

CHAPTER ONE

Introduction

This chapter commences with a discussion on the background to the study and the need for further research in this area. The definitions of the major terms used in the study follows. The study's significance and its objectives are then established. The chapter concludes with a description of the organisation of the dissertation.

1.1 Contingency theory and the accounting information system

This study examines the influence of certain factors on the perceived effectiveness of an entity's accounting information system. Contingency theory has had a significant influence on this type of research (Gul & Chia 1994, 413). Contingency theory suggests that the design and operation of an accounting information system are a function of multiple contingencies such as an organisation's structure, technology, size and other environmental factors (Abernethy & Chua 1995, 3). It suggests that there is no one accounting information system that applies to all entities. Particular features of an accounting information system depend upon the specific circumstances of the entity. There is a match between the level of certain contingent variables and the existence of an effective system. Abernethy and Chua (1995, 4) suggest that the better this match, the more effective the accounting information system. Therefore, organisations need to recognise the accounting information system that best matches their contingency variables (Otley 1980;

Abernethy & Stoelwinder 1991; Gul & Chia 1994). A major strand of management accounting research is the study of these factors that influence the design of accounting information systems. Many factors have been studied in relation to their influence on this system. Examples of these factors are: competition (Khandwalla 1972); production technology (Merchant 1984); financial crisis (Ezzamel & Bourne 1990); task uncertainty (Brownell & Dunk 1991); cultural factors (Dent 1991); organisational control (Flamholtz 1983); task predicability (Kim 1988) and perceived environmental uncertainty (Gul & Chia 1994).

Moore and Stuart (1985, 1) state that this theory has provided the framework for accounting information system research since 1960. Much research has been carried out in this area. Brownell and Dunk (1991,703) claim that this research is:

... the only organised critical mass of empirical work in management accounting at present.

1.2 Institutional theory and the accounting information system

Recent organisational research indicates that the operation and design of an accounting information system is not influenced only by contingent factors. It may also be influenced by institutional factors. Scott (1987, 494) suggests that institutional theory views an organisation as:

... an adaptive vehicle shaped in reaction to the characteristics and commitment of the participants as well as to the influences and constraints from the external environment.

Institutional theory states that external institutionalised rules and norms can also influence an accounting information system (Abernethy & Chua 1995, 4). Gupta, Dirsmith and Forgarty (1994, 2) suggest that contingency theory and institutional theory take almost opposite approaches to understanding the factors that lead to the development of an effective accounting information system. The most common feature of institutional theory is the authorisation or legitimation of certain features of the organisation by using laws or government regulations. Covalleski, Dirsmith and Michelman (1993, 66) argue that:

... an organisation's survival requires it as much to conform to societal norms of acceptable practice as to achieve high levels of production efficiency. Thus, many aspects of an organisation's formal structure, policies and procedures serve to demonstrate a conformity with the institutionalised rules and expectations expressed by external constituents.

Where a legal authority is not present, strong inducements by external parties to the entity can create structural changes in organisations. The entity is enticed to conform to an external party's conditions (Scott 1987, 503). This process is

viewed as political because it reflects the relative power of the internal and external parties associated with the organisation (Covaleski, Dirsmith & Michaelman 1993, 66). For example, government authorities often lack the necessary authority to impose their own values over education, local government or health organisations. However, inducements by government authorities can provide the necessary incentive to bring about change in these areas (Scott 1987, 503).

Despite the apparent inconsistencies between the contingency and the institutional perspective, theorists have recognised their interrelationship. Research has suggested that some contingent factors may become institutionalised over time. Some institutional factors may serve only a symbolic role whilst others will act as external inducements for change (Gupta, Dirsmith & Forgarty 1994, 2).

1.3 The need for more research on accounting information systems in hospitals

There is a need for further research on the factors that influence the perceived effectiveness of accounting information systems in hospitals. There are several reasons for this need. Firstly, pressure has come from government agencies to improve the effectiveness and efficiency of Australian hospitals. This has been prompted by the rising cost of health care in Australia. An example of rising health costs in Australia is reflected in the rising health budget of New South Wales. In 1990/91, the New South Wales Department of Health was responsible for a recurrent health budget of \$4.3 billion. In 1995/96, the same department is responsible for a health budget of \$5.9 billion. This kind of increase has prompted

governments to commence evaluating public hospitals' outputs in relation to the funding of inputs (Stoelwinder 1994, 15). Hospital management has also changed its focus. Management is devoting considerable attention establishing information systems and organisational arrangements required to support these government moves (Palmer 1991, 62). This has prompted a need for research into the influence of contingent and institutional factors on accounting information systems in these organisations (Palmer & Short 1994, 91).

Secondly, a reason for the need for further research in the hospital environment is the interest in a hospital's output. Hospitals provide a very wide range of complex services or products that are very difficult to place in generalised groups. For example, a hospital patient may have a heart ailment yet have an extended length of stay because of complications involving a kidney. Patients can have a several episodes of care and different lengths of stay. Further research is required to ascertain how an accounting information system can accommodate this complexity.

Thirdly, a reason for the need for further research in this area is society's perception of a hospital. Society perceives hospitals as entities that have products that are essential to society. The care of an individual patient is considered more important than the control of costs. More research is required to investigate the variables within this framework.

Finally, hospital research is also required because of a hospital's management structure. Public hospital professionals have considerable power and influence in

managing hospitals because they are central to the functioning of the hospital. Professionals such as visiting doctors control the majority of a hospital's resources and managers have a supervisory role. Abernethy and Stoelwinder (1991, 106) term this structure a dual hierarchal structure. Further research into the influence of this structure on the perceived effectiveness of the accounting information system is required.

Factors such as task uncertainty (Abernethy & Stoelwinder 1991); hospital funding (Covaleski, Dirsmith & Michaelman 1993); role conflict (Abernethy & Stoelwinder 1995) and managerial choice (Abernethy & Chua 1995) have all been studied within the hospital environment. Despite this prior research there is still a lack of systematic empirical evidence about the impact of some of the contextual variables on the perceived effectiveness of accounting information systems in public hospitals (Stoelwinder 1994, 17). Much of the evidence only reflects the authority and position of the individual. Research needs to examine a wider vision of control and an understanding of the interaction between control mechanisms and the processes that operate within a hospital (Abernethy & Stoelwinder 1986, 1). What impact are the new funding methods having on the perceived effectiveness of a hospital's accounting information system? Does the diversity of the hospital's service or the orientation of their CEO influence the perceived effectiveness of a hospital's accounting information system?

1.4 Definitions

At the outset it is necessary to clarify some terms used in this study. This is because these terms set the parameters of the investigation. The definitions of a public hospital, a hospital funding method and a management control system are given.

1.4.1 The public hospital

A dictionary definition of a hospital is an:

Institution for care of the sick or wounded.
(Oxford Dictionary, 576)

This definition needs to be examined closely. Firstly, it does not distinguish between public and private hospitals yet about 80% of all short stay hospital beds in Australia are only in public hospitals (Palmer 1991, 62). Private hospitals are those hospitals that are owned, controlled and funded by enterprises other than by a state government. This study uses the term “public hospital” to denote institutions that are owned and principally funded by a government. Public hospitals in Australia are available for the admission of both private and public patients. Private patients are those patients who pay fees and elect to be treated by a doctor of their choice. Public patients pay no fees but elect to be treated by a hospital appointed doctor. Revenue fees from private patients only contribute to a relatively small part of a public hospital’s costs because the majority of their patients are classified as public patients.

Secondly, state health authorities also use the term public hospital to define all health care centres including state psychiatric and geriatric hospitals that are directly funded by state authorities (Palmer & Short 1994, 87). This study only examines public hospitals that treat acute care patients and excludes institutions that care only for psychiatric and geriatric patients. There were two reasons for these exclusions. It maintains comparability with the majority of past empirical work in this area. It also maintains comparability with the majority of new funding schemes that have been developed for acute care patients in public hospitals. The acute care component in the public hospital system is the main focus of the current funding and organisational reforms (Palmer 1991, 62).

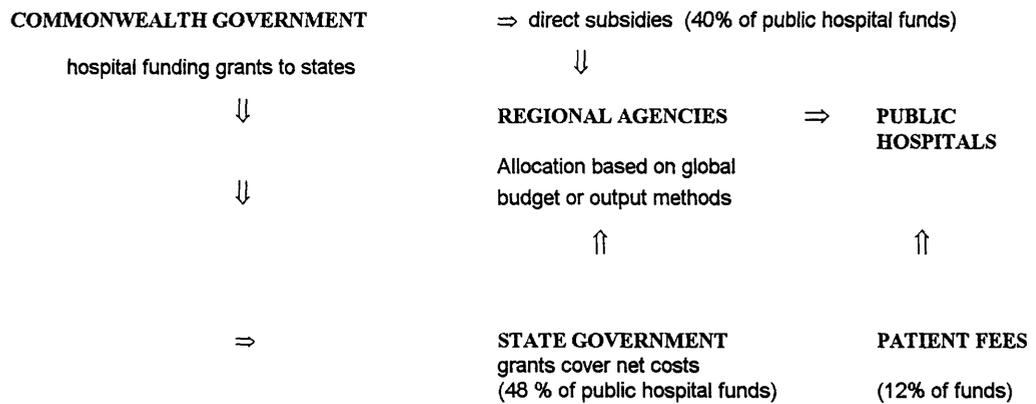
Another problem with this definition is the word “care”. An episode of care is seen as one patient’s illness or condition. Public hospitals cater for the care of both inpatients and outpatients. The prime area of interest in this study is directed towards inpatient treatment. This study examines all activities normally associated with servicing inpatients. This includes activities such as catering, maintenance and domestic services

1.4.2 Methods of funding public hospitals in Australia

A public hospital funding method is defined as an approach to the allocation of financial resources to those hospitals. Figure 1.1 shows the typical method of funding Australian public hospitals. The majority of funds for Australian public hospitals come from the federal (40%) and state governments (48%). The funds

are generally allocated to a regional government agency before being allocated to the hospitals under that agency's control. This study examines the government funding method at the regional agency-public hospital level.

