researchers and instructors need to pay more attention to the issue of strategic IS control in their research work, when teaching courses in strategic IS management or when writing textbooks on strategic IS management. Promoting research in strategic IS control will lead to improving the knowledge and skills of both IS graduate students and IS practitioners.

Appendix A: Questionnaire Covering and Reminder Letters



20 September 2000

The Managing Director/Finance Controller

Dear Sir/Madam

Subject: A survey questionnaire for the study of current practices of strategic information systems (IS) control in New Zealand

I am conducting my Ph.D. research on the issue of performance monitoring and maintenance of strategic IS plans from a strategic perspective (i.e., strategic IS control). My research is designed to help us better understand and evaluate current practices of strategic IS control in IS functions in New Zealand. As a senior business officer in your organisation, your views on this topic are of considerable relevance to the study and your response will be highly appreciated.

The attached questionnaire represents part two of the research questionnaire. Part one was previously completed by the IS function in your organisation. Your part of the questionnaire consists of two pages only. Answering the questionnaire should only take about ten minutes of your time. If you have any queries or questions, please do not hesitate to contact me, using my email address or telephone number. If you wish, a summary of the general results and/or the results of your organisation can be mailed to you, after the data have been analysed.

The study has been approved by the Human Ethics Committee/Massey University and an information sheet and consent form are attached. My supervisors are Dr Attahir Yusuf, Dr. James Lockhart and Professor A. Vitalis from the department of Management Systems at Massey University, Palmerston North, New Zealand. Thank you very much for your time and cooperation. We greatly appreciate yours and your organisation's help in furthering this research endeavour.

Yours sincerely,

Mustafa Eid,
Ph.D. student

E-mail Address: M.I.Eid@massey.ac.nz
Phone: (06) 3569099 ext. 2657



Strategic Information Systems Control Practices in New Zealand

INFORMATION SHEET

This research project is on the issue of performance monitoring and maintenance of the strategic IS plans from a strategic perspective (i.e., strategic IS control). This research is mainly descriptive, which is designed to help us better understand and evaluate current practices of strategic performance monitoring and maintenance of strategic IS plans in IS functions in New Zealand. I am conducting this research for my PhD which is being supervised by Dr A. Yusuf, Professor A. Vitalis and Dr J. Lockhart from the department of Management Systems at Massey University.

Your organisation name has been obtained from the New Zealand Business Who's Who, 41st Edition, year 2000. You will be asked to answer the attached survey questionnaire simply by one of three ways: checking a box, circling a number or writing brief comments. Answering the questionnaire should only take half an hour of your time. If you wish, a summary and/or your own organisational results will be mailed to you after the data have been analysed.

The information obtained from respondents will be used only for this research and publications arising from this research project. The information will be coded, analysed and only summary statistics will be produced and presented in the form of an academic report. The name of your organisation and your name will not be disclosed in any way throughout the produced report. We guarantee full confidentiality of your organisation name and your identity and responses. In order to ensure complete privacy, we have provided an identification number for each participant. We will use this number for follow-up procedures, and your organisation's name will be erased immediately after the coding and analysis of the data has been completed.

If you agree to take part in the study, you have the right to:

- refuse to answer any particular question, and to withdraw from the study at any time;
- ask any further questions that may occur to you during your participation;
- to provide information on the understanding that your name will not be used unless you give permission to the researcher;
- to be given access to a summary of the findings of the study when it is concluded.

If you agree to participate in this study, please sign the consent form and return it with the completed questionnaire in the enclosed, prepaid, self-addressed envelope at your earliest convenience. For further information, please contact me or any of the supervisors on the e-mail addresses shown below.

Mustafa Eid,
Dr A. Yusuf
Prof A. Vitalis
Dr J. Lockhart

M.I.Eid@massey.ac.nz
A.Yusuf@massey.ac.nz
A.Vitalis@massey.ac.nz
J.Lockhart@massey.ac.nz

Te Kunenga ki Pūrehuroa

Inception to Infinity: Massey University's commitment to learning as a life-long journey



1st November 2000

**The Manager
Information Systems/Technology Function**

Dear Sir/Madam

Subject: A survey questionnaire for the study of current practices of strategic information systems (IS) control in New Zealand

Recently, we sent you a survey questionnaire to investigate how IS function's managers or IS planners in New Zealand organisations, handle the issue of performance monitoring and the review of strategic IS plans from a strategic perspective (i.e., strategic IS control). We hope to determine the kind of approaches used in strategic IS control. Also, we hope to measure the effectiveness level of the approaches used. So, your views are very important to the research objectives. To date, we have not received your completed questionnaire, therefore we would like to invite you again to participate in this survey.

If you need another copy of the questionnaire, please send me a message on my E-mail address as shown below. I will be happy to send it to you as soon as possible.

Thank you for your time and cooperation in furthering this research endeavor.

Yours sincerely,

Mustafa Eid,
Ph.D. student
Department of Management
P.O. Box 11-222
College of Business, Massey University
Palmerston North, New Zealand

E-mail address: M.I.Eid@massey.ac.nz
Phone number: (06) 356 9099 Ext. 2657

Te Kūnenga ki Pūrehuroa

Inception to Infinity: Massey University's commitment to learning as a life-long journey



Strategic Information Systems Control Practices in New Zealand

INFORMATION SHEET

This research project is on the issue of performance monitoring and maintenance of the strategic IS plans from a strategic perspective (i.e., strategic IS control). This research is mainly descriptive, which is designed to help us better understand and evaluate current practices of strategic performance monitoring and maintenance of strategic IS plans in IS functions in New Zealand. I am conducting this research for my PhD which is being supervised by Dr A. Yusuf, Professor A. Vitalis and Dr J. Lockhart from the department of Management Systems at Massey University.

Your organisation name has been obtained from the New Zealand Business Who's Who, 41st Edition, year 2000. You will be asked to answer the attached survey questionnaire simply by one of three ways: checking a box, circling a number or writing brief comments. Answering the questionnaire should only take half an hour of your time. If you wish, a summary and/or your own organisational results will be mailed to you after the data have been analysed.

The information obtained from respondents will be used only for this research and publications arising from this research project. The information will be coded, analysed and only summary statistics will be produced and presented in the form of an academic report. The name of your organisation and your name will not be disclosed in any way throughout the produced report. We guarantee full confidentiality of your organisation name and your identity and responses. In order to ensure complete privacy, we have provided an identification number for each participant. We will use this number for follow-up procedures, and your organisation's name will be erased immediately after the coding and analysis of the data has been completed.

If you agree to take part in the study, you have the right to:

- refuse to answer any particular question, and to withdraw from the study at any time;
- ask any further questions that may occur to you during your participation;
- to provide information on the understanding that your name will not be used unless you give permission to the researcher;
- to be given access to a summary of the findings of the study when it is concluded.

If you agree to participate in this study, please sign the consent form and return it with the completed questionnaire in the enclosed, prepaid, self-addressed envelope at your earliest convenience. For further information, please contact me or any of the supervisors on the e-mail addresses shown below.

