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The moderating effect of organisational life cycle stages on the association between the interactive and diagnostic approaches to using controls with organisational performance[☆]

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ABSTRACT

This study examines the moderating effect of organisational life cycle (OLC) stages on the association between the approach to using controls (interactive versus diagnostic) with organisational performance. Analysis is conducted in respect to Miller and Friesen's (1984) organisational life cycle (OLC) stages (birth, growth, maturity, and revival). Data were collected by a survey questionnaire from a random sample of 343 General Managers in Australian manufacturing business units. The results indicate that the interactive approach was positively (negatively) associated with organisational performance in the growth (revival) stage. The use of the diagnostic approach was positively (negatively) associated with organisational performance in the revival (maturity) stage. The study contributes to the literature linking management control systems and OLC stages by providing knowledge regarding the suitability of interactive and diagnostic approaches to using controls for business units within specific OLC stages.

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1. Introduction

While a significant body of management control system (MCS) literature has focused on the examination of the existence, characteristics and/or relative importance of controls, less emphasis has been placed on examining the manner in which controls are used (Abernethy et al., 2010; Ferreira and Otley, 2009) and the subsequent impact

on organisational performance. In assessing the impact of MCSs on performance, contingency theory suggests that managers seek to attain a fit between MCSs and contextual factors within organisations to achieve superior performance (Chenhall, 2003; Govindarajan and Gupta, 1985; Langfield-Smith, 1997). Gerdin (2005) suggests that there is a gap in the MCS literature where the influence of multiple contingent factors on MCSs is investigated simultaneously. Similarly, Drazin and Van de Ven (1985) suggest that associations can be better understood if multiple contingent variables are analysed simultaneously.³

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³ This argument is in line with the configuration approach in the contingency research literature which maintains that multiple contingent variables should be examined simultaneously in order to provide a more

Therefore, in line with Auzair and Langfield-Smith (2005) who argue that an effective MCS occurs as a result of the simultaneous consideration of multiple contingency variables, this study examines the association between the approaches to using controls (the interactive and diagnostic use of controls) and organisational performance within organisational life cycle (OLC) stages. OLC stages reflect the various stages of the development of organisations with each stage reflecting the integral complementarities identified following the simultaneous consideration of multiple contingent variables (Miller and Friesen, 1984). Miller and Friesen (1984) developed a dynamic form of configuration by classifying organisations into different development stages, based on the simultaneous consideration of four contingent variables: organisational situation, strategy, structure and decision-making style. These development stages were labelled OLC stages, and include the birth, growth, maturity, revival and decline stages.⁴

In focusing on the manner in which controls are used, Ferreira (2002) suggests that the approach to using controls plays a more significant role in organisational performance than the design of controls. Abernethy et al. (2010) argues that what differentiates one control from another is not their technical characteristics but the way in which management use the controls. Similarly, Langfield-Smith (1997) reports that it is not sufficient to merely investigate the existence of controls without examining how they are used.

A limited number of studies have examined how approaches to using controls affect organisational performance. These studies have predominantly focused on indirect associations between the approaches to using controls and organisational performance (Bisbe and Otley, 2004; Henri, 2006; Widener, 2007). For instance, Henri (2006) examined how approaches to using controls indirectly affected organisational performance via four capabilities (i.e. market orientation, entrepreneurship, innovativeness and organisational learning). Similarly, Widener (2007) and Bisbe and Otley (2004) examined the indirect effect of approaches to using controls on organisational performance through organisations' orientation to learning and management attention, and product innovation respectively.

However, there is limited theoretical development and empirical analysis concerning the direct association between the use of controls and organisational performance (Hofmann et al., 2012; Sakka et al., 2013). In the context of the use of budgets, Hofmann et al. (2012) reported that the 'interactive use of budgets has a significant negative influence on financial performance, whereas the diagnostic use has a positive effect' (p. 173). Sakka et al. (2013) reported that the interactive (diagnostic) use of MCSs increased project performance when task uncertainty was high (low), while the use of the interactive

approach had a negative impact on performance when task uncertainty was low.

Therefore, this study is motivated to contribute to the limited empirical research examining the direct association between the interactive and diagnostic approaches⁵ to using controls and organisational performance. The study also aims to contribute to the literature by exploring these associations within organisational life cycle (OLC) stages. While OLC stages have been extensively examined in the organisational literature, only a limited number of studies have investigated the association between MCSs and OLC stages in the MCS literature (Auzair and Langfield-Smith, 2005; Davila, 2005; Kallunki and Silvola, 2008; Kober, 2010; Moores and Yuen, 2001; Silvola, 2008). This study therefore aims to contribute to the literature by examining the association between the approach to using controls and organisational performance within four specific OLC stages of Miller and Friesen's (1984) model (birth, growth, maturity, and revival). Specifically, the study proposes that the OLC stage will moderate the association between the approaches to using controls with organisational performance.

The remainder of this paper is structured as follows. The next section discusses the literature on the approaches to using controls, and develops relevant hypotheses in respect to the effect of the moderation of OLC stages on the association between the diagnostic and interactive use of controls with organisational performance. Hypotheses are subsequently formulated in respect to the association between the use of controls and organisational performance for each OLC stage. This is followed by a discussion of the method used to collect data and a description of the measurement of the variables. The Results section provides the results of the data analysis and a discussion of the results. Finally, a discussion of the contributions, practical implications, limitations of the study and insights for future research are presented in Section 5.

2. Theory and hypotheses development

2.1. Approaches to using controls

This study adopts Simons' (1995) framework of control levers including the interactive and diagnostic approaches to using controls which have been widely used in recent MCS studies (Abernethy and Brownell, 1999; Bisbe and Otley, 2004; Bobe and Taylor, 2010; Davila, 2000; Ferreira and Otley, 2009; Henri, 2006; Kober et al., 2007). While Simon's (1995) framework covers four levers of controls (belief, boundary, interactive, diagnostic), most studies examining the approach to using controls have focused on the interactive and diagnostic levers (Abernethy and Brownell, 1999; Bisbe and Otley, 2004; Bobe and Taylor, 2010; Davila, 2000; Ferreira and Otley, 2009; Henri, 2006;

holistic understanding of organisations and their environment (Gerdin and Greve, 2004).

⁴ The decline stage is not included in the current study as previous studies (Silvola, 2008; Kallunki and Silvola, 2008; Auzair and Langfield-Smith, 2005) have found that it is difficult to obtain data from decline stage organisations.

⁵ The interactive approach here refers to a system which emphasizes face-to-face communications and allows managers to personally involve themselves in the decision activities of subordinates, while the diagnostic approach is identified as a system that allows organisational outcomes to be monitored and deviations from preset standards of performance to be corrected.

Kober et al., 2007). The main reason for this focus is as follows. While belief and boundary systems are used to 'frame the strategic domain' (Bisbe and Otley, 2004, p. 711), the interactive and diagnostic approaches allow a comparison of different controls in terms of the way they are used rather than their technical design characteristics (Bisbe and Otley, 2004; Langfield-Smith, 1997; Ramos and Hidalgo, 2003). Hence, given that the current study aims to examine the way in which management uses controls, the focus is on the interactive and diagnostic approaches to using controls.

Under the interactive approach, top management personally and regularly involve themselves in the process of subordinates' decision making activities (Simons, 1995). "The process requires frequent and regular attention from operating managers at all levels of the organisation, and information generated by the process represents an important agenda to be addressed by the highest level of management. The process relies on the continual challenge and debate of underlying data, assumptions, and action plans; and it is fuelled by reward of effort rather than results" (Simons, 1987, p. 351). The interactive approach encourages face-to-face dialogue and debate across different levels, which subsequently facilitates organisational learning and innovation. However, this approach requires continuous management attention from managers at all levels within organisations (Simons, 1995).

With the diagnostic approach, top management delegate a significant level of authority to subordinates, and only get involved in the process of subordinates' decision making activities if there are significant discrepancies between expected and actual results. Data is transmitted through formal reporting procedures and management rely greatly on subordinates to inform them when their attention is needed (Simons, 1987, 1995). The diagnostic approach links organisational strategy with critical performance variables and therefore conserves management attention and helps with the implementation of strategies. However, the diagnostic use of controls and its related incentives create a risk of dysfunctional behaviour from employees who might respond inappropriately so as to achieve the desired outcomes (Simons, 2000).