Figure 1.1 Typical funding overview of public hospital services



Interest in the new systems of funding hospitals has been a major catalyst in the research field. New funding methods have been instituted to make health care more efficient and effective. Understanding how these methods operate and their influence on the perceived effectiveness of a public hospital's management control system enables hospital administrators to better allocate hospital resources.

There are essentially two methods of funding Australian public hospitals. One method is to supply funds based on a global budget. Global budgeting is based either on the historical or population requirements of the hospital. Another funding method uses a measurement based on the output of a hospital.

Both the historical and population-based approaches of global budgeting allocate funds based on the past resource requirements of the public hospital. The historical funding based approach uses *per diem* payments (Abernethy & Stoelwinder 1986, 348). Funds are allocated on a formula that uses budgeted bed utilisation. The advantage of this approach is the ease of obtaining patient bed day numbers. Its disadvantage is its promotion of prolonged bed stays that can have a detrimental impact on the efficient use of a public hospital's resources. The approach contains no incentives for change (Owens & Scotton 1990). Public hospitals that use this approach do not have any impetus to improve their efficiency (Douglas & Hirth 1991, 8). For this reason, it tends to perpetuate existing services and treatment (Broadhead 1991, 224).

The population-based approach is based on the philosophy that public hospital funding should bear some relationship to the number and needs of the people in the region serviced by the public hospital (Broadhead 1991, 224). This approach uses a fixed funding component based on a relative population index. The demographic and medical requirements of a given population are used to calculate the financial requirements of the hospitals in any given region (Clinton & Scheiwe 1995, 92). The NSW regional funding system uses this approach in the Resource Allocation Formula (RAF). The formula includes a component based on the age and sex of the population in any given region (NSW Department of Health (b) 1993, 6). Population-based funding is also used by the Commonwealth Grants Commission

in Australia for calculating the Commonwealth to State Financial Assistance Grants.

The advantage of a population-based approach is its explicit limiting of total expenditure allocated in any one period (Scotton & Owens 1991, 30). A major disadvantage of the population-based approach is the lack of a relationship between the cost of resources incurred and actual output. This does not promote the efficient use of hospital resources.

Government concern about the escalation of hospital expenditure, hospital bed utilisation and the public sector pressure to restrict financial commitment has progressively increased (Palmer 1991, 62). Given the health reforms that are necessary to contain costs in public hospitals, administrators have recognised the need to develop more effective ways to allocate resources, monitor costs and identify areas requiring change. Promotion of effectiveness in patient care requires the merging of financial and medical information (Clinton & Scheiwe 1995, 141). Output-based funding systems link these two types of information together. They reward greater output and efficient use of resources with increased revenue.

Broadhead (1991, 226) defines an output-based funding system as the:

... allocation of resources according to what is actually done, regardless of who or how they are to be served.

Scotton and Owens (1991, 183) suggest that implementing an output-based case payment formula to public hospitals leads to a change in behaviour in the health care delivery system. This results in the more efficient use of a hospital's resources.

The most common output-based hospital funding system in Australia is termed casemix. This term is used for a scientific approach to patient care classification. It is defined as a funding system which uses an allocation classification called diagnostic related groups (DRGs). DRGs are obtained from the international classification of diseases index (ICD9-CM). This index is recorded by a doctor in making the principal and secondary diagnosis of the patient's condition. From this record the DRG is computed (Hickie 1994, 7).

Table 1.1 DRG 122 and its equivalent principal diagnosis ICD9-CM codes

**DRG 122 Acute Myocardial Infarction, Discharged Alive:
ICD9-CM codes (principal diagnosis):**

410.4 Acute myocardial infarction of the inferior wall

410.9 Acute myocardial infarction of unspecified site

410.1 Acute myocardial infarction of other anterior wall

410.7 Subendocardial infarction

410.0 Acute myocardial infarction of anterolateral wall

The Australian DRG system, termed AN-DRG, consists of 471 classes of acute inpatient episodes that are further divided into sub-classes using variables such as age and complexity of the primary diagnosis. An example of a DRG is AN-DRG 122. This DRG is defined as “Acute Myocardial Infarction, Discharged Alive”. It is within the classification of the disorders of the circulatory system. A hospital patient with an episode of care denoted by this DRG has a primary or secondary diagnosis of acute myocardial infarction, no cardiovascular complications and no operating theatre procedures. Table 1.1 shows the principal diagnosis ICD9-CM codes for DRG 122. By allocating a standard cost to a DRG such as DRG 122, this classification provides a definition of patient output that can be directly related to the costs of resources incurred by a hospital (Clinton & Scheiwe 1995, 145).

The federal government has promoted the casemix system under the 1988 Casemix Development Program by providing funds for a five year program to develop a casemix based approach to the funding of all Australian public hospitals (Clinton & Scheiwe 1995, 301).

The casemix system has many advantages over global budgeting. Palmer (1991, 65) suggests that a casemix system can measure the activities of each clinical area within a hospital. It provides data on input costs, utilisation of resources and patient length of stay. This analysis can aid management decision making. Chua and Degeling (1993, 301) suggest that it encourages public hospitals to view their output as commercial products and not as a community right that is provided in the

interest of society. Hospitals that are allocated funds on the basis of a standard cost for each patient treatment or episode of care are rewarded for efficiency.

The primary disadvantage of casemix funding is its lack of “fund capping”. With fund capping, as output rises, funds increase without a finite ceiling or cap. Funds are principally based on output. Another disadvantage is the need to constantly revise the DRG formula as new technology is introduced into hospitals. Australian authorities are presently working on the third version of AN-DRG. Another problem is the grouping of medical conditions into distinct categories. The complexities for any one type of condition are not always recognised (Clinton & Scheiwe 1995, 94).

Although the introduction of casemix funding has been slow, it is now used in many Australian states. Casemix is the variable component of the NSW Efficiency Index that is used to fund the majority of public hospitals in that state. The Queensland Government has incorporated casemix into a similar index. In Western Australia casemix is the basis of the health purchaser-provider system. Area health service managers are given funds to purchase health services on behalf of any given population (Palmer & Short 1995, 312). Walsh (1995) states that Victoria has incorporated casemix into a Weighted Equivalent Inlier Separations Index (WEIS). The South Australian health authorities have also incorporated casemix into a regional purchase-provider system. The Northern Territory will commence funding its public hospitals on the basis of casemix from July, 1996 (Northern

Territory Department of Health and Community Services 1995, 64). Tasmania and the Australian Capital Territory have not yet commenced any program to introduce casemix.

1.4.3 The executive orientation of hospital staff

Executive orientation is defined as a value system. Prior research suggests that orientation of individuals employed in a hospital can be classified under two categories - professional orientation and management orientation. In this study, professional orientation is defined as those characteristics that are perceived to be important in maintaining the prestige of the medical profession. Miller and Wager (1970, 152) suggest that professional orientation is concerned with the acquisition of values and knowledge about a professional culture. For example, a visiting medical officer would have a degree of professional orientation. A person with a high degree of professional orientation retains an identification with a professional group. They are committed to professional skills and look to colleagues both within and outside the organisation for support.

A person with a high management orientation is one who identifies with management-related goals and organisational obligations (Abernethy & Stoelwinder 1991). Their behaviour is directed towards the achievement of management goals such as ensuring the reliability of financial information. A high management orientation is usually held by those staff with management training and values (Comerford & Abernethy 1994, 1). Management values are those

values that are important to the supervisory functioning of a large organisation such as a hospital (Abernethy & Stoelwinder 1995, 8).

1.4.4 The management control system

This study examines the influence of certain factors on the perception of that part of a public hospital's accounting information system termed the management control system. Horngren, Foster and Datar (1994, 466) define a management control system (MCS) as:

... a means of gathering information to aid and coordinate the process of making planning and control decisions throughout the organisation. The system improves collective decisions within the organisation.

The management control system consists of a series of activities used to identify the cost of resources consumed and measure the effectiveness and efficiency of the activities carried out in the entity (Hilton 1991, 13). It is the part of the accounting information system which provides information, quantified in monetary terms, about the internal and external events that have effected the organisation (Chenhall & Morris 1986, 17). Examples of the types of information collected by a hospital's management control system are patient history, medical costs and ward activity.

