Uses of management control and performance measurement systems by Deans and Heads in Australian universities: their effects on research, teaching and networking capabilities

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Submitted to First RMIT Accounting Educators’ Conference, Melbourne, November, 2010
Abstract

Invoking a resource-based view (RBV), this study investigates relationships between management control systems (MCSs) use, including information use from performance measurement systems (PMSs), and organisational capabilities in the context of academic units of Australian universities. Increased competition and attention to distinctive capabilities amongst universities, particularly at their strategic operating unit level of a Faculty\(^1\) or School\(^2\), provides the setting for application of this theoretic perspective. Based on a questionnaire survey of all Faculty Deans and Heads of Schools in all 39 universities in Australia, evidence is provided on relationships between diagnostic and interactive use of MCSs, attention given to imposed and discretionary types of PMS information, the strength of capabilities of the academic unit and, in turn, overall performance of the academic unit. Highlights of findings are that Heads/Deans conceived capabilities of their unit in functional dimensions, not in generic dimensions as found in prior literature; interactive MCS use and imposed performance measures, respectively, direct relate to several types of capabilities and indirectly to performance of the academic unit, but diagnostic MCS use does not. The findings have practical implications for styles of control systems use and performance information use by management in universities.

**Keywords:** management control systems use, diagnostic, interactive, performance measurement systems use, resource-based view, organisational capabilities, performance, universities.

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\(^1\) Faculty may also be called College or Division or Portfolio. It is headed by an Executive Dean or Pro-Vice-Chancellor. It is comprised of a set of academic Schools, Departments and/or Centres from cognate fields of study.

\(^2\) School may also be called Department. It is headed by an Head of School or Head of Department. It comprises one or more academic disciplines. It will normally be part of a Faculty.
1. Introduction

Over the past 15 years, the resource-based view (RBV) of the firm has become an influential framework in the strategic management literature (2001, p. 537; Hoopes, Madsen, and Gordon 2003). The RBV conceptualises organisations as bundles of resources that can be used to implement value-creating strategies (Barney 1991; Eisenhardt and Martin 2000) together with capabilities that forge a link between resources and permit their strategic deployment (Day 1994). In the management accounting research literature, Henri (2006) has been the only study to pursue research at the interface between MCS and strategy with the application of an RBV framework. A large body of management accounting research has explored the relationship between strategy and MCS in the absence of the RBV. These studies take strategy as a given MCS in a structural form whereby the perspective is static and the focus is placed on such issues as the presence or absence of specific MCS systems, their technical properties and their design (Chapman 1997, 1998; Dent 1987). Other studies, however, have considered the role of MCS in the process of formulation of strategy. The focus is on such issues as the dialogue and interaction surrounding the use of MCS (e.g., Bisbe and Otley 2004; Davila 2000; Kloot 1997).

The findings provided by the MCS-strategy stream of research remain ambiguous. These ambiguous results, according to Henri (2006) can be attributed in part to (i) the absence of a theoretical framework founded on the resource-based view, and (ii) the limited attention devoted to the different ways management makes use of MCSs, including their uses of performance measurement systems.

It is postulated in this study that the use of MCSs needs to be studied in terms of its effects on the process of developing and leveraging the firm’s specific capabilities that, under the RBV, is a fundamental factor in achieving strategic success. That is, the link between MCS and strategy-management is likely to occur at the capabilities level rather than the strategic-choice level. Capabilities are deemed to support strategic choices “by providing the competitive advantage necessary to materialize these choices” (Henri 2006, p. 530). Hence, “the notion of strategic choice itself may not be directly traceable to MCS. Instead, the relationship should be examined between capabilities and MCS, rather than between strategic choice and MCS” (Henri 2006, p. 531).

How should the role of MCS be conceptualized in developing capabilities and enabling capabilities to leverage the firm’s resources towards implementation of strategies that produce superior organizational performance? Following the work of Simons (1990; 1991; 1994; 1995), several studies have examined a more active role of MCS in the formulation of strategy and the implementation of strategic change (e.g., Abernethy and Brownell 1999; Bisbe and Otley 2004;
Chenhall and Langfield-Smith 2003). Another line of research describes how organizations balance the traditional and more active roles of MCS (e.g., Ahrens and Chapman 2004; Chapman 1998; Dent 1987; Haas and Kleingeld 1999) or the tension resulting from the use of MCS in various ways (e.g., Chenhall and Morris 1995; Henri 2006; Marginson 2002).

Building on the MCS-use framework of Simons, this study seeks to examine, from an RBV, how the style of use of MCSs by heads of university strategic sub-units (i.e., academic faculties and schools) can affect the strength of capabilities of their organizational sub-unit and, in turn, the performance outcomes resulting from the successful implementation of strategies in a competitive environment. Specifically, this study investigates the traditional feedback style of use of MCS (Simons’ ‘diagnostic use’) and the more proactive discussant style of use of MCS (Simons’ ‘interactive use’) in developing and shaping capabilities and consequently in affecting performance. It also investigates the attention given by Heads/Deans to types of information from the performance measurement system and how this relates to developing different capabilities.

Hence, the primary research questions addressed in this study are: (1) to what extent do the diagnostic and interactive uses of either broader MCSs or narrower PMSs by management of a strategic sub-unit of an organization, contribute to the strength of development of various capabilities of that organizational sub-unit? and (2) to what extent do the diagnostic or interactive style of use of the broader MCSs or narrower PMSs have a significant indirect effect on the performance of the organisational sub-unit through their impact on capabilities?

These research questions have not been addressed outside the work of Henri (2006) in the context of private sector manufacturing companies. This study makes a contribution to the advancement of literature on MCS use from a resource-based view by choosing the setting of public universities. The nature of public universities, with their tension between the ethos of new public management’s (NPM) managerialism and traditional collegiality amongst scholars, coupled with tension within the management structure between professionals and administrators, provides a complex, but relevant, setting for the application these research questions.

2. The Setting for this Study

The empirical research for this study is set in the not-for-profit sector, specifically public universities in Australia. The current study extends Henri’s (2006) private sector model and findings by modifying the categories and scales used in the definition and measurement of MCS
use, PMS use, organisational capabilities, and organisational performance in order to take account of unique practices, policies and environments applying in public university.

The case for the application of the RBV theory to higher-education institutions in the UK has been made by Lynch & Baines (2004) based on increasing competition and attention to distinctive capabilities amongst universities. Strong competition for resources and the relevance of capabilities for the strategic deployment of resources is also present amongst public universities in Australian due to “deregulation and globalization having resulted in greater competition for domestic and international students (as well as) research talent and funding… (and increased) pressure for commercialisation and innovation” (Chung, Harrison, and Reeve 2009, p. 56-57).

In Australia, universities have experienced on-going government-imposed reforms under the banner of NPM since the initial Dawkin’s (1987; 1988) restructuring of the higher/further education sector. Due to the application of NPM doctrines, such as private sector management practices and organisational forms, value-for-money ethos, and efficiency targets, universities in Australia have operated under several constraints and challenges. These relate to reduced government funding, increased dependence on fee-paying students, intensified competition for international students, pressure through government quality audits and funding incentives to continuously improve the quality of teaching and research outputs, increased demands both on-shore and off-shore for flexible and multiple delivery platforms, and heightened compliance and legitimacy demands to provide public accountability for their plans, activities, achievements and financial performance to government agencies, students, alumni, staff, industry alliances, international educational agencies and partners, local communities and the media (Biggs, 2003; Davies and Thomas 2002; Deem 1998, 2004; McLaughlin, Osborne, and Ferlie 2002).