Previous literature suggests that the diagnostic and interactive controls are complementary and can work together to create an effective control environment (Henri, 2006; Simons, 2000; Widener, 2007). Specifically, Widener (2007) argued that interactive controls encourage innovation and learning, while diagnostic controls provide necessary boundary and direction via critical performance measures to ensure the effective use of interactive controls. Similarly, Simons (2000, p. 305) suggested that 'the information and learning generated by interactive systems can be embedded in the strategies and goals that are monitored by diagnostic control systems'.

2.2. The association between the approaches to using controls and organisational performance

The effect of the use of controls on performance is grounded in upper echelon theory which attributes organisational performance to the characteristics of top management teams (Hambrick and Mason, 1984). While

Hambrick and Mason (1984) concentrate on observable upper echelon characteristics, this study adopts a broader perspective, with the characteristics of management reflected in the emphasis placed on the approach to using controls. In particular, we maintain that organisational performance is influenced by the extent to which management use controls in an interactive and diagnostic manner. Specifically, we argue that the way in which managers use controls influences organisational behaviour and decision making, thereby influencing organisational performance (Hofmann et al., 2012). For example, Arachchilage and Smith (2013, p. 11) note that 'the extant literature suggests that MCS can be used diagnostically or interactively with strategies for better organisational performance' (Abernethy and Brownell, 1999; Henri, 2006; Simons, 1995).

The influence of diagnostic control systems on performance is grounded in goal setting and agency theory. Specifically, by focusing on critical control variables managers attempt to 'align the employees' behaviour towards organisational objectives, to measure the results of their actions, and to reward the performance' (Hofmann et al., 2012, p. 155). The diagnostic approach emphasises the monitoring of performance and the achievement of desired performance goals with Sakka et al. (2013, p. 265) maintaining that this approach ensures that 'predetermined objectives are met and that corrective actions are taken when a gap between planned and actual results is detected'. Hence, through the provision of motivation and direction, and by focusing on critical performance variables, it is expected that the diagnostic approach will result in enhanced performance.

Hofmann et al. (2012) found that the diagnostic use of controls had a positive impact on performance, although these findings were in the context of the use of budgets. They refer to its 'contribution to the effective and efficient goal achievement in an organisation' (p. 173). However, the diagnostic approach can encourage conservatism, stifle creativity, and result in dysfunctional behaviour (Simons, 2000). Furthermore, Arachchilage and Smith (2013) report that diagnostic controls are only effective in certain circumstances, with a diagnostic approach considered more appropriate in supporting cost reduction initiatives and considered less appropriate when a differentiation strategy is employed.

The influence of the interactive use of controls on performance is grounded in social exchange theory. Specifically, by applying the interactive approach management show respect for subordinates' ideas and are willing to consult with them in decision making processes. Henri (2006) describes the interactive use as 'an organic control system supporting the emergence of communication processes and the mutual adjustment of organisational actors' (p. 533). It is expected that through enhanced communication the interactive approach serves to facilitate creativity, innovation, and the enhancement of competitive advantage, thereby enhancing organisational performance.

Simons (1995, p. 95) maintains that 'interactive control systems... encourage the emergence of new strategic initiatives' while Sakka et al. (2013, p. 265) argue that such an approach can be used to manage uncertainty and

enhance a project's flexibility. Similarly, [Arachchilage and Smith \(2013, p. 13\)](#) refer to [Dent \(1987\)](#) who infers that the interactive use of controls can lead to better business level strategies and improved organisational performance.

However, while [Sakka et al. \(2013\)](#) found that the interactive approach to using budgets was positively associated with performance, this finding only held when task uncertainty was high. Furthermore, when task uncertainty was low, the interactive approach exhibited a negative association with performance. Similarly, [Hofmann et al. \(2012\)](#) found that the interactive approach had a negative impact on performance in the context of budgets.

This discussion highlights that research concerning the direct influence of the diagnostic and interactive approaches to using controls on organisational performance is in the early stages, with the limited empirical evidence in this area producing mixed findings. This study proposes that the nature of these associations will vary across OLC stages. Accordingly, we do not formulate overriding hypotheses in relation to the direct association between the diagnostic and interactive approaches with organisational performance. Rather, we aim to contribute to the literature in this area by examining the moderating effect of OLC stages on these associations, with Sections 2.4 and 2.5 subsequently formulating hypotheses in respect to specific OLC stages.

2.3. The moderating effect of OLC stages

OLC stages are used to reflect the various stages of the development of organisations with each stage implying integral complementarities amongst a diverse array of characteristics, and exhibiting certain significant differences from all other stages ([Miller and Friesen, 1984](#)). As previously indicated, [Miller and Friesen \(1984\)](#) identified five OLC stages based on the simultaneous consideration of four contingent variables (organisational situation, strategy, structure, and decision-making style), the birth, growth, maturity, revival, and decline stages. The latter stage is not considered in this study due to the difficulty in obtaining data.

In the birth stage, organisations are small in size and are faced with a relatively uncompetitive environment. A niche strategy prevails with a narrow product scope. The structure is described as simple and centralised, and organisations are owner-controlled. Only a minimal amount of information is used for decision making as owners make their decisions mainly based on their intuition. Compared to the birth stage, organisations in the growth stage are larger in size, and the organisational structures are more complex and less centralised. Organisations seek to grow and develop more formal structures, with a focus on functional specialisation. Top management tend to remove their attention away from daily routine administration and consequently delegate authority to subordinates. Given the heterogeneous and competitive environment in this stage, greater effort is devoted to collecting and processing information so as to cope with the high level of uncertainty. Intuition-based decision-making style is replaced by a more analytical and better integrated decision-making style, with a wide array of factors taken into account. The

main strategies pursued are early diversification and innovation, which subsequently results in a broad range of products being provided.

In the maturity stage, organisational size increases and the environment is relatively stable, exhibiting a lower level of uncertainty. Rules and procedures are in place which is consistent with a rigid and centralised structure ([Smith et al., 1985](#)). Compared to the growth stage, the ownership in this stage is more dispersed. Decision-making power rests in the hands of a few top managers, perhaps due to the simplicity and stability of operations in this stage. Instead of pursuing diversification and innovation, maturity stage organisations emphasise improvements in productivity and efficiency, and hence there is a narrower product scope than in the growth stage. The emphasis on productivity and efficiency align with the less innovative, less proactive and more risk averse decision-making style in the maturity stage.

Finally, in the revival stage, organisations are the largest in terms of size. Environmental dynamism and hostility is higher than in any other stage, and ownership is the most dispersed amongst all OLC stages. The organisational emphasis shifts from the defender strategy to dramatic diversification and innovation, with a great deal of risk taking. Hence, a broader scope of products is provided than in the maturity stage. The decision-making style tends to be more flexible and analytical so as to mitigate the high level of risk involved. In order to cope with the increasing market heterogeneity, a divisional structure is adopted with the authority over operating decisions delegated to each division, and divisional managers held responsible for their division's performance.

Evidence suggests that the characteristics of MCSs differs across OLC stages ([Auzair and Langfield-Smith, 2005; Moores and Yuen, 2001](#)) with [Miller and Friesen \(1984\)](#) maintaining that 'OLC stages represent a contingency or driving force to which appropriate organisational responses must be matched' ([Phan et al., 2014, p. 2](#)). For instance, [Moores and Yuen \(2001\)](#) reported that the level of formality of MCSs was higher in the growth and revival stages than in the birth, maturity and decline stages. Similarly, [Auzair and Langfield-Smith \(2005\)](#) investigated the level of bureaucracy of MCSs for organisations in the growth and maturity stages, reporting that maturity stage organisations focus on bureaucratic MCSs more than growth stage organisations.

