Configurations of Control: An Exploratory Analysis

Abstract

There is growing interest in how management controls operate together as a system of interrelated mechanisms. Although theoretical debate dates back to the seminal paper of Otley (1980), there remains little empirical analysis of how control mechanisms combine as a package. To increase knowledge in this area this study explores how multiple accounting and other control mechanisms commonly combine and the associations these combinations have with firm context. From a cross-sectional sample of 400 firms, this study presents an empirically derived taxonomy of five configurations used by top managers, labelled as simple, results, action, devolved, and hybrid. Many of these patterns closely resemble conventional control configurations, while others represent distinctively contemporary arrangements, such as flexible variants of traditional bureaucracy (action), and instances where multiple and seemingly conflicting control modes intermesh (hybrid). In analyzing these configurations this study provides accounting and control researchers with empirical observations to refine and extend existing control frameworks and theory.

1. Introduction

It has long been recognized that management controls operate as systems of interrelated mechanisms (Dent, 1990; Fisher, 1995; Flamholtz et al., 1985; Malmi and Brown, 2008; Otley, 1980). This literature visualizes accounting not as an isolated system but as an interwoven component of an organizational control package (Otley, 1980). Most empirical research, however, examines accounting and other control mechanisms independently (Grabner and Moers, 2013; Luft and Shields, 2003; Speklé, 2001). Although much has been learnt about the determinants and effects of individual mechanisms, the literature provides little insight into the influence of any one control upon another or how multiple controls combine. As Abernethy and Brownell (1997, p. 246) observe:

> It is clear that organizations rely on combinations of control mechanisms in any given setting […]
> Until empirical work begins to examine this complex question, our understanding of how the full
> range of management controls operates will remain piecemeal.

The aim of this study is to empirically examine how accounting and other control mechanisms combine and the associations these combinations have with contextual circumstances. Specifically, this study develops a taxonomy of control configurations. Although taxonomies are descriptions, rather than explanations, of empirical phenomena, they are important for valid theory construction for a number of reasons (Sanchez, 1993). First, taxonomies provide an empirical basis to refine and extend conceptual frameworks. Much of the theorizing in management control research is built upon ideal types – e.g., output, behaviour, and clan (Ouchi, 1977, 1979), mechanistic and organic (Burns and Stalker, 1961). Ideal types are useful conceptual devices as they parsimoniously describe discrete bundles of control and other structural components and the contexts in which they operate effectively. However, more complex arrangements are empirically observable, such as organizations that employ multiple control modes simultaneously (Alvesson and Kärreman, 2004; Caglio and Ditillo, 2008; Snell, 1992). Empirically derived configurations can extend existing frameworks by describing more complex arrangements that arise in practice.

Second, taxonomies are useful for establishing the boundary conditions of contingency propositions. Organizational literature demonstrates that the relationships between contextual and structural variables in one configuration may be unrelated or even inversely related in another (Meyer et al., 1993; Sanchez, 1993). Focusing exclusively on deriving universal propositions is therefore likely to return weak or confounding results, as evidenced in streams of contingency research (Hartmann, 2000; Hartmann and

Moers, 2003; Langfield-Smith, 2007; Speklé, 2001). Identifying common control configurations can improve the generalizability of contingency results by locating the organizational populations in which particular relationships are likely to be valid (Sanchez, 1993).

Third, knowledge of broad control patterns is necessary for constructing valid empirical tests of specific mechanisms. A good theory of accounting control should contain as few determinants as possible (Malmi and Granlund, 2009). But as organizations employ multiple controls that may be systematically associated with accounting, those mechanisms need to be controlled for in empirical research. Given that not every control mechanism available to an organization can be feasibly incorporated into statistical analyses one way of "addressing these concerns is to identify a variety of control taxonomies and consider how they relate to various aspects of MCS" (Chenhall, 2003, p. 131). Identifying those mechanisms that coexist in a particular context facilitates development of parsimonious models that are at a reduced risk of producing spurious results. Furthermore, mechanisms that tend to be observed in combination provide useful guidance for researchers seeking to identify complementarity or substitutability between control mechanisms (Grabner and Moers, 2013).

From a cross-sectional sample of 400 medium to large firms this study constructs a taxonomy of five control configurations used by top managers, labelled as simple, results, action, devolved, and hybrid. While many of these patterns have close resemblance to prior control types (simple, results, devolved), others represent distinctively contemporary arrangements not widely recognized as prominent control forms – such as flexible variants of traditional bureaucracy (action) and instances where multiple and seemingly conflicting control modes intermesh (hybrid). In examining how accounting is implicated within these configurations, and the associations with contextual variables, this study presents a more complex image of how accounting and other controls commonly combine than currently recognized in the literature. Such an image, although by no means entirely surprising, provides accounting and control scholars with empirical observations to refine and extend existing frameworks and theory.

The remainder of this study is structured as follows. The next section outlines the configuration approach and the theoretical and empirical research on organizational and control configurations, followed by the research questions of this study. The section thereafter introduces a framework that informs the choice of control mechanisms and contextual factors used in the empirical analysis. The research design and statistical methods are then detailed, followed by the results and analysis. The final section presents the conclusions, directions for future research, and limitations of this study.

2. Literature review and research questions

The configuration approach contends that a comprehensive understanding of accounting and control structure diversity requires organizations to be investigated as multidimensional arrangements of interconnected components (Dess et al., 1993; Meyer et al., 1993).[1] The central assumption underpinning this approach is that a strong propensity exists for organizational components to cluster systematically, forming a discrete number of temporally stable arrangements (Gersick, 1991). This tendency arises from both exogenous and endogenous forces. Exogenous forces, such as environmental selection and competition (Hannan and Freeman, 1989), effectively limit the number of viable combinations. But endogenous pressures mean that organizations will actively seek out arrangements that have an internally consistent logic (Child, 1972). This implies that organizations are not distributed widely across structural and contextual traits, but will tend to co-locate around a finite number of empirically identifiable patterns. This position is supported in a review of major taxonomic studies in organizational literature by Sanchez (1993), who concludes that notwithstanding a number of methodological shortcomings "in the aggregate they appear to demonstrate that organizations do indeed cluster in recognizable groups" (p. 73).

Organizations are expected to maintain internal consistency even at the expense of superior environmental fit of individual components. Piecemeal alterations work against developing efficiency in operational routines and destroy existing complementarities between system components (Miller and Mintzberg, 1984). Modifying only a few components at a time may "not come at all close to achieving all the benefits that are available through a fully coordinated move, and may even have negative payoffs" (Milgrom and Roberts, 1995, p. 191). Although there is some latitude to adjust arrangements in response to contextual variations, particularly peripheral components that are less connected, organizations will actively resist changes that threaten internal consistency (Tushman and Romanelli, 1985).[2] The import of this contention is that the design and effectiveness of a particular component, such as accounting, will be associated not only to external conditions, but also upon how that component is situated within the

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[1] In organization literature there are numerous terms used in relation to configurations (Dess et al., 1993; Myer et al., 1993; Miller & Friesen, 1984). *Configuration* refers to a specific arrangement of multiple parts, components, elements, mechanisms, attributes, or the like. A classification scheme of configurations can be developed conceptually (*typologies*) or derived empirically (*taxonomies*). *Archetypes* and *gestalts* are often considered as synonymous with configurations, although the term *gestalt* tends to be used to indicate arrangements that commonly arise in reality, whereas archetypes may refer to arrangements that only exist conceptually. These arrangements may or may not be optimal. Theoretically consistent, optimal arrangements are referred to as *ideal types*.

[2] Not all components in a configuration need be tightly coupled. Peripheral components loosely connected to the structural core may be more readily adjustable to changes in contextual conditions, and consequently, be amenable to examination using conventional methods without risk of model misspecification (Chenhall, 2003).

broader control package. Understanding how control mechanisms combine is therefore necessary to adequately explain the variety of accounting structures found in practice.