1.5 Preliminary investigation

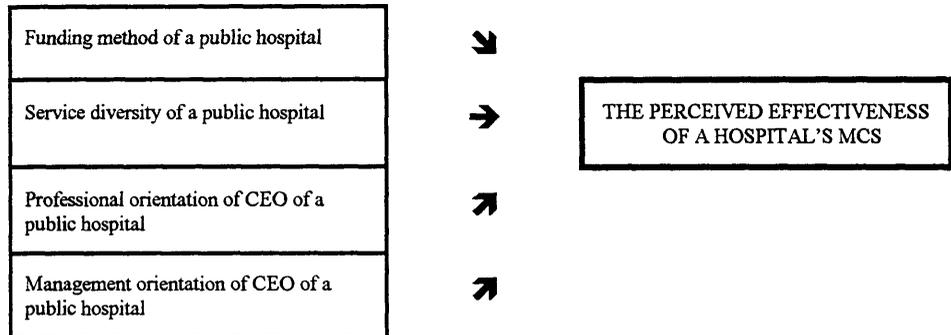
The motive for this research arose from a preliminary investigation by the author into the management control system of a regional public hospital. The management of this hospital required an investigation into developments taking place in management control systems in other large hospitals. This investigation involved a study of 16 public hospitals in NSW and Victoria. Interviews were carried out with the CEOs of these hospitals. The result of this study revealed that hospitals were collecting cost information using different methods. Some public hospitals appeared to have very complex systems whilst others had no management control system in place. It was suggested from this preliminary investigation that the reason for the variety of methods was due to several specific factors. These factors seemed to be the role of the CEO in the public hospital, the diversity of service provided by the hospital and the degree of casemix funding in the public hospital's funding formula. This research was undertaken to investigate the findings of this preliminary study.

1.6 The objectives of the research

This study sought to extend the present research on the contingent and institutional factors that influence the perceived effectiveness of the management control system in a public hospital. It focuses specifically on the role of public hospitals' CEOs, a public hospital's funding method and the service diversity of public hospitals. It develops the theory that as CEOs of public hospitals are required to adopt new

methods of funding, hospitals are perceived to move towards a more effective management control system to cope with their new environment.

Figure 1.2 Framework for research



The framework for the research is presented in Figure 1.2. The funding method is posited as an important institutional variable. The professional and managerial orientation of the CEO and service diversity of the public hospital are posited as important contingent variables.

1.7 Organisation of the dissertation

This chapter contains an outline of the background to the study and the need for further research in this area. It contains the definitions of specific terms to be used in this study. It concludes with a statement of the objectives of the study.

Chapter Two contains a review of the prior literature in this area and the hypotheses of the study. Chapter Three contains the research methods used to carry out the study. Chapter Four contains the regression model used to test the hypotheses developed in Chapter Two. Chapter Five contains a discussion of the results of the analysis, a review of the study and suggestions for further research.

CHAPTER TWO

Development of the theoretical model

This chapter contains the development of the theoretical model. The roles of contingency and institutional theories are first presented. An outline of prior research in this area follows. The chapter concludes with a presentation of the research questions to be investigated and the related hypotheses.

2.1 Theories of management accounting

2.1.1 Contingency theory of management accounting

Understanding how a management control system (MCS) operates in the context of different contingency variables is a major problem in management accounting. Prior research has resulted in some conceptualisation of the important factors but there has not been any consensus on the specific influence of any particular contingencies on the configuration of accounting information (Otley 1980, 416). The reason for this failure has been the concentration on existing systems and the influences of their operations, rather than investigating the role of certain factors in altering a system's effectiveness. Flamholtz (1983, 153) suggests that this type of research has isolated the organisational factors from the accounting function in which they operate. There has been a failure to appreciate the interrelationships between the internal factors and the accounting system (Hopwood 1978, 4).

Merchant (1981, 813) argued that the research that has been carried out in this area has been difficult to integrate and often conflicting because:

... outcomes may interact with higher level variables such as culture, rather than the organisation's characteristics that have been tested.

Dent (1991, 728) examined the influence of culture on accounting in organisations.

He concluded that:

... accounting can be vested with different meanings in culture.

Merchant (1984, 305) also suggested that prior factors may not only be affected by cultural differences but be industry specific.

Khandwalla (1972, 282) examined the influence of competition. He stated that, although it seems to have an influence in a positive direction on the perceived effectiveness of MCSs, different types of competition have different effects. He concluded that further research is required to determine the type of competition that has the greatest effect. Gul and Chia (1994, 414) also suggested that different combinations of factors may have different effects. This difference may be caused by one factor dominating another factor. As most research is only examining a part of the MCS, the interdependency between sub-systems with other sub-systems is not being evaluated. They concluded that there has been no research which explicitly evaluates this interdependency.

Tiessen and Waterhouse (1983, 251) stated that:

... contingency theory has not yet provided a “sufficiently rich base” because of this lack of research.

There is a need to coordinate results and develop a more refined theoretical framework. Merchant (1984, 304) also argued that there is a critical need for more empirical testing of the contingency framework. He stated that more industry-based research into other factors should be explored so that it may be integrated into a more refined theoretical framework. Otley (1980) stated that the explicit consideration of organisational effectiveness and the link between it and organisational design still requires further examination.

2.1.2 Institutional theory of management accounting

Coupled with the need for more research into contingency theory is the need for further research on institutional theory. Abernethy and Chua (1995, 4) stated that while the contingency theory has made important contributions to our understanding of the design of an organisation’s accounting control systems, contingency studies have important limitations. These studies assumed that organisations function as global islands and that firms operate without any external influences. Institutional theory research suggests that organisations also change in response to external pressures. It has had less attention by researchers than contingency theory. Scott (1987, 493) stated that, at this stage, institutional theory:

... has apparently entered a phase of more deliberate development accompanied by efforts aimed at self-assessment and consolidation.

There is still much debate about the influence of external factors on the MCS. Chua and Preston suggest (1993, 291) that the MCS is conceived from and is reflective of people's needs for information that is required for rational decision-making. A system's claim to social legitimacy is threatened when it no longer satisfies people's information requirements (Johnson & Kaplan 1987). However, other research has disputed this rationale, arguing that functional imperatives are not the force that determines how an MCS develops. Covaleski and Dirsmith (1986, 195) suggested that:

... the systems may result from a desire to end the appearance of rationality in a regime interested in maintaining existing power relationships.

Systems may be established because of external political forces. The reason they are developed is that executive control can be maintained through them. Preston, Cooper and Coombs (1992, 12) suggested that external social and economic forces, such as technological development, place pressure on the MCS to supply the necessary information for the organisation. Organisations that are faced with uncertainty must also convince society that they have a commitment to efficiency. The MCS provides such an authority (Covaleski & Dirsmith 1986, 195). Abernethy and Chua (1995, 33) stated that:

... further studies would more clearly distinguish between changes in the organisational control system which are solely motivated by efficiency considerations and those motivated by the need to gain or maintain the normative social legality of the organisation.

Chua and Preston (1994, 6) also argued that not enough research has been carried out to reach a conclusive statement about the influence of institutional factors.

2.2 The perceived effectiveness of an MCS

The term MCS was defined in Chapter One as a system that collects information. Management control assumes that the output of an activity can be measured and compared to targets that are set. One objective of an MCS is to analyse and evaluate how well costs are managed over a certain period of time (Barfield, Raiborn and Kinney 1994, 713). Emmanuel, Otley and Merchant (1992, 6) described this as a measurement process that converts a stream of cost inputs into a stream of outputs. An MCS ensures that corrective action can take place with cost activities so as to achieve its organisational objectives in respect to input and output (Otley & Berry 1980, 232). The information from the MCS can be used to improve effectiveness in certain areas, where necessary (Hofstede 1981, 195).

The measurement of cost inputs against outputs in hospitals is a contentious issue because there is some debate about what constitutes a hospital's output. There are two schools of thought. Firstly, the output of a hospital is viewed in terms of the objectives of the hospital. From a social point of view this would be a

measurement of the increase in patient health care status. There is a difficulty in measuring increased patient health care because of the intangible nature of any health care status (Butler 1994, 82). The second approach to measuring hospital output examines it in terms of the treatment provided by the hospital. Treatment in this sense refers to the effectiveness of the hospital in providing care.

The perceived effectiveness of a hospital's MCS refers to how well this system fulfils the information requirements of a hospital to achieve a level of effective care. This study examines the perception of the hospital's chief executive officer (CEO). It focuses on the CEO's perception of the effectiveness of the MCS to monitor the allocation of hospital resources used to achieve an effective level of output. Moore and Stuart (1985, 4) stated that this has been an accepted method of measurement in past research in this area.

2.3 The hospital environment

This study examines specific external and internal factors in an industry based environment. It examines the relationship between four factors and the perceived effectiveness of a public hospital's MCS.

Oakes, Considine and Preston (1993, 12) stated that public hospitals are facing the same problem of allocating resources as found in a manufacturing environment. Certain factors determine the perceived effectiveness of the MCS (Gray, Abernethy & Stoelwinder 1987, 70).

Because these factors vary between hospitals, there is a range of MCSs being employed in hospitals. Further research is needed on the specific factors that influence the perceived effectiveness of the MCS in a hospital. In this study the term used for the perceived effectiveness of the MCS is PEMCS. The factors in this study are termed the hospital's funding method, its service diversity, the professional orientation of a hospital's CEO and the management orientation of a hospital's CEO.

2.3.1 The influence of a hospital's funding method

The Australian government's view of a public hospital is changing. A range of factors has cut the revenue base of Australian governments yet both costs and demand for health services have continued to increase. These circumstances have led governments to examine the functions, productivity and efficiency of many hospital activities (Schapper 1986, 360). They require greater responsibility be taken for costs.

The use of diagnostic related groups (DRGs) allows governments to allocate funds on the basis of an output measure. Following the Casemix Development Program that was commenced by the Commonwealth Government in 1988, government attention is now being devoted to not only the use of DRGs for funding hospitals but also to the influence of these funding methods and other factors on the perceived effectiveness of the MCS. The funding method is an important factor to

examine because hospitals are dependent upon governments for funds (Abernethy & Chua 1995, 9).

The present methods of funding hospitals fall into two broad categories. Those categories are the global budget method and the output-based method. A definition of each of these methods was given in Chapter One.