Since the inherent characteristics of organisations differ across OLC stages, alternative management practices are considered appropriate at different stages ([Kazanjan, 1988; Smith et al., 1985](#)) with [Kallunki and Silvola \(2008\)](#) finding that the use of activity based costing was used to a greater extent in the maturity and revival stages than in the growth stages. Similarly, we argue that the interactive and diagnostic approaches to using controls will be more (or less) effective in influencing organisational performance within specific OLC stages. For example, [Agbejule \(2007, p. 6\)](#) states that 'the diagnostic use of MAS is likely to be more effective in situations where change is either limited or non-existent'. Alternatively, it is expected that the interactive approach will be more appropriate in circumstances where the search for new opportunities is encouraged.

Hence, we predict that the suitability of the interactive and diagnostic approaches to using controls will vary across Miller and Friesen's (1984) four life cycle stages (birth, growth, maturity, revival), hypothesising that the association between the interactive and diagnostic approaches to using controls with organisational performance is moderated by OLC stages.

H1. Organisational life cycle stages moderate the association between the diagnostic use of controls and organisational performance.

H2. Organisational life cycle stages moderate the association between the interactive use of controls and organisational performance.

2.4. The effect of the diagnostic use of controls on performance across OLC stages

Simons (1995, 2000) suggests that in order to ensure the effectiveness of the diagnostic approach to using controls, organisational goals, strategies, and critical success factors should be explicit enough to make the selection of appropriate outcome measures straightforward. However, birth stage firms are still in a trial stage regarding the determination of their goals and strategies, and hence it is extremely hard to set appropriate critical performance measures to facilitate the effective use of the diagnostic approach. Furthermore, since managers have control over all aspects of daily business operations there is less demand for the diagnostic approach in birth stage organisations.

Similarly, in the growth stage, due to the heterogeneous and dynamic environment in which growth stage organisations operate, it is difficult to determine critical performance measures. Simons (2000) indicated that to ensure that the diagnostic approach to using controls works effectively, critical performance measures must be stable with little variation. Accordingly, the diagnostic approach is not expected to affect organisational performance in this stage.

Abernethy and Brownell (1999) argue that the diagnostic approach to using controls is more effective in a setting where job descriptions and procedures are well-understood and specified. Hence, this approach is considered to be more appropriate in the maturity stage where there is certainty and stability. Similarly, Simons (1991) concludes that within organisations focusing on efficiency and productivity, the parameters for the critical success factors are well-understood throughout the organisation, and can therefore be monitored effectively by exception-based reports with little discussion with subordinates. Further support is provided by Abernethy et al. (2010) who found that when decision making power resides with top managers, the diagnostic approach can be used in a more efficient way to direct subordinates' behaviour. Hence, the diagnostic approach to using controls is expected to be positively associated with organisational performance in the maturity stage.

Since most revival stage firms have previously been in the maturity stage they have already developed the ability to measure results effectively and have well-established knowledge regarding desired results. Hence, while they

also face an uncertain environment, revival stage firms are better equipped than growth stage firms to set clear and appropriate goals and outcome measures, thereby ensuring the effective use of the diagnostic approach to using controls. In addition, given divisional managers are held accountable for their divisions' performance, the use of the diagnostic approach is warranted. Specifically, due to the dynamic and hostile environment and the high level of heterogeneity, a more analytical and integrated approach is required to reduce the level of risk taken, and thereby enhance performance. Tekavcic et al. (2008) maintained that one of the main advantages of the use of the diagnostic approach is to alleviate managers' burden of constant monitoring, particularly for managers in revival stage organisations facing complex and competitive markets with a high level of risk-taking. In addition, Simons (1991) found that the efficient use of management attention, embedded in the diagnostic approach, is positively associated with performance. This is also consistent with Henri's (2006) argument that the diagnostic approach can contribute to organisational performance by monitoring goal achievement and providing boundaries for dramatic innovation.

H3. The diagnostic approach to using controls is (i) not expected to be associated with organisational performance in the birth and growth stages and (ii) expected to be positively associated with organisational performance in the maturity and revival stages.

2.5. The effect of the interactive use of controls on performance across OLC stages

Birth stage organisations have a high level of centralisation with decisions predominantly made at the top management level without communicating with subordinates. Lower level managers have little authority and autonomy in operating their business units (Miller and Friesen, 1984). Accordingly, the interactive approach, which involves frequent information sharing and interaction across different hierarchical levels, is not expected to be used to a great extent and not expected to influence organisational performance.

Widener (2007) argued that the use of the interactive approach assists managers in dealing with situations which are highly complicated and in which they have little experience. Hence, as organisations enter the growth stage, regular face-to-face dialogue and debates, and the exchange of knowledge and communication amongst employees, which are embedded in the interactive approach, facilitate the development of new products and can improve the impact of innovation on organisational performance (Tekavcic et al., 2008). In addition, growth stage organisations exhibit a high level of decentralisation, with Chenhall and Morris (1995) finding that the interactive approach to using controls is more effective through an organic organisational structure, characterised by a high level of decentralisation. Accordingly, the interactive approach to using controls is expected to be positively associated with organisational performance in the growth stage.

Chenhall and Morris (1995) argue that the interactive approach to using controls requires a supportive organisational structure to be effective. Maturity stage organisations exhibit centralised and rigid structures with decision-making activities dominated by a few key managers. This structure is considered inappropriate for the use of the interactive approach, and hence this approach is expected to inhibit organisational performance. Rather, as performance tends to decline in this stage, the diagnostic approach becomes more appropriate, as organisations place greater emphasis on monitoring and controlling performance. In addition, Abernethy and Brownell (1999) report that the interactive approach to using controls is expensive to implement, and since innovation and creativity are not the focus of maturity stage organisations, the costs associated with the use of the interactive approach are likely to exceed the associated benefits. Hence, this approach is more likely to exhibit a negative impact on organisational performance.

Ownership in revival stage firms is widely dispersed, thereby minimising the influence of the board, owners, and shareholders on business operations and decisions. While the interactive approach is useful in contexts where innovation plays a crucial role, most revival stage organisations adopt divisional organisational structures, and therefore it is expected that top managers will not have as much involvement in the process of subordinates decision making. Since divisional managers are held responsible for their own divisions' performance the involvement of top management may have a detrimental effect with Bonner et al. (2002) reporting that such management interventions are negatively associated with project performance within each division, thereby undermining organisational performance in the long term. Similarly, Hofmann et al. (2012) state that frequent discussions and intensive information seeking is likely to have a negative impact on project performance and lead to information overload. Hence, an increase in the extent of interventions by top management in each division's decision making processes is expected to have a negative impact on organisational performance. Furthermore, given the interactive approach is not costless and requires continuous attention (Abernethy and Brownell, 1999) the significant costs involved in using this approach are expected to outweigh the benefits. Hence, we hypothesise that the interactive approach will have a negative effect on organisational performance in the revival stage.

H4. The interactive approach to using controls is (i) not expected to be associated with organisational performance in the birth stage and (ii) expected to be positively (negatively) associated with organisational performance in the growth (maturity and revival) stage/s.

3. Method

The data were collected by distributing a survey questionnaire to a random sample of 1000 General Managers of Australian manufacturing organisations identified in the *Kompass Australian Database* (2010). Respondents were asked to complete the questionnaire in respect to one business unit within their organisation. The business unit was

selected as the unit of analysis because different business units in an organisation may be in different stages of their OLC, making it difficult to complete the survey at the corporate level. General Managers were considered to be the most appropriate respondents for this study, as they are in a position to identify the OLC stage of their chosen business unit, and have sufficient knowledge about the way their business units use controls. Australian manufacturing organisations were selected for two reasons. First, given that there are multiple variables and relationships involved in this study, the focus on a single industry can reduce the noise in the measures, and provide better control for variables beyond the interest of this study (Dixon, 1992). Secondly, by making the second highest contribution to Australian Gross Domestic Product (GDP), the Australian manufacturing industry has a crucial influence on the Australian economy.

To improve the response rate, Dillman's (2007) Tailored Design Method was adopted to design and administer the questionnaire.⁶ The response rate of 34.3% (343 responses) compares favourably with the response rate of recent OLC studies (Auzair and Langfield-Smith, 2005 [15.5%]; Kallunki and Silvola, 2008 [21%]; Moores and Yuen, 2001 [14.5%]). This included a 21.4% response rate (214 responses) from the initial distribution of the questionnaires and a 12.9% response rate (129 responses) from the follow-up mail-out. Non-response bias tests were undertaken by comparing each of the independent and the dependent variables for early and late respondents. The results revealed that there were no significant differences for any of the variables, indicating that non-response bias was not a concern.