There has been heated debate about whether corporate-style management is appropriate for the management of public university (Davies and Thomas 2002; Deem 1998, 2004; Lafferty and Fleming 2000; Parker 2002; Pick 2006; Roberts 2004). Some argued that under new managerialism, universities are forced to become what they are not (Jones 1986). Management systems, processes and expectations that are claimed to now pervading universities due to NPM include a shift from input-focus to output-focus, target-setting, benchmarking (Parker 2002); devolved budgeting, performance budgeting, cost centres, responsibility accounting, quantification (Lapsley 1999; Parker 2002); reduced public funding (Deem 2004; Parker 2002); and competition, incentivization, managerial enterprise, economic rationality, marketisation, modernization (Broadbent and Guthrie 2008). These features make universities a particularly relevant organisational setting for the current study on MCS/PMS-capabilities.
Another noteworthy feature of the setting for this study is the incongruence between scholarly work with its inherent role of contributing to society's intellectual, economic, cultural and social developments (DEEWR 2007), on the one hand, and academic management with its push into commoditization and commercialization of programs and research outputs on the other hand. This incongruence is seen in the fact that academic managers (i.e., Dean of Faculty and Head of School) will usually maintain their academic career in their discipline. Often they will continue their research career, and possibly their teaching career, when holding a managerial position. This can result in a Head of School and a professor in the school, working together on a research project. The research partner might be academically senior to the Head of School. Their relationship cannot be described as a normal supervisor-subordinate relationship. It can best be described as more of a collegial than a managerial relationship, notwithstanding the managerialismand demanded in the NPM era. Hence the style of use of MCSs by Deans and Heads is likely to be different from other commercial organisational settings (Pettersen and Solstad 2007).

3. Literature Review and Hypotheses Development

3.1. Resource-based View

In the RBV literature, various terms have been used for the notion of ‘resources’: firm resources, capabilities, internal capabilities, dynamic capabilities, distinctive internal capabilities, competencies, and distinctive competencies (e.g., Barney 1991, 2001; Clardy 2007; Conner 1991; Day 1994; Eisenhardt and Martin 2000; Ethiraj, Kale, Krishnan, and Singh 2005; Henri 2006; Simons 2000; Tripsas and Gavetti 2000; Wernerfelt 1984). Authors have not necessarily used these terms interchangeably. For example, Day (1994), uses the term competencies to refer to well-defined routines that are combined with firm-specific assets to enable distinctive functions to be carried out whereas capabilities are the mechanisms and processes by which new competencies are developed. On the other hand, Ethiraj et al. (2005) describe resources as factor inputs which are available to be acquired by any organisation unlike capabilities that are developed within an organisation over long period of time.

Following Daft (1983), Barney (1991, p. 101) uses the term ‘firm resources’ to include “…all assets, capabilities, organisational processes, firm attributes, information, knowledge, etc controlled by a firm that enable the firm to conceive of and implement strategies that improve its efficiency and effectiveness’. Barney further explains that in traditional strategic analysis, resources will include internal strengths which firms develop to gain competitive advantage.
Similarly, Simons (2000, p. 23) uses ‘distinctive internal capabilities’ to refer to internal strengths in SWOT analysis and defines it as “…the special resources and know-how possessed by a firm that give it competitive advantage in the marketplace”. Simons provides examples of distinctive capabilities as being the ability to perform world-class research, excellence in product design, superior marketing skills, the ability to manage costs, proprietary information technology, and proprietary manufacturing skills. He classifies these capabilities into three types – functional skills, market skills, and embedded resources.

Prior to Lynch and Baines (2004), the application of RBV had not been explored in the higher education sector. Lynch and Baines (2004) employed RBV to explore if British universities possess capabilities that give them sustainable competitive advantages. By applying RBV application-based concepts to evidence from Quality Assurance Agency’s (QAA) reports (1996 – 2002) and the Research Assessment Exercise’s (RAE) (1996 and 2001) reports, Lynch and Baines (2004) proposed five dimensions of competitive resources (or capabilities) of universities. These are (1) reputation (i.e., capabilities that enable an organisation to communicate favourable information about itself to its stakeholders), (2) architecture (i.e., the network of relationships, contracts, and alliances), (3) innovative (i.e., the ability to undertake totally new initiatives that go beyond the current strategy), (4) core competencies (i.e., the group of production skills and technologies that enable an organisation to provide a particular benefit to customers), and (5) knowledge-based advantages (i.e., tacit and explicit proprietary knowledge possessed by an organization).

This study adopts the dimensions proposed by Lynch and Baines (2004) in defining capabilities. The higher education sectors in the UK and Australia are significantly similar in structure and operations; and Lynch and Baines’ (2004) study is so far the only empirical work on the application of RBV in universities. However, they use secondary data to provide evidence in support of their five generic capabilities appropriate to universities. This study will obtain primary data from a survey of Deans and Heads to test whether these five dimensions are perceived as the ones that resonate or whether they have an alternative perspective on capabilities. Hence, the following hypothesis will be tested:

\[ \text{Hypothesis 1: Heads and Deans will perceive capabilities in the same dimensions as identified from secondary data by Lynch and Baines (2004).} \]

3.2. Management Control Systems
MCS have been investigated from several perspectives and under different contexts. For example, there is a substantial body of literature on the relationships between MCSs and strategy, which was outlined in the introduction. Moreover, there are alternative frameworks to understanding MCSs. Collier (2005)) distinguishes formal, systems-based approaches including those by Otley & Berry (1980), Daft and Macintosh (1984), Simons (1995), Merchant (1998), Otley (1999), and Ferreira and Otley (2005), from informal, social or cultural forms of control including those of Trist and Bamforth (1951), Ansari (1977), Ouchi (1979), Hofstede (1981), Euske, Lebas, and McNair (1993), and Diitllo (2004).

Of interest to the current study is a broader-based formal systems-rooted framework. Such a framework has been developed by Simons (1995) and Ferreira and Otley (2005), respectively. Simons (1995) defined MCSs as comprising of four types of systems which he called ‘levers of control’: belief systems, boundary systems, diagnostic control systems and interactive control systems. Ferreira and Otley (2005) developed a ‘performance management and control’ framework comprising of twelve key planning, control and performance evaluation elements which arose from integrating five issues proposed by Otley (1999) with the Simons (1995) framework.

This study will partially adopt Simons (1995) framework. Simons (1995) has provided the framework for many MCS empirical studies (e.g., Abernethy and Brownell 1997, 1999; Bisbe and Otley 2004; Henri 2006; Kober, Ng, and Paul 2003, 2007; Widener 2007). He argues that his ‘levers of control’ (LOC) provide a framework for controlling business strategy. The framework’s key focus is strategy implementation rather than strategy formulation. Two LOCs, diagnostic control systems and integrative control systems, are deemed to be especially relevant to the context of this study. Prior studies have chosen to include the diagnostic and interactive LOCs alone in their empirical model, and exclude the belief and boundary LOCs. Abernethy & Brownell (1997) and Naranjo-Gil & Hartman (2006) have both justified this choice in the context of public hospitals; Kober et al. (2003; 2007) have justified it in the context of research and development organisations.