There is some debate about the influence of each method on a hospital's MCS. The report by Scotton and Owens (1990, 20) stated that the predominant public hospital funding system in Australia is based on a global budget (see also Douglas & Hirth 1991, 8). This method involves periodic grants to hospitals, based on either a *per diem* or on a population index. Magnus, Abernethy and Stoelwinder (1988, 311) state that an MCS based on this funding method leads to very little analysis of hospital costs. Merchant (1984, 813) concludes that it involves very little computation because it lacks the quantifiable units of hospital output. Keegan (1990, 46) agrees that a hospital funded by a global budget uses a functional budget that involves no output analysis. There is a relationship with costs and funds that is often arbitrary and unpredictable. Sheill (1993, 188) also suggested that technical efficiency cannot exist under this funding method because there is no incentive for hospital administrators to set up cost control systems in this environment. Scotton and Owens (1990, 43) also argued that it prolongs hospital stay times and promotes more services resulting in a detrimental impact on resource efficiency. A hospital's MCS that is based on a *per diem* or population

base lacks effective and acceptable techniques for definition and measurement of output against input costs. Chua and Degeling (1993, 107) notes the findings in both the Corbett Inquiry of 1973-75 in South Australia and the Wilinski Inquiry in 1977 in NSW. Both reports were equally critical of this method.

The output-based method termed casemix is presently being introduced into Australian hospitals. Scotton and Owens (1990, 23) stated:

... in comparison to the per diem and global budgeting formulae, payment on the basis of output will be conducive to productive efficiency in individual hospitals.

Oakes, Considine and Preston (1993, 19) suggested that the primary benefit of casemix is the refinement of cost data collection to allow for the development of these codified standards to compare against actual costs incurred (see also Gray Abernethy & Stoelwinder 1987, 69). Hindle and Scuteri (1988, 321) agree that casemix allows hospital administrators to use a management system as a practical tool for costing purposes. Ashby and Altman (1992, 80) concluded that hospitals, faced with a change to a form of casemix per output of patient, attempt to become more productive in terms of the resources that they use. Under this form of funding, hospital administrators make a comparison between the government reimbursement and actual costs through the use of a better MCS. The MCS becomes a flow of data and administrative processes that is an integral part of the planning and overall MCS (Merchant 1981, 813). An MCS under casemix

integrates financial and clinical information so that the specific cost of a patient's episode of care can be determined.

Casemix also assists in resource utilisation by enabling managers and clinicians to identify patients with abnormally high or low lengths of stay or resource allocation. Under casemix, the MCS collects information which allows a revenue formula to be carried down to all levels of responsibility within a hospital. Its data enables costs to be assessed in respect to those units (Scotton & Owens 1991, 45). It also allows a cost allocation to more complex patient episodes of care that require more resources.

Casemix allows cost inputs to be analysed using either cost modelling or clinical modelling. The NSW Department of Health's Cost Model Kit (1993, 5) defines cost modelling as a system that identifies the total expenditure of a hospital and allocates those costs to patient groups using relative resource usage indicators. A system of averaging is employed to allocate service centre costs to the final cost centres. Clinical modelling identifies actual service consumption and cost by each individual patient. Actual costs are collected using sophisticated software such as the package from McDonnell Douglas called Trendstar. The averaging procedure of cost modelling is replaced by real time costs. Preston, Cooper and Coombs (1992, 564) stated that cost and clinical modelling gives a better understanding and measure of the productive processes of health care delivery. More specifically, it

provides clinicians and managers with enhanced information on workloads and costs. It has had a significant influence on a hospital's MCS.

Chua and Preston (1994, 4) argued that the introduction of casemix on the Australian hospital system has allowed the analysis of costs. The use of casemix means that hospitals are funded according to an overall indicator of resource needs. Hospital administrators may use this data to evaluate their actual cost of resources. Schapper (1986, 355) suggested that if hospital administrators did not have this information it would be impossible for hospitals to determine where any implied inefficiencies occur or how they could optimise the use of their funds. The federal and state governments agree about the advantages of casemix. It is referred to by the NSW Department of Health's Discussion Paper on Options on Casemix Development and Applications in NSW Public Health System (1993, 1) as:

... a system of categorising patients according to some predetermined characteristic that would facilitate measuring a hospital's output.

The aim of introducing casemix into Australia has also been stated in the Casemix Development Program's Strategic Plan 1993/94-1997/98 (1993, 2) as providing:

... the health care industry with a nationally consistent method of classifying patients, their treatment and associated costs, leading to better management,

measurement and payment of high quality and efficient health care services.

The Victorian Health authorities described casemix as a funding method that (Annual Report-Department of Health and Community Services, 5):

... will introduce an element of managed competition, as hospitals assess their services against the State average for quality and cost.

This was reiterated by the present Victorian Minister for Health, Marie Tehan, when she described DRG funding as (Stoelwinder 1994, 15):

... the vanguard of the range of reforms introduced to the health system in Victoria which will encourage hospitals to focus on the need for increased efficiency by creating an atmosphere and opportunity for benchmark comparisons to be made between hospitals.

2.3.2 Different hospital funding systems in Australia

Although hospitals have long recognised the benefits of sophisticated MCSs, very little development in scientific management of costs has taken place up to this decade. Until the introduction of DRGs and casemix there was not a need for any further MCS refinement. Today approximately twenty countries in Europe, North America and Asia together with Australia and New Zealand are undertaking research into DRGs and related aspects of hospital casemix (Palmer 1991, 62).

The introduction of systems such as the Swedish Stockholm model, the English Health Resource Group system and the American casemix system have radically altered the way that public hospital administrators throughout the world now receive their funds. The Australian interest in casemix is only part of an international interest to increase efficiency into the provision of hospital services (Palmer 1991, 62).

The federal and state governments have commenced changing to the casemix method since they integrated casemix into the Medicare Agreement. A funding allocation of \$29.3 million in the last Medicare Agreement was used to support research and provide a technical environment for the development of an Australian casemix classification of AN-DRGs. Another \$40 million has been allocated over the next five years to further develop the casemix program.

Under the Federal Medicare Agreement in Australia, the introduction of a funding system into the states' health systems has been the responsibility of each individual state government. Each state is implementing a funding system based on its population, geographic needs and time constraints.

Presently, each state is also at a different stage of implementing a form of casemix. The Victorian Government was the first state to introduce casemix into its hospital system in 1993. This system incorporates AN-DRGs into its allocation formula as a portion of the factor funding formula. The Victorian Health Minister, Marie Tehan, stated that (Walsh 1995, 5):

The obvious limitations of global funding have been removed and this is a more sophisticated form of putting incentives into the funding of the public hospital system. There are now incentives for hospitals to do more work and be paid appropriately for it.

The Victorian model does not distinguish between hospitals. It makes no distinction between hospitals with small or large budgets. The South Australian system of funding overcomes this problem by offering protection by way of additional grants to small rural hospitals (Nelson 1994, 4). The South Australian Government has introduced a system which is related to a purchaser supply model. This system is based on the establishment of several population-based purchasers who will assess health care requirements in a region and identify opportunities and priorities for the delivery of services. This is described as the Funding Allocation Model and is a capped system which is similar to a number of other Australian state systems. After a fixed component is allocated for such items as capital expenditure, the residual payment is allocated via the number of inpatients, the DRG index, the average length of stay and the outpatients occasions of service. From these factors come a total weighted activity measure for each hospital and the pooled fund is then distributed according to this data (Michael 1991, 248).

The Queensland government uses a resource allocation formula to allocate funds to their health regions. The RAF is calculated on a population measure weighted by age and sex. The regional offices are then required to distribute their RAF funds to their hospitals on a casemix basis (Renfrey 1995, 10).

The NSW government has a system similar to the Queensland model. It allocates funds through a complex equation termed the NSW Resource Allocation Formula (RAF). This consists of a population based allocation with an efficiency index based on casemix. The government has attempted to avoid the full purchaser-provider flow monitoring system because of the multiplicity of administrative costs they believe are involved. State government funds are allocated to health areas using the RAF. The historical budget method is then used to distribute these funds to each hospital.

The Western Australian casemix approach is based on the purchaser-supplier approach to casemix and is the model closest to using DRGs as the sole determinant of allocated funds. It is likely that this funder-provider arrangement will eventually be implemented in other states (Hanson & O'Dea 1994, 3). The Western Australian system is the only system where funding is all output-based. With its introduction, administrators of the hospital's cost management system can examine the hospital's costs against its outputs because funding from the state government is determined by input benchmarks based on DRGs. These benchmarks relate input costs to each episode of care.

The effect of allowing each state to institute its own form of casemix has led to each state using a different system of fund allocation. Each state is at a different stage of implementing the Federal Governments Casemix Program. It is expected that the program will be fully implemented by 1998.

The funding method is identified as an important dimension of context in the study of the perceived effectiveness of the MCS. Prior research suggests that the type of funding system does influence PEMCS. In this study, the funding method is termed HOSFND. In this study the hypothesis regarding the hospital funding method is:

Hypothesis One

There is a positive linear relationship between HOSFND and PEMCS.

2.3.3 The effect of service diversity

Hospital service diversity is defined as the complexity of health care service offered by a hospital. Hospitals are organisations that have considerable service diversity in terms of their function (Clinton & Scheiwe 1995, 91).

Prior empirical work that has been carried out in this area has found that hospital service diversity is related to the increased use of more sophisticated management systems. Diversity increases the complexity of the organisation with a consequent increase in its reliance on more formal support systems.