3.1. Variable measurement

3.1.1. Organisational life cycle (OLC) stages

Miller and Friesen's (1984) instrument was used to classify business units into five OLC stages: birth, growth, maturity, revival and decline. This model was chosen since it covers the complete life of an organisation from birth to death, and has been empirically tested and supported in both the OLC and management accounting literature (Auzair and Langfield-Smith, 2005; Davila, 2005; Drazin and Kazanjian, 1990; Kazanjian and Drazin, 1990; Kallunki and Silvola, 2008; Miller and Friesen, 1984, 1982; Moores and Yuen, 2001; Silvola, 2008). In an attempt to make the survey as concise as possible while still maintaining the accuracy and completeness of the measure, the 54 items in Miller and Friesen's (1984) instrument were reduced to 38 by eliminating those items which were ambiguous, duplicated, and/or considered irrelevant to the context of the current study. Amongst these 38 items, 13 items were used to measure the respondent organisations' strategies, seven items were used to measure the respondent organisations' situation, and nine items were used to measure organisational structure and decision making style. Respondents were asked to indicate the extent to which each item was reflected in their business unit, using a five-point Likert

⁶ The Tailored Design Method provides guidelines in relation to the design and distribution of the questionnaire.

scale with anchors of “Not at all” and “To a great extent” (see [Appendix A](#)).

In order to reduce the 38 items into a manageable set of data factor analysis was conducted, with 35 out of the 38 items loading onto 12 specific factors. However, the loadings of the items on four of these factors were relatively low and not interpretable. Hence, eight factors representing 27 items were obtained as shown in [Table 1](#).

Each of the eight factors was scored as the sum of the items loading onto each factor. These scores were subsequently used in cluster analysis (hierarchical agglomerative technique with Ward's minimum variance method for distance measure between two sub-groups). Consistent with [Miller and Friesen's \(1984\)](#) five-stage OLC model, business units were classified into five clusters representing five OLC stages. [Table 2](#) reveals that as a result of the clustering procedures, 40 business units were categorised into Cluster one, 85 in Cluster two, 81 in Cluster three, 78 in Cluster four and three in Cluster five.

[Table 2](#) also reveals the mean scores for each factor across the clusters, and demonstrates the reliability of the constructs with each of the Cronbach alpha values at an acceptable level of 0.4 or above ([Mital et al., 2008](#); [Sproles and Kendall, 1986](#)). The labelling of clusters was subsequently undertaken by examining the extent to which the characteristics of each of the eight factors were in line with [Miller and Friesen's \(1984\)](#) descriptions of the five OLC stages for each cluster.

The business units in Cluster five appear to have the highest centralised organisational structure, with little authority delegated to subordinates. While the locus of decision making power is vested in top management very few factors are taken into account when making decisions. No particular strategy is pursued in this stage and little effort is devoted to strategic planning, diversification, marketing and distribution. The pattern revealed in this cluster is in line with the characteristics of the decline stage described in [Miller and Friesen \(1984\)](#).

Business units in Clusters two and three exhibit similar scores for most of the OLC factors, and generally higher scores than the other three clusters. Business units in both clusters exhibit a high level of environmental heterogeneity, dynamism and hostility. A great deal of effort is therefore devoted to collecting and processing information in order to deal with the high level of environmental uncertainty. These business units encourage communication between top management and subordinates, with a high degree of decentralisation of authority. Innovation and diversification prevail in both clusters and there is greater product diversity. The decision-making style tends to be analytical, adaptable and multiplex, with more factors taken into account when making decisions. The characteristics of these two clusters closely resemble the characteristics of the growth and revival stages.

Although both Clusters two and three exhibit a relatively high level of diversification, Cluster three reports a significantly higher score in the “Diversification” factor than Cluster two. In a similar vein, while both Clusters two and three reported a high score for the “The influence of the board, owners and shareholders” factor, the score in Cluster three is significantly lower than the score in Cluster

two, indicating an even more dispersed ownership in Cluster three. Given that revival stage business units emphasise extensive diversification with the most dispersed ownership, while growth stage business units emphasise early diversification, business units in Cluster three were labelled as being in the revival stage, and those in Cluster two were labelled as being in the growth stage.

Business units in Cluster one have a widely dispersed ownership, reflected by a low score in the factor “The influence of the board, owners and shareholders”. Little effort is devoted to product innovation and diversification as a result of the emphasis on improving efficiency and productivity. The relatively stable and less heterogeneous environment, as indicated by a low score in the factor “Environmental uncertainty”, allows top management to concentrate power in their own hands, with a low level of decentralisation of authority. A low score for the “Managers' focus on decision making” factor represents a less responsive and adaptive decision-making style. These characteristics suggest that business units in Cluster one correspond to the maturity stage.

Business units in Cluster four emphasise a niche strategy due to weak competitive capability and a considerable level of environmental uncertainty, as indicated by a high score in the factor “Environmental uncertainty”. Ownership is tightly concentrated in the hands of a few individuals with little delegation of authority to subordinates. Business units aim to offer a narrow scope of products to their customers and therefore exhibit a low level of diversification. Decision-making style appears to be risk orientated as management make their decisions mainly based on their intuition without extensive analyses. The pattern revealed in this cluster is consistent with the characteristics of business units in the birth stage.

To confirm the labels assigned to the respective clusters, additional information in regard to the average number of employees (proxy for size of an organisation) and the product scope for business units within each of the five clusters was collected, with the mean values reported in [Table 2](#). [Table 2](#) reveals that the average number of employees increases across the birth, growth, maturity and revival stages but is lower in the decline stage, which is consistent with [Miller and Friesen's \(1984\)](#) descriptions of OLC stage characteristics. In addition, the broader product scope in the growth and revival stages, and the narrower product scope in the decline stage are also in line with [Miller and Friesen's \(1984\)](#) descriptions. Therefore, the classification of OLC stages is considered to be appropriate.

3.1.2. Approaches to using controls

An adapted version of [Simons' \(1995\)](#) instrument was adopted to measure the interactive and diagnostic approaches to using controls. Respondents were asked to indicate the extent to which each item was reflected in their business unit, using a five-point Likert scale with anchors of “1 = Not at all” and “5 = To a great extent” (see [Appendix A](#)).

For the interactive approach, a five-item measure was used to assess the extent to which: (i) there is an on-going interaction between operational management and senior managers; (ii) controls are used regularly in

Table 1
Factor analysis regarding OLC stages.