Simons (1995) defines diagnostic control systems as the use of formal feedback systems by management to monitor outcomes and correct deviations from preset standards of performance. Interactive control systems are defined as use of diagnostic control systems by management in a way that regularly and personally involve them in the decision activities of subordinates. Simons (1995) explains that a diagnostic control system can be made interactive by continued and frequent management attention and interest that facilitates organisational learning and deals with strategic uncertainties.
In terms of their effect on the development of organizational capabilities, Henri (2006) has found that diagnostic use of PMS has a negative effect whereas interactive use of PMS has a positive effect. According to Simons (1995), diagnostic and interactive uses of MCS represent countervailing forces used to balance the inherent organizational tension. Use of MCS in a diagnostic manner tends to reflect single-loop negative feedback and focuses on intended strategies. The use of MCS in an interactive way tends to reflect double-loop positive feedback and focuses on emergent strategies (English 2001).

Diagnostic use of MCS, as described by Simons (1995), is a negative force that creates constraints and ensures compliance with orders: “[Diagnostic systems] constrain innovation and opportunity-seeking to ensure predictable goal achievement needed for intended strategies” (Simons 1995, p. 91). Diagnostic use of MCS is used to signal when productivity and efficiency have fallen, and when innovation needs to be curbed (Miller and Friesen 1982). Henri (2006, p. 537) conjectures that PMS tends to be used diagnostically by management “to limit the deployment of capabilities by providing boundaries and restricting risk-taking.” Alternatively, interactive use of MCS supports the development of ideas and creativity. According to Simons (1995, p. 93) “senior managers use interactive control systems to build internal pressure to break out of narrow search routines, stimulate opportunity-seeking, and encourage the emergence of new strategic initiatives.” By fostering organizational dialogue and debate, an interactive use of MCS contributes to expanding the organization’s information processing capacity and consequently the deployment of organizational capabilities (Haas and Kleingeld 1999).

These arguments lead to the following hypotheses:

**Hypothesis 2a:** Interactive use of MCSs positively influences the extent of the development of capabilities in an academic unit.

**Hypothesis 2b:** Diagnostic use of MCSs negatively influences the extent of the development of capabilities in an academic unit.

### 3.3. Performance Measurement Systems

PMSs have traditionally been used as a means of maintaining organizational control and financial goals that hierarchically condense to measures like EPS and ROI (Hussain 2005). Subsequent studies have concluded that traditional accounting-based PMSs are inadequate in a business environment of economic uncertainty and complex competition (Ballantine and Bringall 1995; Bromwich and Bhimani 1989; Govindarajan and Shank 1992). The need of a broader range of performance measures, including non-financial and financial, internal and
external, qualitative and quantitative and comparative and absolute, measures has been demonstrated by researchers like Johnson (1990) and Kaplan (1991).

Subsequent research on diversity in the design of PMSs has used a contingency approach. This has involved analysis of the effects of various organizational and external factors, including strategy, structure, size, technology, and environmental uncertainty, on specific mixes of financial and non-financial measures (e.g. Baines and Langfield-Smith; Hall; Hoque 2004; Hoque and James 2000; Maurice 2005; Said, Elnaby, and Wier 2003; Stede, Chow, and Lin 2006; Widener 2006).

Another line of study has been the use of diversely designed PMS (e.g. Bisbe and Otley 2004; Henri 2006; Simons 2000). According to Henri (2008, p. 252), the use of PMS refers to “the nature and purpose of the use of performance indicators by managers.” The nature and purpose of use of diverse PMSs in an organizational setting have been classified in several ways. For example, Simon, Guetzkow, Kozmetsky, and Tyndall (1954) classify accounting information use as scorecard, problem-solving, and attention-directing. Atkinson, Waterhouse, and Wells (1997) present three uses of PMS, namely, monitoring, diagnostic, and coordination. Vandenbosch (1999) groups PMSs into four categories, namely, score-keeping, problem-solving, attention-focusing, and legitimizing. Ittner, Larcker, and Randall (2003) present four uses of PMSs, namely, problem identification, capital investment, performance evaluation, and external disclosure. Finally, Henri (2008) classifies PMSs into four main uses – monitoring, strategic decision-making, attention-focusing, and legitimization.

In the current study, the classification of nature and purpose of use of PMS departs from the above suggestions. The public-private sector nature of universities gives rise to unique PMSs. On the one hand, universities in Australia have a suite of standardized key performance measures imposed from the federal government department and its agencies, many of which are tied to funding formulas. On the other hand, universities have considerable operating autonomy in the way they manage the efficiency, quality and strategic differentiation of their Faculties and Schools. At the level of the academic unit, this suggests the need to give attention to both centrally-imposed key performance indicators (KPIs) and locally-determined performance measures that relate to the academic unit’s flexibility at the margin for developing its distinctive capabilities and achieving its competitive advantage. Therefore, in the specific context of use of PMSs by Deans and Heads of academic units, this study seeks to empirically validate a two-fold classification scheme. This two-fold classification distinguishes between the use of PMS for the purpose of meeting centrally-set standardized measures of performance and for the purpose of setting and meeting locally-determined discretionary measures of
performance. In brief, the distinction is between central standard performance and discretionary performance.

Whether Deans and Heads make greater use of indicators of core or discretionary performance or a balance of both is expected to have an influence on the way their academic unit’s capabilities are nurtured and enhanced.

First, consider a high focus on centrally-imposed performance indicators. This would imply that the Dean or Head is strongly concerned about the phenomenon of relative performance evaluation. As explained by Johansson and Siverbo (2009) relative performance evaluation arose in local government organizations after the arrival of new public management (NPM). With NPM-inspired accounting innovations and new performance measurement tools, the observation by Johansson and Siverbo (2009) is that many performance evaluations in Swedish municipalities involve comparison with other municipalities. For universities, if core performance (in any one of the core fields of teaching, research or networks) is relatively superior to that of competitor Faculties or Schools, then it would be expected that the competitive strength of capabilities associated with that core field of performance would be superior.

Second, consider a high attention on locally-developed measures of discretionary performance. This would imply that the Dean or Head is focused on aspects of efficiency or capabilities development that are of specific importance to that academic unit. Such attention would expect to have the effect of strengthening the Faculty’s or School’s capabilities.

Based on these arguments, the following hypothesis is put forward:

Hypothesis 3a: Attention to use of centrally-imposed measures in the PMS by Heads and Deans positively influences the extent of development of capabilities in an academic unit.

Hypothesis 3b: Attention to use of self-determined discretionary measures in the PMS by Heads and Deans positively influences the extent of development of capabilities in an academic unit.

