The association between the use of management control systems and the effectiveness of performance management systems in hospitals

by

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Statement of Candidate

I certify that the work in this thesis entitled “The association between the use of management control systems and the effectiveness of performance management systems in hospitals” is the result of my own research and that it has not, nor has any part of it, been submitted as part of requirements for a degree to any other university or institution other than Macquarie University. Any help and assistance that I have received in my research have been properly acknowledged. I also certify that all information sources and literature used are indicated in the thesis.

(Signature)

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Abstract

This study examines the association between the use of Management Control Systems (MCSs) and the effectiveness of Performance Management Systems (PMSs) in hospitals. Specifically, the study utilizes Simons' levers of control framework to examine the impact of the enabling use of controls (interactive and belief levers) and the constraining use of controls (diagnostic and boundary levers) on the achievement of PMS process outcomes and hospital performance. The findings indicate that the achievement of process outcomes (performance related and staff related) is affected by the enabling use of controls, with the achievement of staff related outcomes mediating the association between the enabling use of controls and hospital performance (medical facilities and effectiveness). In addition, both the enabling and constraining use of controls exhibited a direct impact on hospital performance. The study contributes to the management accounting literature by providing an insight into the role of MCSs and the importance of process outcomes in enhancing the effectiveness of PMSs in hospitals.

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CHAPTER ONE

INTRODUCTION

1.1 Background

The healthcare industry plays an important role with respect to both the quality of life and social welfare in modern society. Specifically, people acquire services from health care systems to enhance their health level which subsequently affects their quality of life to a large extent (Morgon, 2015). In particular, a report from the Australian Institute of Health and Welfare (AIHW) indicates that in 2014-15 over 10 million people used the services of the healthcare system including primary health care such as dental clinics, general medical service, and hospitals. The fact that the total health expenditure in Australia in 2014-15 was estimated to be $203.1 billion or 10.1% of the GDP, also demonstrates the significant importance of the healthcare industry (Australian Bureau of Statistics 2015). Hence, it is important to develop the healthcare industry in an appropriate manner to have a positive impact on both the economy of a country and the quality of life of the country's citizens (Theodoropoulos, 2011).

However, despite the importance of the healthcare industry, significant problems exist. First, ineffective performance management systems (PMSs) result in negative attitudes among clinicians[1] and lead to discontented patients. In particular, the healthcare industry places too much emphasis on financial outcomes, with goals predominantly set and performance evaluated in respect to financial measures (Clinton and Nelson, 2004). Consequently, clinicians are continually faced with a tension in respect to the conflict between focusing on providing a high

[1] Clinicians refer to a physician or other qualified person who is involved in the treatment and observation of living patients, as distinguished from one engaged in research (OED : Oxford English dictionary, 2000, p. 401)

level of service and achieving desirable financial outcomes. This may result in a decline in the performance of professional clinicians, as they are forced to pay more attention to financial performance rather than the improvement of their professional knowledge. Their level of job satisfaction may also decline, leading to a negative attitude towards their job (Clinton and Nelson, 2004). Instances where clinicians are forced to pursue financial outcomes to the detriment of high quality service may also lead to patients' dissatisfaction.

Secondly, many previous studies indicate that inappropriate management control systems (MCSs)[2] have been applied in the healthcare industry (Hill, 2000; Kondo et al., 2013; Cristina et al., 2014). For instance, one of the main causes of ineffective service delivery in hospitals is the inappropriate use of MCSs which affects the innovation and flexibility of clinicians' work (Clinton and Nelson, 2004). In particular, the MCSs in hospitals are too restrictive with the rules, constraints, and controls creating tension between clinicians and managers, and having a negative impact on operational efficiency (Hill, 2000; Kondo et al., 2013). The tension between clinicians and managers is usually accompanied by a tension between clinicians and patients which occurs when clinicians fail to deliver quality services. In addition, while managers try to utilize action controls to enhance the efficiency of daily operations, action controls have been found to have a minimal effect on enhancing clinicians' efficiency in providing medical services (Comerford and Abernethy, 1999; Kondo et al., 2013).

Insufficient attention has been given to PMSs and MCSs in the healthcare industry. Accordingly, this study focuses on the use of MCSs and the effectiveness of PMSs in hospitals. The focus on MCSs and the effectiveness of PMSs in hospitals is considered pertinent for the following

[2] Management Control Systems are the formal, information-based routines and procedures managers use to maintain or alter patterns in organisational activities (Simons, 1995).

reasons. First, hospitals are the most important part of the health care system, with 40.4% of the total health care services in Australia provided by hospitals in 2014-15, and more than 7.5 million clinic presentations reported by public hospitals (AIHW, 2015). Secondly, compared to the primary and secondary health care systems such as dental clinics, pharmacies and first aid, the PMSs and MCSs in hospitals are much more complicated and problematic (Abernethy, 1996). In addition, due to the large size of hospitals, the problems associated with PMSs and MCSs are expected to be more significant and typical than in the primary and secondary heath care systems.

Hence, the study is motivated by the insufficient studies on the effectiveness of PMSs in the healthcare industry, and examines the association between the use of MCSs and the effectiveness of PMSs in hospitals. In examining the use of MCSs, he study utilizes Simons' levers of control framework (Simons, 1995), which consists of four levers of control (belief systems, interactive systems, diagnostic systems, and boundary systems)[3]. While previous studies have examined the impact of these four levers on the effectiveness of PMS in isolation, this study examines the impact of the four control levers in combination, specifically the enabling use of controls (the interactive and belief levers) and the constraining use of controls (the diagnostic and boundary levers), on the effectiveness of PMSs. The effectiveness of PMSs is assessed in respect to both the achievement of PMS process outcomes and hospital performance. Tung et al.'s (2011) measure, which refers to the extent PMSs can assist in improving hospital processes (see Appendix 1, Question 3), is utilised to measure the achievement of PMS process outcomes, while hospital performance is assessed in respect to

[3] Belief systems communicate core values through mission statements and vision statements.
Boundary systems define the limits of freedom include codes of conduct.
Interactive systems provide strategic feedback to update and redirect strategy.
Diagnostic systems monitor organisational outcomes and correct deviations from preset standards of performance.

five aspects of performance, Staff Resources, Effectiveness, Support Facilities, Patient Care, and Medical Facilities. Hence, the study examines the association between the enabling and the constraining use of controls with the achievement of PMS process outcomes, the association between the achievement of PMS process outcomes with hospital performance, and the mediating role of the achievement of PMS process outcomes in the association between the two types of use of controls with hospital performance.

1.2 Motivations of the study

The motivations of this study are as follows; (1) to address the gap in the literature examining the effectiveness of PMSs; (2) to extend the literature examining the association between MCSs and the effectiveness of PMSs.

1.2.1 To address the gap in the literature examining the effectiveness of PMSs

The majority of the previous research on PMS effectiveness has only focused on performance rather than process outcomes. For instance, traditionally, the effectiveness of PMSs has been mainly evaluated through the comparison of financial outcomes such as sales, profit and cash flows with organisational targets (Tung et al., 2011). However, several shortcomings can be found with only focusing on performance when evaluating the effectiveness of PMSs. First, performance only describes the consequences rather than the causes of the ineffectiveness. Hence, if managers only focus on performance results they may be unable to improve the systems on account of lacking the knowledge to ascertain the causes of ineffectiveness (Tung et al., 2011). Secondly, measuring the effectiveness of PMSs from a performance perspective does not allow managers to assess the systems in respect to the full range of strategically

important parts of the organisation such as decision making processes (Hamilton and Chervany, 1981). This may be detrimental to the improvement of systems and may lead to a biased assessment of PMS effectiveness. Finally, too much attention on performance may cause managers to focus excessively on designing the systems to maximize performance rather than balancing the effect brought by the system on both outcome and organisational processes which are important to the operation and development of the organisation.

The limitations of evaluating PMS effectiveness solely from a performance perspective has resulted in increased attention being placed on the system-resource approach which focuses on the contribution made by the system to organisational processes. For instance, according to Hamilton and Chervany (1981) system effects do not necessarily occur directly and immediately, but are reflected by the changes in organisational processes. These impacts on organisational processes can be evaluated by assessing whether the system assists in improving decision makers' ability, the quality of decision making and asset utilization processes, and reduces information processing costs (Hamilton and Chervany, 1981). However, evaluating the effectiveness of PMSs only from the process angle is also not ideal, given performance is one of the most important aspects to the survival and development of organisations. Hence, in this study, both the performance and the process outcome perspectives of effectiveness will be considered. In particular, in line with Hamilton and Chervany (1981), the achievement of PMS process outcomes will be examined as a mediator of the association between the use of MCSs and performance.

In addition, while previous research on the effectiveness of PMSs tends to focus on case studies, this study will employ the survey methodology. While a case study approach may reveal the story in greater depth, a single case is hard to generalize and the conclusions from such a method

inevitably involves subjective interpretations. Accordingly, in order to enhance external validity, this study will use the survey method to collect data from 487 hospitals in Australia.

1.2.2 To extend the literature examining the association between MCSs and the effectiveness of PMSs

Various studies have examined the association between MCSs and the effectiveness of PMSs from either a performance perspective or process outcome perspective. Previous studies examining the association between MCSs and process outcomes have focused on two aspects, the use of MCSs and the behavioural outcomes of MCSs. The exploration of the relationship between MCSs and behavioural outcomes has focused on the effects of MCSs on job satisfaction (Abernethy and Brownell, 1997; Lilian, 2012; Carbonell and Rodriguez-Escudero, 2013) and job related tension or stress (Jaworski and MacInnis, 1989; Chenhall, 2003). For example, Chenhall (2003) argued that the usefulness of MCSs would have a positive impact on individual's satisfaction and consequently lead to better achievement of organisational goals. In respect to the use of MCSs, the types of use of MCSs will impact the achievement of process outcomes. For instance, the interactive use of controls will positively affect organisational process innovation and process efficiency, thereby improving the level of achievement of process outcomes (Bisbe and Otley, 2004; Bisbe and Malagueño, 2009; Chenhall, 2015). Similarly, the diagnostic use of controls will positively affect the achievement of process outcomes by minimizing the level of uncertainty and clarifying the organisational objectives (Merchant, 2007; Simons, 2013).