Individual questions ^a	Component							
	Factor 1: environmental uncertainty	Factor 2: the influence of the board, owners and shareholders	Factor 3: decentralisation of authority	Factor 4: strategic planning	Factor 5: diversification	Factor 6: marketing and distribution	Factor 7: innovation	Factor 8: managers' focus on decision making
F1.1	0.406	0.087	0.047	−0.147	0.053	0.330	−0.275	0.336
F1.2	0.692	0.027	−0.002	0.154	0.011	−0.164	0.172	0.116
F1.3	0.721	0.040	0.094	−0.039	0.090	0.166	0.107	0.193
F2.1	0.094	0.796	−0.107	−0.041	−0.109	−0.020	0.039	0.047
F2.2	−0.137	0.506	−0.464	−0.046	−0.088	−0.007	−0.069	0.006
F3.1	−0.001	0.174	0.489	0.040	0.146	−0.109	0.135	0.379
F3.2	−0.137	0.008	0.347	0.263	0.047	0.082	0.189	0.403
F3.3	0.014	−0.110	0.613	0.145	0.060	0.141	0.132	0.343
F3.4	−0.051	0.149	0.402	0.087	0.044	0.129	0.160	0.306
F4.1	−0.041	0.028	0.182	0.634	0.071	0.103	0.072	0.391
F4.2	0.170	−0.110	0.104	0.635	0.012	−0.065	0.010	0.393
F5.1	0.060	−0.116	−0.025	0.159	0.752	0.194	0.019	−0.010
F5.2	0.005	−0.056	0.008	−0.061	0.839	0.099	0.037	0.140
F5.3	0.117	0.002	−0.061	0.375	0.361	0.156	−0.055	−0.030
F6.1	−0.070	0.045	0.111	−0.005	0.133	0.719	−0.066	0.242
F6.2	0.059	−0.132	0.042	0.064	0.111	0.685	0.133	0.162
F6.3	0.132	0.110	0.031	0.246	0.111	0.592	0.242	−0.126
F6.4	0.305	−0.205	0.370	0.037	−0.047	0.316	0.370	0.241
F7.1	0.044	−0.022	0.118	0.035	−0.005	0.012	0.786	0.026
F7.2	0.110	0.056	0.129	0.083	0.113	0.176	0.716	0.226
F8.1	0.086	−0.028	0.228	0.248	−0.014	0.205	0.230	0.531
F8.2	0.067	0.181	0.067	0.108	0.069	0.033	−0.042	0.732
F8.3	0.151	0.064	0.120	0.071	0.033	0.030	0.016	0.786
F8.4	0.074	−0.096	0.168	−0.065	−0.051	0.024	0.063	0.752
F8.5	0.063	−0.037	−0.117	0.206	0.062	0.100	0.045	0.711
F8.6	0.122	0.012	0.048	0.173	0.076	0.180	0.219	0.657
F8.7	0.182	−0.067	0.000	0.170	−0.121	0.106	0.264	0.494
Eigenvalue	1.294	1.103	2.002	1.612	1.404	2.322	1.878	7.876
% of variance	3.405%	2.903%	5.269%	4.243%	3.695%	6.112%	4.942%	20.726%

^a As listed in [Appendix A](#).

scheduled face-to-face meetings between operational and senior managers; (iii) controls are used to discuss changes that are occurring within the business unit; (iv) controls generate information that forms an important and recurring agenda in discussions between operational and senior managers; and (v) controls are used as a means of developing ongoing action plans. The extent of use of the interactive approach was measured as the average score of these five items, with higher (lower) scores representing a higher (lower) extent of use of the interactive approach.

For the diagnostic approach, a four-item measure was applied to assess the extent to which controls are used to: (i) track progress towards goals and monitor results; (ii) plan how operations are to be conducted in accordance with the strategic plan; (iii) review performance; and (iv) identify exceptions from expectations and take appropriate actions. The extent of use of the diagnostic approach was measured as the average score of these four items, with higher (lower) scores representing a higher (lower) extent of use of the diagnostic approach.

3.1.3. Organisational performance

Organisational performance was measured using an adapted version of [Kaynak and Kara \(2004\)](#) instrument. This instrument consists of six items measuring both

financial and non-financial performance (see [Appendix A](#)). Respondents were asked to indicate the extent to which they agree with each of the following statements relating to their current business unit: (i) profit goals have been achieved; (ii) sales goals have been achieved; (iii) return on investment goals have been achieved; (iv) our product(s) are of a higher quality than that of our competitors; (v) we have a higher customer retention rate than our competitors; and (vi) we have a lower employee turnover rate than our competitors. A five point scale with anchors of “Strongly agree” and “Strongly disagree” was used, and organisational performance was measured as the total scores of these 6 items, with higher (lower) scores representing stronger (weaker) performance.

3.1.4. Control variables

Two control variables were incorporated in the analysis, environmental uncertainty and strategic uncertainty.⁷ ([Milliken, 1987](#), p. 136) defines environmental uncertainty as ‘an individual's perceived inability to predict (an organisation's environment) accurately because of a lack ... of information or an inability to discriminate between

⁷ Organisational size was originally included as a control variable however was removed from the model as it had no significant effect.

Table 2

Descriptive statistics: mean values for each OLC factor across clusters.

	OLC factors	Minimum actual (theoretical)	Maximum actual (theoretical)	Entire sample	Cluster mean					Cronbach alpha
				Mean	One (N = 40)	Two (N = 85)	Three (N = 81)	Four (N = 78)	Five (N = 3)	
Situation										
F1	Environmental uncertainty	3 (3)	15 (15)	9.10	7.23	9.89	9.48	9.03	3.00	0.636
F2	The influence of the board, owners and shareholders	2 (2)	10 (10)	6.99	6.60	7.38	6.31	7.40	8.67	0.440
Structure										
F3	Decentralisation of authority	4 (4)	20 (20)	14.63	12.73	16.29	15.07	13.74	4.00	0.753
Strategy										
F4	Strategic planning	2 (2)	10 (10)	6.73	5.68	7.44	7.12	6.28	2.00	0.634
F5	Diversification	0 (3)	14 (15)	6.22	4.90	5.38	9.10	4.87	5.33	0.615
F6	Marketing and distribution	0 (4)	19 (20)	12.20	9.63	13.12	14.12	10.72	6.67	0.610
F7	Innovation	0 (2)	10 (10)	7.08	6.60	7.73	7.26	6.64	2.00	0.580
Decision making										
F8	Managers' focus on decision making	7 (7)	35 (35)	24.70	17.52	29.52	25.06	23.37	8.33	0.859
<i>Confirmatory variables</i>										
	Average no. of employees				185	114	195	86	4	
	Product scope ^a				2.90	3.85	3.75	3.35	1.67	
	Label				Maturity	Growth	Revival	Birth	Decline	

^a The product scope was measured with scores ranging from 0 to 5.

relevant and irrelevant data', while strategic uncertainty refers to emerging threats and opportunities which are fundamental to achieve current business strategy (Simons, 1995, 2000; Widener, 2007).

These two variables were chosen due to their frequent use in the MCS literature and their linkage to organisational performance. For instance, environmental uncertainty has played a significant role in the contingency-based management accounting literature, with many studies having examined the association between environmental uncertainty and MCSs (Ezzamel, 1990; Gosselin, 2005; Govindarajan, 1986; Moores and Sharma, 1998). There are also a number of studies which have made reference to the link between environmental uncertainty and organisational performance (Cannella et al., 2008; Chong and Chong, 1997; Gul, 1991; Mia, 1993; Shamir and Howell, 1999; Waldman et al., 2001). Similarly, previous studies have reported that strategic uncertainty is linked with organisational performance (Widener, 2007; Zahra et al., 2002).

Environmental uncertainty was measured using three items, Dynamism, Hostility and Heterogeneity (see Appendix A). Respondents were asked to indicate the extent to which each item was reflected in their business unit using a five point Likert-type scale with anchors of "1 = Not at all" and "5 = To a great extent". The extent of environmental uncertainty was measured as the total score of these 3 items with higher (lower) scores representing a higher (lower) extent of environmental uncertainty.

The instrument used to measure strategic uncertainty was adopted from Widener (2007) and consists of 12 items which capture all relevant types of uncertainties in a business unit's life cycle (see Appendix A). Respondents were asked to indicate the extent to which each item was reflected in their business unit using a five-point Likert scale with anchors of "1 = Not at all" and "5 = To a great extent". The extent of strategic uncertainty was measured as the total score of these 12 items with higher (lower) scores representing a higher (lower) extent of strategic uncertainty.

4. Results

4.1. Descriptive statistics

Table 3 shows the summary statistics for the independent, dependent and control variables (strategic uncertainty and environmental uncertainty). For the scales used to measure each variable, the actual range was comparable with the theoretical range, and the Cronbach alpha coefficients exceeded the acceptable 0.40 threshold.

A multi-collinearity test was performed in regards to the two independent variables, i.e. diagnostic and interactive controls. Table 4 reveals that Variation Inflation Factors (VIFs) for interactive and diagnostic controls were both below the threshold value of 5 (Craney and Surles, 2002; Menard, 1995), indicating an absence of any multi-collinearity problems.

Table 3

Descriptive statistics of the variables.

Variables	N	Mean	Std. dev.	Minimum actual (theoretical)	Maximum actual (theoretical)	Cronbach's alpha
Interactive approach	336	3.31	0.05	1 (1)	5 (5)	0.916
Diagnostic approach	331	3.41	0.06	1 (1)	5 (5)	0.929
Performance	330	22.99	0.22	12 (6)	30 (30)	0.740
Strategic uncertainty	315	43.18	6.98	16 (12)	60 (60)	0.863
Environmental uncertainty	329	9.18	2.30	3 (3)	15 (15)	0.64

Table 4

Multi-collinearity results for the interactive and diagnostic controls.