Current understanding of how control mechanisms combine is largely derived from organizational typologies. These typologies describe theoretically consistent configurations of structural components and contextual conditions. One of the first studies to systematically examine patterns of structure and context is Burns and Stalker (1961). They outline organizational types that represent effective responses to either high or low uncertainty. The formalized and vertical structure of the mechanistic organization is considered suitable to stable environmental conditions, while the informal and lateral structure of the organic organization is more appropriate in dynamic and uncertain settings. Perhaps the most influential work on organization configurations is by Mintzberg (1979, 1989). Building on the research of Burns and Stalker (1961) and other early investigations into structural diversity (Galbraith, 1973; Lawrence and Lorsch, 1967; Perrow, 1967; Pugh et al., 1969; Thompson, 1967; Woodward, 1965), Mintzberg describes seven configurations: simple structure, machine bureaucracy, adhocracy, missionary structure, professional bureaucracy, divisionalized form, and the political organization.[3] Each configuration is associated with particular environmental and technological conditions, and organizational factors such as age and size.

Although presenting rich descriptions, as the typologies of Burns and Stalker and Mintzberg originate from literatures outside accounting they contain limited detail on how and why the design and use of accounting mechanisms vary across configurations. There are, however, a number of typologies that address more specifically control structures. Bruns and Waterhouse (1975) and Merchant (1981) describe two control approaches, administrative and interpersonal, with particular emphasis on budgetary control. The choice of approach is explained in terms of organizational size, diversity, and technological complexity, with larger, more diverse, and technological complex firms requiring an administrative control approach. Ouchi (1977, 1979) identifies three control strategies – output, behaviour, and clan (see also Eisenhardt, 1985; Snell, 1992). The preference for either output or behaviour control is a function of information characteristics. If the firm has knowledge of the transformation process then tasks can be programmed and control accomplished through evaluation of behaviours. When the firm has valid and reliable measures of goals then control is attained by evaluating outputs. If neither antecedent is satisfied then the firm will rely on clan control, developed through input mechanisms such as selection and socialization (Snell, 1992). The more recent framework by Speklé (2001) draws on transaction cost

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[3] Only the first four structures are applicable to the sampling frame of this study (see Section 4). Professional bureaucracies and political organizations are not usually business firms, and the divisionalized form sits outside the level of analysis.

economics (TCE) to explain control structure choice. Speklé presents nine types, five of these – arm's length, machine bureaucratic (action and results oriented), exploratory, and boundary – refer to forms of hierarchical control.[4] Similarly, Vosselman (2002) employs TCE to explain the adoption of horizontal control structures. Although horizontal control is not the focus of the present study, Vosselman contrasts these to two hierarchical types, strongly bureaucratic and weakly bureaucratic, which are variations on Mintzberg's machine bureaucracy.

<Insert Table 1 about here>

The ideal types relevant to this study, from the typologies discussed, are described in Table 1. These provide a theoretical foundation for assessing the control configurations commonly formed in practice. Speklé (2001, p. 439) writes that his ideal types are constructs that "help to recognize and expound general tendencies" while Mintzberg (1979, p. 473) suggests that "a great many organizations […] tend to design structures rather close to one of the configurations" presented in his framework. However, as conceptual constructions, ideal types may not be descriptively accurate in every respect and observed control configurations may not always fall neatly into pre-defined categories (Speklé, 2001).

One way to refine and extend conceptual frameworks is by exploring the actual control configurations formed in practice. Empirically derived configurations (i.e., taxonomies) can provide more complete descriptions of how controls tend to combine and identify alternative control patterns not captured or explained by existing frameworks. Currently there are few empirical observations to draw upon in the accounting literature, with just three main empirical studies at the firm level. In analyzing a variety of management techniques, accounting practices, and competitive strategies, Chenhall and Langfield-Smith (1998) provide support for the idea that internally consistent arrangements enhance firm performance. Moores and Yuen (2001) investigate variation in MA systems across organizational life-cycle stages, showing how reliance on accounting information varies in response to changes in strategy and organizational complexity, while Henri (2008) constructs a taxonomy of performance measurement systems and analyses contextual variation. Although these studies are informative, they present partial examinations of how accounting forms part of the wider package of controls. Moores and Yuen (2001) and Henri (2008) focus their analysis of control structures to the formal information characteristics of accounting and performance measurement systems. Chenhall and Langfield-Smith (1998) include a wider

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[4] Boundary and arm's-length control are not viable control alternatives at the firm level. Arms-length control is characteristic of relationships between corporate management and divisions in some conglomerate firms, while boundary control is likely to be limited to control of specialized departments. The remaining types are market based control or market-bureaucratic hybrid forms.

array of mechanisms, although many control mechanisms known to be employed at the firm level, such as administrative and socio-ideological controls, are excluded (Malmi and Brown, 2008).

Given the relatively few systematic insights available, this study treats the problem of how controls commonly combine, and the role of accounting within these configurations, as an empirical question. The first research question is formalized as follows:

> **RQ1:** What are the common control configurations in practice? What is the role of accounting in these configurations?

Configuration theory argues that firms will select the internally consistent control structure best suited to contextual conditions. An extensive body of contingency-based research highlights significant factors associated with the design and use of accounting and other control mechanisms (Chenhall, 2003). This research suggests that if the empirically derived configurations represent valid groupings, each unique control combination will be aligned to different firm contexts. Furthermore, it implies that contextual factors predict firm membership of control configurations. This expectation is central to taxonomic construction, as "ultimately, the utility of any classification scheme relies on its ability to generate insight or to advance a predictive task" (Miller, 1996, p. 507). There are, however, likely to be limitations to predictive capacity. In contrast to the typical assumptions of contingency research, the associations between control and context are not presumed to be necessarily linear, symmetric, or continuous. As internal consistency tends to be favoured over external alignment, changes in context are not always associated with changes in control structure. Multiple control configurations may also be able to operate within the same contextual circumstances (Gresov and Drazin, 1997). With these caveats in mind, the following research question is posed:

> **RQ2:** What contexts are associated with each configuration? Does context predict configuration membership?

A final concern relates to equilibrium assumptions. As noted, it is expected that organizations stabilize around the control configuration that is most effective for a given context. Idiosyncratic shifts in conditions mean, however, that not all (or possibly few) organizations are in an optimal position, but given switching costs and performance benefits of an internally consistent arrangement, the alternative currently in place represents the most economically viable. Some organizations will have low performance. When the cost of contextual misalignment outweighs the benefit of internal consistency,

organizations make the disruptive shift to a new system state. However, as episodes of stability are generally much longer than reorientations, the number of organizations in transition at any point in time should be small (Miller, 1982; Tushman and Romanelli, 1985). Organizations are expected to be, on average, in equilibrium.[5] It is assumed then, that empirically derived configurations represent practically viable alternatives. Infeasible combinations are unlikely to be found – either they never arise or quickly die out (Williamson, 1991).

3. Research framework

This section details the categories of control and context, and the selection of constructs, used to explore the research questions.

3.1 Control

Management control refers to a set of processes and mechanisms used by managers to influence the behaviour of individuals and groups towards more or less predetermined objectives (Flamholtz et al., 1985; Langfield-Smith, 2007; Speklé, 2001). The array of mechanisms that form part of management control efforts is extensive. This poses a distinct challenge for inquiry into control configurations, as there is an inevitable "need to balance parsimony and exhaustiveness of coverage" (Venkatraman, 1989, p. 433). A common empirical strategy to reduce this variety to more manageable portions is to factor analyse a list of control attributes applicable to a sample of firms (e.g., Chenhall and Langfield-Smith, 1998; Simons, 1987). While this method certainly has merit, control literature has not advanced to a stage that allows for an easy prioritization of the items that should be included. A more constructive approach is to specify the theoretical categories of control *a priori*, with the selection of constructs providing comprehensive coverage of those categories. In this respect there is a better-developed stream of research delineating the core dimensions of control to draw upon (Alvesson and Kärreman, 2004; Brickley et al., 2004; Daft and Macintosh, 1984; Ferreira and Otley, 2009; Fisher, 1995; Flamholtz, 1983; Flamholtz et al., 1985; Langfield-Smith, 2007; Malmi and Brown, 2008; Merchant and Van der Stede, 2012; Ouchi, 1977, 1979; Simons, 1995). While not circumventing the problem of achieving an appropriate balance of control mechanisms, this literature provides a stronger conceptual basis for construct selection.

The control categories used in this study are as follows: planning, measurement, compensation, structure, policies and procedures, and socio-ideological. These categories encapsulate a relatively broad conceptualization of control, similar in intent and coverage to the more recent work of Malmi and Brown

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[5] This represents the congruence form of configuration fit (Gerdin and Greve, 2004).