Mustafa Eid,
Dr A. Yusuf
Prof A. Vitalis
Dr J. Lockhart

M.I.Eid@massey.ac.nz
A.Yusuf@massey.ac.nz
A.Vitalis@massey.ac.nz
J.Lockhart@massey.ac.nz

Te Kūnenga ki Pūrehuroa

Inception to Infinity: Massey University's commitment to learning as a life-long journey

Appendix B: The Questionnaire

PhD Research Questionnaire

Strategic Information Systems Control Practices in New Zealand

By

Mustafa Eid

Department of Management Systems
College of Business
Massey University
Palmerston North, New Zealand

September 2000

Strategic Information Systems Control Practices in New Zealand

PhD Research Questionnaire

This research aims to investigate:

- The way Information Systems (IS) practitioners in New Zealand control (monitor, review and maintain) their IS strategy from a strategic perspective; and
- How effectively they perform this task.

Strategic IS Control is a process of strategic oriented monitoring and reviewing the performance of IS strategy so as to maintain the adequacy of IS strategy and improve the strategic IS management process. In the context of this questionnaire, the term **strategic IS management** includes development and implementation of IS strategy or strategic IS plan. The terms: **strategic IS planning** and **strategic IS management** mean the same thing. **Strategic IS plan** consists of a set of integrated IS applications which are focused towards supporting the business strategy. The IS manager/officer responsible for the strategic IS plan(s) in your organisation, should complete this research questionnaire.

Please, note completion of the questionnaire implies consent, and you may withdraw from the study at any time by writing to the researcher using the E-mail address shown below.

Please indicate whether you want a copy of the summary of the general results and/or the results of your organisation

A summary of the general results	YES	<input type="checkbox"/>	NO	<input type="checkbox"/>
A summary of your organisation’s results	YES	<input type="checkbox"/>	NO	<input type="checkbox"/>

You will be asked to respond in one of four ways: Circle “①” a number on a scale, Tick ☒ in a box or Write your comments on the line(s) provided.

If you have any enquires about this survey, please contact:
Mustafa Eid, using the Email address M.I.Eid@massey.ac.nz

Part1. Demographics															
1.	<p>Please tick <input checked="" type="checkbox"/>one of the boxes (organisation size) below which best represents (approximately) the total number of employees in your organisation.</p> <p>1 <input type="checkbox"/> 1-10 3 <input type="checkbox"/> 51-100 5 <input type="checkbox"/> 151-200 2 <input type="checkbox"/> 11-50 4 <input type="checkbox"/> 101-150 6 <input type="checkbox"/> 201 or more</p>	Office Use Only 1													
2.	<p>What is your organisational structure based on? Please tick <input checked="" type="checkbox"/> your choice</p> <p>1 <input type="checkbox"/> Functions 3 <input type="checkbox"/> Divisions 2 <input checked="" type="checkbox"/> Products 4 <input type="checkbox"/> Other, (please specify below): _____</p>	2													
3.	<p>To what extent do managers (of functions, divisions, etc) have authority with respect to running their operations independently of the head office? Please circle “①” a number.</p> <table><tr><td>Minimum Authority</td><td></td><td></td><td>Moderate Authority</td><td></td><td>Maximum Authority</td></tr><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr></table>	Minimum Authority			Moderate Authority		Maximum Authority	1	2	3	4	5	6	7	3
Minimum Authority			Moderate Authority		Maximum Authority										
1	2	3	4	5	6	7									
4.	<p>How do you rate the level of industry competitiveness in which your organisation is operating? Please circle “①” a number.</p> <table><tr><td>Not Competitive</td><td></td><td></td><td>Average Competitive</td><td></td><td>Very Competitive</td></tr><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr></table>	Not Competitive			Average Competitive		Very Competitive	1	2	3	4	5	6	7	4
Not Competitive			Average Competitive		Very Competitive										
1	2	3	4	5	6	7									
5.	<p>How many employees/contractors (approximately) are currently working in the Information Systems function in your organisation? Please tick <input checked="" type="checkbox"/> your choice.</p> <p>1 <input type="checkbox"/> 1- 20 3 <input type="checkbox"/> 41- 60 5 <input type="checkbox"/> 81- 100 2 <input type="checkbox"/> 21- 40 4 <input type="checkbox"/> 61- 80 6 <input type="checkbox"/> 101 or more</p>	5													
6.	<p>How intensive are your information/office systems being used by end users in your organisation? Please circle “①”a number?</p> <table><tr><td>Minimum Use</td><td></td><td></td><td>Average Use</td><td></td><td>Maximum Use</td></tr><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr></table>	Minimum Use			Average Use		Maximum Use	1	2	3	4	5	6	7	6
Minimum Use			Average Use		Maximum Use										
1	2	3	4	5	6	7									
7.	<p>Your gender? Please tick <input checked="" type="checkbox"/> your choice.</p> <p>1 <input type="checkbox"/> Male 2 <input type="checkbox"/> Female</p>	7													

8.	How many years of IS/IT managerial experience do you have? Please tick <input checked="" type="checkbox"/> your choice.		Office Use Only	
	1 <input type="checkbox"/> 1-3 2 <input type="checkbox"/> 4-6	3 <input type="checkbox"/> 7-10 4 <input type="checkbox"/> 11-15		5 <input type="checkbox"/> 16 and more
9.	Does your organisation have a strategic IS plan currently or in the past?	Please tick <input checked="" type="checkbox"/> your choice 1 <input type="checkbox"/> Yes, Continue 2 <input checked="" type="checkbox"/> No, ⊗ Part 6, page 14		9
10.	What time period does/did your strategic IS plan(s) cover? Please tick <input checked="" type="checkbox"/> your choice 1 <input type="checkbox"/> 1 – 2 years 2 <input type="checkbox"/> 3 – 5 3 <input type="checkbox"/> 6 – 9 4 <input checked="" type="checkbox"/> 10 or more			10
Part 2. Degree of Existence of strategic IS control practice				
11.	Did you perform any kind of strategic IS control (i.e., strategic oriented monitoring and reviewing of the strategic IS plan) currently or in the past? Please tick <input checked="" type="checkbox"/> your choice 1 <input checked="" type="checkbox"/> Yes, ⊗ Part 3, page 5 2 <input type="checkbox"/> No, Continue			11
12.	If you are not currently practising strategic IS control, then do you practise any other kind of control over your strategic IS plan(s)?	Please tick <input checked="" type="checkbox"/> your choice 1 <input type="checkbox"/> Budgetary/Financial control 2 <input type="checkbox"/> Other		12
13.	If you are not currently performing or have not performed in the past any kind of strategic IS control in your organisation, then what is your current position in relation to establishing a strategic IS control process in your organisation? Please tick <input checked="" type="checkbox"/> one option. 1 <input type="checkbox"/> Not intending to establish a process of strategic IS control, Continue 2 <input type="checkbox"/> Thinking of establishing a IS control, Continue 3 <input type="checkbox"/> Proposing to establish a process of strategic IS control, ⊗ Part 3, page 5 4 <input type="checkbox"/> Developing a process of strategic IS control, ⊗ Part 3, page 5			13
14.	If you are not currently intending to establish a process of strategic IS control in your organisation, then please indicate the reason(s) why not? Please tick <input checked="" type="checkbox"/> all that apply. 1 <input type="checkbox"/> Not relevant 4 <input type="checkbox"/> Lack of knowledge and skills 2 <input type="checkbox"/> Difficult 5 <input type="checkbox"/> Lack of time 3 <input type="checkbox"/> Lack of funds 6 <input type="checkbox"/> Other, Please Specify below: ⊗ Part 6, page 14			14 – 22