Merchant (1984, 293) stated that:

... as the number of people in any organisation increases, it becomes less practical to use informal methods of communication and control, such as oral communication and direct supervision because there is an exponentially

increasing number of channels requiring information flows and the organisation becomes more highly differentiated. ... Therefore as organisational size and differentiation increases, formal budgeting should become more important.

Galbraith (1973, 5) also stated:

The amount of information that is needed to perform a task is a function of (1) the *diversity of outputs* provided as measured by the number of different products, services or clients, (2) the number of different *input resources* utilised as measured by the number of different technical specialties on a project.

Bruns and Waterhouse (1975, 6) found that larger and more diverse organisations use a more highly developed and more formal budgeting system.

The need for a more effective MCS becomes apparent as a hospital's services becomes more diverse. In Australia, as hospitals have grown in diversity, specialisation has increased. This is the result of a cost benefit analysis finding an optimum mix of health care. Clinton and Scheiwe (1995, 217) suggest that as health care organisations increase in size and complexity, the management processes become more complex. Organisational structures need to change to accommodate the increased complexity of a hospital.

Service diversity has been identified as a factor in the perceived effectiveness of the MCS. In this study, service diversity is termed HOSDIV. The hypothesis regarding service diversity in this study is:

Hypothesis Two

There is a positive linear relationship between HOSDIV and PEMCS.

2.3.4 The effect of executive orientation

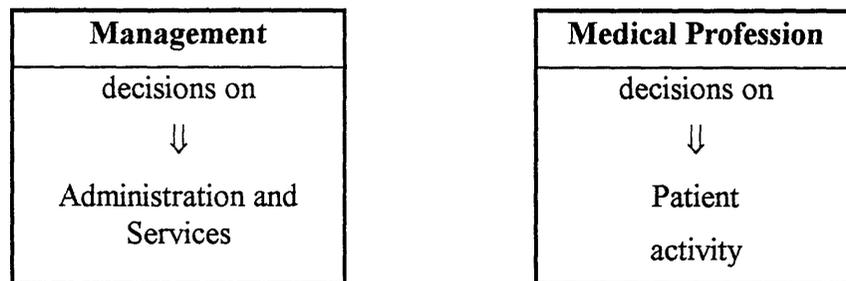
Most contingency studies have concentrated on the relationship between certain internal factors and the MCS. In these studies it is usually assumed that the individuals within an organisation always act rationally in order to match the contextual factors so as to achieve organisational effectiveness (Abernethy & Stoelwinder 1991, 115). The term “rationally” means acting to achieve the entity’s goals. This study suggests that certain individuals in a hospital may not act rationally because their goals are dysfunctional to the hospital’s goals. These individuals do not identify with the management control system. Individuals with different orientations may have different influences on the organisation and the management control system.

Palmer (1991, 64) stated:

The method of establishing the managerial requirements for increased hospital efficiency in the context of greater reliance on hospital casemix as a funding mechanism must also examine the behaviour of the principal actors in the hospital.

Different types of orientation are evidenced in public hospitals.

Figure 2.1 Conventional hospital organisational structure



As shown in Figure 2.1, hospitals are environments where various parties have succeeded in controlling particular parts of the organisation. This figure shows that there are two distinct organisational structures in public hospitals.

It has been suggested that the medical profession such as visiting medical officers (VMOs) make the majority of decisions regarding resource allocation yet rarely participate in the hospital's line management. Line management is accountable for the hospital's budget yet they do not make decisions about the allocation of the majority of resources (Clinton & Scheiwe 1995, 91). However, management staff

establish the MCS which actually allocates resources. It has also been suggested that professionally-oriented persons in hospitals use management as facilitators to enable them to get on with the major role of seeing patients (Preston, Cooper & Coombs 1992, 572). Abernethy and Stoelwinder (1986, 348) suggest that 92% of a hospital's funds are for the support services of a hospital with 8% allocated to the direct costs expended by professionals. However, most of the decisions about all the funds to be allocated within a hospital are made by these professionals. The control of the allocation process by professional orientated persons in hospitals has been examined. Hindle (1994, 9) states that within hospitals:

... there are patterns of thought and behaviour which significantly constrain management styles and information systems development.

Scotton and Owens (1991, 45) suggest that the dominance by medical staff within a hospital has stifled the establishment of effective MCSs because their major goals are equity and quality of health care. This is regardless of the cost involved in achieving those goals. They use the medical justification of costs as a tool against the use of commercially oriented accounting techniques. Professionals believe that the introduction of casemix will be at the expense of quality health care. They argue that hospitals provide a service to the sick whatever the cost in contrast to commercial organisations who must produce their product at minimum cost (Preston 1992, 86).

Scotton and Owens (1991, 58) argued that even with casemix, management may still be unable to improve the effectiveness of the MCS because of the large influence of hospital medical staff in the decision making process. However, the move to make hospitals more efficient has meant that VMOs are becoming more accountable for their decision making. They are doing this by taking on more management roles.

The findings of most studies in the past suggest that individuals can maintain both a high professional orientation and a high managerial orientation when in a management role (Rizzo, House & Lirtzman 1970).

Abernethy and Comerford (1994, 7) suggest that a person in a hospital environment can maintain a dual orientation. In their study on orientation conflict in hospitals, they argue that:

... health care professionals who take on managerial values while maintaining their professionalism, provide the interface between the professional values critical for controlling production tasks.

Aranya and Ferris (1984, 8) agreed that a person can have dual orientations. In their study they found that individuals may be high in both management and professional orientation.

Miller and Wager (1970, 155) also suggested that:

The magnitude of the relationship is moderate at best, the two types of role orientation are negatively correlated with the other (-.30) in these data. That is, the greater the professional orientation, the less the bureaucratic (management) orientation among this sample. This finding, partially confirms the first perspective concerning the differentiation of these two types of role orientation. However, the strength of the relationship is too weak to conclude that the two types of orientations are incompatible.

There has been empirical work carried out on the division between management oriented and the clinical oriented staff in a hospital (Comerford & Abernethy 1994; Palmer 1991; Sheill 1993). This research argues that different degrees of both orientations exist in Australian hospitals. Tuma and Grimes (1981, 188) stated that the most common explanation of this can be explained in a two-dimensional model. This model is shown in Figure 2.2.

Tuma and Grimes (1981, 191) suggested that the relationship between the two factors can be explained by cognitive congruence, organisation selection and behavioural feedback.

Figure 2.2 The relationship between professional and management orientation

	HIGH MANAGEMENT ORIENTATION (MO)	LOW MANAGEMENT ORIENTATION (MO)
HIGH PROFESSIONALISM (PO)	Medical staff with management training	Visiting VMOs without management training
LOW PROFESSIONALISM (PO)	Management staff with no medical training	Domestic staff with neither medical or management skills

Cognitive congruence suggests that in the majority of hospitals, the two orientations are negatively correlated. When a person has high professionalism, then their managerial orientation is low. However, organisational selection suggests that a hospital requires people with different degrees of the two orientations in different positions within the organisation. Dimensions vary across organisations and hospital managers select employees to match these dimensions. Behavioural feedback suggests that the type of organisation may alter one's degree of orientation over time (Tuma & Grimes 1981, 192). A person may change the level of professional or management orientation according to the time a position has been held within the hospital.

An effective MCS requires management skills and management orientated staff. Keegan (1990, 48) stated that the reason for the lack of improvement after the introduction of casemix is due to the medical staff in managerial positions who have little or no training in management skills. This is supported by the KPMG Peat Marwick National Cost Study for AN-DRGs (1994) which found that higher

quality data for their study came from those hospitals that invested more staff time in management processes. Duckett (1991, 43) also argued that executive staff with high management orientation in a hospital brings about greater efficiency.

However, opinions differ on the effect of these two types of orientations on the development of an MCS. Walsh (1995, 11) noted that an efficient costing system may never be achieved in hospitals because the professionally oriented staff's view of social efficiency will always take precedence over a good accounting system. Comerford and Abernethy (1994, 5) suggested that under the present financial and political constraints now faced by hospitals, the dominance of this group will not be allowed to continue in the future. They stated that the problem is not when this dominance will cease but how it will be undertaken. They suggested that this division of hospital executive staff has had a strong effect on the quality of the MCS and health care services. A management oriented executive can ensure, through the MCS, that the hospital system achieves technical efficiency. However, this goal can be in conflict with the aim of social efficiency. Technical efficiency is concerned with waste whilst social efficiency requires value judgements about the type of services offered. The former is seen as desirable by the management oriented executive whilst the professionally-oriented person considers social efficiency to be more important. Hospital staff members that are oriented towards management examine the relative profitability of DRGs. The professionally-oriented person examines the patients that society believes should be treated (Sheill 1993, 188).

Keegan (1990, 48) suggested that the medical staff demonstrate a lack of understanding of the budgeting process in hospitals. This is due to their professional background and their lack of managerial training. They have a strong professional orientation and little orientation towards the well being of the organisation as a whole. However, Keegan (1990, 45) also suggested that the effectiveness of the MCS is dependent upon the willingness of these decision makers. Highly professionally-oriented staff make most of the decisions regarding a hospital's resources. Their involvement in the control system is of central importance. If this involvement does not occur, separate professional and bureaucratic lines of authority will continue to exist (Comerford & Abernethy 1994, 1).

Wide public acceptance of more effective MCSs has been hampered by the dominance of the medical profession. Their view is often that an MCS does not help administrators manage hospitals. There is a conflict between this view and the economic consequences of their actions.