(2008), while retaining core elements and comparability with frameworks already established in the literature (e.g., Merchant and Van der Stede, 2012).[6] The control constructs included in the empirical analysis are detailed in Table 2.[7]

<Insert Table 2 about here>

Strategic planning involves establishing long-term goals, expectations, and courses of action (Daft and Macintosh, 1984; Flamholtz, 1983; Langfield-Smith, 2007).[8] In its most overt form, planning achieves goal-congruence through the pre-determination of activities and behaviours required to realize desired objectives. Planning may also be used as a coordinative mechanism by formally articulating and communicating goals and schedules to individuals involved in particular activities across an organization. Variations in the strategic planning process are frequently conceptualized along a continuum ranging from formalized and systematic approaches to processes that are informal and emergent (Brews and Hunt, 1999; Mintzberg, 1994).

Measurement refers to the "process of assigning numbers to represent aspects of organizational behaviour and performance" (Flamholtz, 1983, p. 156). While this encapsulates much of the formal information produced by an organization, the focus here is the accounting information used by management to

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[6] Control categories are discrete but are not necessarily unrelated. For instance, measurement and compensation systems would be tightly coupled in control structures premised on cybernetic regulation, while in other configurations they may operate quite independently. Constructs within categories can also be closely associated, such as the use of standardization (specifying how an activity is to be performed) and boundary controls (defining the domain of acceptable activity) in a conventional bureaucracy. In organic control structures standardization has more limited application, although boundary systems may feature quite prominently as a means for managers to focus subordinate behaviours without removing the capacity for autonomous action. Boundary systems would be common to both control arrangements, but it is how this mechanism is combined in a package that is important for understanding different control outcomes.

[7] Arguments can be made for the inclusion of additional or alternative control mechanisms, but it is maintained that the current selection provides a sufficiently comprehensive coverage of each category. Furthermore, not every possible variable needs to be included in a configuration analysis for valid patterns to emerge, particularly if variables are highly correlated. For instance, a notable omission is formalization, which has strong conceptual ties to a number of other constructs (e.g., boundary systems, belief systems) and empirically it is highly correlated with standardization. Including formalization would result in significant overlap and little incremental information useful for constructing and interpreting configurations.

[8] Conventional frameworks associate control with strategic implementation rather than formulation (Langfield-Smith, 2007). However, Ferreira and Otley (2009) argue that strategic planning is an important control mechanism for aligning individual behaviours to the overall mission of the organization. Recent empirical work also includes strategic planning as part of the control package (e.g., Davila and Foster, 2007). Action planning is identified as a distinct control category in some frameworks (e.g., Malmi and Brown, 2008), but here short-term planning mechanisms are captured by the categories of measurement and policies and procedures.

influence the behaviour of subordinates (Malmi and Brown, 2008; Brickley et al., 2004).[9] To understand the control implications of accounting it is necessary to identify *what* is measured and *how* that information becomes incorporated into control efforts. Traditionally, accounting concerns the use of budgets and standard costs to measure productivity and efficiency (Covaleski and Aiken, 1986). Contemporary applications see a wider spectrum of activities being subject to calculation, increasing the potential sphere of individual accountability. Even without other applications, the very act of measurement serves a rather subtle, ex-ante control function. Flamholtz (1983, p. 156) refers to this as the process function of accounting, whereby individuals direct their efforts towards areas that are measured. In much of the literature the analysis of accounting is limited to its role in performance evaluation, but more recent understandings have emphasized the wider control functions of accounting (Hartmann, 2000; Chapman, 1997). Highly influential in this respect is Simons (1995), who distinguishes between conventional, feedback applications of accounting, operating on an exception-basis, and their use in proactive engagements with subordinates to address strategic uncertainties and to foster experimentation and opportunity search. Targets embedded in formal measurement systems are also important for designating individual accountability (Merchant, 1985; Van der Stede, 2001). Tightly circumscribed accountabilities serve to define responsibilities and restrict subordinate discretion.

Compensation is both an ex-ante and ex-post control (Flamholtz et al., 1985). As an ex-ante mechanism, compensation incentivizes goal congruent behaviour through the anticipation or expectation of receiving a reward for task performance. Compensation functions as an ex-post control by rewarding outcomes and serving as part of the feedback process, which provides information on the desirability of past behaviours and correct for deviations. Compensation methods vary significantly across firms (Bonner and Sprinkle, 2002). The most examined attributes concern the extent of performance-based compensation use, the method of determination, either through subjective assessments or through predetermined standards of performance, and the time horizon (Fisher, 1995; Flamholtz, 1983). Rewards may also be extrinsic or intrinsic. However, the design of compensation systems as part of the evaluation-reward process is primarily concerned with the provision of tangible, financial rewards.

Structure concerns the specification of roles and the patterns of authority and communication within an organization (Chenhall, 2003; Flamholtz, 1983). Empirical MA research generally considers structure as a

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[9] Flamholtz (1983) categorizes both accounting systems and information systems within measurement systems. Accounting is limited to "measures of financial and managerial performance," while information systems refer to operational and non-financial metrics (Flamholtz, 1983, p. 156). Contemporary usage of the term accounting in MA research is more or less synonymous with measurement, although it is recognized that some information systems, such as those used by human resources or project management systems, may not be considered accounting yet fit the definition of measurement.

contextual variable. However, structural mechanisms contribute to managerial control efforts in a number of ways. Some structural attributes, such as centralization, directly influence control by determining who has decision rights over non-programmable events. Other aspects of structural design influence the variability of subordinate behaviours. More bureaucratic structures with vertical hierarchies and mechanistic patterns of communication promote behavioural conformity, while flatter, more organic, and integrative structures enable greater flexibility through mutual adjustment.

Policies and procedures refer to control mechanisms concerned with directly specifying how tasks are to be performed or the limits to allowable behaviours (Malmi and Brown, 2008; Merchant and Van der Stede, 2012).[10] When the actions required to achieve effective task outcomes are known control can be achieved by closely monitoring adherence to standardized rules and procedures (Ouchi, 1977). When tasks are non-routine or the context is inherently uncertain, managers can restrict individual discretion by specifying boundaries to acceptable conduct or by implementing formal approval procedures. Boundary controls enable subordinates to respond to local contingencies autonomously but within predefined limits (Simons, 1995), while pre-action reviews provide a mechanism to guide or restrict proposed activities (Merchant and Van der Stede, 2012).

Socio-ideological controls are mechanisms that "persuade people to adapt to certain values, norms and ideas about what is good, important, praiseworthy, etc. in terms of work and organizational life" (Alvesson and Kärreman, 2004, p. 4).[11] Despite receiving scant attention in empirical research, the importance of socio-ideological controls has long been recognized (Ouchi, 1979; Flamholtz, 1983; Fisher, 1995). While it is improbable that managers have the ability to fabricate an entire culture, they are typically in a stronger position than others to mould or sustain the practices that encourage internalization of desired norms and values (Flamholtz, 1983). The main control mechanisms available are selection, socialization, and formal communication of organizational values and beliefs (Harrison and Carrol, 1991; Snell, 1992; Chatman, 1991; Ouchi, 1979; Simons, 1995).[12] Formally instituted procedures are not the only mechanisms that influence individual acculturation. The construct social control is included to capture the effects of informal processes that result in employees accumulating values and basic assumptions infused within the symbols, rituals, language, and social structures of the organization

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[10] Policies and procedures are closely associated to the categories of behaviour and action controls (Ouchi, 1977; Merchant and Van der Stede, 2012).

[11] Socio-ideological control is preferred to the more common label of cultural control (Malmi and Brown, 2008; Merchant and Van der Stede, 2012), which is not always clearly differentiated from the related but distinct terms of informal and clan controls (Alvesson and Kärreman, 2004; Langfield-Smith, 2007).

[12] Selection and socialization are also referred to in the literature as personnel, ex-ante, and input controls (Flamholtz, 1983; Merchant and Van der Stede, 2012; Snell, 1992; Widener, 2004).

(Schein, 2004). The higher the degree of crystallization of shared values and the more socially cohesive the organization, the greater the level of normative pressure on newcomers to conform to prevailing social norms, providing an indirect but potentially powerful source of control.