Part 3. Strategic Information Systems Control Practice		<i>Office Use Only</i>
The questions below allow us to identify the kind of strategic IS control process used in your IS function.		
Section (3.1) Strategic IS Performance Monitoring		
15.	<p>Monitoring strategic performance of a strategic IS plan(s) is concerned with checking how well the strategic IS plan performs in achieving its objectives and supporting the business strategy and direction.</p> <p>The following are possible methods for monitoring the strategic performance of a strategic IS plan: Please indicate how do you approach the issue of monitoring strategic performance of your strategic IS plan(s) by <u>circling</u> “①” one or more of the following options?</p> <p>a. Cybernetics type monitoring which includes:</p> <ol style="list-style-type: none">1. Defining Strategic IS Performance Measure(s), (A strategic IS performance measure is a conceptual variable whose values indicate the actual performance of the implemented IS application in relation to a specific strategic IS target or objective.)2. Comparing the actual strategic IS performance results against the corresponding strategic IS targets or objectives3. Determining the variance between the actual strategic IS performance results and the desired strategic IS targets or objectives.4. Proceeding to review the IS strategy in case significant variance does exist. <p>b. Ad hoc type monitoring which includes:</p> <ol style="list-style-type: none">1. Enquiring from business top management and/or concerned end users about the strategic performance of current IS applications in the current business circumstances.2. Evaluating the strategic IS performance against the set out strategic targets or objectives, based on the feedback from top management and/or concerned end users3. Reviewing strategic IS plan(s) in case of unsatisfactory strategic IS performance. <p>c. Other, (please specify below):</p> <div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	23-27

Section (3.2) Monitoring Organisational Environment		Office Use Only
16.	<p>Monitoring the organisational environment is concerned with scanning the organisational environment factors, for the purpose of identifying any relevant change(s) or event(s), that could have an impact on the strategic performance of the strategic IS plan(s) in the organisation.</p> <p>Among the following, what information do you search for while monitoring the organisational environment? Please circle “①” the numbers that apply.</p> <ol style="list-style-type: none">1. External Business Environment (Economic, commercial, social, political and competitive climate in which the organisation operates, new external opportunities for using IT such as inter organisational IS)2. Internal Business Environment (Strategy, Objectives, Direction, Resources, Activities, processes, procedures, structure and culture of the business)3. External IS/IT Environment (IS/IT trends, The use of IS/IT by others in the industry or by similar organisations)4. Internal IS/IT Environment (Current situation, quality, contribution and management of available IS/IT in the organisation)	28-31
17.	<p>Among the following, what kind of tools/information sources do you employ for searching and collecting information about the organisational environment? Please circle “①” the numbers that apply.</p> <ol style="list-style-type: none">1. News papers2. Internet tools3. Specialised external databases4. Business internal resources/databases5. Specialised information agencies6. Others, (please specify below): <div></div> <div></div>	32-40
18.	<p>To what extent could changes in your organisational environment affect the adequacy of your strategic IS plan(s)? Please circle “①” a number.</p> <div><div>Little Effect</div><div>123</div><div>Medium Effect</div><div>456</div><div>Large Effect</div><div>7</div></div> <div></div>	41

19.	During the last year, how many change(s) have you observed in your organisational Environment? Please circle "①" a number.		Office Use Only
	<div><div>Few Changes</div><div>Average Changes</div><div>Many Changes</div></div> <div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>7</div></div>		
Section (3.3) Strategic IS Review			
20.	Strategic IS Review is concerned with revising and maintaining the strategic IS plan(s) from a strategic perspective. Strategic IS review may also involve revising and maintaining the strategic IS management process. From the following, what type of strategic IS review do you perform? Please circle "①" a number. 1. Review strategic IS plan(s) only 2. Review both strategic IS plan(s) and strategic IS management process		43- 44
21.	On what basis do you perform the strategic IS review task? Please circle "①" the numbers that apply. 1. On a regular basis as part of the annual IS planning cycle 2. As a result of monitoring strategic IS plans or strategic IS process 3. As a result of relevant significant changes in the organisational environment 4. Others, (please specify below): _____ _____		45- 51
22.	If you perform regular strategic IS reviews as part of the annual IS planning cycle, how often do you carry out the regular strategic IS review?	Please tick <input checked="" type="checkbox"/> your choice 1 <input type="checkbox"/> Yearly 2 <input type="checkbox"/> Half Yearly 3 <input checked="" type="checkbox"/> Quarterly 4 <input checked="" type="checkbox"/> Monthly	52
23.	Among the following, please indicate the possible outcome(s) of the strategic IS review process. Please circle "①" the numbers that apply. 1. Change the strategic IS plan 2. Change individual IS application(s) 3. Change the strategic IS management process/approach 4. Change internal organisational process(s)/procedure(s) 5. Change organisational structure of IS function 6. Others, please specify below: _____ _____		53- 62

24.	Does the strategic IS review process produce feedback information such as learning experience in terms of planning/implementation lessons or problems, that are useful for improving the strategic IS management process?	Please tick <input checked="" type="checkbox"/> your choice 1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No	Office Use Only 63
Section (3.4) Organisational Behaviour of Strategic IS Control			
25.	Among the following possible staff members or group of staff members, who is responsible for running or managing the strategic IS control process in your organisation? Please circle “①” a number. 1. Chief Information Officer 2. IS planning manager/officer 3. Group of IS senior officers 4. Group of IS and business senior officers 5. Other, (please specify below):		64
26.	To whom do the strategic IS control staff report? Please circle “①” a number. 1. Chief Information Officer 2. Chief Executive Officer 3. Chief Accounting/Finance Manager 4. Other, (please specify below): _____ _____		65
27.	To what extent do the responsible staff members /group have authority with regards to making decisions in relation to strategic IS control issues? Please circle “①” a number. Minimum Authority Moderate Authority Maximum Authority 1 2 3 4 5 6 7 _____		66 67-