Prior research has shown that where the medical profession has not supported the introduction of a more effective system, the supposed efficiency of the cost system is lost (Duckett 1994; Comerford & Abernethy 1994). Further research is required to fully investigate this conclusion.

Professional orientation and management orientation are recognised as important factors in the perceived effectiveness of the MCS. This study hypothesises that the

degree of professional orientation influences the perceived effectiveness of a hospital's MCS in a negative direction. This means that as the degree of professional orientation increases, the perceived effectiveness of the MCS decreases. It also hypothesises that the degree management orientation influences the perceived effectiveness of the MCS in a positive direction. This means that as the degree of management orientation increases, the perceived effectiveness of the management control system increases. In this study, professional orientation is termed HOSPROF and management orientation is termed HOSMGT.

The hypothesis in this study regarding professional orientation is:

Hypothesis Three

There is a negative linear relationship between HOSPROF and PEMCS.

The hypothesis in this study regarding management orientation is:

Hypothesis Four

There is a positive linear relationship between HOSMGT and PEMCS.

2.4 Hypotheses

The following hypotheses used in this study are summarised below:

Hypothesis One

There is a positive linear relationship between HOSFND and PEMCS.

Hypothesis Two

There is a positive linear relationship between HOSDIV and PEMCS.

Hypothesis Three

There is a negative linear relationship between HOSPROF and PEMCS.

Hypothesis Four

There is a positive linear relationship between HOSMGT and PEMCS.

2.5 Summary

This chapter began with a presentation of the past research in contingent and institutional theories of management accounting. The chapter then focused on four factors that may influence the perceived effectiveness of the MCS. They are the funding method, service diversity, the management orientation of the CEO of a public hospital and the professional orientation of the CEO of a public hospital. Service diversity, professional orientation and management orientation are termed contingent variables whilst the funding method is termed an institutional variable.

It is hypothesised that these factors influence the perceived effectiveness of a hospital's management control system.

CHAPTER THREE

Research Method

This chapter contains a review of the procedure required to collect and analyse the data in this study. The first section contains a description of the survey method. This is followed by an outline of the survey form design. Attention is then given to the issue of scaling, followed by a description of the measurement of the variables and tests of unidimensionality. The chapter concludes with a summary including the summary statistics.

3.1 The survey method

The study is a cross sectional study. That is, it consists of a structured set of survey questions that is aimed at collecting information about the variables at a point in time. Gay and Diehl (1994, 238) defined a survey as:

... an attempt to collect data from members of the population in order to determine the current status of that population with respect to one or more variables.

Long (1984, 70) stated that the survey method is an important tool in health field research because of its ease of sampling and use of valid and reliable definitions and measurement techniques. De Vaus (1992, 334) suggested that although the

survey method is not without its critics, it is probably the easiest method of collecting large sets of information. This accounts for its popularity.

This research study uses a mailed survey form as the survey instrument. Mailed survey forms have certain advantages over other forms of survey instruments. They are cost effective, give access to a large sample and they do not contain any interviewer bias. They can be distributed quickly and with a greater assurance of perceived anonymity. Rubinson and Neutens (1978, 105) stated that in health science research:

... the mailed survey is a technique with much potential and several advantages.

3.2 The selection of the sample

The objective of this study is to make an inference about a public hospital population based on information contained in a sample of public hospitals. The population used in this survey is defined as those public hospitals listed in Isaacson, (1994). This year book lists the names of 774 public hospitals in Australia with their addresses, telephone numbers and the chief executives' names. Public hospitals throughout Australia were chosen for the sample using a selected random number selection. Private hospitals were excluded from the survey because they are not funded from government sources. No other sampling bias is placed on the sample either by limiting the size or the location of the selected hospitals.

3.3 The size of the sample

In a relationship study such as this one, an important factor in sample selection is the size of the sample. To determine the sample size, the required degree of accuracy has to be considered. The extent to which there are variations in the population and the expected non-response rate is important in this decision (de Vaus 1994, 71).

The sample size must be large enough to draw conclusions about the characteristics of the population it represents, and it must reduce the probability of failing to reject the null hypothesis when it is false. Sample size has varied in similar surveys carried out in this area. Khandawalla (1972) had a sample of 92 firms when examining competition and control systems, Abernethy and Stoelwinder (1995), 100 managers, Moore and Stuart (1985), had a sample of 53 executives when examining uncertainty, size and control, whilst Gul and Chia (1993) surveyed 100 executives in their research on uncertainty and decentralisation. However, Berenson and Levine (1992, 317) suggested that the distribution of the sample mean will be approximately normally distributed if thirty observations or more are made.

Specific guidance for this survey's sample size is drawn from Cohen and Cohen (1983, 116-117). They set out the procedure for power analysis, that is the probability of finding the sample r to be significant.

The desired sample size (n^*) for the F -test of the significance of R^2 is first determined by setting the significance level (α) at .05 and the desired power at .80. These are regarded as suitable measures for the studies of this type (Cohen & Cohen 1983, 52 & 165). The resulting L -value at $\alpha = .05$ from Table E.2 is 12.83 (Cohen & Cohen 1983, 527). The population effect size is then determined using the formula provided in Cohen and Cohen (1983, 117):

$$f^2 = R^2 / (1 - R^2)$$

The R^2 used in this equation was .20. This was considered to be a suitable population R^2 in a survey such as this one (Cohen & Cohen 1983, 161).

Substituting this value into this equation gave an f^2 of .25. The sample size is then determined by the formula suggested by Cohen and Cohen (1983, 117):

$$\begin{aligned} &= L / f^2 \quad + \quad k \quad + \quad 1 \\ &= 12.83 / .25 \quad + \quad 4 \quad + \quad 1 \\ &= 55.32 \end{aligned}$$

In the above k represents the df or number of independent variables (IVs) in the study. In this study there are 4 IVs.

Thus the number of useable responses required is 56. An effective response rate of approximately 40% is anticipated. This is calculated by looking at similar studies (Gul & Chia, 1994, 51% ; Brownell & Dunk, 1991, 67% ; Aranya & Ferris, 1984,

46.6%). For this study 154 survey forms were mailed out. This gave an additional allowance of 14 above the minimum required number set by this analysis. This was done to ensure that the required number of responses was obtained.

3.4 Missing data

When the survey data was collated, it was found that some questions had not been answered. Values which are missing can reduce the number of cases that can be analysed (de Vaus 1991, 285). This can place an unacceptable bias on the results. There are several solutions to the missing data problem. One solution is to use listwise analysis. This analysis deletes all matched variables that have missing data. Another solution is to delete the entire variable that has any missing data.

However, de Vaus (1991, 286) suggests that the most acceptable solution is to use pairwise analysis. Pairwise analysis with SPSS calculates a correlation matrix based on the number of cases available for each variable (Norusis 1993, 300).

Although this means the number of cases in the analysis may vary, de Vaus (1991, 286) stated:

... of the approaches that involve losing data or cases, the pairwise solution is generally the best and is easily accomplished with most computer packages.

Pairwise analysis was considered the most suitable method to account for the missing data in this study.

3.5 Design of the survey form

Five sets of questions were used to measure the variables developed in Chapter Two. Each set of questions required responses about a variable. The survey form used is shown at Appendix B. Twenty-three questions were divided into four main parts. These parts were labelled Sections A, B, C, D and E. The hypotheses developed in Chapter Two required the measurement of five variables. Question 1 of Section A measured the service diversity of a public hospital. Question 1 of Section B measured the method of funding the hospital. Five questions in Section C measured the management orientation of the CEO of the hospital. The professional orientation of the CEO was measured with three questions in Section C. Five questions in Section D and a further five questions in Section E measured the perceived effectiveness of the hospital's management control system (MCS).

3.6 Scaling

Multi-summed scales were used for professional and management orientation as well as for the perceived effectiveness of the MCS. De Vaus (1992,249-250) states that multi-summed scales provide a measure which is more reliable and precise in this situation.

The use of interval scales in social research is controversial. Cohen and Cohen (1983, 239) state:

Formally, fixed model regression analysis demands that the quantitative independent variables be scaled at truly equal intervals and measured without error.

However, Cohen and Cohen also state that rigid adherence to this principle would eliminate many different types of research in social science. The scales used in this research are ordinal scales but are used as though they are interval scales. Cohen and Cohen (1983, 241) state that in situation such as this:

... ordinal scales, as well as those that seek ... to yield interval or ratio level measurement, may be profitably employed.

3.7 The dependent variable: The perceived effectiveness of the management control system

The perceived effectiveness of the management control system was identified in Chapter Two. This study uses the method developed by Kim (1988, 474) who stated:

... measuring user satisfaction with information quality is generally recognised as one of the most important indicators of information system effectiveness.

Effectiveness is measured by using the perceptions of user satisfaction. User satisfaction is measured using a two-part instrument. It is considered to a multiplicative factor of the perceived importance and the perceived usefulness of

certain activities of the management control system. This follows the method used by Abernethy and Stoelwinder (1991, 111). They measured performance by obtaining a response for the perception of importance and weighted effectiveness by this method. This method is considered suitable for this study.

Questions in Section D requested responses to gauge the perceived importance of five activities to the operation of the hospital. The activities used in these questions are based on information gathered in the pilot study carried out prior to this research. The activities were:

1. Deciding on the performance of a unit or manager
2. Deciding on the cost of a medical condition
3. Controlling the cost of administration
4. Identifying how medical costs are incurred
5. Making decisions on the most efficient way to allocate hospital resources

Section E was constructed to gauge the perceived usefulness of the management control system to manage these same activities.