3.2 Context

To analyse variation in the operating conditions of control combinations a set of contextual factors is identified from prior literature.[13] The comprehensive review by Chenhall (2003) guided initial selection. Chenhall details the primary dimensions that influence management control choice: technology, external environment, structure, strategy, size, and national culture. Two are excluded: structure, because it is conceptualized as part of management control, and culture, as this study has been conducted in a single national context. Table 3 presents definitions of the contextual constructs for technology, environment, and strategy. Constructs are selected based on conceptual coverage of each dimension and prior theoretical and empirical research to support systematic association with management controls at the firm level of analysis.

<Insert Table 3 about here>

Size, age, and stock exchange listing are also included as additional factors. Although few MA studies have explicitly considered these variables they have potentially significant consequences for management control. Research consistently reports strong associations between size and adoption of bureaucratic control structures (Astley, 1985; Donaldson, 2001), with age having a similar relationship (Davila, 2005; Mintzberg, 1979). The specific demands on information disclosure imposed by public listing necessitate increased measurement controls, while associated governance requirements entail greater emphasis upon policies and procedures (Merchant and Van der Stede, 2012).

4. Research method

4.1 Sample

Data were obtained from a mail survey conducted in Australia. The population sample was acquired from the Certified Practicing Accountants of Australia (CPAA). A random sample of 1500 firms was selected

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[13] The term context is used instead of contingency for three reasons. First, it avoids the deterministic connotation that contingency carries (Gerdin and Greve, 2004). Second, the contextual factors are external to what has been defined as the management control structure, but this is not meant to imply an actual separation in reality. Third, it is recognized that an organization is likely to have some degree of influence over its context and all factors are choice variables for the firm at least at one point in time (Fisher, 1995).

from their database. Firms are independent companies or strategic business units (SBU).[14] To ensure that control and contextual variables were applicable to the respondent it was required that firms have a minimum size of 100 employees and at least AUD 20 million in revenues. Through cross-checking minimum requirements against Dun and Bradstreet and Hoovers databases, 107 firms were removed, leaving a useable population of 1393.

Survey administration was conducted over three months. Targeted respondents are the highest member of the top management team whose details were available in the CPAA database.[15] Some are chief executive officers or general managers while others are responsible for functions such as accounting, finance and operations. Initial telephone calls were made to generate interest in the research, ensure that firm characteristics are appropriate for this study, and check that respondents had sufficient knowledge of questionnaire content. In total, 911 respondents who satisfied the criteria agreed to participate. Surveys were sent out within a week of contacting each respondent. Reminder postcards were sent one and a half weeks after initial mailing and a further telephone call was made to non-respondents after three weeks (Dillman, 2000). The process generated a response rate of 46.2 percent with 421 returned surveys. To test for non-response bias the size and industry of respondent firms are compared to the initial sample with no significant differences detected ($p<0.05$). Additionally, comparison of construct means between the first and last 20 percent of surveys received reveal no meaningful differences.

The analysis uses 400 responses. Responses are removed if they failed to meet the criteria of this study or have significant missing data.[16] Surveys where one or more items appeared to have been missed inadvertently are retained. Missing values are imputed using the expectation-maximization process.[17] Demographic data for the usable sample is shown in Table 4.

<Insert Table 4 about here>

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[14] This definition is consistent with prior management control research at the firm level (e.g., Chenhall, 2005; Chenhall and Langfield-Smith, 1998; Henri, 2006). All firms appear as separate entities in the CPAA, Dun and Bradstreet, and Hoovers databases.

[15] Top management team is defined as the top two tiers of an organization's management structure (e.g., CEO/GM, COO, CFO, and the next highest level of management) (Henri, 2006).

[16] In some cases respondents failed to answer items of entire constructs (e.g., they missed full pages of the questionnaire). These responses are excluded from the analysis.

[17] Data are shown to be missing completely at random ($p>0.10$). The expectation-maximization method is applied as it has negligible impact upon mean, covariance and correlation parameters (Hair et al., 2006).

4.2 Variable measurement

Where possible previously validated constructs are used or adapted to fit the requirements of this study. However, a number of new constructs are developed as prior measurements are inadequate or are not available. Extensive pilot testing of the survey instrument was undertaken to enhance content validity. This involved 10 interviews with senior managers from medium-to-large organizations in manufacturing and service industries. The purpose of the interviews was to refine the selection of constructs, assess consistency in interpretation of survey items, and remove any undue complexity or ambiguity in item wording. To further establish content and face validity nine academics in the management control discipline reviewed the survey.

The measurement model guidelines of Rossiter (2002) and Jarvis et al. (2003) are applied in the development or modification of constructs. The distinction between different measurement models is important as incorrect specification can have adverse consequences. For instance, if a reflective model is selected when indicators are in fact defining facets of the construct, then replacing or removing indicators may alter the construct's conceptual domain and theoretical meaning. This can result in flawed interpretations of empirical tests (Bisbe et al., 2007; Jarvis et al., 2003). In some cases existing literature indicates the most appropriate measurement model (e.g., the specification of interactive control by Bisbe et al., 2007). Otherwise the selection of reflective or formative models is based upon construct definitions. Measurement of each construct is described in detail in the appendix. Likert-type scales from 1 to 7 are used unless otherwise indicated. Descriptive statistics are reported in Table 5 and bivariate correlations are presented in Table 6.

<Insert Table 5 about here>

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For reflective measurement models, unidimensionality is evaluated through common factor analysis using Maximum-Likelihood extraction with oblique rotation. Internal consistency is assessed by calculating Cronbach alphas. Factor analyses indicate that items load strongly on single factors (>0.35) with satisfactory alphas (between 0.67 and 0.90). As indicators need not covary in formative constructs conventional tests of validity and reliability are inappropriate (Bisbe et al., 2007). Petter et al. (2007) recommend examining the weightings and multicollinearity of construct items. Item weightings are examined through principal components analysis. Items on all formative constructs are positive and have weights above the recommended minimum of 0.30 (Hair et al., 2006). Variance inflation factors (VIF) are

calculated to assess multicollinearity. The maximum VIF of 4.13 is below the general threshold of 10 (Hair et al., 2006).[18] Multicollinearity is assessed through a condition index. The highest value of 5.37 on the condition index is below the general tolerance of 30 (Hair et al., 2006). Harman's one-factor test is conducted to assess for common-rater bias. An unrotated principal components analysis shows that the first factor explains less than the majority of variance, suggesting that single-source bias is not a significant concern (Podsakoff and Organ, 1986).

5. Results

Cluster analysis is employed to examine the first research question. This technique is consistent with configuration theory as it attempts to locate homogenous, mutually exclusive groupings within a population (Gerdin and Greve, 2004). The 22 control mechanism variables outlined in Table 2 are included in a two stage clustering process (Ketchen and Shook, 1996).[19] In the first stage the number of clusters and centroids are determined through a hierarchical agglomerative procedure using Ward's algorithm with squared Euclidean distance. This clustering algorithm is appropriate as it factors in both intra-cluster homogeneity and inter-cluster differentiation (Everitt et al., 2001). However, the approach can be sensitive to outliers and construct scaling (Hair et al., 2006). Constructs are Z-score standardized to minimize the effect of different measurement scales, while tests for the effect of multivariate outliers find minimal differences in cluster solutions.[20]

The five cluster solution is used in the analysis. This partition is selected because of the interpretability of the clusters with respect to prior literature and the support of supplementary analyses. Examination of the dendogram indicates significant jumps between two to five clusters, while the Duda-Hart index, a stopping rule, supports two, five, and nine cluster solutions. These alternate cluster partitions are examined. Partitions of two to four clusters provide less fine-grained detail in the variation between clusters, while the nine cluster solution produces clusters with significant overlap providing little

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[18] Although a cut-off of 10 is commonly applied more restrictive thresholds are suggested in the literature as low as 3.33 (Petter et al., 2007). Only one item has a VIF above 3.33 in the construct belief systems. Removal of this item would affect the conceptual domain of the construct and hence it is retained.