28.	What kind of knowledge, skills or expertise do the staff member(s) working on the strategic IS control task have? Please circle “①” the numbers that apply.		73
	<div>1. Strategic IS management</div> <div>2. General IS management</div> <div>3. Accounting</div> <div>4. <u>IS/IT Technical</u></div> <div>5. Other, (please specify below):</div>		
29.	If applicable, how often do the strategic IS control staff members work in a teamwork environment? Please circle “①” a number.		Office Use Only
	<div>Never Seldom Sometimes Often Always</div> <div>1 2 3 4 5</div>		74
Section (3.5) Formality of Strategic IS Control Process			
30.	How do you communicate the information related to the activities of the strategic IS control process? Please circle “①” the numbers that apply.		75-78
	Monitoring Organisational Environment	1 2 3	
	Monitoring Strategic Performance of Strategic IS Plan(s)	1 2 3	
	Strategic Review of Strategic IS Plan(s)	1 2 3	
	Strategic Review of Strategic IS Management process	1 2 3	79
31.	Do you perform the activities of the strategic IS control process according to a documented model that defines the steps, procedures and sequence in a systematic manner?	Please tick <input checked="" type="checkbox"/> your choice 1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No	

Part 4. Level of effectiveness of Strategic IS Control Approach								
32.	To what extent do you anticipate or predict future events, changes in the organisational environment that are relevant to your strategic IS plan(s)? Please circle “①” a number.						80	
	Never 1	Seldom 2	Sometimes 3	Often 4	Always 5			
33.	To what extent do you consider making future changes in the strategic IS plan(s) to cater for anticipated future changes in the organisational environment? Please circle “①” a number.						81	
	Never 1	Seldom 2	Sometimes 3	Often 4	Always 5			
34.	How do you rate the level of accuracy of the acquired organisational environment information? Please circle “①” a number.						82	
	Least Accurate 1	2	3	Moderately Accurate 4	5	6	Most Accurate 7	
35.	To what extent is the information produced from monitoring the strategic performance of strategic IS plan(s) or monitoring the organisational environment are timely? Please circle “①” the numbers that apply.						Office Use Only	
		Not Timely			Moderate		Very Timely	
	Monitoring Strategic Performance of Strategic IS Plans	1	2	3	4	5	6	7
	Monitoring Organisational Performance	1	2	3	4	5	6	7
36.	To what extent do you feel informed about the developments occurring in the organisational environment? Please circle “①” a number.						83- 84	
	Least Informed 1	2	3	Moderate 4	5	6	Most Informed 7	

37.	To what extent is the strategic review process of the strategic IS plan(s) timely in response to strategic IS performance monitoring or organisational environment monitoring processes? Please circle “①” a number.							86	
<div>Not TimelyMiddleVery Timely</div> <div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>7</div></div>									
38.	How frequently does the strategic IS review process lead to timely changes in the strategic IS plans? Please circle “①” a number.							87	
<div>NeverSeldomSometimesOftenAlways</div> <div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div></div>									
39.	How do you rate the speed of processing the paperwork and communications related to activities of and decisions made by the strategic IS review process? Please circle “①” a number.							88	
<div>Very SlowModerateVery Fast</div> <div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>7</div></div>									
40.	How do you rate the value of information collected from monitoring strategic performance of strategic IS plan(s) or monitoring the organisational environment? Please circle “①” a number.							89-90	
		Little Value			Average Value		High Value		
	Monitoring Strategic Performance of Strategic IS Plans	1	2	3	4	5	6		7
	Monitoring Organisational Environment	1	2	3	4	5	6		7
41.	Among the following, what methods/tools do you employ for documenting, presenting, storing and maintaining the important details and outcome of the activities of the strategic IS control in your organisation? Please circle “①” the numbers that apply.							91	
		Hand Written Notes	Electronic Word Processing	Document Management System/Database	Presentation tools such as Microsoft Power Point				
	Activities of Strategic IS Control	1	2	3	4				

42.

During the last twelve months, how would you rate the level of each of the following performance characteristics of your strategic IS plan(s), as a result of applying strategic IS control in your organisation? Performance characteristics of strategic IS plan(s) are defined as follows:

Feasibility represents the possibility of implementing strategic IS plans in the current and future business and IT circumstances. **Consistency** is how much is the strategic IS plan(s) consistent with the strategic Business plan(s). **Capability** represents the ability of strategic IS plan(s) to satisfy and support strategic business plan(s). **Reliability** is how reliable is the strategic IS plan(s) against changes in the current and future business environment assumptions, circumstances and conditions. **Validity** is how accurate and realistic is the strategic IS plan(s). Please circle “①” the numbers that apply.

	Low			Medium			High
Feasibility	1	2	3	4	5	6	7
Consistency	1	2	3	4	5	6	7
Capability	1	2	3	4	5	6	7
Reliability	1	2	3	4	5	6	7
Validity	1	2	3	4	5	6	7

43.

How easily is the internal reporting and communication of information related to the process of strategic IS control? Please circle “①” a number.

Not Easy

Moderate

Very Easy

1

2

3

4

5

6

7

44.

If you have changed your strategic IS plan(s) as a result of the strategic IS review process, do you do any kind of testing to validate the newly changed strategic IS plan(s) before implementing them in real life? Please circle “①” a number.

Never

Seldom

Sometimes

Often

Always

1

2

3

4

5

Office Use Only
92

45.

To what extent do you believe the strategic IS management process is improving as a result of learning from strategic IS planning and implementation mistakes/problems identified by the process of strategic IS control? Please circle “①” a number.

Little Improvement

Moderate

Much Improvement

1

2

3

4

5

6

7

93

46.	How effective is each of the following management functions in relation to managing the process of strategic IS control in your organisation? Please circle “①” the numbers that apply.							94-98
Management function / level	Least Effective			Middle			Most Effective	
Planning	1	2	3	4	5	6	7	
Organising	1	2	3	4	5	6	7	
Directing	1	2	3	4	5	6	7	
Co-ordinating	1	2	3	4	5	6	7	
Controlling	1	2	3	4	5	6	7	
Part 5. Primary Obstacles facing Current Strategic IS Control Practices								
47.	What are the primary obstacles you encounter during the subtasks of strategic IS control process? Please circle “①” the numbers that apply.							99-102
	Lack of Funding	Lack of Time	Lack of Tools	Lack of Knowledge/Expertise	Difficult			
Monitoring Organisational Environment	1	2	3	4	5			
Strategic Monitoring of Strategic IS plan(s)	1	2	3	4	5			
Strategic Review of Strategic IS plan(s)	1	2	3	4	5			
Strategic Review of Strategic IS management process	1	2	3	4	5			
Part 6. Comments								
48.	If you have any comments on any topic raised in the questionnaire, please feel free to write them below:							103-110