3.4. Relationships between MCS/PMS use, Capabilities and Organizational Performance

The RBV of the firm suggests that distinctive capabilities lead to a sustained competitive advantage, which in turn contributes to organizational performance. The generic capabilities of universities which can give competitive advantage are identified by Lynch and Baines (2004) as reputation, architecture (external relationships), innovativeness, core competencies (in production technology and skills) and knowledge-based (expertise). They are considered to be vital for leveraging resources in a way that deploys them for new value-creating strategies.
Empirically, previous studies on the private sector show that different sets of capabilities contribute positively to performance (e.g. Henri 2006; Hult and Jr 2001; Lee, Lee, and Pennings 2001; Spanos and Lioukas 2001).

In section 3.2 diagnostic use of MCS and interactive use of MCS are linked to capabilities leading to H2. In section 3.3 it is argued that the attention given to both centrally-imposed core metrics and locally-developed discretionary indicators in the PMS are linked to capabilities, leading to H3. Since, these capabilities are expected to lead to organizational performance, the use of MCS and PMS, respectively, can be expected to have an indirect effect on performance through their influence on capabilities and resources deployment.

Therefore, the following hypotheses are proposed:

**Hypothesis 4a:** The interactive use of MCSs by Heads and Deans has a positive and significant indirect effect on performance of an academic unit through its impact on capabilities.

**Hypothesis 4b:** The diagnostic use of MCSs by Heads and Deans has a negative and significant indirect effect on performance of an academic unit through its impact on capabilities.

**Hypothesis 4c:** The use of key performance indicators by Heads and Deans has a positive and significant indirect effect on performance of an academic unit through its impact on capabilities.

**Hypothesis 4d:** The use of non-key performance indicators by Heads and Deans has a negative and significant indirect effect on performance of an academic unit through its impact on capabilities.

### 4. Method

#### 4.1. Sample selection and instrument preparation

This study collects primary data through a questionnaire survey of Deans of Faculties and Heads of Schools in Australian universities. The unit of analysis is an academic unit (Faculty and School). These academic units are deemed equivalent to strategic business units since they have sufficient responsibility in generating and using operating budgets, recruiting staff and initiating their teaching and learning programs and research activities in their fields of scholarly discipline.

The survey instrument was developed in three steps, before being finally administered. The first step involved the preparation of a draft questionnaire in reference to previously validated
scales in the literature and website content of five universities for contextualization purposes. The second step involved pre-testing in which the questionnaire was reviewed by three accounting professors, one senior lecturer of accounting, one associate professor of information systems, and three accounting/finance Heads of Schools for wording, clarity, ambiguity, and relevancy of the individual items. Several non-fundamental revisions to the instrument resulted from these experts' comments. The third step involved piloting the instrument with three deans of science and business faculties in two Australian universities. These deans completed the survey in their own time followed by semi-structured interviews. The interviews aimed at ensuring that definitions of MCS, capabilities and organisational performance would resonate with respondents. The final questionnaire consisted of questions on the demographics of respondents and their academic unit, together with multi-items measures of dimensions of use of MCS, attention given to types of performance measures, extent of development of different capabilities, and self-rating of the unit’s performance. Details from the questionnaire are provided in Appendix B.

After ethics approval, the final questionnaire was mailed to 200 Deans and 679 Heads. This sample was selected as a census of all Faculties and Schools in all 39 Australian universities. The mailing lists of 200 Deans and 679 Heads were prepared from the websites of each university’s Faculties and Schools. The survey package consisted of a covering letter addressed to each Dean/Head by name and title, the questionnaire (four pages), and a reply paid envelope. Two weeks after mailing the questionnaire, reminder phone calls were made to the Deans who had not responded or responded but not identified themselves through their personal/executive assistants. The Heads were contacted via direct emails encouraging them to complete the questionnaire and thanking those who had responded. After a further two weeks, the Heads were sent second reminder emails.

After these follow up phone calls and emails, 58 (29%) questionnaires from Deans and 168 (24.74%) from Heads were received. Two questionnaires from Deans and three questionnaires from Heads were rejected due to missing data. Hence, the final usable responses were 56 from Deans, a response rate of 28%, and 165 from Heads, a response rate of 24.3%, making a combined response rate of 25.14%. These response rates are in the higher regions of the 15-25% reported in similar studies (Henri 2006; Mahama 2006). To test for non-response bias, the means the MCS use and performance variables were compared between the first 40 responses and the last 40 responses received (20 from Deans and 20 from Heads). No significant

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3 At the bottom of the first page of the questionnaire, respondents were given options of providing their names and email addresses if they wished to receive summary of the findings of the study.
differences were found. A comparison of means of responses between the Deans and the Heads was also undertaken, and again no significant differences were found.

4.2. Variable measurement

Eleven constructs (latent variables) are used in the empirical model. Discussion of the measures of each construct is presented below.

Management control systems use: The scales for interactive/diagnostic uses of MCSs (MCSINTER and MCSDIAG) were generated in reference to instruments developed by Abernethy and Brownell (1999); Henrie (2006); Kober et al. (2003; 2007); Naranjo-Gil and Hartmann (2006) and Simons (1987; 1990). Simons (1995) was used as the main reference. They were measured using seven-point Likert-scales anchored from 1 strongly disagree to 7 strongly agree. The preamble to this part included a definition of MCS as covering planning/budgeting, monitoring, and performance reporting and review systems. Both the diagnostic use and interactive use constructs had six-item scales. The MCS diagnostic use scales were reverse coded.

Performance indicators: The scales for performance indicators were developed in reference to Naranjo-Gil and Hartmann’s (2006) distinction between financial and non-financial indicators. The instrument had 6 items of financial and 6 items of non-financial performance data. Respondents were asked to indicate the extent to which they keep a watch on, discuss and, if necessary, take action on the progressive reporting of each of these 12 performance measures. They were seven-point scales anchored from 1 rarely or never to 7 very often.

Organisational (academic unit) capabilities: While Lynch and Baines (2004) sought to apply the RBV to the higher education sector, their proposed set of capabilities was not validated but based loosely on university data collected by government. The scales for organisational capabilities for the current study were devised to capture the five “competitive resources of university’ identified by Lynch and Baines (2004). Twenty-three items grouped into these five dimensions were drafted and re-drafted following the pre-test and pilot test stages explained in section 4.1. The final instrument provided a definition of academic unit capabilities as those distinctive resources, expertise, networks or reputation that the unit had developed to make it more competitive. It then presented Lynch and Baines’ (2004) five dimensions of relationship with outside institutions\(^4\) (4 items), innovative capabilities (4 items), expertise\(^5\) (4 items),

\(^4\) Lynch and Baines (2004) use the term ‘architecture’.
\(^5\) Lynch and Baines (2004) use the term ‘knowledge-based advantages’.
reputation (7 items), and core competencies (4 items). Seven-point scales were anchored from 1 not at all developed to 7 fully developed.

Organisational (academic unit) performance: Respondents were asked to give a subjective self-rating of the overall performance of their Faculty or School out of 10. To guide respondents in deciding on this score, they were asked to weigh up the following aspects of their Faculty’s or School’s recent performance: teaching and learning output-based successes, research output-based successes and reputation for attracting high quality students and staff.