[19] Contextual variables are excluded from the clustering process. First, configuration theory indicates that it is possible for organizations to use similar control configurations in different contexts. As cluster analysis attempts to find mutually exclusive groupings, including contextual variables in the analysis would limit the potential for equifinality to be identified. Second, this study examines whether contextual variables differ significantly between configurations, that is, whether they have predictive validity. Variables included in the cluster analysis cannot be used to test the predictive validity of the classification as these would significantly bias the result.

[20] A Mahalanobis distance (D^2) test is conducted (Hair et al., 2006). The analysis indicates that six cases are possible outliers ($p<0.001$). Visual inspection does not suggest any unusual patterns. Removal of these cases has minimal impact on cluster formation. All cases are retained.

additional insight. Replication with alternate clustering algorithms demonstrates that the five cluster solution presented is stable.[21]

The centroids from the five cluster hierarchical solution are used in the second clustering stage. Here a non-hierarchical procedure (*K*-means clustering) that allows switching of cluster membership is applied (Hair et al., 2006). The results of this analysis are shown in Table 7. Differences in cluster patterns are examined through analysis of variance (ANOVA) and Games-Howell post-hoc multiple comparison procedures (MCP).[22] Clusters are labelled as simple (C1), results (C2), action (C3), devolved (C4), and hybrid (C5). Labels are based on the cluster interpretations detailed in the following section.

<Insert Table 7 about here>

<Insert Table 8 about here>

The second research question asks whether contextual variables vary between, and are able to predict membership of, control configurations. Contextual attributes of each cluster are shown in Table 8 with results of ANOVA and MCP.[23] The predictive power of the contextual variables is assessed using predictive discriminant analysis (PDA).[24] The results of PDA are shown in Table 9.[25] The correctly categorized cases (the "hit rate") as a number or percentage are listed along the diagonal from top to bottom. Overall, 54 percent of cases are correctly classified.[26] To establish significance the hit rate is compared to threshold values of the maximum chance criterion (MCC), the proportional chance criterion (PCC), and Press's Q statistic (Hair et al., 2006; Tabachnick and Fidell, 2007).[27] The hit rate is well above the threshold values of 30.25 percent for MCC and 21.7 percent for PCC, while the *Q* value of 289

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[21] The clustering process is repeated with alternate hierarchical (within-group) and non-hierarchical (*K*-means) algorithms. The within-group procedure has a correspondence of 85.8 percent to the cluster membership from Ward's method, while the non-hierarchical procedure results in 75.8 percent of cases with equivalent cluster membership. A small number of statistical differences are found in comparison to mean scores reported in Table 7 but these do not substantively affect cluster interpretation.

[22] Kruskal-Wallis tests return equivalent results as ANOVA.

[23] Chi-square tests with Bonferroni pairwise comparisons are conducted to assess differences in industry association across clusters. There are no significant results ($p<0.05$).

[24] Results of MANOVA ($p<0.001$) indicate that the contextual variables reported in Table 6 are valid predictors of cluster membership, and hence can be used for classification (Tabachnick and Fidell, 2007).

[25] As the research is exploratory the PDA results are based on the conservative assumption of equal prior probabilities (Tabachnick and Fidell, 2007).

[26] To cross-validate the result an additional jackknife procedure termed "leave-one-out" is performed. This method calculates the discriminant functions using *N*-1 cases, repeated *N* times. The procedure returns a similar pattern of categorization across groups and an overall hit rate of 45.5 percent.

[27] The MCC and PCC provide hit rates expected by chance. The MCC is the hit ratio if all cases were classified in the largest group, whereas the PCC takes into account all groups weighted by relative size.

exceeds the critical value of 6.63 (p=0.01). Overall the results show that context differs significantly across clusters and has predictive validity.

<Insert Table 9 about here>

6. Analysis of results

This section provides an interpretation of the five clusters reported in the previous section. Interpretations are based on the statistical differences reported in Tables 7 and 8 and comparison to prior theoretical frameworks.[28] The intent of this analysis is twofold. The first is to provide an understanding of the control logic underpinning each configuration.[29] The second is to further validate the cluster solution. While the results show that contextual factors have significant capacity to predict cluster membership, supporting the relevance of the clusters, there is no available method to determine whether the solution presented is optimal. Analytical validation can, however, be achieved through generalization to existing conceptual frameworks and empirical (primarily case-based) research describing complex control structures in contemporary practice (Lindsay, 1995; Yin, 1989).

6.1 Simple control (C1)

The relatively unelaborated pattern that emerges in C1 suggests that the basis for control and coordination is largely informal, achieved through centralized decision-making (<C2,C4,C5), restricted autonomy and direct supervision (<C2,C4,C5). The centralization of power and informality of this control structure permits significant flexibility in responding to environmental shifts and setting the strategic direction of the firm. The informal strategic planning process (<all) and limited involvement of subordinates (<C4,C5) suggests that strategy resides largely in the minds of top management, with formulation intuitive and implementation potentially rapid, unimpeded by bureaucratic formalities. Upper management may also be involved in task execution, coordinating activities through direct involvement. Alternatively, guidelines for task accomplishment issued by top management may be quite vague, with trust placed in the competence and tacit knowledge of subordinates, as suggested by the reasonably high emphasis on

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[28] Statistical differences are reported in parentheses throughout the analysis. Those indicated by an asterisk (*) are significant at $p<0.10$. All others are significant at $p<0.05$ or better.

[29] Control logic is an extension of the broader concept of "dominant logic" - the general "principles of organizing" that are "encoded in the minds of organizational actors (or agents) who create institutions" (Drazin et al, 2004, p. 165). Bettis and Prahalad (1995, p. 10) argue, "organizational structure and systems [...] are tightly coupled to the dominant logic and embody parts of it". These logics are conceptually similar to "deep structures" which, consistent with configuration theory, act to stabilize the organization and resist forces for change: "logic guides the development of structure [which] once in place, tend to delimit the further development of managerial logic" (Drazin et al, 2004, p. 164).

personnel selection (=C2,C4). This description closely resembles Mintzberg's structural type of the same name and the interpersonal control strategy outlined by Bruns and Waterhouse (1975) and Merchant (1981). However, there is some evidence of a basic hierarchical structure, with vertical differentiation (hierarchy) the same as more bureaucratic structures (C2,C3,C5), and although less than other clusters, diagnostic control is one of the more prominent attributes within this configuration. The extent to which control is achieved through personal contact or through basic bureaucratic structuring will be in part a function of size and age (Astley, 1985), but is also likely to be strongly influenced by the leadership style of top management (Mintzberg, 1979).

Contextual factors indicate that simple control is observed in smaller sized, non-listed firms (<C5). C1 contains more early stage firms than most other clusters (forty-two percent), although this is not statistically different. Administrative technology is significantly lower than all other clusters, consistent with the generally lower emphasis placed on bureaucratic control mechanisms. However, when a firm has both an imperfect understanding of transformation processes and an inability to reliably measure outcomes it is expected that control will be premised on socio-ideological mechanisms (Ouchi, 1979). Yet C1 exhibits the lowest emphasis on these controls. A potential explanation is that early-stage firms are unlikely to exhibit the preconditions of a long and stable membership necessary to develop the kind of thick social understandings and intense commitment to collective values required for clan formation (Alvesson and Lindkvist, 1993). As firms mature, they tend to adopt more bureaucratic structures, even if the control configuration remains relatively basic. The presence of these basic bureaucratic arrangements limits the potential for clan controls to dominate, suggesting that a pure-type clan will be a relatively rare form of control in practice.[30]

6.2 Results (C2) and action (C3) control
Firms in C2 place a high emphasis on diagnostic and tight application of accounting information and objectively determined, performance-based compensation (>C1,C3,C4). This suggests a control structure consistent with output (Ouchi, 1977) and administrative (Bruns and Waterhouse, 1975; Merchant, 1981) control strategies, and the results-oriented variant of the machine bureaucracy (Mintzberg, 1979; Speklé, 2001). Strategy formation takes place at the apex of the organization with limited participation (<C4,C5), although the process is not overly formalized (<C3,C5) possibly because primary attention is directed towards short-term financial performance (<C3,C4,C5). Implementation is top-down, with formal,

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[30] This generalization is limited to the characteristics of the current sample: for-profit organizations of medium to large size. Clan-type arrangements may be more prevalent, for example, in relatively mature but small-sized organizations, some sub-units of larger organizations, or in other industry sectors, such as government and third-sector organizations.

vertical channels of communication containing directives and performance feedback (<C4,C5). Through exception-based monitoring, managers are able to maintain control at a distance, intervening periodically to modify behaviours when the organization deviates from expected outcomes. This allows for individual autonomy and delegation of decision rights (>C1,C3), providing some flexibility in the way local contingencies are handled (Speklé, 2001). However, the selective emphasis on performance dimensions and their rigid enforcement serve to impose definite parameters on subordinate activity. The constraining nature of the accounting apparatus may explain why, apart from selection, socio-ideological mechanisms have relatively little importance for control (<C3,C4,C5). This comes down to the way accounting controls are mobilized as the primary intermediary for individual accountability (Hopwood, 1972). Hierarchical accountability systems act to internalize efficiency and productivity as dominant organizational norms, providing the ideological basis for individual action (Roberts, 1991).