Participant's Assessment

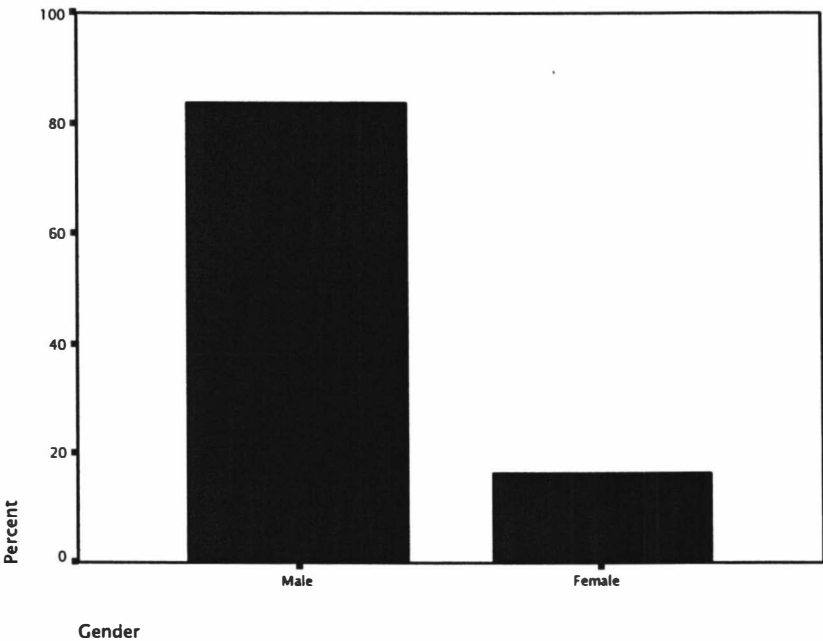
The following question is part of the pilot test which is designed to collect assessment feedback information from participants who filled the given questionnaire about strategic IS control practices in New Zealand. The purpose of the assessment of the assessment is improve the questionnaire with respect to aspects of clarity, readability, simplicity, understandability, consistency, organization, sensitivity, and length of questionnaire.

1.	From your reading and answering the questions included in the given questionnaire about strategic IS control practices in New Zealand, To what extent are you satisfied with each of the following aspects of the given questionnaire? Please circle “①” the numbers that apply.							<i>Office Use Only</i>
	Least Satisfied			Reasonably Satisfied			Most Satisfied	1-8
	Clarity	1	2	3	4	5	6	7
	Readability	1	2	3	4	5	6	7
	Simplicity	1	2	3	4	5	6	7
	Understandability	1	2	3	4	5	6	7
	Consistency	1	2	3	4	5	6	7
	Organization	1	2	3	4	5	6	7
	Sensitivity	1	2	3	4	5	6	7
	Length of Questionnaire	1	2	3	4	5	6	7