Previous studies have also examined the association between the types of controls specifically Simon's four levers of control and organisational performance. For instance, the association between beliefs systems and organisational performance has been demonstrated to be positive

in professional service organisations including consultation firms and accounting firms (Kray and Haselhuhn, 2007; Areepattamannil et al., 2016) and negative in mass service organisations such as in the manufacturing industry (Kray and Haselhuhn, 2007; Narasimhan et al., 2012; Areepattamannil et al., 2016). In addition, boundary systems exhibit a negative relationship with performance in the service-oriented industry (Jiang et al., 2015). Finally, the use of interactive systems was associated with higher performance in professional service organisations (Berkman et al., 2012; Janke, 2014; Suen, 2013Jiang et al., 2015), and there is evidence of a negative association between diagnostic systems and organisational performance in professional service organisations (Suen, 2013; Jiang et al., 2015).

This study aims to contribute to this contingency based literature in three ways. First, while previous studies have examined the association between the types of controls and organisational performance in professional service organisations, few studies have examined this association in a hospital context. Secondly, while these studies examine the impact of the four levers on performance, they consider the impact of each lever in isolation. Accordingly, in line with Simons (1995) who states that "control of business strategy is achieved by integrating the four levers of beliefs systems, boundary systems, diagnostic control systems, and interactive control systems" (Simons, 1995, p.83) and argues that the four control levers will produce the best possible results when they work together, the four control levers will be considered as two pairs (the enabling and constraining use of controls). This approach is in line with Simons' argument that the four control levers will work as pairs to achieve synergy through a continuous process of balancing dynamic tensions. The dynamic tensions are created through the enabling use of controls which have a positive impact on the organisation and the constraining use of controls which have a negative impact (Simons, 1995). Hence, the control levers do not work in isolation, rather they will positively impact the organisation to the largest extent when they work together

to achieve synergy (Henri, 2006; Widener, 2007) and contribute to the achievement of the organisational objectives (Simons, 1995).

Thirdly, given previous research has tended to focus on the impact of controls on end results rather than the 'means to an end', this study aims to assist managers by providing an insight into the impact that controls have on an organisations' processes. Specifically, while previous research has concentrated on the associations between MCSs and performance, this study focuses on both hospital performance, as the end result, and the impact on the achievement of PMS process outcomes, as the 'means to an end'. In addition, emphasis is placed on examining the mediating role of PMS process outcomes in the relationship between the use of MCSs and hospital performance.

To summarize, this study intends to examine the association between the use of MCSs with the effectiveness of PMSs. The specific aims of the study are to investigate: (1) the association between both the enabling use of controls and the constraining use of controls with the achievement of PMS process outcomes; (2) the association between the achievement of PMS process outcomes and hospital performance; and (3) the mediating role of the achievement of PMS process outcomes on the association between the use of MCSs and hospital performance.

1.3 Organisation of the thesis

The thesis is organised as follows. Chapter 2 presents a review of the literature on the effectiveness of PMSs and Simon's levers of control framework, discusses the link between the effectiveness of PMSs and the use of MCSs, and develops the hypotheses. Chapter 3 then discusses the methodology used to collect the data, including the design of the questionnaire. Chapter 4 provides the results of the data analysis performed to test the hypotheses developed

in Chapter 2, and finally, Chapter 5 discusses the results, the contributions, and the limitations and suggestions for future research.

CHAPTER TWO

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

This chapter provides the review of prior studies concerning the effectiveness of PMSs and the association between MCSs with PMSs effectiveness. Section 2.1 provides an overview of the PMS literature, including an overview of the nature of MCSs, and the contingency studies examining the association between MCSs and the effectiveness of PMSs. Section 2.2 then provides an overview of the nature of Simons' (1995) four levers of control. Finally, the hypotheses are developed in section 2.3.

2.1 Performance management systems

Performance management systems (PMSs) can be defined as a continuous process where managers and employees work together to plan, monitor and assess an employee's work objectives as well as their contributions to the organisation (Henri, 2006; Biron et al., 2011). Performance management is an ongoing process involving the process of goal setting, performance evaluation and performance appraisal, which aim to link employees' actions to the organisational mission and goals (Marchand and Raymond, 2008; Simons, 2013).

Specifically, managers utilize PMSs to ensure employees' actions and outputs are congruent with organisational desired goals and consequently contribute to organisation's survival and development. PMSs create the link between employees' behaviour and organisational goals through the ongoing communication process between both managers and employees in relation to goal setting, observing output and receiving feedback (Aguinis, 2009).

Managers can acquire effective information from an appropriate PMS to enable them to monitor and evaluate employees' performance, thereby maximizing the likelihood that organisations achieve the desired goals (Merchant and Van der Stede, 2007). The current position and the future potential of the organisation in the market can be indicated and predicted from the information provided by the PMS. Managers can therefore position the organisation in the market by comparing the performance data with others in the industry, thereby facilitating the development of future strategies to assist the organisation to improve their competitiveness (Broadbent and Laughlin, 2009).

There are five main benefits of using PMSs. First, employees' motivation to perform can be enhanced by an appropriate PMS (Simons, 2000; Merchant, 2007; Aguinis, 2009). In particular, receiving performance feedback can increase the motivation for future performance with positive feedback demonstrating one's value at work. Secondly, through highlighting the strengths and weaknesses of an individual's performance, employees' competence and performance can be improved. Specifically, feedback can enable employees to improve their work performance and their own competence by concentrating on their strengths and mitigating their weaknesses (Merchant, 2007; Aguinis, 2009).

Thirdly, PMSs provide mechanisms which can enhance the congruence between employees' activities and organisational desired goals (Rummler and Brache, 1995; Otley, 1999; Simons, 2000; Merchant and Van der Stede, 2007; Aguinis, 2009). For example, the job definition and performance criteria are clarified in PMSs, which assist employees in gaining a better understanding of the behaviour and results required in different positions. In addition, the goal setting process ensures that employees gain a clear insight into the organisational goals and the assignment of such goals to each unit and employee.

Fourthly, managers will gain a better insight into their employees which will assist them in assigning the right person to specific tasks (Aguinis, 2009). Hence, PMSs will provide managers with an insight into employees' performance and personality, with managers and employees working together to make plans, assess performance, and provide appropriate feedback. Fifthly, PMSs can facilitate organisational change, and align such change with the organisational goals and objectives. In particular, the PMS, specifically the reward systems, can be used to motivate employees to accept and implement change (Aguinis, 2009; Broadbent and Laughlin, 2009).

Although there are many benefits which can be attained through utilizing PMSs, the benefits will only be achieved if appropriately designed PMSs are implemented. Accordingly, previous studies have examined the association between specific aspects of PMS design and PMS effectiveness. Most of these contingency-based studies on PMS design are based on the framework presented by Ferreira and Otley (2009) who argue that a well-designed PMS should consider factors including the vision and mission of the organisation, key success factors, organisational structure, the strategies and plans adopted by the organisation, key performance measures, organisational target setting, performance evaluation, rewards systems, information flows, network and system coherency, and culture. Based on this framework, prior studies have examined the design factors in different contexts. For example, previous studies have demonstrated that the types of services will affect the design of PMSs, with Boland and Fowler (2000) finding that in hospitals, where professional service requires more flexibility and innovation, the use of participative budgeting and non-financial evaluation leads to a higher level of innovation and performance. In addition, King and Clarkson (2015) found a negative relationship between using PMSs that only focus on financial rewards and performance in

professional service organisations. Alternatively, in mass service organisations, such as universities and manufacturing companies, the design of PMSs tend to focus on detailed budgets and financial performance (Silvestro et al., 1992).

Other studies have examined the influence of PMS implementation on PMS effectiveness reporting that poorly implemented PMSs will be detrimental to organisations through prompting employees to quit, decreasing employees' motivation, damaging the relationships among employees, lowering the self-esteem and competence of employees, and breaking the congruence between employees' actions and organisational goals (Aguinis, 2009). In addition, some studies have examined the various contingency factors that are related to PMS implementation. For example, culture will impact the implementation of PMSs through affecting employees' acceptance level of the system (Chow et al., 1999; Chenhall, 2003; Merchant et al., 2011). In addition, the level of centralization has been found to be negatively related to organic type PMSs (Sharma, 2002; Broadbent and Laughlin, 2009; Lee, 2011); the environment has been found to be positively associated with the bureaucratic type of PMS implementation (Sharma, 2002; Chenhall, 2003); and size has been found to be positively associated with the use of multidimensional PMSs (Chenhall, 2003; Merchant et al., 2011). Hence, PMSs effectiveness may be enhance through designing and implementing PMSs appropriately.

This study aims to contribute to the PMS contingency based literature by examining the association between the use of MCSs and PMS effectiveness. The nature of PMS effectiveness and MCSs is discussed in Sections 2.1.1 and 2.2 respectively, with the hypotheses concerning their association developed in Section 2.3.

2.1.1 The effectiveness of PMSs

An effective PMS refers to a system which can assist organisations in achieving a set of objectives and/or the organisational goals (Cinquini and Mitchell, 2005). First, an effective PMS could provide managers with an insight into the current financial position of the organisation including the actual sales and costs, and their comparison with budgeted amounts. Based on this information, managers may choose to maintain, adjust or change the strategy in order to increase sales and/or reduce costs (Neely et al., 1995; Simons, 2000).

Secondly, an effective PMS could assist managers in motivating their employees (Simons, 1995; Merchant and Van der Stede, 2007; Malmi and Brown, 2008). An effective PMS could optimize incentive plans to motivate the achievement of specific goals, and improve employee engagement by ensuring employees have a clear understanding of how they are directly contributing to organisational goals. Transparency in the achievement of goals as well as high confidence in the bonus payment process, will also enhance employees' motivation (Cristina et al., 2014).

Furthermore, an effective PMS can assist managers to achieve the organisational desired goals effectively and efficiently through the provision of effective performance information. In addition, management controls can be improved by an effective PMS as the information provided by PMSs can simplify the communication of strategic goals, scenario planning and help managers be more flexible in adapting to employees' needs (Otley, 1999; Tung et al., 2011).

There are two approaches to evaluating the effectiveness of PMS, the goal-centered view and the system-resource view. The goal-centered view is where the evaluation of system

effectiveness focuses on performance results, while the system resource view emphasizes the achievement of process outcomes (Hamilton and Chervany, 1981). In the goal-centered view, the way to assess the effectiveness of the systems is through the outcomes of the organisation, in other words, effectiveness is determined by comparing the objectives with performance (Hamilton and Chervany, 1981). Whether the system assists the organisation in achieving the organisational desired goals is the main criteria in the goal-centered approach. Alternatively, in the system-resource view the quality of the system, which refers to the extent to which the system can assist with improving organisational processes is much more important than the performance results (Hamilton and Chervany, 1981). For instance, whether the system assists in improving organisational processes such as the operational process and the decision making process is the main criteria in the system-resource approach.