5. Results

5.1 Descriptive Statistics

The respondents’ profile and their academic unit is characterized as follows:

- the majority of Deans (57%) and Heads (64%) have no academic qualification in administration or management.
- approximately half of the Dean and half of the Heads have held their current position for less than 3 years.
- prior senior academic management positions of 4 years or more have been held by 70% of Deans and 49% of Heads.
- the majority of the Deans (59%) and substantial proportion of Heads (45%) have been in the higher education sector as academics and/or academic managers for greater than 20 years.
- 48% of Deans and 50% of Heads had never held a management/leadership position (even short-term) in an organization other than universities.
- no Dean or Head is below the age of 35 and about one third were female.
- Schools ranged in diversity from one discipline to nine disciplines, and in size from less than 1,000 to greater than 5,000 equivalent full-time undergraduate student load.

5.2 Confirmatory Factor Analysis to Test H1 on Capabilities

As mentioned, the instrument contained 23 scales for capabilities of the academic unit devised to capture Lynch and Baines’ (2004) areas of capabilities in developing and nurturing external relationships, innovation, expertise, reputation and core skills/technologies. These 23 items for capabilities were subjected to principal components factor analysis using SPSS. Twenty of the 23 items loaded into three factors. The remaining three items had very small factor loadings and were removed from further analysis. From a perusal of the nature of the items in the three factors, three functional capabilities were labelled as follows: networking
capabilities (6 items); teaching capabilities (6 items); and research capabilities (8 items). Table 1 presents the results of this factor analysis.

It is concluded from the results in Table 1 that Hypothesis 1 (i.e., that Deans/Heads perceive capabilities in the same dimensions as identified from secondary data by Lynch and Baines, 2004) is not supported. This study finds that capabilities of academic units are perceived by Deans/Heads in their functional dimensions. That is, capabilities are perceived as bundles of relationships, innovations, skills, technologies and reputations that are differentially developed into specific sets of teaching capabilities, research capabilities and network capabilities.

5.3  Partial least-squares analysis

The analysis proceeds by employing partial least square (PLS) path modelling (using SmartPLS 2.0 created by Ringle, Wende, and Will (2005)). PLS provides two levels of analysis – its is used first as a ‘measurement model’ that relates observed variables (measures) to their respective unobserved variables (constructs or latent variables); and second as a ‘structural model’ that estimates relationships between constructs (latent variables) as hypothesised in the researcher’s conceptual model (shown in Figure 1).

PLS is said to be a useful technique for causal-predictive analysis in situations of high complexity but low theoretical support (Joreskog and Wold 1982). The advantages of PLS have been reported in recent management accounting research (e.g. Abernethy et al. 2010; Mahama 2006). The particular features that have led to the choice of this methodology for the current study are its handling of complex structural models, its acceptance of data that does not meet parametric data distributional assumptions, its allowance for multicollinearity among endogenous variables, and its creation of latent variable scores directly using cross products involving multi-item measures (Chin and Newsted 1999).

5.3.1 The PLS measurement model for reliability and validity testing

The measurement model relates the measures (indicators) to their respective constructs. As such, it evaluates the reliability and validity of the scale measures. Table 2 presents the results for each of the multi-scale variables (constructs) in this study. The reliability of individual items is assessed from the loading to their respective construct. The loading scores are the correlations between the observable indicators and their associated constructs. Estimate of 0.70 or more is desirable (Nunnally 1978) although in causal modeling lower values are acceptable (Barclay, Higgins, and Thompson 1995).
### Table 1: Factor analysis of capabilities for regrouping of items from five dimensions suggested by Lynch and Baines (2004) to three functional capabilities.

<table>
<thead>
<tr>
<th>Rotated Component Matrix&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Component</th>
<th>Description of items in the questionnaire</th>
<th>Coded for PLS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Items in the survey questionnaire</strong></td>
<td><strong>1</strong></td>
<td><strong>2</strong></td>
<td><strong>3</strong></td>
</tr>
<tr>
<td>Reputation 3</td>
<td><strong>.900</strong></td>
<td>-.040</td>
<td>-.081</td>
</tr>
<tr>
<td>Expertise 2</td>
<td><strong>.894</strong></td>
<td>.013</td>
<td>-.069</td>
</tr>
<tr>
<td>Reputation 5</td>
<td><strong>.861</strong></td>
<td>.042</td>
<td>-.081</td>
</tr>
<tr>
<td>Innovative capabilities 2</td>
<td><strong>.849</strong></td>
<td>.046</td>
<td>.003</td>
</tr>
<tr>
<td>Reputation 6</td>
<td><strong>.794</strong></td>
<td>.080</td>
<td>-.016</td>
</tr>
<tr>
<td>Expertise 3</td>
<td><strong>.773</strong></td>
<td>.120</td>
<td>.062</td>
</tr>
<tr>
<td>Innovative capabilities 3</td>
<td><strong>.635</strong></td>
<td>.171</td>
<td>.254</td>
</tr>
<tr>
<td>Reputation 1</td>
<td><strong>.622</strong></td>
<td>.024</td>
<td>.196</td>
</tr>
<tr>
<td>Relationships with outside institutions 3</td>
<td><strong>.586</strong></td>
<td>.164</td>
<td>.340</td>
</tr>
<tr>
<td>Expertise 4</td>
<td><strong>.554</strong></td>
<td>.068</td>
<td>.227</td>
</tr>
<tr>
<td>Innovative capabilities 4</td>
<td><strong>.481</strong></td>
<td>.399</td>
<td>.191</td>
</tr>
<tr>
<td>Innovative capabilities 1</td>
<td><strong>.043</strong></td>
<td><strong>.845</strong></td>
<td>.095</td>
</tr>
<tr>
<td>Core competency 1</td>
<td><strong>.060</strong></td>
<td><strong>.773</strong></td>
<td>.192</td>
</tr>
<tr>
<td>Expertise 1</td>
<td>-.052</td>
<td><strong>.760</strong></td>
<td>.041</td>
</tr>
<tr>
<td>Core competency 2</td>
<td><strong>.240</strong></td>
<td><strong>.514</strong></td>
<td>.451</td>
</tr>
<tr>
<td>Core competency 3</td>
<td>-.017</td>
<td>.124</td>
<td><strong>.852</strong></td>
</tr>
<tr>
<td>Core competency 4</td>
<td>-.099</td>
<td>.162</td>
<td><strong>.835</strong></td>
</tr>
<tr>
<td>Reputation 4</td>
<td><strong>.390</strong></td>
<td>.282</td>
<td><strong>.434</strong></td>
</tr>
<tr>
<td>Relationships with outside institutions 4</td>
<td><strong>.381</strong></td>
<td>.232</td>
<td><strong>.417</strong></td>
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<tr>
<td>Relationships with outside institutions 1</td>
<td>-.072</td>
<td>.113</td>
<td>.043</td>
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<tr>
<td>Relationships with outside institutions 2</td>
<td>-.082</td>
<td>.129</td>
<td>.292</td>
</tr>
<tr>
<td>Reputation 2</td>
<td><strong>.293</strong></td>
<td>.281</td>
<td>.149</td>
</tr>
<tr>
<td>Reputation 7</td>
<td><strong>.371</strong></td>
<td>.427</td>
<td>.184</td>
</tr>
</tbody>
</table>

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

Note 1: Removed due to low factor loading and lack of face validity with the other research capability items.

Note 2: Removed due to low factor loading and lack of face validity with the other research capability items.