Independent variables	Coefficient	T-statistics	Significance	VIF
Interactive controls	0.138	1.294	0.197	3.731
Diagnostic controls	0.002	0.019	0.985	3.731

4.2. The association between the approaches to using control and organisational performance

Table 5 provides the results of the regression analysis used to examine the moderating effect of OLC stages on the association between the use of the interactive and diagnostic approaches with organisational performance. The two control variables, environmental uncertainty and strategic uncertainty are shown to exhibit a positive association with organisational performance. In addition, the interaction between OLC stages and both the interactive use and diagnostic use of controls exhibits a significant positive association with organisational performance, thereby providing support for *Hypotheses 1 and 2*.

Given the significant findings in respect to the effect of the interaction between OLC stages and the two approaches to using controls on organisational performance, subsequent analysis was performed to examine the impact of the interaction of these two approaches with each OLC stage. The parameter estimates of this analysis enable us to

Table 5

Regression results for the moderating effect of OLC stages on the association between interactive and diagnostic controls with organisational performance.

Variables	Organisational performance	
	Coefficient	F value (sig.)
Interactive use of controls (IC)	0.061	0.162 (0.687)
Diagnostic use of controls (DC)	0.078	0.208 (0.648)
Strategic uncertainty (SU)	2.298	6.106 (0.014)**
Environmental uncertainty (EU)	1.642	4.365 (0.038)**
OLC stage × IC	3.497	3.098 (0.027)**
OLC stage × DC	3.323	2.944 (0.033)**
OLC stage × SU	2.776	2.459 (0.063)*
F		3.782
F sig.		0.000
R ²		0.183
Adjusted R ²		0.135

* Significant at 10%.

** Significant at 5%.

Table 6

Significance of association between diagnostic and interactive controls across OLC stages.

OLC stage	Diagnostic use of controls		Interactive use of controls	
	Coefficient	p-Value	Coefficient	p-Value
Birth	+0.07	0.10	−0.12	0.35
Growth	−0.08	0.30	+0.29	0.03**
Maturity	−0.41	0.02*	+0.26	0.10
Revival	+0.21	0.06**	−0.30	0.03**

* Significant at 10%.

** Significant at 5%.

formulate the following equations to depict the association between the diagnostic and interactive use of controls with organisational performance for each stage:

Birth stage : Performance = 3.67 − 0.12IC + 0.14DC + 0.07SU − 0.12EU

Growth stage : Performance = 3.45 + 0.29IC − 0.08DC + 0.08SU − 0.12EU

Maturity stage : Performance = 3.97 + 0.26IC − 0.41DC + 0.11SU − 0.12EU

Revival stage : Performance = 2.55 − 0.30IC + 0.21DC + 0.53SU − 0.12EU

where IC, interactive use of controls; DC, diagnostic use of controls; SU, strategic uncertainty; EU, environmental uncertainty.

These equations show that the interactive approach to using controls exhibits a positive (negative) association with organisational performance for the growth and maturity (birth and revival) stages. Alternatively, the diagnostic approach to using controls exhibits a positive (negative) association with organisational performance for the birth and revival (growth and maturity) stages. While the equations show the direction of the association, analysis of the standard error of each coefficient and its *p*-value enables us to observe if these associations are significant. Table 6 shows these *p*-values in respect to both types of controls across the four stages with diagnostic controls exhibiting a significant positive (negative) association with organisational performance in the revival⁸ (maturity) stage. This result provides partial support for *Hypothesis 3* with the use of the diagnostic approach enhancing performance in the revival stage and having no impact on performance in the birth and growth stages. Surprisingly, in opposition to the hypothesis, the diagnostic approach exhibited a negative association with organisational performance in the maturity stage.

In respect to the use of interactive controls, Table 6 reports a significant positive (negative) association with organisational performance in the growth (revival) stage and no association in the birth stage. These results provide

⁸ At the 10% significance level.

support for [Hypothesis 4](#), although no significant association was found in respect to the maturity stage.

5. Conclusion and discussion

The study aimed to examine the association between the diagnostic and interactive use of controls with organisational performance within OLC stages. The findings revealed that the OLC stages moderated the association between both the diagnostic and interactive use of controls with organisational performance. In respect to the diagnostic use of controls, significant associations were observed in both the maturity and revival stages. A positive association between the diagnostic approach to using controls and financial performance was identified in the revival stage. Hence, to enhance financial performance, managers in revival stage organisations should consider relying more on exception reports to monitor results and to review critical performance variables. In the maturity stage, while a significant positive association with organisational performance was expected, the diagnostic approach to using controls was found to be negatively associated with organisational performance. A possible explanation for this finding could be that the use of the diagnostic approach undermines performance, possibly due to the constraints on employees' behaviour in an environment where many rules and policies are already in place. Accordingly, these findings suggest that to enhance performance, managers in maturity stage organisations should consider placing less emphasis on the achievement of desired outcomes.

The interactive approach to using controls exhibited significant associations with organisational performance in both the growth and revival stages, with a positive association between the use of the interactive approach and organisational performance identified in the growth stage. This suggests that in order to enhance performance, managers in growth stage organisations should consider placing greater emphasis on frequent discussions, face-to-face meetings and continual information exchange amongst the different hierarchical levels, thereby facilitating product innovation and generating new ideas and initiatives ([Tekavcic et al., 2008](#)). In the revival stage, the interactive approach to using controls was found to be negatively associated with organisational performance. This supports [Bonner et al.'s \(2002\)](#) findings that a high level of management intervention negatively affects project performance within individual divisions, thereby undermining the organisation's overall financial performance. Accordingly, top management should consider limiting their involvement in subordinates' decision making. Specifically, top level managers should provide divisional managers with the autonomy and flexibility required to enhance performance.

Overall, the study provides an important insight into the use of controls across OLC stages. In particular, while no significant results were found in the birth stage, the findings suggest that greater emphasis should be placed on the interactive approach in the growth stage, less emphasis should be placed on the diagnostic approach in the maturity stage, and greater (less) emphasis should be placed on the use of the diagnostic (interactive) approach in

the revival stage. Such findings should assist managers in determining their approach to using controls, and enhance organisational performance.

The study contributes to the MCS literature in a number of ways. First, the study highlights the importance of examining the manner in which controls are used ([Abernethy et al., 2010](#); [Langfield-Smith, 1997](#)). The findings highlight the important role that the use of controls have in enhancing organisational performance and suggest that in addition to focusing on the existence, characteristics and/or relevance of controls, managers and academics need to consider the approach to using controls.

Secondly, the study contributes to the contingency literature by examining the association between the approach to using controls and organisational performance from an OLC perspective. The finding that the suitability of the interactive and diagnostic use of controls is dependent upon the OLC stage, suggests that academics and managers need to be aware of the particular context in which such approaches are employed in order to maximise their effect on organisational performance. In addition, the findings provide managers with an insight into the manner in which the emphasis placed on the use of controls should be adapted as their organisation progresses through the different OLC stages.

Thirdly, by focusing on OLC stages, the study contributes to the gap in the MCS literature examining the simultaneous influence of multiple contingent factors. Specifically, the study employs [Miller and Friesen's \(1984\)](#) configuration approach to determine OLC stages based on the simultaneous consideration of four contingent variables, organisational situation, strategy, structure, and decision-making style. While this approach is considered to provide a more holistic understanding of the relationship between organisations and their environment ([Drazin and Van de Ven, 1985](#)), only a limited number of MCS studies have adopted the configuration approach. Furthermore, while previous research examining the association between OLC stages and MCSs has focused on the characteristics of the types of controls employed ([Auzair and Langfield-Smith, 2005](#); [Kallunki and Silvola, 2008](#); [Moores and Yuen, 2001](#)), this study contributes to the OLC literature by highlighting the impact that the approach to using controls has on organisational performance for specific OLC stages. The findings here suggest that future MCS research should consider an organisation's stage of development (i.e. OLC stage) and/or consider how multiple organisational contextual factors combine to simultaneously influence MCSs.