The measurement of PMS effectiveness has mainly focused on the end results (the goal-centered approach) such as performance rather than processes such as the achievement of process outcomes (system-resource approach). However, performance only describes the results rather than the causes. Therefore, managers are unable to acquire an insight into the contributory factors which lead to the effective or ineffective performance. Consequently, managers may find it hard to resolve problems and decide which corrective actions to take when performance is undesirable or alternatively which actions to emphasise if performance is desirable. Therefore, as mentioned previously, this study will consider both performance and process outcomes to assess PMS effectiveness. Specifically, the study will assess PMS effectiveness in respect to both the achievement of process outcomes and hospital performance. The study will also examine the association between the achievement of process outcomes and performance, the nature of which will be discussed in section 2.3.3.

2.1.2 The influence of MCSs on PMS effectiveness

Management control systems provide information to assist managers in performing their jobs and to assist organisations in developing and maintaining appropriate pattern of behaviour. Previous research has demonstrated that MCSs contribute to organisational performance (Simons, 1995; Widener, 2007; Malmi and Brown, 2008), with evidence of positive relationships between specific type of MCS, including formal controls (Miah and Mia, 1996; Merchant and Van der Stede, 2007; Merchant, 2007) and informal controls (Wilkins and Ouchi, 1983; Chow et al., 1999; Li and Zhou, 2005), with performance.

Previous studies have also examined the association between Simons' (1995) levers of control and organisational performance. For instance, the diagnostic use of controls is demonstrated to negatively affect performance in professional service organisations while the interactive use of controls has a positive impact on performance (Merchant, 2012; Nankervis et al., 2012; Sakka, 2016). Furthermore, there is evidence of the use of beliefs systems (boundary systems) exhibiting a positive (negative) association with performance in professional service organisations (Govindarajan and Gupta, 1985; Lee, 2011).

These previous studies on the relationship between the four levers of control and organisational performance have focused on the levers in isolation rather than considering the combined impact of the levers. However, Simons (1995) argues that the control levers do not work alone to affect the implementation of organisational strategy, but rather work in an integrated way (Simons, 1995). Specifically, Simons suggests that the four control levers will create dynamic tensions through two pairs, referring to the enabling use of controls, which is expected to have a positive impact on the organisation, and the constraining use of controls, which is expected

to have a negative impact. Accordingly, as mentioned previously, in examining the link between MCSs and the effectiveness of PMSs, this study will focus on the impact of the control levers as two pairs (the enabling and constraining use of controls).

Hence, while many prior studies have focused on the impact of MCSs on PMS effectiveness (Otley and Berry, 1980; Chenhall, 2003; Chenhall and Langfield-Smith, 2007), this study aims to extend this literature by examining the influence of MCSs on PMS effectiveness using Simon's levers of control framework and treating the control levels as two pairs, specifically the enabling use of controls and the constraining use of controls. The focus on the empirical examination of the impact of the two pairs of levers is particularly pertinent given Simons (1995) emphasis on the combined power of the levers. A detailed discussion of the nature of Simon's levers of control framework and the enabling and constraining use of controls is now provided in Section 2.2, followed by the discussion of the expected associations between these pairs of levers with PMS effectiveness in Section 2.3.

2.2 Simon's levers of control

Simons' (1995) levers of control framework consists of four control systems: beliefs systems, boundary systems, interactive systems and diagnostic systems (Simons, 1995). The four systems work together to contribute towards the achievement of organisational objectives.

Belief systems are "the explicit set of organisational definitions that senior managers communicate formally and reinforce systematically to provide basic values, purpose, and direction for the organisation" (Simons, 2000, p.300). That means, belief systems are often used to communicate the core values of the organisation in order to inspire creativity and innovation in a stable environment, and ensure congruence between employees' action and organisational

goals to the largest extent. Belief systems will have a positive effect on motivating employees' innovation by communicating organisational core values through the mission or vision statements, thereby providing explicit directions to employees to seek opportunities.

An interactive system, aims to strengthen the organisation's ability to handle changes, and impacts the organisation in a positive way. Managers involve themselves in the control process and choose which controls to use in an interactive way in order to perceive and solve strategical uncertainties. Managers could obtain access to local knowledge in order to develop new strategies through an interactive system, while the emergence of new strategies could also be stimulated through the system. The use of an interactive system allows managers to communicate organisational strategies with employees face-to-face through meetings, which ensures a clearer understanding of organisational strategies by employees, thus leading to a higher degree of goal congruence (Widener, 2007).

Managers use belief systems to create an open environment to inspire creativity. Similarly, the use of the interactive system will make employees feel much more equal because top managers involve themselves in the controls (Simons, 1995). Hence, these two controls combine together to impact the organisation in a positive way. Accordingly, the combined use of this pair of levers is referred to as the enabling use of controls.

The boundary system aims to control the uncertainty and restrict opportunity-seeking behaviour in order to ensure the organisation is not harmed by high-risk actions, thereby preventing employees from wasting organisational resources (Widener, 2007). Both belief and boundary systems intend to increase employees' ability to seek new opportunities and be creative, although the impact of these two systems on employees differs. Specifically, the belief systems

effect on employees is more positive, whereas boundary systems impact employees in a much more negative way, restricting employees' behaviour in order to make sure the opportunities sought by employees are not outside the areas imposed on them (Widener, 2007).

A diagnostic system is used to communicate critical performance rewards and monitor the implementation of intended strategies (Simons, 1995). Managers use diagnostic systems to compare actual performance outcomes against pre-set targets and to identify exceptions and deviations from plans. The main functions of diagnostic systems refer to monitoring outcomes as well as correcting deviations through setting appropriate goals, implementing feedback systems, and identifying critical performance variables (Langfield-Smith, 1997). Information on critical success factors, which allows managers to pay more attention to critical aspects of an organisation's operations, can be provided by the diagnostic system.

Similarly to a boundary system, the diagnostic system affects the organisation through the constraints of employees' behaviour for the sake of ensuring the achievement of organisational goals (Simons, 1995). However, the system does not always have a constraining influence on employees' behaviour, with the main target of the system being to monitor and evaluate the achievement of outcomes, thereby facilitating the modification of inappropriate actions taken by employees. Through this process the likelihood of goal congruence could be enhanced within the organisation.

The diagnostic system is used to restrict employees' behaviour for the sake of aligning their actions with the organisational objectives and the use of boundary systems aims to depict the direction of innovation within the organisation (Simons, 1995). These two control levers could be regarded as restricting the organisations operations' and may impact the organisation in a

negative way. Accordingly, the combined use of the boundary and diagnostic controls is referred to as the constraining use of controls.

2.3 Hypotheses development

2.3.1 The link between the enabling use of controls and the achievement of PMS process outcomes

The enabling use of controls, which contains belief systems that are usually used to create core values and interactive systems that are used to strengthen an organisation's ability to deal with change and uncertainty, have been found to have a positive impact on the achievement of process outcomes in professional service organisations. While some studies refer to the potential weaknesses of applying the enabling use of controls (Kray and Haselhuhn, 2007; Narasimhan et al., 2012; Areepattamannil et al., 2016), the majority of previous studies refer to the significant benefits of installing the enabling use of controls (Kray and Haselhuhn, 2007; Jordan and Messner, 2012; Narasimhan et al., 2012; Areepattamannil et al., 2016).

The enabling use of controls can assist in improving the achievement of PMS process outcomes in four ways. First, through involving employees in decision making process, the enabling use of controls will motivate employees to develop a positive attitude towards their work, and thereby assist organisations in achieving desired goals. This is in line with Simons (2000, p. 304) who states that "these systems create intrinsic motivation by creating a positive informational environment that encourages information sharing and learning". For example, Kondo et al. (2015) argue that professional staff can be motivated by involving them in the decision making processes as they will attain a sense of accomplishment when their ideas are accepted by managers, and their ideas are successfully implemented. Similar arguments are

found in Suen (2013) who demonstrated that the level of commitment to organisational objectives improves when professional staff are involved in goal setting process. Hence, it is expected that the enabling use of controls will enhance employees' motivation and level of commitment, thereby assisting the achievement of PMS process outcomes in professional service organisations.

Secondly, the enabling use of controls facilitates effective communication between managers and employees in professional service organisations, and hence enhance the level of transparency, i.e. the extent of employees' understanding of their tasks, responsibilities and targets. Accordingly, the level of goal congruence can be enhanced, thereby improving the likelihood of achieving organisational desired goals (Adler and Borys, 1996; Kondo et al., 2013). For example, Adler and Borys (1996) argue that the enabling use of controls, which provides the opportunity for managers to generate and share ideas face-to-face with employees, can help employees to develop a clearer and more precise understanding of organisational goals, thereby assisting managers in achieving the goals. Similarly, Kondo et al. (2015) found that professional staff will have a higher level of commitment and understanding of a hospital's goals when they are involved in the goal-setting process. In addition, the conflicts between managers and professional staffs can be mitigated through the enabling use of controls which allows the two parties to communicate organisational objectives and share values (Simons, 2000). Therefore, it is expected that the likelihood of achieving organisational desired goals will improve as the enabling use of controls facilitates managers and employees working together to achieve the same goals.

Thirdly, Simons (2000, p. 304) argues that the enabling use of controls can "motivate organisational participants to search creatively and expand opportunity space". Accordingly,

the enabling use of controls could stimulate creativity and innovation within the professional service organisations. Assuming that such creativity and innovation are likely to be reflected in improvements in organisational processes (Simons, 2013), such as the quality of decision making processes, it is expected that this will enhance the likelihood of achieving organisational desired goals (Kray and Haselhuhn, 2007; Narasimhan et al., 2012; Areepattamannil et al., 2016).

Finally, the enabling use of controls will assist in the achievement of PMS process outcomes by assisting managers in providing strategic feedback, identifying market position and triggering new ideas (Simons, 1995; Widener, 2007). Specifically, through face-to-face meetings with employees, managers can acquire an insight into the current market position of their organisation, provide performance feedback and identify existing strengths, thereby enabling them to adjust their strategy in order to fit the changing market in a timely manner.

Hence, it is expected that the enabling use of controls will be positively associated with the achievement of PMS process outcomes. This is supported by evidence that the enabling use of controls has been found to impact the achievement of process outcomes such as enhancing employees' motivation and commitment (Suen, 2013; Kondo et al., 2015), assisting in the achievement of organisational goals (Adler and Borys, 1996; Kondo et al., 2015), and assisting with the implementation of an organisational strategy (Jiang et al., 2015; Suen, 2013). Similarly, it is expected that the enabling use of controls will assist managers to achieve hospital goals, enhance clinicians' motivation, achieve goal congruence within hospitals, ensure staff commitment to hospital's objectives, and provide accurate feedback to clinicians and managers. Therefore, the above discussion leads to the development of the following hypothesis:

Hypothesis 1: The extent of use of the enabling use of controls is positively associated with the achievement of PMS process outcome achievement in hospitals.