Note 3: Removed due to lack of face validity with the other network capability items.
Table 2 first shows that in respect of the 20 scales that were validated in Table 1 as the items in the measurement of capabilities, there are 3 items from network capability and one item from teaching capability with low loadings. Consequently, these 3 items are removed from further PLS analysis, leaving the final measurement model with 3 scales for network capability; 5 for teaching capability; and 8 for research capability.

Second, Table 2 shows an unanticipated result for the use of PMS information. As previously mentioned, the survey instrument contained scales for performance indicators based on Naranjo-Gil and Hartmann’s (2006) distinction between financial and non-financial indicators. However, in the two ‘performance indicators’ factors in Table 1, the items consist of a mixture of financial and non-financial loadings. (See Appendix B for a description of the items). Three items were dropped due to low loading values and the final measurement model consisted of four items in factor 1 and five items in factor 2. These sets of items were reviewed to establish if they could be interpreted in any conceptually meaningful way. The answer appeared to be in the source of determination of these performance measures. All four performance indicators in factor 1 were found to be of a type that is widely imposed on Faculties/Schools by their university chancellory because they are sought by federal government departments or agencies and are tied to either funding or benchmarking of universities by government. In contrast, all five items in factor 2 are performance measures that are typically associated with discretionary spending or fund raising activities at the Faculty/School level. Hence, the concept of PMS information use is found to fall into two dimensions of attention given to centrally-imposed performance indicators (PIIMPOSED) and attention given to locally-activated discretionary performance indicators (PIDISCRETION).

Third, the measures for academic unit performance had two scales dropped because of low loadings – one scale from teaching performance and one from reputation performance. The inclusion of the overall performance measure, where respondents are asked to rate the overall performance of their Faculty or School, provides another way of validating the other performance indicators (e.g. Abernethy and Brownell 1997).

Turning to the overall results in Table 2, it is found that most measures (39 out of 43) are above or close to 0.70. All loadings are statistically significant at the 0.001 level (one tailed). This suggests high reliability across the measures. Further, Table 2 gives the composite reliability and Cronbach’s alpha as measures of the internal consistency (reliability) of the set of

---

6 Loading value of 0.70 and greater are desirable although lower values are acceptable in early stages of research.
scales associated with each construct. The composite reliability scores are all greater than the recommended 0.70 (Fornell and Larcker 1981), with all constructs ranging from 0.82 to 0.95. Similarly, the Cronbach’s alpha scores are all greater than the recommended 0.70 except for the teaching performance construct. Given that this construct has a 0.84 for composite
reliability, it is concluded that its scales have sufficient internally consistency. Table 2 also presents the average variance extracted (AVE) for each construct. AVE is used to measure the convergent validity of the scales to their associated constructs. It measures the amount of variance extracted by an underlying factor in relation to the amount of variance due to measurement error. The AVE for all constructs is greater than 0.50 (except for one indicator which scored 0.50 exactly) and satisfies the suggested criterion in the literature (Chin 1998). Lower values are acceptable in early stages of studies that are not yet fully established (Abernethy et al. 2010).

Turning to Table 3, this provides an assessment of the discriminant validity of the scales using the square roots of the AVE scores of each construct compared to the correlations among the constructs. Table 3 shows that all of the square roots of the AVEs are greater than their corresponding correlation values confirming that adequate discriminant validity exists for all latent variables (Fornell and Larcker 1981). An alternative measure of discriminant validity based on the matrix of the cross-loadings of the observable indicators to their latent variables was run. Results are not presented in this paper, but they also confirm that there is adequate discriminant validity in the scales.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. CAPNW</td>
<td>0.81</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. CAPRES</td>
<td>0.53</td>
<td>0.82</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. CAPTEACH</td>
<td>0.47</td>
<td>0.42</td>
<td>0.71</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. PIIMPOSED</td>
<td>0.32</td>
<td>0.36</td>
<td>0.30</td>
<td>0.73</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. PIDISCRETION</td>
<td>0.21</td>
<td>0.07</td>
<td>0.19</td>
<td>0.45</td>
<td>0.72</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. MCSDIAG</td>
<td>0.19</td>
<td>-0.17</td>
<td>-0.27</td>
<td>-0.28</td>
<td>-0.23</td>
<td>0.73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. MCSINTER</td>
<td>0.21</td>
<td>0.13</td>
<td>0.27</td>
<td>0.25</td>
<td>0.35</td>
<td>-0.66</td>
<td>0.87</td>
<td></td>
</tr>
<tr>
<td>8. PERFOVERALL</td>
<td>0.42</td>
<td>0.51</td>
<td>0.44</td>
<td>0.30</td>
<td>0.16</td>
<td>-0.13</td>
<td>0.15</td>
<td>1.00</td>
</tr>
</tbody>
</table>

5.3.2 The PLS structural model for hypotheses testing

The PLS structural model provides the analysis for the hypothesized relationships between the latent variables as presented in Table 4. The results for direct effects are depicted in Figure 1. Table 4 has two panels. Panel A presents the results of the direct PLS structural model relationships between the latent variables while Panel B provides the total effects (direct and indirect) of the structural relationships between the latent variables. In all cases, the statistical significances of the path coefficients have been tested using a bootstrapping approach with 1,000 re-samplings.
The results given in Panel A for direct relationships reveal some clear patterns about the effects of MCS and PMS use on capabilities. First, in respect of H2, interactive MCS use is expected to positively relate to the strength of capabilities (H2a), whereas diagnostic MCS use is expected to negatively relate to capabilities in the academic unit (H2b). The results in panel A show only one relationship between MCS use and capabilities is significant – from interactive MCS use to teaching capability. Therefore, there is a partial support to hypothesis 2a. Interestingly, diagnostic MCS use is not significantly related to any capabilities, so H2b is fully rejected. This study is not consistent with Henri (2006) who found significant positive effects of interactive MCS use and significant negative effects of diagnostic MCS use on capabilities in manufacturing companies. However, Henri’s (2006) study may not be comparable to this study because capabilities are conceived in different dimensions.

Table 4: PLS Structural Model Results: Regression Coefficients (and t-values) for relationships between MCS use, Capabilities and Performance

Panel A: Direct Effects

<table>
<thead>
<tr>
<th>Path from:</th>
<th>CAP NW</th>
<th>CAP RES</th>
<th>CAP TEACH</th>
<th>PERF OVERALL</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCSINTER</td>
<td>0.10 (1.19)</td>
<td>0.02 (0.22)</td>
<td>0.13 (1.45)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MCSDIAG</td>
<td>-0.04 (0.49)</td>
<td>-0.08 (0.96)</td>
<td>-0.12 (1.24)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PIIMPOSED</td>
<td>0.26 (3.68)***</td>
<td>0.39 (5.47)***</td>
<td>0.22 (2.77)***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PIDISCRETION</td>
<td>0.05 (0.61)</td>
<td>-0.13 (1.44)*</td>
<td>0.01 (0.18)</td>
<td></td>
<td>0.12</td>
</tr>
<tr>
<td>CAPNW</td>
<td></td>
<td></td>
<td>0.35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAPRES</td>
<td></td>
<td></td>
<td>0.24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAPTEACH</td>
<td></td>
<td></td>
<td>0.07</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PERFOVERALL</td>
<td></td>
<td></td>
<td>0.50</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Panel B: Total Effects