The study is subject to the usual limitations associated with the use of the survey method, such as reflecting only associations rather than causal relationships between independent variables and dependent variables ([Singleton and Straits, 2005](#)). Future studies could use multiple methodological approaches to obtain further insights. For instance, conducting interviews with business unit managers could provide a deeper understanding of how the use of the interactive and diagnostic approaches affects performance within different OLC stages, especially as organisations move from one OLC stage to the next. In addition, future studies could investigate how approaches to using controls

affect behavioural outcomes such as employee organisational commitment. Future studies could also replicate this study in different industries so as to extend the findings of this study to different contexts. Furthermore, due to the difficulty in collecting data decline stage organisations were

not examined in the study. Future studies could attempt to obtain an access to decline stage organisations and examine how the interactive and diagnostic approaches to using controls affect organisational performance in such organisations.

Appendix A.

The instrument of OLC stages

Please indicate the extent to which the following statements reflect the work environment in your business unit (1 = not at all, 5 = to a great extent)

Situation

D1: Environmental uncertainty

1. Dynamism (evidenced by the unpredictability of changes in customer tastes, production technologies)
2. Hostility (evidenced by the intensity of competition and other external influences)
3. Heterogeneity (evidenced by the differences in competitive tactics, customer tastes, product lines, channels of distribution).

D2: The influence of board, owners and shareholders

4. The decisions and operations are influenced by the boards of directors
5. The decisions and operations are influenced by owners/shareholders

Structure

D3: Decentralisation of authority

6. Participative Management
7. Effective internal communication systems
8. Delegation of decision-making
9. Proactive decision-making

Strategy

D4: Strategic planning

10. Action planning (includes formal strategic and project planning and review procedures, the use of capital budgeting techniques, and market forecasting).
11. Scanning (involves identification of threats and opportunities in the external environment of your business unit)

D5: Diversification

12. Use acquisition to diversify into unrelated lines
13. Diversifies into unrelated lines by establishing our own departments or subsidiaries
14. Engages in vertical integration

D6: Marketing and distribution

15. Has major, frequent product innovations
16. Dominates distribution channels
17. Extensive advertising and promotional expenditure
18. Provides different product lines for different markets

D7: Innovation

19. Has small, incremental product innovations
20. Selective in respect to the introduction of new products

Decision-making style

D8: Managers' focus on decision making

21. Centralization of strategy formulation
22. Extensive analysis of major decisions
23. Multiplexity of decisions: (consideration of a broad range of factors in making strategic decisions)
24. Integration of decisions (actions in one area of the firm are complementary or supportive of those in other areas (i.e. divisions, functions)).
25. Futurity of decisions (our business unit incorporates a long-term planning horizon relative to our industry)
26. Consciousness of strategies (concerns the degree of your conscious commitment as a business unit manager to an explicit corporate strategy)
27. Adaptiveness of decisions (concerns the responsiveness and appropriateness of decisions to market requirements and external environmental conditions)

Note:

11 items did not load onto any of the eight factors and are listed below:

28. Follows the lead of competitors
29. Adopts a niche strategy
30. Engages in price cutting
31. Charges a premium for high quality products
32. The decisions and operations of our business unit are influenced by customers
33. The decisions and operations of our business unit are influenced by managers
34. Sophisticated Management Information Systems
35. Technocratization (A higher proportion of highly trained staff specialists and professionally qualified people (accountants, engineers, scientists) as a percentage of the number of employees)

36. Resource shortages (human, physical and financial shortages)
37. Risk taking
38. Industry expertise of top managers (They are in a position to make decisions because of their excellent knowledge of internal operations and the outside environment)

Measures of use of controls

Please indicate the extent to which the following statements reflect the work environment in your business unit (1 = not at all, 5 = to a great extent).

The interactive use of controls

- (a) There is a lot of on-going interaction between operational management and senior managers.
- (b) Controls are used regularly in scheduled face-to-face meetings between operational and senior managers.
- (c) Controls are used by operational and senior managers to discuss changes that are occurring within the business unit.
- (d) Controls generate information that forms an important and recurring agenda in discussions between operational and senior managers.
- (e) Controls are often used as a means of developing ongoing action plans.

The diagnostic use of controls

- (a) Controls are used to track progress towards goals and monitor results.
- (b) Controls are used to plan how operations are to be conducted in accordance with the strategic plan.
- (c) Controls are used to review performance
- (d) Controls are used to identify significant exceptions from expectations and take appropriate actions.

Measures of performance

- (a) Profit goals have been achieved.
- (b) Sales goals have been achieved.
- (c) Return on investment goals have been achieved.
- (d) Our product(s) are of a higher quality than that of our competitors.
- (e) We have a higher customer retention rate than our competitors.
- (f) We have a lower employee turnover rate than our competitors.

Measure of strategic uncertainty

To what extent does top management in your organisation monitor the following strategic uncertainties in order to ensure that the goals of the firm are achieved (1 = to a small extent, 5 = to a great extent):

- (a) Changes in product technology that affect the relative cost/efficiency of current products.
- (b) New technology.
- (c) Changes in buyer tastes/needs.
- (d) Product introductions by competitors.
- (e) Diffusion of knowledge (i.e. the extent of knowledge transfer or sharing within the organisation)
- (f) Marketing innovations
- (g) Scale effects (the size of operations)
- (h) Scope effects (the range of products available)
- (i) Input costs (e.g. raw materials, staffing costs)
- (j) Internal product innovations (refer to the use of new or improved design principles or technologies for incorporation in products or services)
- (k) Competitor market tactics
- (l) New industry entrants

References

- Abernethy, M.A., Brownell, P., 1999. The role of budgets in organisations facing strategic change: an exploratory study. *Account. Organ. Soc.* 24, 189–204.
- Abernethy, M.A., Bouwens, J., Lent, L., 2010. Leadership and control system design. *Manage. Account. Res.* 21, 2–16.
- Agbejule, A., 2007. How the diagnostic and interactive use of MAS determine the relationship between task uncertainty and organizational performance. In: AAA 2007 Management Accounting Section (MAS) Meeting, Fort Worth, TX.
- Arachchilage, N.D., Smith, M., 2013. The effects of the diagnostic and interactive use of management control systems on the strategy-performance relationship. *J. Appl. Manage. Account. Res.* 11, 9–27.
- Auzair, S.M., Langfield-Smith, K., 2005. The effect of service process type, business strategy and life cycle stage on bureaucratic MCS in service organisations. *Manage. Account. Res.* 16, 399–421.
- Bisbe, J., Otley, D., 2004. The effects of the interactive use of management control systems on product innovation. *Account. Organ. Soc.* 29, 709–737.
- Bobe, B.J., Taylor, D.W., 2010. Use of management control systems in university faculties: evidence of diagnostic versus interactive approaches by the upper echelons. In: Proceedings of the 6th Asia Pacific Interdisciplinary Research in Accounting Conference, pp. 1–22.
- Bonner, J.M., Ruekert, R.W., Walker, O.C., 2002. Upper management control of new product development projects and project performance. *J. Prod. Innov. Manage.* 19, 233–245.
- Cannella Jr., A.A., Park, J.H., Lee, H.U., 2008. Top management team functional background diversity and firm performance: examining the roles of team member colocation and environmental uncertainty. *Acad. Manage. J.* 51, 768–784.
- Chenhall, R.H., Morris, D., 1995. Organic decision and communication processes and management accounting systems in entrepreneurial and conservative business organisations. *Omega* 23, 485–497.
- Chenhall, R.H., 2003. Management control systems design within its organisational context: findings from contingency-based research and directions for the future. *Account. Organ. Soc.* 28, 127–168.
- Chong, V.K., Chong, K.M., 1997. Strategic choices, environmental uncertainty and SBU performance: a note on the intervening role of management accounting systems. *Account. Bus. Res.* 27, 268–276.
- Craney, T.A., Surlis, J.G., 2002. Model-dependent variance inflation factor cutoff values. *Qual. Eng.* 14 (3), 391–403.
- Davila, T., 2000. An empirical study on the drivers of management control systems' design in new product development. *Account. Organ. Soc.* 25, 383–409.
- Davila, T., 2005. An exploratory study on the emergence of management control system: formalizing human resources in small growing firms. *Account. Organ. Soc.* 30, 223–248.
- Dent, J.F., 1987. Tensions in the Design of Formal Control Systems: A Field Study in a Computer Company. Harvard Business School Press, Boston, USA.
- Dillman, D.A., 2007. Mail and Internet Surveys: The Tailored Design Method, second ed. John Wiley and Sons, New York.
- Dixon, J.R., 1992. Measuring manufacturing flexibility: an empirical investigation. *Eur. J. Oper. Res.* 60, 131–143.
- Drazin, R., Kazanjian, R.K., 1990. A reanalysis of Miller and Friesen's life cycle data. *Strateg. Manage. J.* 11, 319–325.
- Drazin, R., Van de Ven, A.H., 1985. Alternative forms of fit in contingency theory. *Adm. Sci. Q.* 30, 514–539.
- Ezzamel, M., 1990. The impact of environmental uncertainty, managerial autonomy and size on budget characteristics. *Manage. Account. Res.* 1, 181–197.