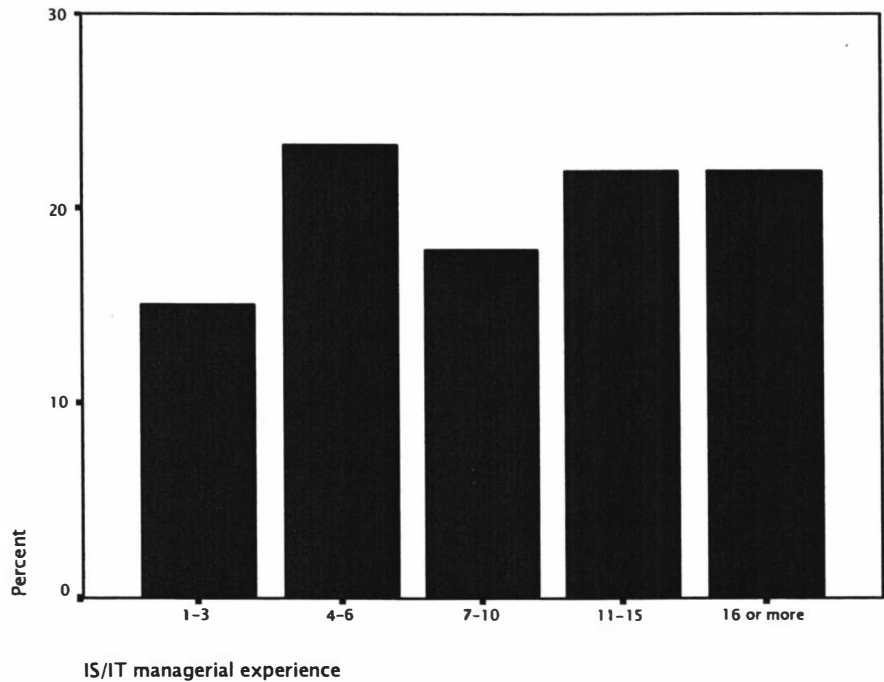
Appendix C: Graphs

C.1 Respondents Characteristics

C.1 Percentage Distribution of Gender



C.2 Percentage Distribution of Respondents IS/IT Managerial Experience



C.2 Organisational Characteristics

Figure C.3 Percentage Distribution of Organizational Size

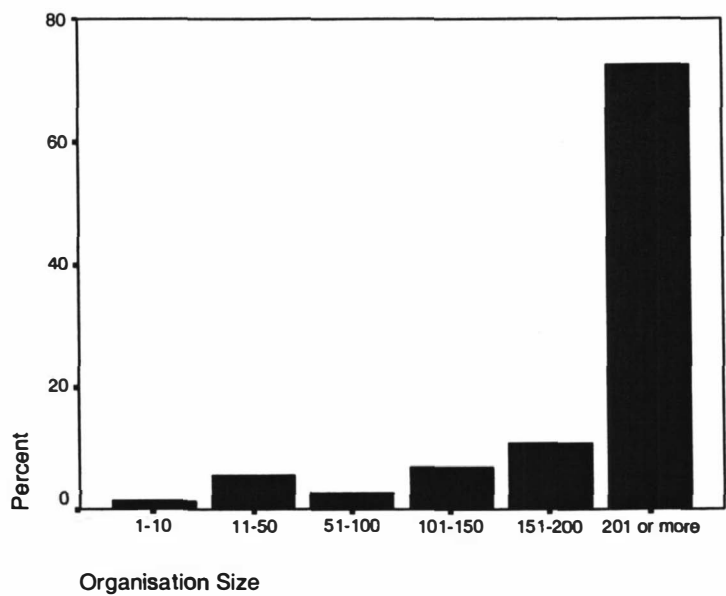


Figure C.4 Percentage Distribution of Organisation’s Structure

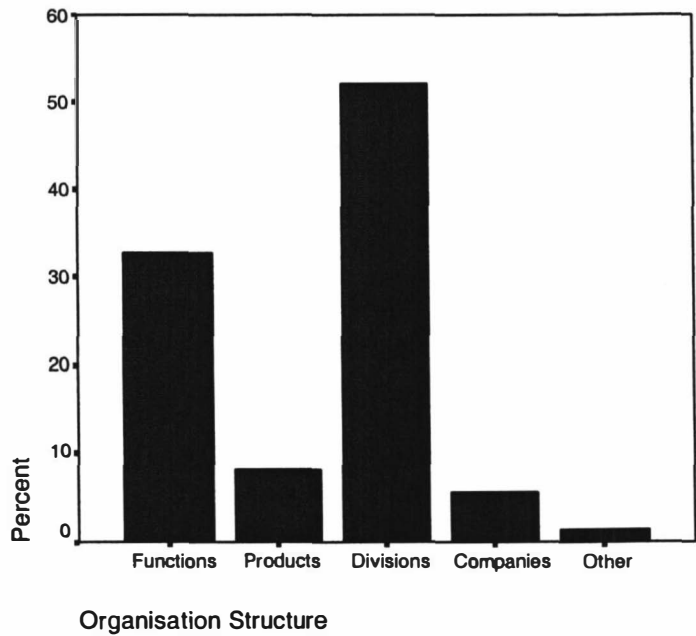


Figure C.5 Percentage Distribution of Organisation’s Authority Level

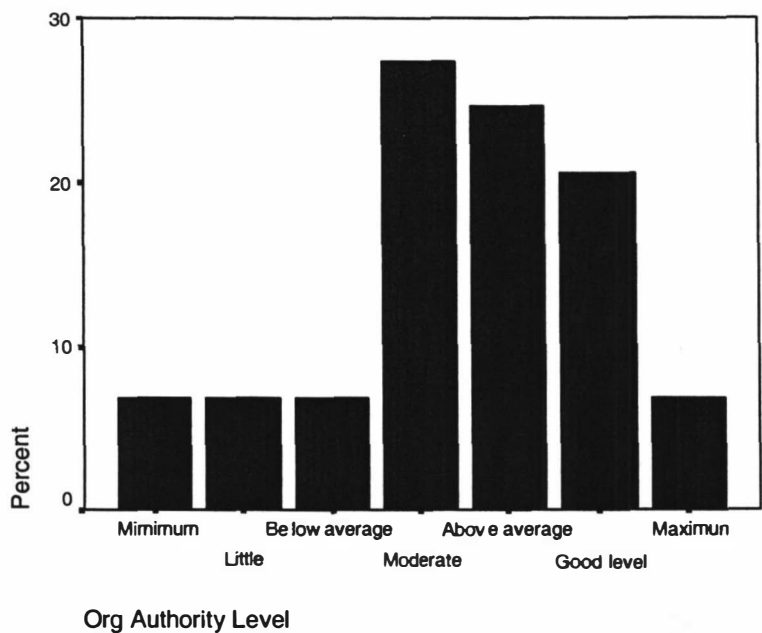


Figure C.6 Percentage Distribution of Industry Type

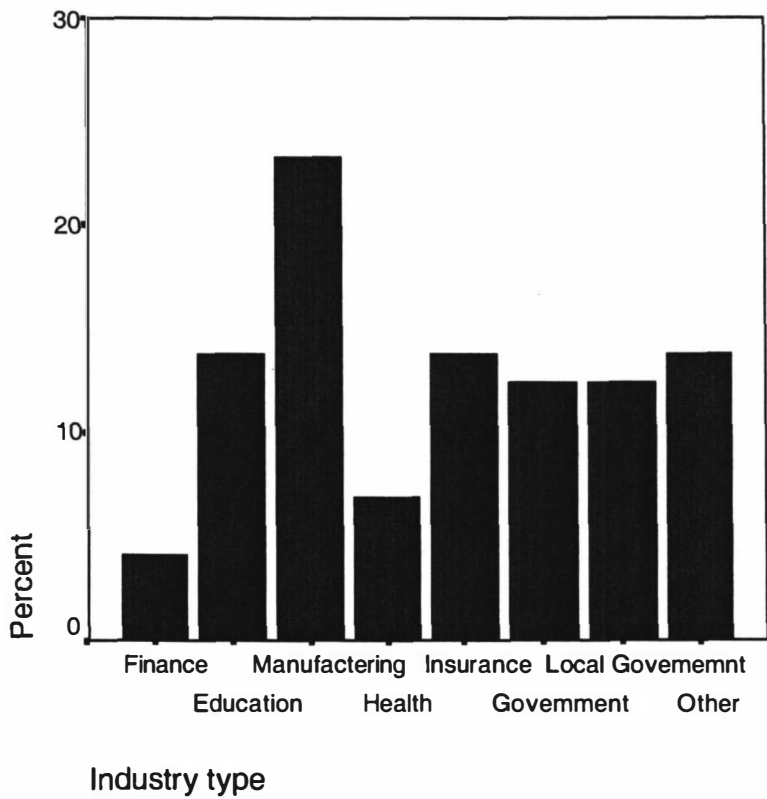
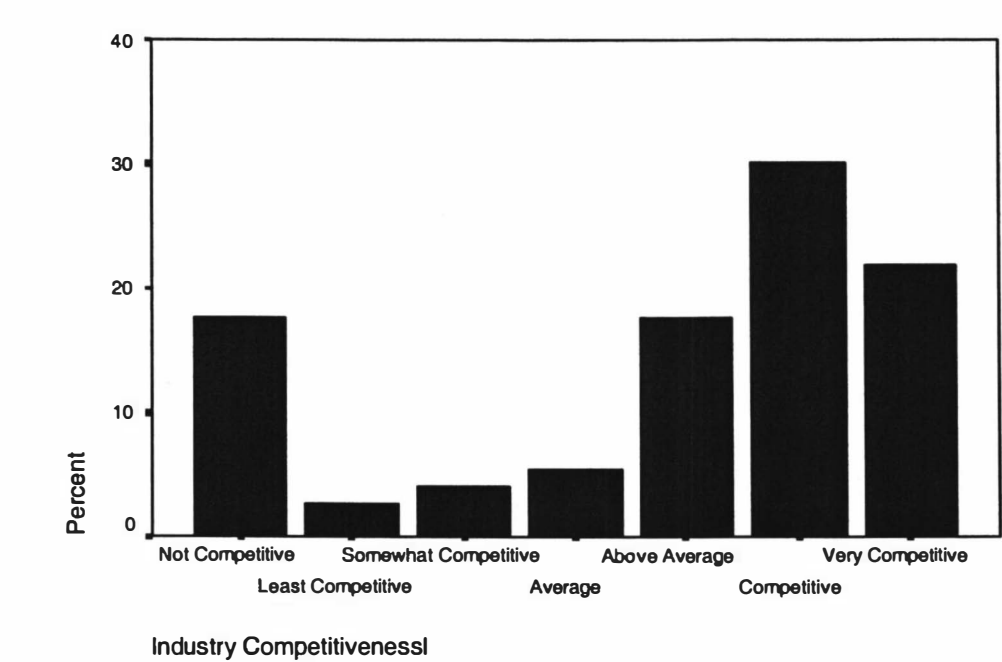