2.3.2 The link between the constraining use of controls and the achievement of PMS process outcomes

The constraining use of controls, which contains boundary systems that aim to avoid potential risks and diagnostic systems that aim to critically evaluate and monitor the implementation of organisational strategy, have been found to be negatively associated with the achievement of process outcomes in professional service organisations (Berkman et al., 2012; Suen, 2013; Jiang et al., 2015; Sakka, 2016). Specifically, the constraining use of controls is used to "constrain search behaviour" (Simons, 2000, p.304), direct employees' behaviour and control their actions so as to achieve organisational desired goals. Such an approach can negatively affect the achievement of PMS process outcomes by reducing the likelihood that employees successfully developing their skills and knowledge (Suen, 2013; Sakka, 2016), reducing employees' motivation (Suen, 2013; Kondo et al., 2015), and hence reducing the likelihood of achieving organisational goals (Jiang et al., 2015).

The constraining use of controls imposes restrictions on the level of creativity and innovation within organisations. Employees will lose the motivation to perform due to the restrictions on the direction and range of innovation permitted by the constraining use of controls (Simons, 1995; Merchant and Van de Stede, 2007; Kondo et al., 2015). Such controls may also restrict employees' ability to respond to uncertain situations, especially in hospitals where different patients have diverse demands that require clinicians to be innovative and adopt flexible approaches to fulfill diverse patients' needs (Berkman et al., 2012; Suen, 2013; Jiang et al., 2015; Sakka, 2016). For example, Kondo et al. (2015) argue that the strict restrictions created by the constraining use of controls limit the flexibility of professional staff in daily operations,

which will result in the failure to meet diverse customer needs. Consequently, it is expected that motivation of professional staff will decrease due to their inability to satisfy customer requirements.

Bisbe and Otley (2004) argue that too many restrictions will harm the innovation and service quality of professional groups, and cause employees to develop negative attitudes to their work, thereby reducing the possibility of achieving organisational desired goals. Similarly, Merchant and Van der Stede (2007) argue that the behavioural constraints created by the constraining use of controls, may cause employees to develop negative attitudes with behavioural displacement resulting in the inability to attain desired performance targets.

Hence, in summary the restrictions created by utilizing the constraining use of controls may limit employees' creativity and innovation thereby impeding the development of individual knowledge and competence (Chenhall, 2003; Simons, 2013). Such controls may lead to negative attitudes amongst employees such as clinicians, with the decrease in motivation weakening their ability to meet patients' demands. Consequently, it is expected that the constraining use of controls will be detrimental to the effectiveness of PMSs in hospitals, and accordingly the following hypothesis is stated in the negative form.

Hypothesis 2: The extent of use of the constraining use of controls is negatively associated with the achievement of PMS process outcomes in hospitals.

2.3.3 The link between the achievement of PMS process outcomes and hospital performance

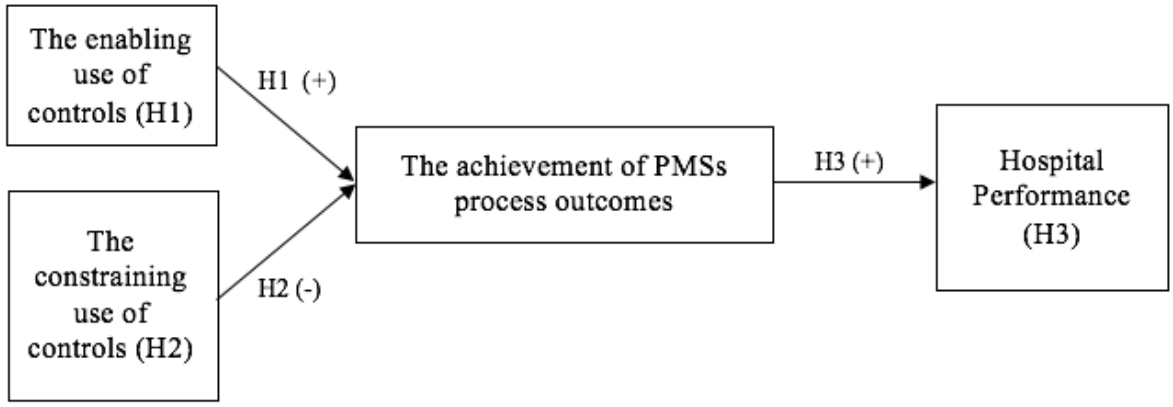
The achievement of process outcomes will be beneficial to an organisation with the enhancement in the quality of organisational processes, such as decision-making processes and

operational processes, expected to result in improvements in organisational performance (Hamilton and Chervany, 1981). Specifically, according to Hamilton and Chervany (1981), improvements in organisational processes could lead to several benefits to organisations such as a better understanding of problems, desirable changes in employees' attitudes, a higher degree of employee cooperation and consensus, and a shorter length of time to make decisions. Such benefits are expected to enhance the likelihood of achieving better organisational performance through the improvement of employees' goal congruence and working attitudes (Kristof-Brown and Stevens, 2001). Similarly, Malina and Selto (2001) argue that organisational performance will be enhanced once the process outcomes have been achieved. The above discussion leads to the development of the following hypothesis.

Hypothesis 3: The achievement of PMS process outcomes is positively associated with hospital performance.

Figure 2.1 provides an overview of the relevant hypotheses developed. It shows that both the enabling use of controls and the constraining use of controls are hypothesized to be positively and negatively associated with the achievement of process outcomes respectively. In addition, the achievement of PMS process outcomes is hypothesized to have a positive association with hospital performance. Given these hypothesized relationships, this study will also perform an exploratory analysis of the mediating role of the achievement of PMSs process outcomes in the association between the use of MCSs with hospital performance.

Figure 2.1 Summary of hypotheses



CHAPTER THREE

METHOD

This chapter describes the research method used in this study and is arranged into six sections. Section 3.1 provides the reasons for choosing a mail survey questionnaire as the instrument for data collection. Section 3.2 then provides an overview of the design of the survey questionnaire. Section 3.3 discusses the data collection procedures including the unit of analysis, sample size and survey distribution procedures. Sections 3.4 and 3.5 provide details concerning the measurement of the dependent and independent variables respectively. The response rate and non-response bias are discussed in section 3.6.

3.1 Justification of the mail survey method

The survey method was chosen to collect data for a number of reasons. First, using real-world participants avoids the risks that may exist in an experimental setting. In particular, management processes are usually very complicated and confounded by many dynamic issues, which cannot be replicated in an artificial setting. The use of the survey method ensures the generalizability and applicability of the study's results. Secondly, unlike financial market data, the variables involved in this study are unobservable and cannot be provided by archival data. First-hand data collection is thus essential. Thirdly, the survey method has an advantage over the interpretive case study method as it involves a statistical sample that can be analyzed and generalized. In addition, although the case study approach may reveal the story in greater depth, a single case is hard to generalize and the conclusions from such a method inevitably involve subjective interpretations.

An internet survey was not selected as it is easier to ignore or delete emails and also due to evidence that internet surveys result in lower response rates than mail surveys (Singleton et al., 1993). An interview-based survey was also not feasible due to time constraints and the fact that the sample involved a wide geographic dispersion within Australia.

Hence, among several different types of survey, the mail survey method was chosen for a number of reasons. First, the mail survey allows for a wider geographic coverage, thereby enhancing external validity. This could overcome the limitations of prior studies which have tended to be case studies, and hence have only focused on a small number of organisations. Secondly, the mail survey approach allows for the collection of data in an efficient and timely manner and enables the collection of sufficient data to address several variables and test multiple hypotheses. In addition, mail surveys can also reduce researcher bias in that researchers are not able to influence subject's responses. Finally, the mail survey approach has become one of the most common methods used for data collection (Díaz de Rada, 2005) and also represents a low-cost approach to collect data.

While it is acknowledged that there are a number of weaknesses involved in using the survey method, including non-response bias and problems associated with low response rates, every attempt was made to minimise their impact. Section 3.6 will discuss the influence of these issues and the attempts to mitigate such influences.

3.2 The design of the survey questionnaire

The questionnaire was designed in a "respondent-friendly" style, using simple-worded questions and was presented in colour to attract respondents' attention. In respect to the length of the questionnaire, according to Aldridge and Levine (2001) and Dillman (2000), the response

rate of a survey is negatively associated with the length of the questionnaire. Therefore, the questionnaire was designed to be as concise as possible. Accordingly, four questions and a statement of appreciation for the respondents' participation were all included in a 4-page questionnaire collated in the form of one A3 sized piece of paper (see Appendix 1). The contact information of the researcher was also provided on the last page of the survey to allow respondents to ask questions, thereby reducing the non-completion of questionnaires due to insufficient information or a lack of understanding.

For the structure of the questionnaire, it was decided to set up questions in a sequenced order, which is based on the argument of Aldridge and Levine (2001) that the sequencing of questions can enhance respondent's confidence in a survey and thereby increase the response rate. Specifically, the questionnaire commenced with straightforward demographic questions which were easy to answer and ended with more complex questions designed to evaluate hospital performance.

A seven-point Likert scale was applied throughout the questionnaire and the majority of the questions were close-ended with respondents only required to tick a box to complete most questions. Most measures were adopted from prior studies in order to ensure that the questions were appropriate for the current study. However, a self-developed measure of hospital performance was utilized, with the questions developed following a review of the relevant related literature (Grosskopf and Valdmanis, 1987; Voelker et al., 2001; Organizations and Hospital, 2008). These questions were pilot tested by some academics prior to distribution to ensure the questions were not misleading or ambiguous. Adjustments were subsequently made to the questions based on the feedback provided.

3.3 Data Collection

This section includes three parts. Section 3.3.1 describes the unit of analysis, while Section 3.3.2 describes the determination of sample size. Section 3.3.3 then outlines the survey distribution procedure employed.

3.3.1 Unit of analysis

The unit of analysis in this study was different types of managers in different hospitals. As discussed in Chapter 1, the focus on the hospitals is justified due to the importance of the health care industry to the country. Three levels of managers were considered in the study: higher level managers (CEOs and General Managers), middle level managers (Financial Managers and Health Service Managers) and lower level managers (Directors of Nursing). These managers were chosen as they were expected to have the required knowledge of the issues covered and hence had the knowledge to complete the questionnaire. The selection of these managers enabled different perceptions of the use of controls and the effectiveness of PMSs to be obtained, thereby facilitating a broad view of the relationship between MCSs and the effectiveness of PMSs.