<table>
<thead>
<tr>
<th>Path from:</th>
<th>Path through: CAPNW, CAPRES &amp; CAPTEACH</th>
<th>PERF OVERALL</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCSINTER</td>
<td></td>
<td>0.03 (0.59) H4a</td>
<td></td>
</tr>
<tr>
<td>MCSDIAG</td>
<td></td>
<td>-0.05 (1.17) H4b</td>
<td></td>
</tr>
<tr>
<td>PIIMPOSED</td>
<td></td>
<td>0.21 (5.04)*** H4c</td>
<td></td>
</tr>
<tr>
<td>PIDISCRETION</td>
<td></td>
<td>-0.05 (1.25) H4d</td>
<td></td>
</tr>
</tbody>
</table>

Second, in respect of H3, attention to use of centrally-imposed measures in the PMS by Deans/Heads is expected to positively related to capabilities in an academic unit (H3a), as is attention to discretionary performance measures (H3b). The results in panel A give fully support for H3a and no support for H3b.

The main findings in Panel A of Table 4 need to be interpreted in the specific context of universities. First, the result that interactive MCS use significantly positively affects teaching capabilities could be understood by the fact that teaching capabilities are developed and
nurtured through collegial needs. Hence, capabilities in teaching and learning innovations, flexible delivery technologies and reputations of teaching teams would be more strongly supported when a Dean/Head uses MCSs interactively by stimulating dialogue about teaching and learning quality and promoting adoption of exemplary teaching practices.

**Figure 1: Direct Effects of MCS Use and PMS use on Capabilities, Direct Effects of Capabilities on Performance, and Indirect Effects of MCS use and PMS use on Performance**

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**Total Effects (= Direct + Indirect Effects)**

Interactive MCS use through Capabilities on Performance = 0.03 n.s.
Diagnostic MCS use through Capabilities on Performance = -0.05 n.s.
Imposed PMS use through Capabilities on Performance = 0.21***
Discretionary PMS use through Capabilities on Performance = -0.05 n.s.

*= significant at .05, ** = significant at .01
Second, the result that use of centrally-imposed performance indicators is significantly positively related to all capabilities (teaching, research and networking capabilities) could be evidence that these imposed performance indicators are treated as imperatives by those Deans/Heads who use them the most, so these indicators will strongly guide their decisions relating to capabilities of the academic unit. The centrally-imposed performance indicators contain well-known metrics on research publications, external research income, course/program surveys by students and external bodies. Hence, the strength of teaching capabilities, research capabilities and networking capabilities will all be more fully pushed by a Dean/Head who gives greater attention to these centrally-imposed performance metrics.

Third, Panel A shows that greater attention to discretionary performance indicators has a negative relationship to the extent of development of research capabilities. This result could be understood by the sensitivity of decisions made about allocations of discretionary resources like travel funds and support staff by those Deans/Heads who give greater attention to discretionary performance indicators. Such resource allocation decisions concerning the use of internal discretionary funds of the academic unit may be perceived as unsupportive of the development of research capabilities amongst research-active staff because the metrics in the centrally-imposed performance indicators expect researchers to generate research funds and seek talent external to the academic unit.

Finally, Panel A reveals significant positive relationships between the different dimensions of capabilities (teaching, research and networking) and the different dimensions of performance (teaching, research and reputation) of academic units. This finding supports the RBV which conceptualises organisations as having distinctive capabilities that can enable resources to be used in implementing value-creating strategies (Barney 1991; Day, 1994; Eisenhardt and Martin 2000), resulting in sustained performance.

Panel B in Table 3 provides results for the tests of H4 concerning the indirect effects of the uses of MCS and PMS on organisational performance through the intervening effects of organisational capabilities. The PLS structural path model shows the result that the indirect effect of interactive MCS use on performance (through organisational capabilities) is only significant for the path to teaching performance. H4a is partially supported. For diagnostic MCS use, Panel B shows that none of the path coefficients to organizational performance are significant. Hence, H4b is rejected. These indirect effects of MCS use on performance are entirely consistent with the direct effects of MCS use on capabilities. Turning to the PMS results, all the indirect path coefficients from use of centrally-imposed PMS measures to organisational performance are significantly positive, giving fully support for H4c. Further, the path results for
discretionary PMS measures reveal a significant negative relationship to both research performance and reputational performance. This result is opposite to the direction hypothesized. Hence H4d is rejected. In summary, the path results in Panel B reinforce the relevance of RBV as a theoretical perspective, and the inclusion of organizational capabilities as a factor, in contingency-based functionalist research studies on MCS/PMS use.

6. Conclusions

This study has extended Henri (2006) – the only prior survey-based MCS/PMS study that has invoked the resource-based view – to the unique organisational setting of academic units of universities. It is a setting which is characterized by tensions between managerial and collegial approaches to management, performance criteria that is centrally directed but has room for some discretion at the academic unit level, and academic work that can give senior researchers higher status than their administrative Dean or Head. In this setting, findings on the uses of MCS and PMS and their impact on organisational capabilities and performance are expected to be context specific. Hence, if they are found to be consistent with the findings of Henri (2006), this would provide evidence of the power of RBV as a theoretical perspective in MCS/PMS research.

Several results were produced that could only be explained by the specific context of university academic units. In particular, Deans/Heads conceived capabilities of their unit in functional dimensions, not in generic dimensions as found in prior literature. They thought in terms of bundles of generic capabilities (e.g., expertise, innovation, reputation) that were differentiated as teaching, research and networking capabilities. They also thought in terms of PMS information that was either imposed or discretionary performance measures, not in terms of financial/non-financial information. In relation to path modelling results, highlights are that MCS use has little relationship with the extent of development of capabilities. First diagnostic use of MCS is unrelated to the development of capabilities in any of the fields of teaching, research or networking, and in turn does not indirectly affect overall performance. Second, interactive MCS use is only related to teaching capabilities, probably because of the inherent need to manage quality issues in teaching at the ground level of the academic unit. A further highlight is that use of centrally-imposed measures from the PMS is positively related to capabilities in all these fields and, in turn, indirectly positively affects overall performance. The strong influence of these common centrally-imposed performance across faculties and schools of universities tends to infer that the development of capabilities and, in turn, areas of attained
performance is converging rather than differentiating for the purpose of sustaining competitiveness.