The control logic in C3 appears to have the same bureaucratic underpinnings as the results configuration, but with a different set of mechanisms accomplishing individual accountability. Control is based on centralized authority, direct monitoring and restricted autonomy (<C2,C4,C5), formal planning (>C1,C2,C4), standardized rules and procedures (>C1,C2,C4) and well-defined boundaries of conduct (>C1,C5). Firms exhibit a tall hierarchy (>C4) and vertical, routinized and restricted patterns of communication (>C4,C5) that serve to reinforce positional authority and hierarchical accountability (Mintzberg, 1979). These characteristics are consistent with a behavioural control strategy (Ouchi, 1977), the action-oriented variant of the machine bureaucracy (Mintzberg, 1979; Speklé, 2001) and the mechanistic-type organization (Burns and Stalker, 1961). Although C2 emphasizes broad-scope information (>C1,C2; =C3), diagnostic and tight use of accounting is significantly lower than results control (C2), as is the use of performance-based compensation, suggesting that accounting has reduced importance for securing individual performances. Instead accounting may function as a supplement to the direct observations of top management in the evaluation of task execution, forming part of the feedback loop in refining the specifications of roles and procedures. Somewhat inconsistent with conventional bureaucratic logic, however, is the relatively high emphasis upon lateral integrative devices (>C1,C2*; =C4,C5) and socio-ideological mechanisms (>C1,C2; =C3).

The choice between action and results control structures is typically attributed to the relative availability of information (administrative technology) – results control structures applicable when information is available to accurately capture achievement of desired outcomes and action control suitable when tasks

can be programmed and monitored (Ouchi, 1977; Eisenhardt, 1985).[31] However, the results in Table 6 show no significant differences between C2 and C3 on either dimension. Instead C2 and C3 are separated by environmental factors. Results control (C2) is associated with relatively predictable (<C3*,C4) and stable (<C3*,C5) environments, which are considered necessary prerequisites for control strategies that hold subordinates tightly accountable to predetermined targets. Action control firms (C3) are found to operate in more unpredictable, turbulent, and hostile environments. This is in contrast to conventional thought that mechanistic-type structures are most "appropriate to an enterprise operating under relatively stable conditions" (Burns and Stalker, 1961, p. 5). These findings suggest an alternate interpretation of the logic underpinning the action control configuration.

Recent studies have revealed the capacity for some organizations to perform in highly dynamic environments by activating bureaucratic structures in a flexible and enabling fashion (e.g., Adler et al., 1999; Ahrens and Chapman, 2004; Bigley and Roberts, 2001). The firms in these case studies share the conventional hallmarks of bureaucracy – an emphasis on hierarchical relations, centralized authority, and the structuring of tasks through an extensive array of formalized rules, routines, and operating procedures – but without the characteristic rigidities that prevent adaptation to dynamic environmental conditions. Although this research is conducted at an operational level, a similar logic might be applicable for understanding control by top management at the firm-level. One interpretation of the accountability structure in C3 is that top management monitors actions not to enforce adherence to rules and procedures but to ensure flexible adjustment. Accounting is present but unlike the results-oriented bureaucracy it is not privileged as a source of control. Combined with lateral integrative devices and an emphasis on ideological cohesion, information conveyed by accounting systems may be "interpreted and understood within the shared context of extensive mutual knowledge" (Roberts and Scapens, 1985, p. 451). This is suggestive of a "socializing" style of accountability, which may impart a far greater ability for flexibility and adaptation (Mouritsen, 1999) – quite different from the "individualizing" effects characteristic of conventional bureaucratic control (Roberts, 1991).

There are no other significant differences between the contextual attributes of C2 and C3. Compared to other clusters, results control firms show no significant differences on competitive strategy, apart from customer focus (<C5), indicating that results control firms pursue a range of strategic priorities, including innovation. However, as individual accountabilities are strongly tied to short-term performance, any innovative efforts are likely to be directed towards incremental, rather than radical, projects, which carry

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[31] When information is available to feasibly pursue either control approach, results-control will be preferred because "it tends to require less elaborate structuring, [...] is likely to demand less higher level involvement, and is more supportive of adaptation" (Speklé, 2001, p. 429).

less risk and uncertainty (March, 1991). For the action configuration, there is an emphasis on customer focus and flexibility (>C5), but not innovation (<C4,C5). This is consistent with the recent empirical evidence of flexible and enabling bureaucracies just outlined. All cases illustrated firms responding to immediate operational contingencies or customer demands, through existing information structures. Whereas interactive, organic and fluid networks facilitate radical experimentation and speculative exploration in generating new knowledge, the enabling aspects of bureaucratic structures are more suited to assimilating, re-combining, and exploiting existing knowledge to cope with localized, day-to-day uncertainties (Davila et al., 2009). The redesign of old routines and generation of novel actions may be an occasional outcome, but not the norm for the flexible bureaucracy.

6.3 Devolved control (C4)

The fourth cluster exhibits a flat hierarchy (>all), emergent and lateral communication channels (>all), employment of integrative liaison devices (>C1,C2; =C3,C5), significant individual autonomy (>C1,C2,C3), long-term performance assessment (>all), reliance on socialization processes and social controls (>C1,C3,C5), and reduced emphasis on standardized behavioural routines (<C2,C6) and predetermined performance targets (<C2,C5). Such features are prevalent in discussions of new forms of organizing – such as network, flexible, heterarchical, and post-bureaucratic (Pettigrew and Fenton 2000) – but are also characteristic of earlier types such as the organic structure of Burns and Stalker (1961) and the adhocracy of Mintzberg (1979). The central thread of these structures is a shift in the locus of authority from managers to subordinates, where coordination primarily occurs through self-organization and mutual adjustment, such that "control of the work rests in the hands of the doers" (Mintzberg, 1979, p. 3). C3 is labelled devolved control to reflect this common trait.

Available means for managers to influence behaviours in organic-type structures are often assumed to be quite limited and largely informal in nature, centred upon active engagements in lateral coordination and the shaping of shared expectations (Burns and Stalker, 1961; Mintzberg, 1979). The relatively high levels of subordinate participation in strategic planning (>C1,C2,C3*) and communication of organizational values through belief systems (>C1,C2) are consistent with this. But in contrast to prior ideal type descriptions there is a rather strong presence of formal control mechanisms. Boundary controls and pre-action reviews are utilized to a similar extent as action control (C3), although combined in an otherwise organic structure they likely have an enabling role (Adler and Borys, 1996). Measurement systems also appear to be important in this configuration. Rather than tightly specifying individual accountabilities (<C2,C5), broad-scope (>C1,C2) accounting controls are used to direct attention, encourage novel

behaviours, and facilitate an open sharing of information, the latter of which Speklé (2001) argues to be essential in exploratory control structures for equitable performance assessments.

The contextual associations of C4 are reasonably consistent with what might be expected for this type of configuration – unpredictable and turbulent environments (>C2*), and an emphasis on innovation (>C1,C3). However, there are few other variances of note. Task programmability and outcome measurability differ significantly from simple (C1) and hybrid (C5) firms, but not from results (C2) or action (C3) control structures, which is counter to prior literature that shows organic, devolved structures with highly autonomous individuals are more prevalent in conditions where cause-effect relations are unknown or ambiguous, and desired outcomes difficult to specify (Ouchi, 1977). The findings also indicate that devolved organizations are relatively large (=C5), and although this cluster has the highest percentage of early-stage firms, this is not statistically significant. Rather than being a temporary or transitional organizational form adopted by adolescent firms prior to undergoing bureaucratization (Mintzberg, 1979; Speklé, 2001), organic-type configurations may represent a more permanent mode of organizing. Finally, the results show that the devolved configuration has the lowest percentage of firms correctly classified (Table 9), suggesting that devolved control is viable under a range of contextual circumstances.