The responses are recorded on a 5-point Likert scale with polar anchors 'not at all important' and 'extremely important' for the perceived importance scale and 'not at all useful' and 'extremely useful' for the perceived usefulness scale. The scale for the construct, perceived effectiveness of the management control system

aggregate scale is developed by taking the product of each of the five items' perceived usefulness and perceived importance scores. The square root was then found for each of the products. Cohen and Cohen (1983, 263) state that under the above conditions, the square root transformation is carried out to avoid violating the assumption of the constant dependent variable variance and normality in the regression model.

In Chapter Two this variable was designated as PEMCS.

3.8 The independent variables

3.8.1 Funding method

The funding method was identified in Chapter Two. Question 1 of Section B of the survey form required a response about the method by which the hospital receives its funds. The type of funding method of the hospital was operationalized using the term casemix funding. In this study, the degree of casemix was considered a suitable measure for the type of funding method. This was because the pilot study carried out prior to this research suggested that a question that was related to the degree of casemix funding would give a more accurate response than one asking for details of the funding method employed.

The question for the type of funding method used was:

What is the proportion of funds received by your hospital from a casemix formula ?

The response was based on a 5-point Likert scale. To minimise idiosyncratic perception on the part of the respondent, the scales were polar anchored at both ends and labelled 'almost all' at 1, 'more than half' at 2, 'half' at 3, 'less than half' at 4 and 'very little' at 5. Responses to this question were reverse coded before further analysis because the order of the responses to the dependent variables were the reverse of this scale.

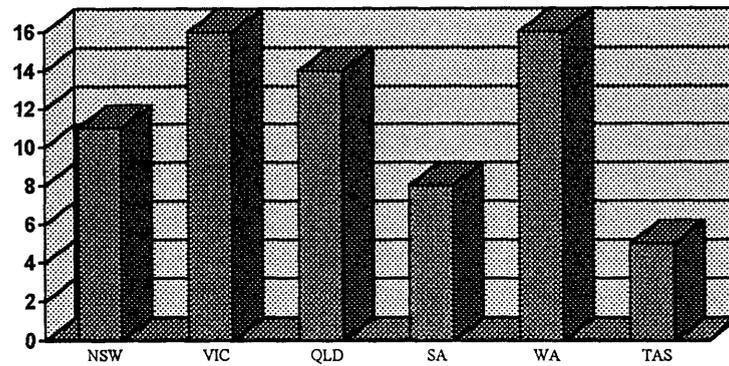
In Chapter Two this variable was designated as HOSFND.

As each Australian state has a different form of casemix funding, a question was placed in the survey instrument to ascertain whether there was any response bias towards any particular state. This question was Question 2 in section A. The question stated:

In what Australian state is your hospital situated?

The response pattern to this question is shown at Figure 3.1. An analysis of the responses as compared to total hospital numbers does show a response bias towards some states. However, this bias was not considered large enough to affect the analysis.

Figure 3.1 Survey responses by Australian State



3.8.2 Service diversity

The independent variable termed the service diversity of a hospital was developed in Chapter Two. Question 1 of section A of the survey form required a single response about the service diversity of the hospital. An open response was considered appropriate for this question. It avoids a bias caused by a pre-determined categorisation. De Vaus (1992, 91) stated that open responses are suitable for this type of survey question.

Because of the difficulty in measuring the construct service diversity, it was operationalized using hospital size. Gupta, Dirsmith and Fogarty (1994, 5) argued that the size of an entity can be:

... interpreted by organisational members as increasing the complexity or visibility of the work they perform.

Size is related to factors such as output and structure. The NSW Health Efficiency Index uses size as a surrogate for diversity when using funding categories such as community or small district hospitals, medium district hospitals, large metropolitan and regional hospitals and teaching or referral hospitals. Hospital size is therefore considered a suitable measure for the term service diversity.

Kimberly (1976, 574) suggested that the concept of size has not been operationally defined. The size of a hospital can be measured using several different methods. Different methods of measuring size involve using the number of hospital employees, the amount of funds received by a hospital or the number of hospital beds. Merchant (1981, 817) measured size using the number of employees. In this study the number of hospital employees is not considered suitable because of the large number of casual staff that a hospital employs. A measure using the number of staff is distorted by disproportionate casual staff numbers. Using the amount of funds received as a measure of size is also considered unsuitable because this data is not publicly available. Another measure of size for hospitals is bed numbers. This measure is considered suitable for this study for a number of reasons. Firstly, the data on bed numbers is publicly available. Secondly, it has been used as a measure of hospital size in past studies. Kimberly (1976, 587) suggests that:

... at any particular point in time, there are constraints imposed on most, if not all, organisations by their physical size. These constraints generally limit the amount of work

an organisation can do. The most common example of the use of this aspect as a measure of the global concept of size is the number of beds in studies of hospitals.

In this study the size of the hospital was measured using the number of maintained beds in a hospital. This is defined as the number of beds in the hospital that are in use. The question to measure the service diversity of a hospital was:

Approximately how many maintained beds does your hospital have ?

Figure 3.2 Survey responses by the number of maintained beds.

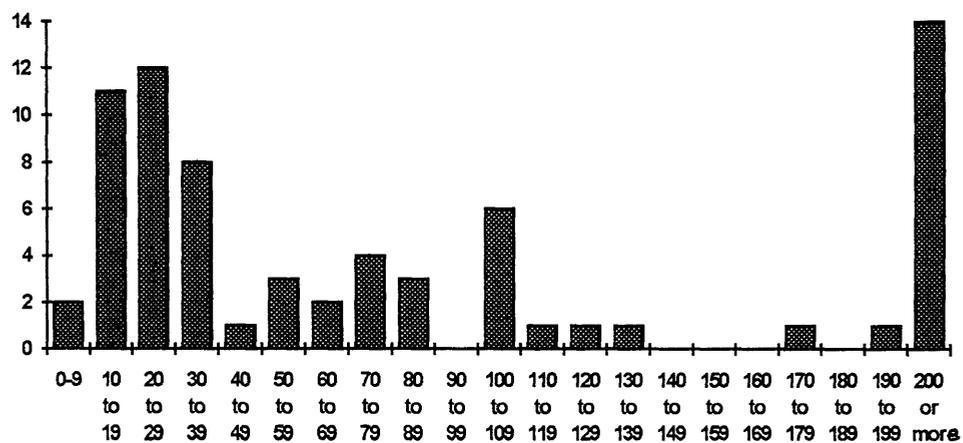


Figure 3.2 shows the responses to this question. A normal distribution is not evident due to a disproportionate number of responses from small and large hospitals. To overcome this problem the responses were dichotomised. De Vaus (1992, 280) suggests that this method of collapsing responses into smaller categories is suitable in this situation.

The division between these groups was achieved by calculating the median hospital size. The median was 60 maintained beds. Two divisions were constructed. Hospitals below 60 maintained beds were denoted by 0. Hospitals with 60 or more maintained beds were denoted with 1.

In Chapter Two this variable was designated as HOSDIV.

3.8.3 The executive orientation of the CEO of the hospital

The two variables for executive orientation identified in Chapter Two are termed the management orientation and professional orientation of the CEO of a hospital. Section C of the survey form was designed to measure these two variables.

Although these variables had been identified in prior literature as important in explaining managerial behaviour, very few researchers have attempted to operationalize these terms (Abernethy & Stoelwinder 1991, 115). Miller and Wager (1970) devised an instrument to measure professional orientation for their study into role orientation. Comerford and Abernethy (1994) and Abernethy and Stoelwinder (1995) used that instrument to measure professional orientation in their study on role conflict. Comerford and Abernethy (1994, 8) suggest that:

The instrument was not meant to capture professional behaviour, as such, but rather act as a proxy for the values which are perceived to be associated with a professional orientation.

As this is a similar study, it was decided to use these questions to measure professional orientation.

Comerford and Abernethy (1994, 9) also adapted a series of questions from Perrow (1979) to examine management orientation. These questions were related to the goals of the organisation and included such managerial aims as efficiency, adaptation unity and financial accountability. As this study is similar to their study, the same questions were considered suitable for measuring management orientation.

The first five questions of Section C were used to measure the management orientation of the CEO. The next five questions of Section C were used to measure the professional orientation of the CEO. All questions used a 5 point Likert scale. De Vaus (1992, 55) considers that these types of questions are more reliable than a single response in surveys where opinions are requested. Polar anchors used were 'strongly agree' at 1 and 'strongly disagree' at 5.

The respondents were asked, by ticking the appropriate box, the extent to which they agreed with each question. The questions were divided into two orientation groups as follows (the orientation perspective for each question is in italics):

- a. Ensuring that my hospital operates within budget is very important to me.
(*management orientation*)
- b. Implementing cost reduction programs is important to me.
(*management orientation*)

- c. Ensuring that my hospital is managed efficiently is important to me.
(management orientation)
- d. I think it is important for me to promote and develop the loyalty of my staff to the hospital rather than only to their profession or union.
(management orientation)
- e. It is important to increase or maintain the prestige or image of the hospital.
(management orientation)
- f. It is important to me that I be able to pursue and carry out my own research ideas.
(professional orientation)
- g. In the near future, I would like to further my professional career.
(professional orientation)
- h. It is important to me to be able to publish the results of my work in professional journals.
(professional orientation)

Responses to this question were reverse coded before further analysis because the order of the responses to the dependent variables were the reverse of this scale.

In Chapter Two the variable, management orientation of the CEO, was designated CEOMGT. Professional orientation of the CEO was designated CEOPROF.