3.3.2 Sample size

The desired sample size is dependent on the statistical analysis used to test the hypotheses. In this study, we adopt Cohen's (1988) approach to determine the appropriate sample size. According to Cohen (1988), the minimum required sample size of a regression analysis is determined based on the number of predictor variables, the expected population effect size, and the required significance and power levels. For the population effect size, Cohen (1988) suggested that a small effect accounts for 2% of the population variance, a medium effect

accounts for 15% of the population variance, and a large effect accounts for 35% of the population variance. As three independent variables were tested in this study, a small population effect size was applied. Thus, the combination of the three independent variables was expected to explain 2% of the variation in the dependent variable.

Using the conventional 5% significance level of two tailed test, the suggested power level of 0.20 (Cohen, 1988) and the small size effect, the desired sample size can be calculated as followed:

$N=\gamma/f^2$

$=1.3/0.02$

$=65$

Where N=sample size

γ= the non-centrality parameter (Table 9.4.2, p.452, Cohen, 1988)

f^2= the effect size

Accordingly, 65 valid responses were required in order to perform the regression analysis. Previous health care industry studies have indicated response rates in the range of 5% to 20% (Theodoropoulos, 2011 <16%>; Konda et al., 2013 <15%>; Clinton and Nelson, 2014 <13%>). Therefore, an average response rate of 14% was considered to be feasible for this study. According to the analysis above, 65 responses were required and assuming a 14% response rate, 487 questionnaires were mailed out.

3.3.3 Survey distribution procedures

The survey questionnaires were distributed to 487 mid-class managers in 487 Australian hospitals. Using the One Source data base (2015), the contact information of 151 Directors of Nursing, 175 General Managers, 40 Health Service Managers, 156 CEOs and 156 Financial Managers of 487 Australian hospitals was available. While multiple potential respondents were available from some hospitals, only one respondent was chosen from each hospital, with the respondents randomly selected in instances when there was more than one potential respondent.

According to Dillman (2007), in order to acquire a higher response rate, five elements should be included in a survey: a respondent-friendly questionnaire, up to five contacts with the questionnaire recipient, a stamped return envelope, personalized correspondence and a token financial incentive. Due to the financial constraints the financial incentive was not provided and due to ethics requirements only two contacts could be made. However, efforts were made to comply with the other three elements. For example, in addition to the questionnaire, three other documents were mailed out to the respondents including a cover letter, a postcard and a self-addressed reply-paid envelope. The initial cover letter (see Appendix 2) provided the general information of the survey including the purpose of the study, contact information, the purpose of the postcard and the ethics approval statement. Since, according to Dillman (2007) a higher level of correspondence will lead to a higher response rate, the cover letter was printed on university letterhead and was signed by the researcher. A self-addressed reply-paid postcard with an identification number was also sent to respondents. The purpose of this was to enable the identification of respondents, so as to avoid a follow-up mail-out being sent to the respondents who had already completed the questionnaire.

A follow-up mail-out was distributed to non-respondents three weeks after the initial distribution. The follow-up mail-out involved the distribution of a cover letter (see Appendix 3), a questionnaire, a postcard and a reply-paid envelope.

3.4 Measurement of dependent variables

3.4.1 The achievement of PMS process outcomes

We employ Tung et al.'s (2011) measure, which is based on Lawler (2003), to measure the achievement of PMS process outcomes. Specifically, the achievement of PMS process outcomes is measured based on the extent to which 16 desired outcomes of PMSs have been achieved (see Appendix 1, Question 3). Respondents were required to indicate the extent to which their PMS had achieved each of the 16 items desired outcomes using a seven-point Likert scale with anchors of "1=Not at all" and "7=To a great extent".

The factor analysis indicates that these 16 items loaded onto two dimensions (see Table 3.1). The first dimension consists of 10 items (see Table 3.1), and consistent with Tung et al. (2011), we label this dimension as 'performance-related outcomes'. The second dimension consists of 6 items (see Table 3.1). The loading of these items is also consistent with Tung et al. (2011), and hence we labelled this dimension 'staff-related outcomes'. The achievement of process outcomes is measured by the average score of the 10 [6] items used to assess performance [staff] related outcomes, with higher (lower) scores representing a higher (lower) achievement of PMS process outcomes.

Table 3.1 Factor analysis of PMS process outcomes

Items	Component	
	Performance-related outcomes	Staff-related outcomes
1. Motivating performance	**0.800**	0.312
2. Developing individual's skill and knowledge	**0.812**	0.225
3. Assisting in the achievement of goals	**0.813**	0.287
4. Developing a performance-oriented culture	**0.802**	0.305
5. Supporting change efforts	**0.775**	0.367
6. Providing useful performance feedback to employees	0.569	**0.595**
7. Implementing the organisational strategy appropriately	**0.805**	0.180
8. Providing an accurate assessment of business	**0.675**	0.432
9. Ensuring staff commitment to organisational objectives	**0.795**	0.361
10. Addressing the concerns of staff	0.575	**0.564**
11. Ensuring staff time is used efficiently	**0.619**	0.374
12. Linking individual performance to business unit performance	**0.634**	0.458
13.Identifying talented employees	0.334	**0.721**
14. Rewarding talented employees	0.452	**0.609**
15. Identifying poor performing staff	0.217	**0.831**
16. Managing poor performing staff	0.186	**0.849**
Variance explained	60.175%	8.013%

* As listed in Question 3, Appendix 1.

Table 3.2 shows that the Cronbach alpha scores for each dimensions are higher than the required cut-off point (0.7) (Nunnally, 1978), which indicates that the measures for each of these PMS process outcomes variables were reliable.

Table 3.2 Reliability test of PMS process outcomes dimensions

PMS process outcomes factors	Number of items	Cronbach's Alpha
Staff related outcomes	124	0.838
Performance related outcomes	124	0.947

3.4.2 Hospital performance

Given the objective of healthcare to improve the quality of life and social welfare, the evaluation of hospital performance generally focuses on the service given to patients, and hence is usually evaluated from the patients' perspective. For example, a patient's satisfaction survey is a common approach used to evaluate hospital performance. However, evaluating hospital performance from the patients' perspective does not directly reflect the relationship between management actions and performance. Hence, in this study, we evaluate hospital performance from the managers' perspective in order to explore the relationship between management actions and performance in a more direct way.

The questions measuring hospital performance were developed following a review of the relevant literature (Organisation and Hospital, 2008; Voelker et al., 2001; Grosskopf and Valdmanis, 1987) and the indicators launched by the Australian Institute of Health and Welfare (AIHW, 2015) with 17 items developed (see Question 4, Appendix 1). Respondents were required to evaluate their hospitals' performance in respect to each of the 17 items using a seven-point Likert scale with anchors of "1=Extremely poor" and "7=Excellent". Factor analysis of the measure indicates that there are five dimensions of hospital performance (see Table 3.3). The first dimension consists of three items including: 1) Nurse-Doctor ratio; 2) Bed-

Nurse ratio; and 3) Patient-Doctor ratio. Accordingly, this dimension was labelled as 'staff resources' i.e. the extent to which there are enough clinicians to facilitate daily operational processes. The second dimension consists of five items including: 1) efficiency of the patient admission/discharge process; 2) the ability of managers to manage the length of patient stay; 3) managing patient complaints; 4) average waiting time in the emergency department; and 5) surgery waiting time. Since, these items all focus on the management of processes, we labelled this dimension as 'effectiveness'. The third dimension consists of five items including: 1) cleanliness of wards; 2) the extent of hospital security; 3) the quality of IT facilities; 4) the provision of patient support facilities; and 5) the provision of staff training. This dimension was labelled as 'support facilities', reflecting the extent to which quality support facilities are provided. The fourth dimension consists of two items including: 1) overall patients' satisfaction and 2) the quality of patient care and was therefore labelled as 'patient care'. Finally, the fifth dimension consists of two items including: 1) the quality of medical facilities and 2) the provision of medical facilities and was labelled as 'medical facilities'. Hospital performance was measured based on the average scores of the items loading on each of the dimensions, with higher (lower) scores representing higher (lower) hospital performance.

Table 3.3 Factor analysis of hospital performance

Items	Component				
	1	2	3	4	5
1	-0.139	0.351	**0.537**	0.183	0.497
2	0.368	-0.022	**0.711**	-0.104	0.170
3	0.304	0.175	**0.673**	-0.069	0.363
4	0.353	0.068	0.191	0.104	**0.835**
5	0.517	-0.006	0.182	0.137	**0.562**
6	0.126	-0.042	0.117	**0.858**	0.075
7	0.108	-0.083	**0.685**	0.371	0.086
8	**0.917**	0.015	0.246	0.077	0.165
9	**0.848**	0.046	0.028	0.329	0.058
10	**0.831**	0.064	0.215	0.035	0.174
11	0.200	0.280	0.076	**0.817**	0.088
12	-0.021	**0.578**	0.481	0.116	-0.203
13	-0.244	**0.738**	0.016	0.265	0.045
14	0.248	0.476	**0.621**	0.308	0.023
15	0.007	**0.682**	0.148	-0.069	0.263
16	0.164	**0.724**	-0.264	0.035	0.182
17	0.254	**0.719**	0.261	-0.026	-0.259
Variance explained	18.651%	16.874%	15.818%	11.293%	10.095%

Table 3.4 shows the Cronbach alpha scores for each dimension are higher than Nunnally's (1978) cut-off point (0.7), which indicates that the five measures of hospital performance were reliable.

Table 3.4 Reliability test of hospital performance dimensions

Hospital performance factors	Number of items	Cronbach's Alpha
Staff resources	124	0.905
Medical facilities	124	0.834
Support facilities	126	0.744
Patient care	121	0.749
Effectiveness	126	0.717

3.5 Measurement of independent variables: the use of MCSs

The measure of belief systems is a three-item measure based on Widener (2007) with respondents required to indicate the extent to which the 1) mission statement communicates hospital's core values; 2) top managers communicate core values; and 3) the mission statement inspires the workforce. The measure of interactive systems is based on Simons' (1995) instrument with a six-item measure used to assess the extent to which 1) there is a lot of on-going interaction between operational management and senior managers in the performance management system process; 2) performance measurement systems are used regularly in scheduled face-to-face meetings between operational and senior managers; 3) performance measurement systems are often used as a means of developing ongoing action plans; 4) performance measurement systems generate information that forms an important and recurring agenda in discussions between operational and senior managers; 5) performance management systems are used by operational and senior managers to discuss changes that are occurring and 6) performance measurement systems are often used as a means of identifying strategic uncertainties.