- Ferreira, A., 2002. *Management Accounting and Control System Design and Use: An Exploratory Study in Portugal*. Lancaster University.
- Ferreira, A., Otley, D., 2009. The design and use of management control systems: an extended framework for analysis. *Manage. Account. Res.* 20, 263–282.
- Gerdin, J., 2005. Management accounting system design in manufacturing departments: an empirical investigation using a multiple contingencies approach. *Account. Organ. Soc.* 30, 99–126.
- Gerdin, J., Greve, J., 2004. Forms of contingency fit in management accounting research – a critical review. *Account. Organ. Soc.* 29, 303–326.
- Gosselin, M., 2005. An empirical study of performance measurement in manufacturing firms. *Int. J. Prod. Perform. Manage.* 54, 419–437.
- Govindarajan, V., 1986. Impact of participation in the budgetary process on managerial attitudes and performance: universalistic and contingency perspectives. *Decis. Sci.* 17, 496–516.
- Govindarajan, V., Gupta, A.K., 1985. Linking control systems to business unit strategy: impact on performance. *Account. Organ. Soc.* 10, 51–66.
- Gul, F.A., 1991. The effects of management accounting systems and environmental uncertainty on small business managers' performance. *Account. Bus. Res.* 22, 57–61.
- Hambrick, D.C., Mason, P.A., 1984. Upper echelons: the organization as a reflection of its top managers. *Acad. Manage. Rev.* 9, 193–206.
- Henri, J.-F., 2006. Management control systems and strategy: a resource-based perspective. *Account. Organ. Soc.* 31, 529–558.
- Hofmann, S., Wald, A., Gleich, R., 2012. Determinants and effects of the diagnostic and interactive use of control systems: an empirical analysis on the use of budgets. *J. Manage. Control* 23, 153–182.
- Kallunki, J.P., Silvola, H., 2008. The effect of organisational life cycle stage on the use of activity-based costing. *Manage. Account. Res.* 19, 62–79.
- Kaynak, E., Kara, A., 2004. Market orientation and organizational performance: a comparison of industrial versus consumer companies in mainland China using market orientation scale (MARKOR). *Ind. Market. Manage.* 33, 743–753.
- Kazanjian, R.K., 1988. Relation of dominant problems to stages of growth in technology-based new ventures. *Acad. Manage. J.* 31, 257–279.
- Kazanjian, R.K., Drazin, R., 1990. A stage-contingent model of design and growth for technology based new ventures. *J. Bus. Ventur.* 5, 137–150.
- Kober, R., 2010. The emergence and utilization of management control systems in a high growth firm, Working paper presented at Accounting & Finance Association of Australia and New Zealand. Christchurch, New Zealand.
- Kober, R., Ng, J., Paul, B.J., 2007. The interrelationship between management control mechanism and strategy. *Manage. Account. Res.* 18, 425–452.
- Kompass Australian Database, 2010. Peter Isaacson Publications, Victoria, Australia.
- Langfield-Smith, 1997. Management control systems and strategy: a critical review. *Account. Organ. Soc.* 22, 207–232.
- Menard, S., 1995. *Applied Logistic Regression Analysis*. Sage University Series on Quantitative Applications in the Social Sciences. Sage, Thousand Oaks, CA.
- Mia, L., 1993. The role of MAS information in organizations: an empirical study. *Br. Account. Rev.* 25, 269–285.
- Miller, D., Friesen, P.H., 1982. Innovation in conservative and entrepreneurial firms: two models of strategic momentum. *Strateg. Manage. J.* 3, 1–25.
- Miller, D., Friesen, P.H., 1984. A longitudinal study of the corporate life cycle. *Manage. Sci.* 30, 1161–1183.
- Milliken, F.J., 1987. Three types of perceived uncertainty about the environment: state, effect, and response uncertainty. *Acad. Manage. Rev.* 12, 133–143.
- Mital, A., Desai, A., Subramanian, A., Mital, A., 2008. *Product Development: A Structured Approach to Consumer Product, Design and Manufacture*. Jordon Hill, Oxford.
- Moore, K., Sharma, D., 1998. The influence of environmental uncertainty on performance evaluation style and managerial performance. *Account. Perform.* 4, 1–16.
- Moore, K., Yuen, S., 2001. Management accounting systems and organisational configuration: a life-cycle perspective. *Account. Organ. Soc.* 26, 351–389.
- Phan, T.N., Baird, K., Blair, B., 2014. The use and success of activity-based management practices at different organisational life cycle stages. *Int. J. Prod. Res.* 52, 787–807.
- Ramos, M.M., Hidalgo, F.G., 2003. From diagnostic to interactive style of management control. *Manage. Res. News* 26, 21–31.
- Sakka, O., Barki, H., Cote, L., 2013. Interactive and diagnostic uses of management control systems in IS projects: antecedents and their impact on performance. *Inform. Manage.* 50, 265–274.
- Shamir, B., Howell, J.M., 1999. Organizational and contextual influence on the emergence and effectiveness of charismatic leadership. *Leadership Q.* 10, 257–284.
- Simons, R., 1987. Planning, control, and uncertainty: a process view. In: Burns, W.J., Kaplan, R.S. (Eds.), *Accounting and Management: Filed Study Perspectives*. Harvard Business School Press, Boston, pp. 339–362.
- Simons, R., 1991. Strategic orientation and top management attention to control systems. *Strateg. Manage. J.* 12, 49–62.
- Simons, R., 1995. *Levers of Control: How Managers Use Innovative Control Systems to Drive Strategic Renewal*. Harvard Business School Press, Boston.
- Simons, R., 2000. *Performance Measurement & Control Systems for Implementing Strategy*. Prentice Hall, New Jersey.
- Singleton, R.A., Straits, B.C., 2005. *Approaches to Social Research*. Oxford University Press, New York.
- Silvola, H., 2008. Do organisational life-cycle and venture capital investors affect the management control systems used by the firm? *Adv. Account.* 24, 128–138.
- Smith, K.G., Mitchell, T.R., Summer, C.E., 1985. Top level management priorities in different stages of the organisational life cycle. *Acad. Manage. J.* 28, 799–820.
- Sproles, G.B., Kendall, E.L., 1986. A methodology for profiling consumers' decision-making styles. *J. Consumer Aff.* 20, 267–279.
- Tekavcic, M., Peljhan, D., Sevic, Z., 2008. Levers of control: analysis of management control systems in a Slovenian company. *J. Appl. Bus. Res.* 24, 96–104.
- Waldman, D.A., Ramirez, G.A., House, R.J., Puranam, P., 2001. Does leadership matter? CEO leadership attributes and profitability under conditions of perceived environmental uncertainty. *Acad. Manage. J.* 44, 134–143.
- Widener, S.K., 2007. An empirical analysis of the levers of control framework. *Account. Organ. Soc.* 32, 757–788.
- Zahra, S.A., Neubaum, D.O., El-Hagrassey, G.M., 2002. Competitive analysis and new venture performance: understanding the impact of strategic uncertainty and venture origin. *Entrep. Theory Pract.* 27, 1–28.