3.9 Distribution of the survey form and collation of the responses

The survey form was sent to the chief executive officer (CEO) of each hospital chosen in the sample. The CEO was identified as the person who was in charge of the supervision and direction of all staff at each location. Moore and Stuart

(1985,4) state that in most past research in this area the perception of the CEO has been used because:

... on the basis of these perceptions, that decision makers
make their strategic decisions.

As far as possible the title of the person in this position were collected from the listing before the survey was sent. This is considered a factor that would increase the responses.

De Vaus (1992, 107) argues that mail survey forms should be brief. This survey instrument requires no more than ten minutes to complete. To obtain the maximum response to the survey form a covering letter that stated the reasons for the survey and its confidentiality was included with the survey form. A note is also included that stated that the final report would be available to any interested parties. Gay and Diehl (1992, 246) state that a cover letter motivates the respondent to complete the survey questions. A copy of the covering letter is shown at Appendix A. A stamped reply envelope was included with the survey form. This was also thought to increase the response rate.

Table 3.1 provides a summary of the survey's distribution and collation. One hundred and fifty-four survey forms were sent out by mail. Four survey forms were returned unanswered because those hospitals were no longer at their given address. This left a sample of one hundred and fifty distributed survey forms. Seventy-three survey forms were returned completed. Of these survey forms,

three were considered unusable because the hospitals had changed to aged care residences. This left seventy completed survey forms. That provided an effective response rate of 47%.

Survey form non-response can pose two problems in a mail survey. Firstly it can create an unacceptably small sample. This problem was overcome to some extent in this study by selecting a larger sample than required. The second problem is response bias. This bias can be minimised by examining any known information such as geographic location about the non respondents. This information can then be compared to the known information about the sample. Any differences that occur indicate the degree of bias (de Vaus 1992, 75). However, due to time constraints, no examination of potential non response bias, other than by geographic location, was undertaken in this dissertation. The geographic distribution of responses was considered to be satisfactory.

Table 3.1 A summary of the survey's distribution and collation

EFFECTIVE SAMPLE SIZE	
Number of surveys sent	154
Less returned with address unknown	<u>4</u>
Effective sample size	<u>150</u>
NUMBER OF USEABLE RESPONSES	
Number of replies received	73
Less unusable because of changed circumstances	<u>3</u>
Number of useable responses	<u>70</u>
Response Rate = $70 \div 150 = 47\%$	

3.10 Summation and validity of the scales

A scale consists of responses to a number of questions (de Vaus 1992, 250). Summation of the scales are carried out in Sections C, D and E of the survey instrument used in this study. In this study the responses for each question from each respondent are collected. The scores for each question are then added to provide a scale score for the set of questions for each respondent.

This study has eighteen questions for the four multiple question instruments. The instruments are used for measuring professional orientation (five questions), management orientation (three questions), the perceived importance of certain management activities (five questions) and the perceived usefulness of those management activities (five questions). A score for the effectiveness of the management control system is obtained by weighting the perceived usefulness score by the perceived importance score.

Following de Vaus (1991, 255-256) each multi-summed variable was tested for validity. That is, tests were carried out to determine whether the questions in each of these groups measure the same underlying concept.

Table 3.2 The results of the first rotated factor loading

Section C				
a	.91466	-.0110	-.00419	.02838
b	.70029	.14932	.27184	-.05891
c	.85322	-.04656	-.11912	-.09200
d	.79495	-.08154	-.06835	-.06389
e	.78311	.10485	.03307	-.09424
f	-.11072	-.74629	-.09628	-.14274
g	-.04538	.71343	.22323	-.11045
h	.02116	.80310	.07161	.05729
Section D				
a	-.03312	.04031	.70296	-.17270
b	-.01692	.27999	.47391	.13216
c	.04480	.08975	.77621	-.05646
d	.03530	.15956	.78208	.03930
e	.01502	-.00863	.70217	.23552
Section E				
a	-.00775	-.00672	.13375	.83265
b	-.10255	.32749	.10237	.70612
c	-.03646	-.25589	.12640	.80009
d	-.07206	.17085	-.18119	.78886
e	-.09904	.00179	-.04373	.87553
Eigenvalue	3.83301	3.31198	2.6982	1.63269
Factor Name	MANAGEMENT ORIENTATION	PROFESSIONAL ORIENTATION	PERCEIVED IMPORTANCE	PERCEIVED USEFULNESS

Rotated factor analysis can be used to ascertain if there is any question in a scale that does not conform to a consistent answer pattern. This is termed a test of unidimensionality. The variables that used a multi-summed scale were tested for unidimensionality using varimax rotated factor analysis. The initial principal factor matrix was rotated orthogonally to reach the final solution. In the first rotation four factors with an eigenvalue greater than one were extracted. They accounted for 63.7% of the total variance. In studies of this type, only factors with an eigenvalue greater than 1 are normally included in further analysis (Norusis 1993, 54). Table 3.2 shows the first rotated factor loadings, the percentage of variance explained by each factor and a descriptive factor title. Factor loadings greater than .40 were considered acceptable.

The first five questions in Section C loaded onto Factor One. These five questions were developed to measure management orientation. Three questions in Section C loaded onto Factor Two. These questions were developed to measure professional orientation. Question f of Section C was expected to load onto Factor Two. Observation of Table 3.2 indicates that question f of Section C loads onto all factors in a negative direction. This result indicates that the responses should be reverse coded. However, reverse coding was not carried out because subsequent analysis concluded that the question's wording was ambiguous. It was therefore discarded.

The five questions in Section D loaded onto Factor Three. These five questions were developed to measure the perceived importance of certain activities of the MCS. The five questions in Section E loaded onto Factor Four. These five questions were developed to measure the perceived usefulness of the same activities of the MCS.

After excluding question f of Section C, the remaining data was then subjected to further analysis. The result of this analysis is shown in Table 3.3. Observation of this table shows that the items measuring each factor loaded together with eigenvalues greater than one. They accounted for 65% of the variance.

The Kaiser-Meyer-Olkin (KMO) is a measure of sampling adequacy. De Vaus (1992, 259) suggests that if the KMO is above 0.7, then the correlations between

questions are sufficiently high to make factor analysis suitable. The KMO in this study was .74591. This supports the results obtained from the factor loading.

Table 3.3 The results of the second rotated factor loading

Section C				
a	.91620	-.00706	-.00833	.03200
b	.70466	.14616	.27059	-.05479
c	.85478	-.02612	-.12838	-.08917
d	.79386	-.08846	-.07056	-.06224
e	.78096	.01338	.05356	-.09424
g	-.02288	.76323	.22541	-.11045
h	.04105	.78090	.09259	.05729
Section D				
a	-.03141	.05698	.69722	-.17270
b	-.01030	.28667	.47366	.13216
c	.04383	.05302	.78262	-.05646
d	.03892	.16421	.78025	.03930
e	.01297	-.02551	.70444	.23552
Section E				
a	-.01353	-.05719	.14197	.83265
b	-.08956	.41388	.08675	.70612
c	-.04739	-.29403	.12936	.80009
d	-.06383	.24366	-.19514	.78886
e	-.10602	-.06904	-.02950	.87553
Eigenvalue	3.82194	3.31198	2.68267	1.63269
Factor Name	MANAGEMENT ORIENTATION	PROFESSIONAL ORIENTATION	PERCEIVED IMPORTANCE	PERCEIVED USEFULNESS

3.11 The summary statistics

Pearson's correlation coefficients (Pearson's r) for all variables are presented in Table 3.4. A coefficient greater than .7 indicates that the respective relationship between dependent variables is so strong that both variables are having the same influence on the dependent variable. This is termed multicollinearity. The results show all correlation coefficients between the independent variables are less than .7. Therefore no multicollinearity is assumed to be present. The correlation coefficient between management orientation and professional orientation is -.0320. This latter result agrees with the results of a similar study by Miller and Wager (1970).

Table 3.4 Pearson's correlation coefficients

	Diversity	Funds	Man. Orient	Prof.Orient	Effective MCS
Diversity	1.00 (n=70)				
Funds	-.1317 (n=70) p = .277	1.00 (n=70)			
Man. Orient	-.1898 (n=70) p=.113	-.0336 (n=70) p=.782	1.00 (n=70)		
Prof. Orient	.0925 (n=70) p=.443	.2764 (n=70) p=.021	-.0320 (n=70) p=.791	1.00 (n=70)	
Effective MCS	-.0963 (n=70) p=.428	-.2239 (n=69) p=.064	.2834 (n=70) p=.017	.1710 (n=70) p=.157	1.00 (n=70)

Table 3.5 sets out the summary statistics for the variables identified in Chapter Two. They will be used in the analysis described in Chapter Four.

Table 3.5 Summary statistics for the variables

	OPERATIONAL DEFINITION	MEAN	STANDARD DEVIATION	MIN. Possible Actual	MAX. Possible Actual
SERVICE DIVERSITY	HOSDIV	117.66	166.74	N/A 2	N/A 950
FUNDING METHOD	HOSFND	3.56	1.72	1 1	5 5
MAN. ORIENT	CEOMGT	3.12	.90	1 1	5 5
PROFESS. ORIENT	CEOPROF	1.80	.62	1 1	5 5
EFFECT MCS	PEMCS	2.01	.54	1 1	5 4.8

3.12 Summary

This chapter contained a description of the research method used to collect and compile the data. It first discussed the survey method, the selection of the sample and the design of the survey form used in this study. It then discussed the instruments used to measure the dependent and independent variables. Finally, it discussed the distribution and collation of the responses, the validity of the scales

and the summary statistics. The next chapter examines the regression analysis used to analyse the data.