Figure C.7 Percentage Distribution of Industry Competitiveness



C.3 Information Systems Characteristics

Figure C.8 Percentage Distribution Information Systems function size

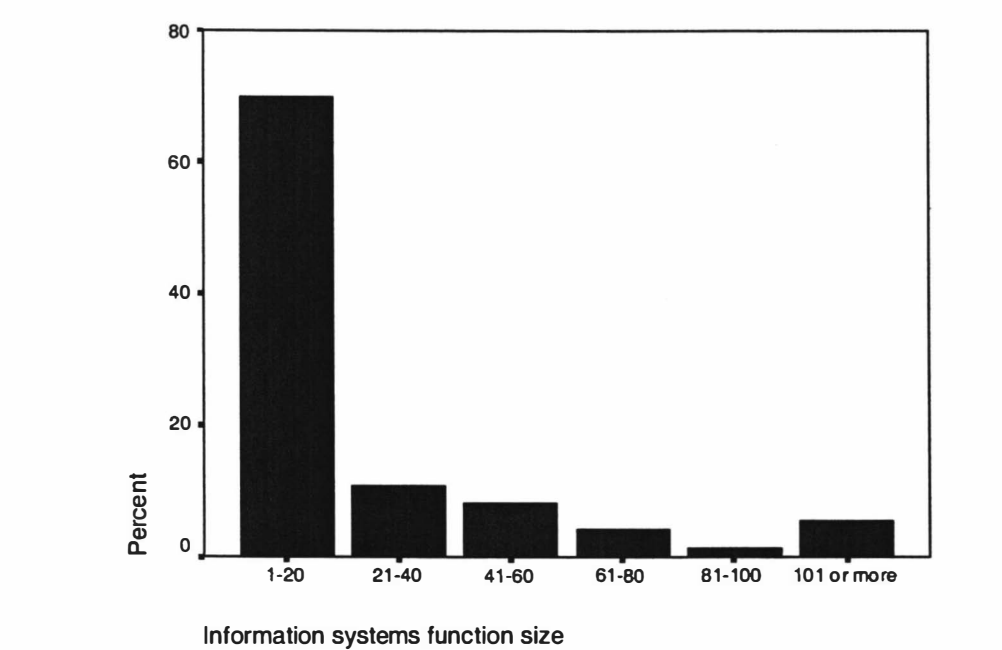


Figure C.9 Percentage Distribution of Information Systems Use

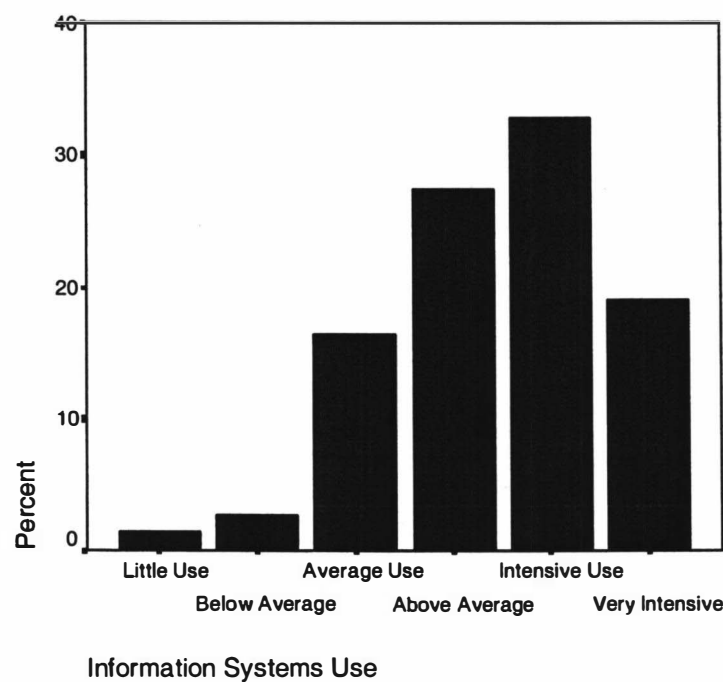
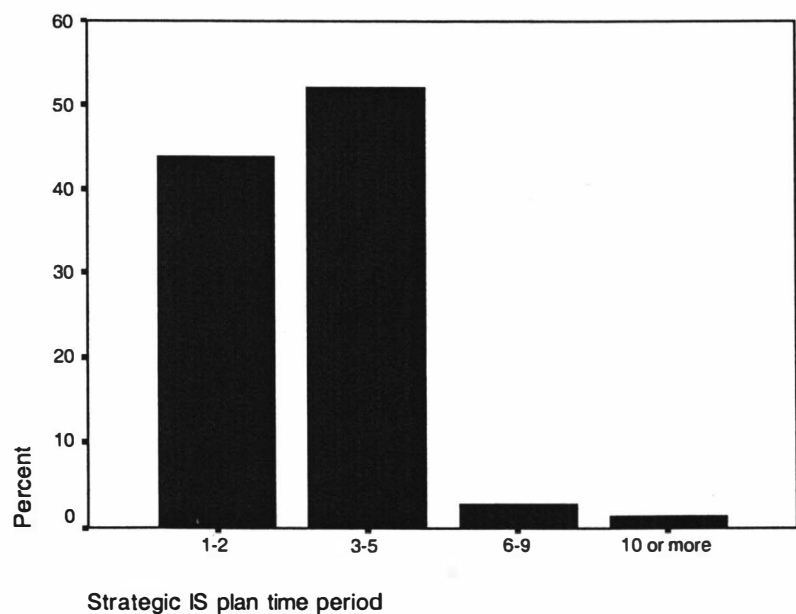


Figure C.10 Percentage Distribution of Strategic IS plan period



C.4 Strategic IS Control Characteristics

Figure C.11 Percentage Distribution of the Use of a Documented Model in Strategic IS Control

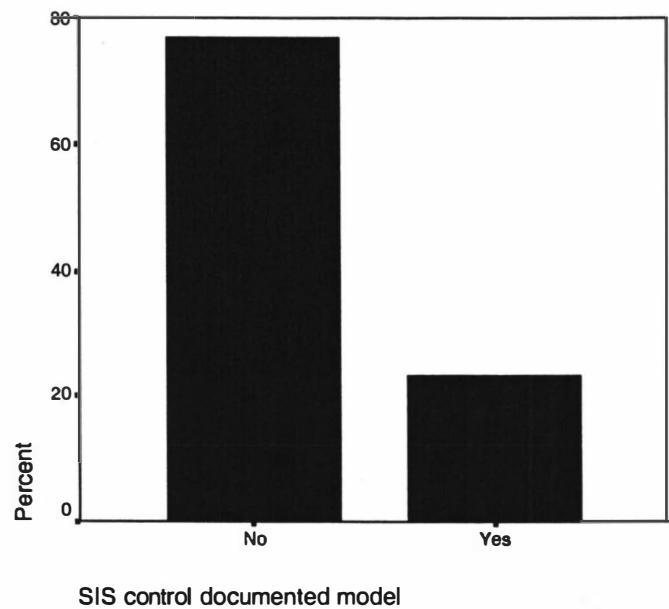


Figure C.12 Percentage of Organisations practising Review of SIS plans only and those that Review both SIS plans and SIS management process in Strategic IS Control