For the boundary systems, based on Widener's (2007) instrument a four-item measure was applied to assess the extent to which 1) a code of conducts defines appropriate behaviour for the workforce; 2) a code of conducts informs the workforce about off-limit behaviour; 3) the hospital communicates to the workforce risks that should be avoided; 4) the workforce is aware of the code of conduct. The measure of diagnostic systems is based on Simons' (1995) instrument. A four-item measure was applied to assess the extent to which performance management systems are used to 1) track progress towards goals and monitor results; 2) review performance; 3) plan how operations are to be conducted in accordance with the strategic plan; and 4) identify significant exceptions from expectations and take appropriate actions.

Respondents were required to indicate the extent to which each statement reflected practices within their hospitals, using a seven-point Likert scale with anchors of "1=Not at all" and "7=To a great extent". Each of the four levers were measured as the average score of the items. The enabling use of controls was subsequently measured as the average score of belief systems and interactive systems, while the constraining use of controls was measured as the average score of boundary systems and diagnostic systems. Table 3.5 shows that the Cronbach alpha scores for each type of use of control is higher than the cut-off point (0.7) (Nunnally, 1978), indicating that the measures for the enabling and constraining use of MCSs were reliable.

Table 3.5 Reliability test of the use of MCSs dimensions

Type of the use of MCSs	Number of items	Cronbach's Alpha
The enabling use of controls	123	0.902
The constraining use of controls	126	0.830

3.6 Response rate and non-response bias

3.6.1 Response rate

A total of 76 questionnaires were received within three weeks of the initial distribution of the questionnaires, representing an initial response rate of 15.6%. The follow-up mail-out was conducted three weeks after the initial distribution, with a further 50 questionnaires received within three weeks after sending out the questionnaires, representing a response rate of 10.3%. Accordingly, the final response rate is 25.9%.

3.6.2 Non-response bias analysis

According to Roberts (1999) non-response bias can be examined using late responses as a proxy for non-responses. Therefore, a non-response bias test was conducted by comparing the data collected from the early respondents (the respondents to the first round mail-out) and late respondents (the respondents to the follow-up mail-out).

An ANOVA analysis was performed to compare the responses of early and late respondents for each of the dependent and independent variable. The results are shown in Table 3.6, and indicate that there are no significant differences ($p<0.05$) between the two groups of respondents. Therefore, non-response bias was not considered to be a problem.

Table 3.6 Results of ANOVA comparing the mean scores of all the variables between the early and late respondents

Variables	Early respondents	Late respondents	F-value	P-value
	Mean (Std.Dev)	Mean (Std.Dev)		
The enabling use of controls	5.53 (0.99)	5.40 (1.05)	0.516	0.474
The constraining use of controls	5.91 (0.69)	5.88 (0.74)	0.045	0.832
Performance related outcomes	5.15 (0.91)	4.89 (1.09)	2.061	0.154
Staff related outcomes	5.07 (1.02)	4.81 (1.37)	1.480	0.226
Support facilities	5.47 (0.80)	5.49 (0.84)	0.016	0.899
Medical facilities	5.82 (0.92)	5.60 (1.02)	1.618	0.206
Patient care	6.18 (0.69)	6.26 (0.66)	0.418	0.519
Staff resources	5.60 (1.18)	5.41 (1.11)	0.884	0.349
Effectiveness	5.55 (0.84)	5.63 (0.85)	0.263	0.609

CHAPTER FOUR

RESULTS

This chapter presents the results of the study. Section 4.1 provides the descriptive statistics in regard to the independent variables (the enabling use of controls and the constraining use of controls) and the dependent variables (PMS process outcomes and hospital performance). Section 4.2 then provides the results of the path analysis used to examine the association between the variables.

4.1 Descriptive statistics

Table 1 provides the descriptive statistics including the mean, standard deviation, and the minimum and maximum values for each of the independent and dependent variables. The mean score of the constraining use of controls (5.90) is slightly higher than the mean score of the enabling use of controls (5.48), indicating that greater focus is placed on the constraining use of controls in hospitals. In respect to the achievement of PMS process outcomes, the mean score of performance related outcomes (5.05) is slightly higher than the mean score of staff related outcomes (4.97), indicating that performance related outcomes are achieved more than staff related outcomes. Hence, the hospitals involved in this study pay more attention on the processes that can improve hospital performance rather than improving employees' ability and attitude.

In respect to the five hospital performance factors, while the mean score of patient care (6.21) lies towards the higher end of the scale, the mean scores for support facilities (5.48), medical facilities (5.73), staff resources (5.53) and effectiveness (5.58) all exceed the mid-point of the range. Overall, the mean scores of the two factors representing the achievement of PMS process

outcomes and the mean scores of the five factors representing hospital performance are all higher than the mid-point of range, suggesting that on average the respondents assessed their performance management systems to be moderately effective.

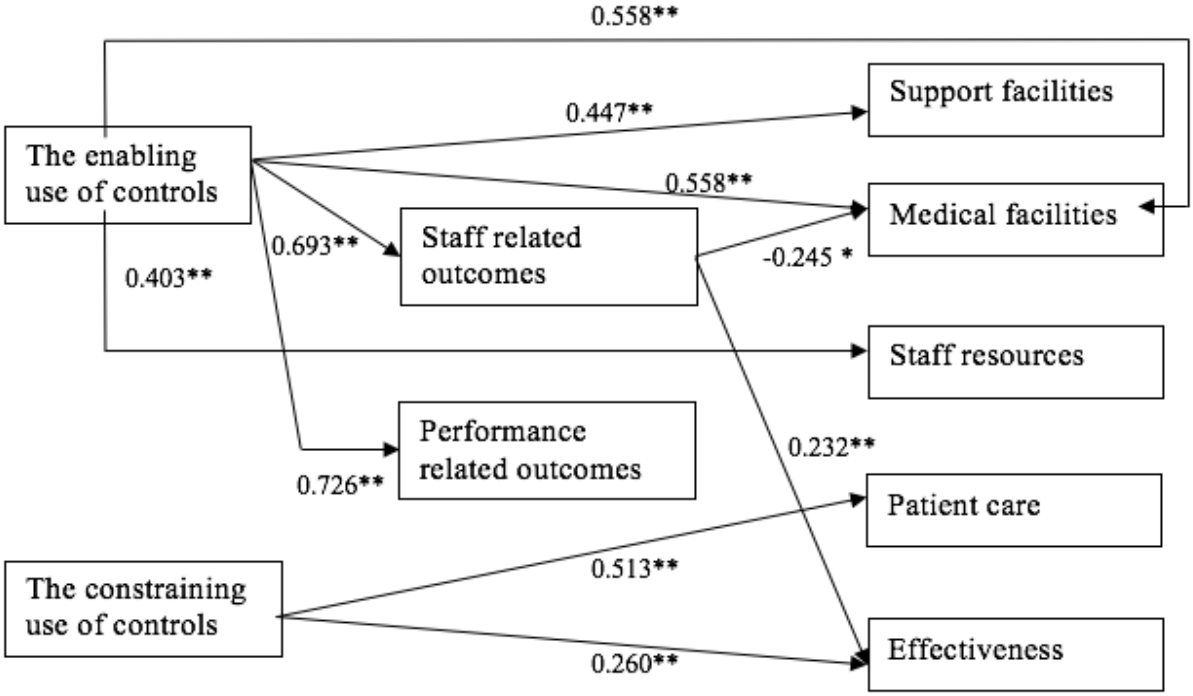
Table 4.1 Descriptive statistics of independent and dependent variables

Variables	N	Mean	Std. Dev.	Minimum (Theoretical)	Maximum (Theoretical)
The enabling use of controls	121	5.48	1.02	2.00 (1)	7.00 (7)
The constraining use of controls	123	5.90	0.71	3.25 (1)	7.00 (7)
Staff related outcomes	124	4.97	1.17	1.17 (1)	7.00 (7)
Performance related outcomes	124	5.05	0.99	1.10 (1)	7.00 (7)
Support facilities	126	5.48	0.81	3.20 (1)	6.80 (7)
Medical facilities	124	5.73	0.97	3.00 (1)	7.00 (7)
Patient care	125	6.21	0.68	4.00 (1)	7.00 (7)
Staff resources	121	5.53	1.15	2.00 (1)	7.00 (7)
Effectiveness	126	5.58	0.85	1.80 (1)	7.00 (7)

4.2 Path Analysis

Structural equation modelling (SEM) was used to examine the hypotheses. According to Anderson and Gerbing (1988), in order to ensure the model is the most concise and precise one to explain the variation of variables, the paths that were not statistically significant were removed until all remaining paths in the model were significant and the overall model was a good fit. The BC bootstrap method (Cheung and Lau, 2007) was then used to examine the mediation impact.

Figure 4.1 Results of the structural equation model examining the association between MCSs and the effectiveness of PMSs



* Significant at the 5% significance level
** Significant at the 1% significance level

The results of the structural equation model are shown in Figure 4.1 with the results of the path analysis presented in Table 4.2. The three benchmark fit indices (CMIN/DF [4] = 0.608; CFI[5] = 1.000; RSMA[6] = 0.000) indicate a good fit of the model. In respect to the achievement of PMS process outcomes, the enabling use of controls was found to be positively related to both staff related outcomes (β = 0.693; p = 0.000) and performance related outcomes (β = 0.726; p = 0.000), supporting hypothesis 1. No significant results were found to support hypothesis 2.

[4] The best models have values approaching 1 (Ullman and Bentler, 2003).
[5] Values of at least 0.95 and 0.93 can be seen as "good" and "acceptable" fits (Byrne, 2013).
[6] Values less than 0.05 and 0.08 can be seen as "good" and "acceptable" fits respectively (Schermelleh-Engel et al., 2003).

The achievement of staff related outcomes was found to have a subsequent impact on hospital performance. Specifically, staff related outcomes were found to be negatively related with medical facilities ($\beta = -0.245$; $p = 0.013$) and positively related with effectiveness ($\beta = 0.232$; $p = 0.008$). A possible explanation for the negative association between staff related outcomes and medical facilities could be that when organisations place greater emphasis on staff related issues, they may do so to the detriment of the resources devoted to hardware facilities. While no associations were found between performance related outcomes and hospital performance, these findings in respect to staff related outcomes provide partial support for hypothesis 3.

In addition to the hypotheses that the use of MCSs will impact on the achievement of PMS process outcomes, a direct association between the use of MCSs and hospital performance was found. Specifically, the enabling use of controls was found to be positively related to support facilities ($\beta = 0.447$; $p = 0.000$), medical facilities ($\beta = 0.558$; $p = 0.000$) and staff resources ($\beta = 0.403$; $p = 0.000$), while the constraining use of controls was found to be positively related to patient care ($\beta = 0.513$; $p = 0.000$) and effectiveness ($\beta = 0.260$; $p = 0.004$).