The findings are subject to the limitations arising from the field survey method. In particular, data would be expected to contain respondent biases from the ‘halo effect’ or acquiescence. Since, some of the scales in the instrument were heavily adopted from other instruments to be applied for the first time to the higher education sector, and re-conceptualised after the data was factor analysed, replication studies are needed to fully establish the validity and reliability of constructs used in this study. Further research could provide greater depth of understanding about the use of MCS/PMS by Deans/Heads and the way capabilities are prioritised and strengthened by undertaking qualitative case study research within selected university Faculties and Schools.
## Appendix A: Profile of respondents and their academic units

### Profile of respondents:

<table>
<thead>
<tr>
<th>Deans (N=56)</th>
<th>Heads (N=165)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Valid count</strong></td>
<td><strong>Percentage</strong></td>
</tr>
<tr>
<td><strong>Educational qualification in administration and related fields of education:</strong></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>32</td>
</tr>
<tr>
<td>1 to 2 years</td>
<td>3</td>
</tr>
<tr>
<td>3 years</td>
<td>2</td>
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<tr>
<td>4 to 5 years</td>
<td>4</td>
</tr>
<tr>
<td>More than 5 years</td>
<td>12</td>
</tr>
<tr>
<td><strong>Missing</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>Experience in current academic management position:</strong></td>
<td>3.12</td>
</tr>
<tr>
<td>Less than 3 yrs</td>
<td>30</td>
</tr>
<tr>
<td>3 – 5 yrs</td>
<td>16</td>
</tr>
<tr>
<td>Greater than 5 yrs</td>
<td>10</td>
</tr>
<tr>
<td><strong>Missing</strong></td>
<td>-</td>
</tr>
<tr>
<td><strong>Experience in prior academic management positions:</strong></td>
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</tr>
<tr>
<td>Less than 4 yrs</td>
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<td>4 – 10 yrs</td>
<td>27</td>
</tr>
<tr>
<td>11 – 20 yrs</td>
<td>12</td>
</tr>
<tr>
<td><strong>Missing</strong></td>
<td>-</td>
</tr>
<tr>
<td><strong>Total years of experience in higher education (teaching, research, management, etc):</strong></td>
<td>24.14</td>
</tr>
<tr>
<td>10 yrs or less</td>
<td>10</td>
</tr>
<tr>
<td>11 – 20 yrs</td>
<td>22</td>
</tr>
<tr>
<td>21 – 30 yrs</td>
<td>11</td>
</tr>
<tr>
<td>31 – 40 yrs</td>
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<tr>
<td>40 yrs or more</td>
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<tr>
<td><strong>Management/leadership positions in organisations other than universities:</strong></td>
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</tr>
<tr>
<td>None</td>
<td>27</td>
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<tr>
<td>1-5 yrs</td>
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<td>6 – 10 yrs</td>
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<td>Greater than 10 yrs</td>
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<tr>
<td>35-44 yrs</td>
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<tr>
<td>45 – 54 yrs</td>
<td>21</td>
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<tr>
<td>55 – 64 yrs</td>
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<tr>
<td>Older than 65 yrs</td>
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<tr>
<td><strong>Missing</strong></td>
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</table>

### Profile of the academic units

<table>
<thead>
<tr>
<th>Academic schools/departments or disciplines in the Faculty/School (number):</th>
<th>5.66</th>
<th>4.12</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 and less</td>
<td>15</td>
<td>27</td>
</tr>
<tr>
<td>4 – 5</td>
<td>13</td>
<td>23</td>
</tr>
<tr>
<td>6 – 7</td>
<td>14</td>
<td>25</td>
</tr>
<tr>
<td>8 and more</td>
<td>-</td>
<td>-</td>
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<tr>
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<table>
<thead>
<tr>
<th>Undergraduate students in the Faculty/College/School/Department (EFTSL*):</th>
<th>3,505</th>
<th>911</th>
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<tbody>
<tr>
<td>1,000 and less</td>
<td>7</td>
<td>13</td>
</tr>
<tr>
<td>1,001 – 2,000</td>
<td>12</td>
<td>21</td>
</tr>
<tr>
<td>2,001 – 3,000</td>
<td>11</td>
<td>20</td>
</tr>
<tr>
<td>3,001 – 5,000</td>
<td>11</td>
<td>20</td>
</tr>
<tr>
<td>Greater than 5,000</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td><strong>Missing</strong></td>
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</tr>
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</table>

*EFTSL stands for equivalent full-time taught student load which is 96 credit hours or 8 subjects of 12 credit hours.
Appendix B: Survey instruments

Organisational distinctive capabilities

Respondents were asked to indicate the extent that their academic unit has developed the following capabilities ranging with 1 (not at all developed) to 7 (fully developed).

Network capabilities
2 Professional connections/involvement of staff members with government regulators, professional bodies, and media in general.
5 Professional connections/involvement of staff members with private and public sector organizations and government councils for research funding.
6 Reputation with external communities/stakeholders/industry engagement.

Teaching capabilities
1 Core competencies in the processes underpinning teaching, learning and assessment strategies (e.g. technology based teaching delivery; flexible delivery modes; diverse assessment structures)
3 Ability and experience in teaching and learning innovations (e.g., experiential learning, e-learning).
4 Reputation for distinguished teachers.
5 Reputation in teaching and learning.
6 Core competencies in the application of theory to practical problems (vocation) for the development of teaching or consultancy products or research.

Research capabilities
1 Reputation in research.
2 A critical mass of internationally renowned researchers in focused research areas.
3 Reputation for eminent professors.
4 Ability and experience in pursuing original research projects and generating publications.
5 Reputation for renowned authors.
6 Expertise and support structures for the Faculty to seek linkage research grants.
7 Recognised brand name in the higher education sector.
8 Ability and experience in commercializing research through patents or consulting/training services.

Performance
Respondents were asked to give a subjective rating of the performance of their academic units on the following criteria out of 10 where 10 is the highest.

Teaching and Learning
2 Graduates employment success rates
3 Student retention rates

Research
1 Research publications
2 Research income
3 Higher degree by research

Reputation
1 Ability to attract quality students
2 Ability to attract high-profile academic staff

Overall
Overall performance of the Faculty/School

Use of Management Control Systems

Respondents were asked to indicate the extent to which they agree or disagree with the following statements anchored with 1 (strongly disagree) and 7 (strongly agree).
MCS interactive use
I often use management control systems (MCS) information as a means of questioning and debating the decisions and actions of heads of schools/departments and other managers in the Faculty. I use the MCS to stimulate dialogue with heads of schools/departments and other managers in the Faculty. The information generated by the MCS becomes an important and recurring agenda item addressed by the highest level of management of the Faculty. The MCS involves a lot of interactions with all levels of managers. The MCS is designed to respond to new and unplanned circumstances (e.g., new opportunities) in a flexible way. MCS information generated by the system is often interpreted and discussed in face-to-face meetings.

MCS diagnostic use (reverse coded)
1 The monitoring and accomplishment of predetermined critical performance goals is central to the use of the MCS.
2 I heavily rely on staff specialists (i.e., finance and other administrative staff) to monitor the achievement of goals and strategies.
3 I mainly use MCS information reported through formal channels.
4 The MCS is primarily used to regularly track progress towards goals.
5 I give higher priority to accuracy and completeness of MCS information than its timeliness.

Performance measures
Respondent were asked to indicate the extent to which they keep a watch on, discuss and, if necessary, take action on the progressive reporting of the following performance measures anchored with 1 (rarely or never) and 7 (very often):

Centrally-directed performance indicators
4 Research publications.
5 External course/program surveys carried out by government and other institutions such as CEQ and GDS.
6 Internal course/program surveys carried out by the University/Faculty.
7 Research income.

Discretionary performance indicators
1 Cost per equivalent full-time student.
2 Tuition income.
3 Staff salary cost by categories (e.g. full-time, part-time).
4 Travel costs.
5 Administrative expenditures other than salary cost.

References