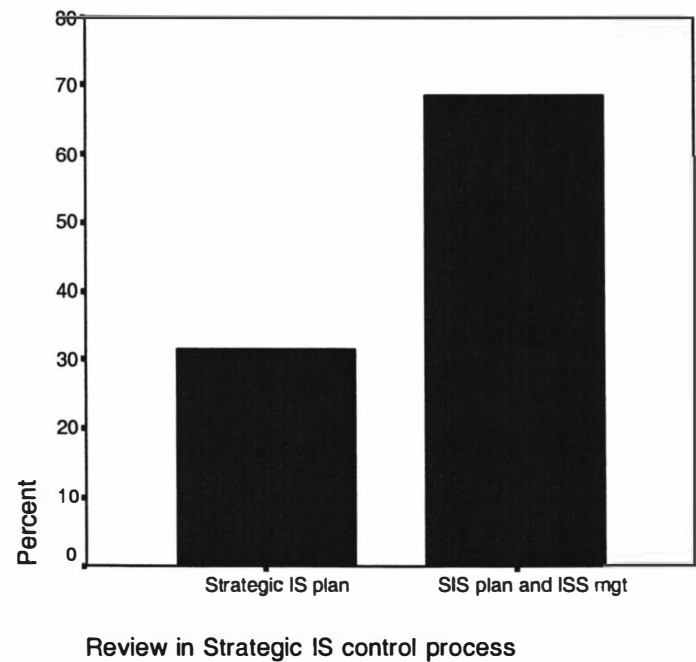


Figure C.13 Percentage of organisations having a learning process in Strategic IS control practice

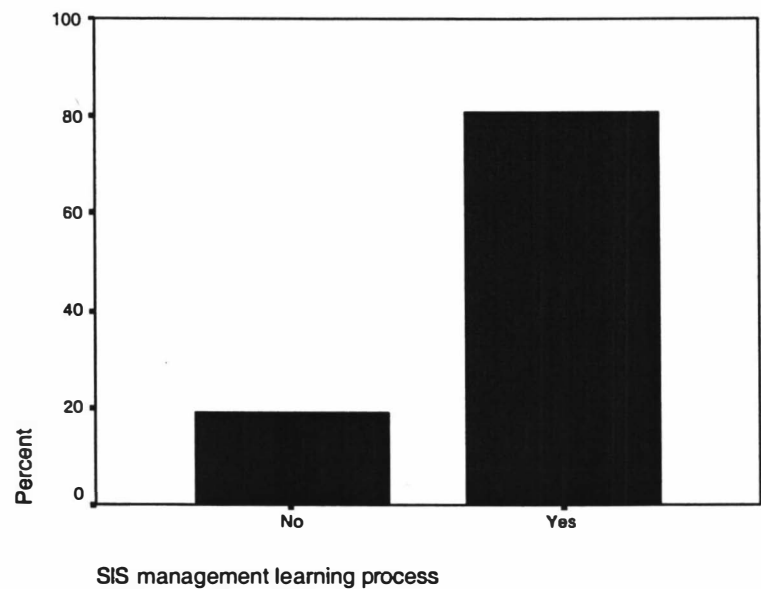


Figure C.14 Type of strategic IS approach and mean of total monthly hours spent on strategic IS control process

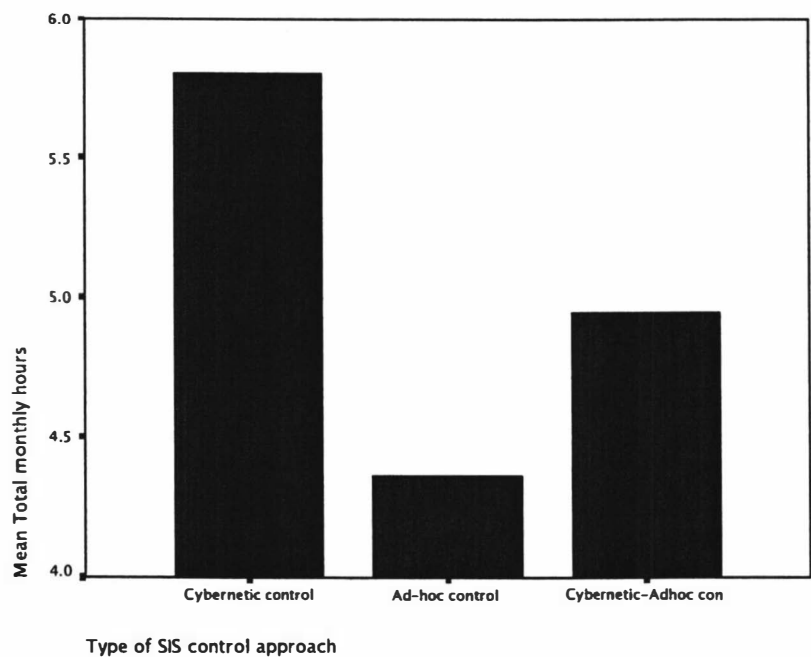
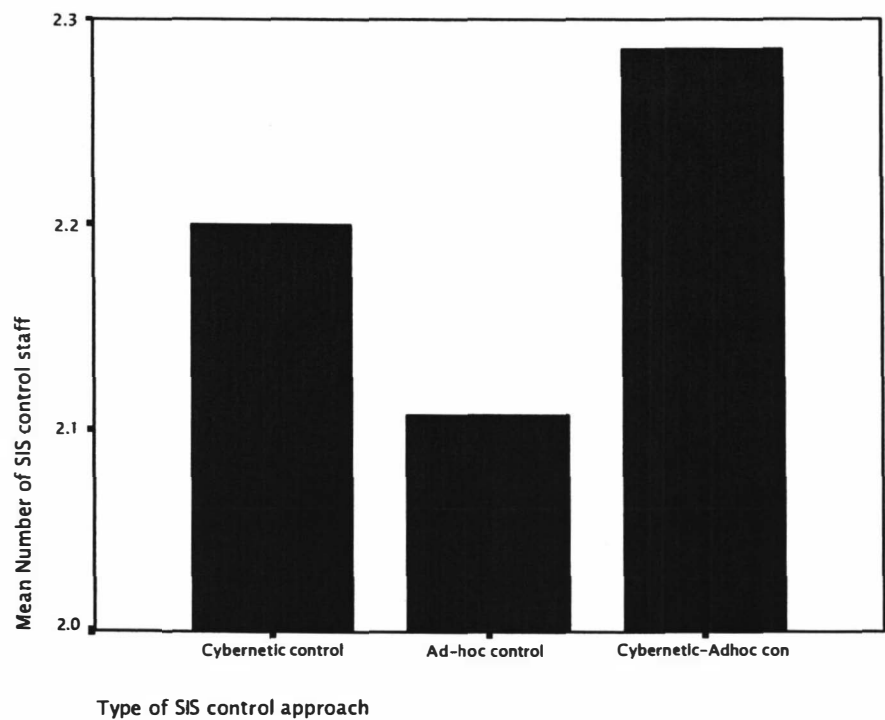


Figure C.15 Type of strategic IS approach and mean of total number of staff members used by strategic IS control process



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