6.3 Hybrid control (C5)

The final cluster represents the most elaborated arrangement, characterized by an intensive and demanding application of accounting and a significant bureaucratic complex. C5 reveals tightly emphasized accountabilities (>C1,C3,C4) to a wide array of metrics (>all) coupled with strong performance-based incentives (>C1,C3,C4), while strategic planning, boundary systems, standardization, and pre-action reviews are equal or greater in emphasis than other clusters. This pattern of controls is consistent with the contextual attributes of administrative technology (>all), large size (>C1,C3), and age (highest proportion of mature age firms), which prior research shows are strongly associated with increased bureaucratic structuring (Astley, 1985; Chenhall, 2003; Snell, 1992). Balanced against this is a high level of participation in strategic planning (>C1,C2,C3), delegated decision authority (>C1,C3), discretion in conducting work activities (>C1,C3), moderately organic patterns of interaction (>C2,C3), and use of lateral integrative devices (>C1,C2), indicating quite complex modes of integration and coordination. Reliance on socio-ideological controls is also significantly higher than all other clusters. As firms in C5 are comprised of an intermeshing of multiple control modes the cluster is labelled hybrid control.

This hybridization of multiple control modes is in contrast to the conventional assumption that firms emphasize a single control mode, such as results or action control (Alvesson and Kärreman, 2004). Furthermore, it is often claimed that the internalization of shared beliefs and values obviates the need for an extensive bureaucratic apparatus of explicit rules and formalized systems of accountability to govern behaviour (Alvesson and Lindkvist, 1993). What appears to be a far more prevalent occurrence is the co-existence of traditional bureaucratic structures with those mechanisms oriented towards the normative and ideational spheres of individual conduct. As Alvesson and Kärreman (2004) demonstrate in a management consultancy firm, this interweaving of bureaucratic and socio-ideological controls may provide an alternative, and possibly substitutable, way of organizing in relatively dynamic and complex conditions. The structural tensions inherent in such a configuration, and the association with multiple strategic priorities, also supports theories of ambidexterity – complex combinations of mechanistic and organic structures are required to balance the competing objectives of efficiency and flexibility (Raisch and Birkinshaw, 2008).

7. Summary and conclusion

The primary motivation for this study is to provide an empirical basis for extending our understanding of how control mechanisms combine and the contexts in which they operate. The analysis shows that existing frameworks have much to say about how controls combine in contemporary practice – many of the configurations closely resemble the ideal type descriptions in Table 1 – yet it also reveals a much more complex image of organizational reality. That a more complex and "messy" picture of control emerges is in some sense not surprising, as theoretical categorizations are intentionally stylized, ideal types. But if we want to explain control structure variety within and between organizations then rich descriptions of the actual choices made in practice may be a prerequisite for empirically valid theoretical developments, or at the very least, highly instructive. The taxonomy presented in this study offers a number of empirical observations to advance such efforts in future research.

First, the taxonomy indicates general empirical tendencies that are not adequately explained by existing frameworks, such as firms characterized by significant bureaucracy operating in relatively uncertain and dynamic conditions (C3) and others with a complex hybridization of multiple control types (C5). These configurations are not entirely novel as case-based research describes organizations with remarkably similar structures. Rather the findings indicate that these distinctly contemporary organizational forms are more common in practice that the literature currently suggests, and deserve further systematic

investigation to develop more complete explanations than offered here about how they function and the contexts in which they are most effective.

Conversely, some ideal types might experience limited diversity – an instance where a theoretically possible configuration is not empirically observable (Fiss, 2007). In this study there is no evidence that firms commonly adopt configurations premised predominantly on socio-ideological controls. Instead, these controls are most prominent when combined with more complex administrative arrangements, suggesting that socio-ideological mechanisms are more likely to exhibit a complementary relationship with bureaucratic controls, rather than act as substitutes as is commonly assumed in the literature (Alvesson and Kärreman, 2004). In conditions where theory would suggest configurations based on socio-ideological controls to be the preferred structural choice – imperfect administrative information and relatively small size – organizations instead adopt quite basic, interpersonal control structures (C1). This conjecture does not invalidate the theoretical claim that clan control is a more efficient alternative to the basic bureaucratic arrangement shown here. Instead it points to the need for theory that more fully explains not only optimal types but also the actual choices observed in practice.

Second, this study illustrates how accounting combines with a wide variety of control arrangements and contexts. Consistent with ideal type depictions the results control configuration (C2) shows accounting situated within a hierarchical structure operating in stable environmental conditions, while in contexts characterized by uncertainty, accounting is activated in an interactive fashion and combines with organic (C4) and flexible-bureaucratic (C3) configurations. But it would also seem that the central mechanisms of results control are not limited to stable contexts as they are found in relatively dynamic conditions within a complex array of bureaucratic and socio-ideological mechanisms (C5). These findings elaborate on prior work that observe formal accounting controls combining with organic structural types (Chenhall and Morris, 1995; Simons, 1987) and provides support for recent case studies demonstrating how accounting integrates with both formal and informal control structures under a variety of organizational settings (e.g., Ahrens and Chapman, 2004; Frow et al., 2010; Jørgensen and Messner, 2009). Echoing the concerns of Caglio and Ditillo (2008, p. 875), a useful extension to existing frameworks would be to more explicitly recognize the combinatory potential of accounting in different control configurations, and the roles that accounting can perform across different contexts.

Explanations of the design and use of accounting mechanisms are also likely to require knowledge of not only contextual conditions, but also of the wider control structure in which that mechanism resides. For instance, the formalized accountability structure found in the hybrid configuration (C5) would seem

inconsistent with relatively complex and dynamic conditions. Yet it may be able to function effectively because of the combination with socio-ideological controls (Davila et al., 2009). The way accounting is combined with other control mechanisms, in addition to the role it takes, may help to explain the paradox of the reliance on accounting performance measures in conditions of both predictability and uncertainty (Chapman, 1997; Hartmann, 2000).

Finally, the findings suggest that the explanatory power of control theories will improve if the assumption of direct and universal associations to context is relaxed. In this study configurations are found to be characterized by differences *and* similarities - very different control arrangements are aligned to the same contextual dimension while in other cases control mechanisms in different configurations have equivalent emphasis despite variation in context. This provides empirical support for the concept of equifinality in control configurations. Few studies have explicitly considered this possibility, although Gerdin (2005, p. 119) concludes from an investigation of MA systems in manufacturing departments facing multiple contingencies that it "may be important *not* to assume automatically that there is a one-to-one relationship between context and MCS [as] different control mechanisms available in the control package may well combine in different ways in a particular context". Although the configurations presented here do not necessarily represent optimal alignments between control structure and context, future research can use these configurations as an initial basis to develop more specific hypotheses about equifinal combinations. One particular observation is that both the devolved configuration and the hybrid configuration are associated with high levels of innovation. If these configurations are equifinal with respect to innovation then it would explain why some studies find tight formal controls associated with higher performance in innovative firms (e.g., Simons, 1987) when much of the literature instead argues that control structures must be informal and loose (Langfield-Smith, 2007).

To address these issues researchers will need to use both conventional and alternative methodological approaches. Path analytic techniques are able to examine the interrelationships between control mechanisms thereby identifying core and peripheral components in different configurational subgroups (e.g., Fullerton et al., 2013). Such techniques may also be able to identify relationships between control and contextual variables that hold for one class of configuration but are absent or reversed in another. Other theoretical concerns could be better addressed through methods less common to MA literature. The utility of cluster analysis for examining how multiple control mechanisms make up a system or package has been previously noted (Chenhall and Langfield-Smith, 1998; Gerdin, 2005). A quite different approach is offered by set-theoretic methods. These use Boolean algebra to assess how different variables combine to achieve an outcome (Fiss, 2007). One unique benefit of this approach is the ability to examine

necessary and *sufficient* causal conditions. For example, imperfect administrative information and small size may be necessary conditions for clan or cultural control, but the results of this study suggest they are not sufficient for this form to emerge. Set-theoretic approaches could further untangle the effect of multiple contingent variables on control structure variety.