Table 4.2 Results of the path analysis for the association between the use of MCSs and the effectiveness of PMSs

Regression path	Std. beta	Std. error	Critical ratio	P-value
The enabling use of controls → staff related outcomes	0.693	0.074	10.741	0.000
The enabling use of controls → performance related outcomes	0.726	0.059	11.806	0.000
Staff related outcomes → medical facilities	-0.245	0.080	-2.471	0.013
Staff related outcomes → effectiveness	0.232	0.063	2.632	0.008
The enabling use of controls → support facilities	0.447	0.061	5.713	0.000
The enabling use of controls → medical facilities	0.558	0.098	5.307	0.000
The enabling use of controls → staff resources	0.403	0.089	5.005	0.000
The constraining use of controls → patient care	0.513	0.072	6.835	0.000
The constraining use of controls → effectiveness	0.260	0.108	2.851	0.004
Goodness of fit statistics				
CMIN	9.113			
DF	15			
CMIN/DF	0.608			
CFI	1.000			
RMESEA	0.000			

Furthermore, the mediating role of the achievement of PMS process outcomes on the association between the use of MCSs and hospital performance was also tested. Table 4.3 presents the results of the test of mediation of the model. The results highlight the mediating role of staff related outcomes on the association between the enabling use of controls and hospital performance. Hence, staff related outcomes partially mediate the positive association between the enabling use of controls and hospital performance (medical facilities (CILL 0.015, CIUL 0.315) and effective (CILL 0.034, CIUL 0.260).

Table 4.3 Bootstrapped regression analysis of mediation effects

	The enabling use of controls		
	CILL	CIUL	Significance
Medical facilities	0.015	0.0315	0.027
Effectiveness	0.034	0.260	0.006

* CI, confidence interval; LL, Lower Limit; UL, Upper Limit.

CHAPTER FIVE

CONCLUSION

This chapter is divided into three sections. Section 5.1 provides a discussion of the results and Section 5.2 discusses the contributions of the study. Finally, section 5.3 provides the limitations of the study and suggestions for future research.

5.1 Discussion of results

This study empirically examined the relationship between the use of MCSs and the effectiveness of PMSs, with the effectiveness of PMS assessed from two perspectives: the achievement of PMS process outcomes and hospital performance. The achievement of PMS process outcomes was evaluated based on the extent to which 16 desired outcomes were achieved, with the results indicating that performance related outcomes were achieved to a greater extent than staff related outcomes. Hence, the hospitals were utilizing PMSs to improve performance more than enhancing employees' ability and attitude.

Hospital performance was evaluated based on the extent to which 17 desired performance indicators were achieved with factor analysis revealing five dimensions of hospital performance: medical facilities (i.e. whether the quality of medical facilities are at the highest level), effectiveness (i.e. whether patients can get treatment in the most effective and efficient way) , support facilities (i.e. whether the support facilities are effective), staff related resources (i.e. whether there are enough clinicians to treat patients) and patient care (i.e. whether patients are satisfied by the service obtained from hospitals). The results indicate that hospitals were achieving the highest level of success in respect to patient care followed by medical facilities, effectiveness, staff resources and support facilities. Finally, the use of MCSs was evaluated

based on the extent to which 17 control practices were applied, with the results indicating that the constraining use of controls is applied in hospitals to a greater extent than the enabling use of controls.

The results reveal that while the constraining use of controls was not found to be significantly associated with either of these PMS process outcomes, the enabling use of controls exhibited a positive association with both the achievement of staff related outcomes and performance related outcomes. The findings provide managers with an insight into the specific type of MCSs that they need to concentrate on in order to enhance the achievement of PMS process outcomes. Specifically, managers should apply the enabling use of controls to communicating hospital's core values to clinicians in order to enhance a hospital's level of creativity and innovation. This is in line with prior studies which argue that the enabling use of controls improves the level of hospital's creativity and innovation, enhances clinician's commitment to the hospital, and hence increases the likelihood that PMS processes will be more effective (Kimberly and Evanisko, 1981). Accordingly, it is recommended that managers provide appropriate communication in relation to hospital core values and objectives so as to enhance employees' awareness and knowledge of the hospital's targets and mission. While the constraining use of controls was not associated with the achievement of PMS process outcomes, the findings suggest that the application of the constraining use of controls is associated with hospital performance through improving the level of patient care and hospital effectiveness. Therefore, the constraining use of controls still influences the effectiveness of PMSs and hence appropriate controls should be implemented to restrict employees' action and to monitor and evaluate performance in order to reduce patients' complaints.

Analysis of the relationship between the achievement of PMS process outcomes and hospital performance highlights the significant role of the achievement of staff related outcomes in improving hospital performance. In particular, while the achievement of performance related outcomes were not associated with hospital performance, it was found that the achievement of staff related outcomes exhibited a positive association with effectiveness. Therefore, it is recommended that hospitals seeking improvements in hospital performance focus on managing their clinicians' behaviour and achievements. Specifically, managers should manage and evaluate both talented and poor performing staff to focus clinicians' effort, motivate the performance of talented and poor performing staff, address staff concerns to keep clinicians' behaviour on track, and review clinicians' performance to ensure improvements in hospital performance (Kondo et al., 2013; Suen, 2013).

The results show that the achievement of PMS process outcomes mediates the association of the enabling use of controls with hospital performance. Hence, the presence of the enabling use of MCS is important to improve hospital performance, with their positive impact actualized through the achievement of staff related outcomes. This finding reinforces Hamilton and Chervany's (1981) claim that process effectiveness is crucial in achieving desired performance.

The importance of the enabling use of controls is emphasized by the finding that it was found to be a direct contributing factor in enhancing hospital performance. Specifically, the enabling use of controls was associated with hospital performance, enhancing the quality of staff resources, support facilities and medical facilities. These findings are in line with Chapman and Kihn (2009) who suggest that the enabling use of controls provides great opportunity for improving organisational performance. Similarly, in line with Kondo et al. (2015), the findings suggest that the enabling use of controls will improve clinicians' acceptance level of resource

distribution, thereby enhancing the likelihood of achieving better hospital performance.

5.2 Contributions of the study

From a theoretical perspective this study contributes to the literature in multiple ways. First, the findings provide empirical evidence to support Simons' theoretical argument that the levers work together in pairs to influence an organisation. Specifically, evidence of the association between the combined use of levers (the enabling and constraining use of controls) and PMS effectiveness was found. In particular, the enabling use of controls is associated with hospital performance, both directly and indirectly, through the achievement of PMS process outcomes, while the constraining use of controls is associated with two aspects of hospital performance, patient care and effectiveness. The findings support Simons' (1995) argument concerning the importance of the combined use of control levers.

Secondly, the study also provides further support for the theoretical argument of Hamilton and Chervany that performance is influenced by the achievement of process outcomes. Specifically, the findings suggest that hospital performance is influenced by the achievement of PMS process outcomes, in particular the achievement of staff related outcomes. The study also links Simons' framework to Hamilton and Chervany's theoretical framework by providing evidence of the connection between MCSs and process outcomes. In particular, it was found that the enabling use of controls was associated with two aspects of hospital performance, medical facilities and effectiveness, through the achievement of staff related outcomes.

From an empirical perspective this study provides evidence on two aspects. First, the findings provide evidence of the factors associated with the achievement of process outcomes in hospitals. Specifically, the findings suggest that the achievement of process outcomes will be

affected by the enabling use of controls in hospital. This finding provides managers with an insight into the type of controls that managers need to focus on in order to improve the effectiveness of PMS processes in hospitals.

Secondly, it demonstrates the role of MCSs in enhancing organisational performance. Specifically, the findings of this study provide evidence of the direct association between both the enabling and constraining use of controls with hospital performance, and the indirect association between the enabling use of controls and hospital performance through the achievement of process outcomes. Overall, the findings suggest that managers should focus on enhancing both enabling and constraining use of controls in order to achieve better hospital performance.

5.3 Limitations and suggestions for future research

The study is subject to the usual limitations of the mail-survey approach. According to Singleton et al. (1993), surveys can only find associations between variables but fail in revealing causal relationships due to their inability to eliminate counter-explanations. In addition, as the current study utilizes a self-report survey, the potential threat of measurement error may result from social desirability bias whereby respondents may answer questions in line with social desirability rather than their real feelings (Singleton et al., 1993). Accordingly, future studies could combine other methods to mitigate the limitations, such as combine interviews with surveys to get a deeper insight into the factors that impact the level of PMS effectiveness in hospitals.

Secondly, the measure of hospital performance was self-developed and it was not subject to any prior tests. Therefore, future studies could test the validity and reliability of these measures,

or develop more detailed measures to examine hospital performance from an employees' perspective. In addition, the survey questionnaires were distributed only to three levels of managers in the hospital hierarchy. Consequently, the data provided only represents managers' perspective of the use of controls and their association with the effectiveness of PMSs. Hence, future studies could improve the generalizability of the results by also collecting data from front-line clinicians.

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APPENDIX 1: Performance Management Survey

1 General information

1. What is your current position within your hospital?

☐Financial Manager ☐General Manager ☐Director of Nursing ☐Health Service Manager
☐CEO ☐Other (please specify) _____

2. How many years have you been working in your hospital? _____ Year(s)

3. What is the approximate number of employees of your hospital? _____

4. Is your hospital private or public?

☐Public ☐Private

2 **Please indicate the extent to which the following statements reflect practices within your hospital.**

	Not at all						To a great extent
1. There is a lot of on-going interaction between operational management and senior managers in the performance management system process	☐1	☐2	☐3	☐4	☐5	☐6	☐7
2. A code of conduct informs the workforce about off-limits behaviour	☐1	☐2	☐3	☐4	☐5	☐6	☐7
3. The hospital communicates to the workforce risks that should be avoided	☐1	☐2	☐3	☐4	☐5	☐6	☐7
4. Performance measurement systems are used regularly to scheduled face-to-face meetings between operational and senior managers	☐1	☐2	☐3	☐4	☐5	☐6	☐7
5. A mission statement communicates the hospital's core values	☐1	☐2	☐3	☐4	☐5	☐6	☐7
6. Performance measurement systems are often used as a means of developing ongoing action plans	☐1	☐2	☐3	☐4	☐5	☐6	☐7
7. Performance management systems are used to track progress towards goals and monitor results	☐1	☐2	☐3	☐4	☐5	☐6	☐7
8. Performance management systems generate information that forms an important and recurring agenda in discussions between operational and senior managers	☐1	☐2	☐3	☐4	☐5	☐6	☐7
9. A code of conduct defines appropriate behaviour for workforce	☐1	☐2	☐3	☐4	☐5	☐6	☐7
10. Performance management systems are used to review performance	☐1	☐2	☐3	☐4	☐5	☐6	☐7
11. Performance management systems are used to plan how operations are to be conducted in accordance with the strategic plan	☐1	☐2	☐3	☐4	☐5	☐6	☐7
12. The workforce is aware of the hospital's code of conduct	☐1	☐2	☐3	☐4	☐5	☐6	☐7
13. Top management communicates core values	☐1	☐2	☐3	☐4	☐5	☐6	☐7
14. Performance management systems are used by operational and senior managers to discuss changes that are occurring within the business unit	☐1	☐2	☐3	☐4	☐5	☐6	☐7
15. The mission statement inspires the workforce	☐1	☐2	☐3	☐4	☐5	☐6	☐7
16. Performance management systems are used to identify significant exceptions from expectations and take appropriate actions	☐1	☐2	☐3	☐4	☐5	☐6	☐7
17. Performance measurement systems are often used as a means of identifying strategic uncertainties	☐1	☐2	☐3	☐4	☐5	☐6	☐7

3 **Below is a list of perceived outcomes of Performance Management Systems. Please indicate the extent to which your hospital has achieved each of these outcomes.**

	Strongly Disagree			Neutral			Strongly Agree
1. Motivating performance	☐1	☐2	☐3	☐4	☐5	☐6	☐7
2. Developing individual's skill and knowledge	☐1	☐2	☐3	☐4	☐5	☐6	☐7
3. Assisting in the achievement of goals	☐1	☐2	☐3	☐4	☐5	☐6	☐7
4. Developing a performance oriented culture	☐1	☐2	☐3	☐4	☐5	☐6	☐7
5. Supporting change efforts	☐1	☐2	☐3	☐4	☐5	☐6	☐7
6. Providing useful performance feedback to employees	☐1	☐2	☐3	☐4	☐5	☐6	☐7
7. Implementing the hospital's strategy	☐1	☐2	☐3	☐4	☐5	☐6	☐7
8. Providing an accurate assessment of performance	☐1	☐2	☐3	☐4	☐5	☐6	☐7
9. Ensuring staff commitment to the hospital's objectives	☐1	☐2	☐3	☐4	☐5	☐6	☐7
10. Addressing the concerns of staff	☐1	☐2	☐3	☐4	☐5	☐6	☐7
11. Ensuring staff time is used efficiently	☐1	☐2	☐3	☐4	☐5	☐6	☐7
12. Linking individual performance to the hospital's performance	☐1	☐2	☐3	☐4	☐5	☐6	☐7
13. Identifying talented employees	☐1	☐2	☐3	☐4	☐5	☐6	☐7
14. Rewarding talented employees	☐1	☐2	☐3	☐4	☐5	☐6	☐7
15. Identifying poor performing staff	☐1	☐2	☐3	☐4	☐5	☐6	☐7
16. Managing poor performing staff	☐1	☐2	☐3	☐4	☐5	☐6	☐7

4 **Please evaluate your hospital in respond to each of the following.**

	Extremely poor	Very poor	Poor	Neutral	Good	Very good	Excellent	Not applicable
1. Cleanliness of the wards	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐
2. Hospital security	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐
3. Quality of IT facilities	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐
4. Quality of medical facilities	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐
5. Provision of medical facilities	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐
6. Quality of patient care	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐
7. Provision of patient support facilities	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐
8. Nurse-Doctor ratio	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐
9. Bed-Nurse ratio	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐
10. Patient-Doctor ratio	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐
11. Overall satisfaction of patients	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐
12. Efficiency of the patient admission/discharge process	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐
13. Managing patient complaints	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐
14. Provision of staff training	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐
15. Average waiting time in the emergency department	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐
16. Surgery waiting time	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐
17. Managing the length of patient stay	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐

Thank you for taking the time to complete this survey. Your assistance in providing this information is very much appreciated. **Please return your completed survey in the enclosed envelope to:**

Yanjie Yu C /- Associate Professor Kevin Baird/ Yanjie Yu
Department of Accounting and Corporate Governance
Faculty of Business and Economics
Macquarie University, NSW 2109

Please also return the enclosed postcard separately in the mail. The receipt of the postcard will alert me not to send you a follow up questionnaire.

APPENDIX 2 Cover letter for initial mail-out

18th July, 2016

<Name>
<Job title>
<Address>

Dear Mr. / Mrs. XX,

You are invited to participate in a study titled "The association between the use of management control systems and the effectiveness of performance management systems in hospitals". The study examines the association between specific control aspects with the achievement of process outcomes and hospital performance. The study is being conducted by Ms. Yanjie Yu (0452619623, yanjie.yu@students.mq.edu.au) under the supervision of Associate Professor Kevin Baird (02 98508532, kevin.baird@mq.edu.au) and Dr. Amy Tung (02-98509282, manamy.tung@mq.edu.au) of the Department of Accounting and Corporate Governance. **As an expression of gratitude, for the participants in this survey we offer the following:**

*** A summary of the findings of the study**
*** A copy of any journal articles produced**

Participation in this study is entirely voluntary. You are not obliged to participate. Return of the questionnaire will be regarded as consent to use the information for research purposes. If you decide to participate, you will be required to complete the questions on the attached questionnaire. The questionnaire should take approximately fifteen minutes to complete.

Any information or personal details gathered in the course of the study are confidential and only the researchers will have access to the data. No individual will be identified in any publication of the results. While a postcard is provided, the purpose of this is to inform us that you have completed the questionnaire, thereby preventing a follow up being sent. If you would like a copy of the results of the study， please indicate so on the postcard.

Thank you for your assistance.

Yours Sincerely,

Yanjie Yu

The ethical aspects of this study have been approved by the Macquarie University Human Research Ethics Committee. If you have any complaints or reservations about any ethical aspect of your participation in this research, you may contact the Committee through the Director, Research Ethics (telephone (02) 9850 7854; email ethics@mq.edu.au). Any complaint you make will be treated in confidence and investigated, and you will be informed of the outcome.

APPENDIX 3 Cover letter for follow-up mail-out

8th August, 2016

<Name>
<Job title>
<Address>

Dear Mr. / Mrs. XX,

A few weeks ago you would have received a letter inviting you to participate in a study titled "The association between the use of management control systems and the effectiveness of performance management systems in hospitals". The study examines the association between specific control aspects with the achievement of process outcomes and hospital performance. The study is being conducted by Ms. Yanjie Yu (0452619623, yanjie.yu@students.mq.edu.au) under the supervision of Associate Professor Kevin Baird (02 98508532, kevin.baird@mq.edu.au) and Dr. Amy Tung (02-98509282, manamy.tung@mq.edu.au) of the Department of Accounting and Corporate Governance.

Our records indicate that you have not as yet complete the questionnaire, but if you have please ignore this letter and thank you for your assistance. If you are yet to complete the questionnaire could you please do so, for it is only by hearing from everyone in the sample that we can be sure that results are truly representative. In case you have misplaced the survey, I have attached another copy of questionnaire. **As an expression of gratitude, for the participants in this survey we offer the following:**

*** A summary of the findings of the study**
*** A copy of any journal articles produced**

Participation in this study is entirely voluntary. You are not obliged to participate. Return of the questionnaire will be regarded as consent to use the information for research purposes. If you decide to participate, you will be required to complete the questions on the attached questionnaire. The questionnaire should take approximately fifteen minutes to complete.

Any information or personal details gathered in the course of the study are confidential and only the researchers will have access to the data. No individual will be identified in any publication of the results. While a postcard is provided, the purpose of this is to inform us that you have completed the questionnaire, thereby preventing a follow up being sent. If you would like a copy of the results of the study, please indicate so on the postcard.

Thank you for your assistance.

Yours Sincerely,

Yanjie Yu

APPENDIX 4 Final ethics approval letter

Office of the Deputy Vice(Research) -Chancellor

Research Office
Research Hub, Building C5C East
Macquarie University
NSW 2109 Australia
T: +61 (2) 9850 4459
http://www.research.mq.edu.au/
ABN 90 952 801 237

18 July 2016

Dear Associate Professor Baird
Reference No: 5201600437

Title: *The association between the use of management control systems and the effectiveness of performance management systems in hospitals*

Thank you for submitting the above application for ethical and scientific review. Your application was considered by the Macquarie University Human Research Ethics Committee (HREC (Medical Sciences)).

I am pleased to advise that ethical and scientific approval has been granted for this project to be conducted at:

• Macquarie University

This research meets the requirements set out in the *National Statement on Ethical Conduct in Human Research* (2007 – Updated May 2015) (the *National Statement*).

Standard Conditions of Approval:

1.Continuing compliance with the requirements of the *National Statement*, which is available at the following website:

http://www.nhmrc.gov.au/book/national-statement-ethical-conduct-human-research

2. This approval is valid for five (5) years, subject to the submission of annual reports. Please submit your reports on the anniversary of the approval for this protocol.

3.All adverse events, including events which might affect the continued ethical and scientific acceptability of the project, must be reported to the HREC within 72 hours.

4.Proposed changes to the protocol and associated documents must be submitted to the Committee for approval before implementation.

It is the responsibility of the Chief investigator to retain a copy of all documentation related to this project and to forward a copy of this approval letter to all personnel listed on the project.

Should you have any queries regarding your project, please contact the Ethics Secretariat on 9850 4194 or by email ethics.secretariat@mq.edu.au

The HREC (Medical Sciences) Terms of Reference and Standard Operating Procedures are available from the Research Office website at:

http://www.research.mq.edu.au/for/researchers/how_to_obtain_ethics_approval/human_research_ethics

The HREC (Medical Sciences) wishes you every success in your research.

Yours sincerely

Professor Tony Eyers
Chair, Macquarie University Human Research Ethics Committee (Medical Sciences)

This HREC is constituted and operates in accordance with the National Health and Medical Research Council's (NHMRC) *National Statement on Ethical Conduct in Human Research* (2007) and the *CPMP/ICH Note for Guidance on Good Clinical Practice*.

Details of this approval are as follows:

Approval Date: 11 July 2016

The following documentation has been reviewed and approved by the HREC (Medical Sciences):

Documents reviewed	Version no.	Date
Macquarie University Ethics Application Form		Received 08/06/2016
Correspondence responding to the issues raised by the HREC (Medical Sciences)		Received 25/06/2016
MQ Participant Information Letter	1	08/06/2016
Performance Management Survey	1	08/06/2016

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