There are a number of limitations to this study. First, cluster analysis lacks the rigor of conventional statistics with no methods available to test the significance of the solution presented. Although replication with alternate clustering algorithms suggests that the clusters are relatively stable, and results indicate predictive validity, they should be considered as providing preliminary, rather than conclusive, evidence. The clusters are not meant to be exhaustive of all possible control configurations but rather representative of the central tendencies of common control patterns observable in practice. Like any study, the results should be subject to scrutiny through empirical replication. Second are the typical caveats to survey research, notably issues of sampling and measurement. While much effort was made to draw upon a generalizable sample that mirrored size and industry distributions, the database used may contain biases against this. Measurements are subjective assessments obtained from a single respondent. However, significant attention was given to construct measurement and pre-testing of the survey instrument, and there are no indications that single-source bias is a significant concern. Third, despite the breadth of attributes considered, there is scope for additional variables to be analysed as part of the control package. Inclusion of additional constructs, such as those that tap more directly into the enabling and coercive aspects of formalization, may result in alternative combinations. Despite these limitations it is hoped that the insights of this study into complex control configurations will contribute towards further developing theories of accounting and control structure variety.

Appendix

Variable measurements, factor loadings and alphas are detailed below for the constructs used in this study.

Survey items	Anchors	FA / PCA loadings	Cronbach alpha
Long-term Planning			
Strategic Planning (reverse scored) is measured through four items. Items based on the instruments by Brews and Hunt (1999) and Covin et al. (2001). End-point anchors of indicators reflect the position of an organization on a continuum from informal/emergent to formal/deliberate strategic planning processes, implying a reflective measurement model.			
1. How would you describe the strategic goals of your SBU?	Specific, detailed, quantified / Broad, general, qualitative	0.799	0.874
2. How would you characterise the strategic plan of your SBU?	Highly detailed, comprehensive outline of strategic actions / Little detail, rough outline of strategic actions	0.891	
3. How closely is the strategic plan followed in your SBU?	Tightly followed, plans implemented as outlined / Loosely followed, acts as a guide only	0.805	
4. How would you describe the process by which strategy develops in your SBU?	Develops through formalised and deliberate processes / Develops through often unintended and emergent processes	0.697	
Planning Participation is assessed using a single item. Multi-item reflective scales based on existing measures were reviewed (e.g., Shields and Young, 1993), but as this question is preceded by strategic planning items it is considered reasonable that a respondent can make an overall assessment of subordinate participation. Prior studies also use single item scales to measure participation (e.g., Simons, 1987).			
1. To what extent are subordinates involved in the strategic planning processes of the SBU?	Very low extent / Very high extent	n/a	n/a
Measurement			
Diagnostic Control is measured through five items that represent the use of accounting as part of a cybernetic control cycle (Simons, 1995). Items are based on Henri (2006), Widener (2007) and the descriptions of Simons.			
To what extent does the top management team use budgets (performance measurement systems) for the following	Very low extent / Very high extent		
1. Identify critical performance variables (i.e. factors that indicate achievement of current strategy)		0.784	0.89
2. Set targets for critical performance variables		0.799	
3. Monitor progress towards critical performance targets		0.839	

4. Provide information to correct deviations from preset performance targets	0.758	
5. Review key areas of performance	0.756	

Interactive Control is based on the formative measurement model outlined by Bisbe et al. (2007). They identify five constitutive properties: (1) intensive use by top management, (2) intensive use by operating managers, (3) face-to-face challenge and debate, (4) focus on strategic uncertainties, and (5) non-invasive, facilitating and inspirational involvement. These dimensions are each measured using a single indicator. The wording of indicators are made with reference to studies by Widener (2007), Henri (2006) and Bisbe and Otley (2004).

To what extent does the top management team use budgets (performance measurement systems) for the following	Very low extent / Very high extent		
1. Provide a recurring and frequent agenda for top management activities		0.766	n/a
2. Provide a recurring and frequent agenda for subordinate activities		0.832	
3. Enable continual challenge and debate of underlying data, assumptions and action plans with subordinates and peers		0.842	
4. Focus attention on strategic uncertainties (i.e. factors that may invalidate current strategy or provide opportunities for new strategic initiatives)		0.775	
5. Encourage and facilitate dialogue and information sharing with subordinates		0.832	

Tightness is based on Merchant's (1985) conception of tight versus loose control. Merchant suggests that tighter control systems are present when there is: (1) more complete and specific targets, (2) more frequent and timely communication of targets, (3) closer and more frequent monitoring of results, and (4) a more transparent and stringent link between performance and rewards. These attributes are treated as the defining facets of a formative construct as they do not appear to share a common nomological net or necessarily covary. A single indicator is used to capture each attribute. Items are based on those used by Kober et al. (2007), Simons (1987) and Van der Stede (2001).

The following questions relate to pre-established targets set for subordinates of the top management team (e.g., senior managers that report directly to a member of the top management team). These targets or goals may be financial (e.g., budget targets) or related to other performance dimensions.			
1. How flexible are subordinate performance targets once they have been set? (Reverse coded)	Very inflexible / Very flexible	0.722	n/a
2. How frequently are subordinates consulted about performance target achievement? (Reverse coded)	Very frequently (daily) / Monthly / Very infrequently (quarterly or longer)	0.674	
3. To what extent are written explanations for variances from target performance levels required from subordinates?	Very low extent / Very high extent	0.727	
4. To what extent are subordinate evaluations predominantly based on achievement of performance targets?	Very low extent / Very high extent	0.761	

Cost Control is assessed through three items derived from the reflective instrument of Simons (1987), Widener (2004) and Kober et al. (2007).

1.	Cost control systems monitor virtually all tasks in the SBU	Strongly disagree / Strongly agree	0.634	0.72
2.	SBU operations are controlled by analysing and reporting to top management variances between actual costs and standard or expected costs	Strongly disagree / Strongly agree	0.871	
3.	To what extent are cost centres used in your SBU?	Not used at all / Used occasionally / Used to a great extent	0.555	

Measure Diversity is captured through six items each relating to a dimension of subordinate performance. The categories employed closely mirror those used in prior studies of measurement diversity (e.g., Henri, 2006; Ittner et al., 2003; Scott and Tiessen, 1999). Respondents are also provided the option to include an additional, self-labelled dimension.

	To what extent are measures related to the following dimensions used to evaluate subordinate performance?	N/A / Very low extent / Very high extent		
1.	Customer (e.g., market share, satisfaction, retention)		0.609	n/a
2.	Employee (e.g., employee satisfaction, turnover, workforce capabilities and development)		0.689	
3.	Operational Process (e.g., productivity, safety, cycle time)		0.649	
4.	Innovation (e.g., R&D, new product/service success, development cycle time)		0.681	
5.	Quality (e.g., product/service quality, defects, awards)		0.730	
6.	Social Responsibility (e.g., environmental compliance, community impact, public image)		0.751	
7.	Other Dimension (please elaborate)			

Compensation

Performance Based Compensation is measured using a pre-existing instrument from Chalos and O'Connor (2004). The three item reflective model is a modified version of the construct used by Shields and Young (1993).

	Please indicate the extent to which…	Very low extent / Very high extent		
1.	The financial rewards of subordinates increase as actual performance increasingly exceeds targets		0.762	0.73
2.	Subordinates whose performance relative to targets is among the top 25% are given larger financial rewards than those given to managers among the bottom 25%		0.688	
3.	Compensation contracts clearly specify how compensation is related to subordinate performance relative to performance targets		0.662	

Subjective / Objective Based Compensation is measured through a single indicator based on the item used by Simons (1987). Indicator end-points represent an entirely subjective or entirely objective determination of compensation respectively.

1. What is the usual basis for determining performance-based or bonus compensation for subordinates?	Determined Subjectively (based on top management assessment) / Intermediate / Determined Objectively (based on pre-determined formulas or targets)	n/a	n/a

Short / Long Term Based Compensation is assessed with a single item. End-points of the indicator represent short or long term orientations in determining compensation. Short term is defined as one year or less and long term as three years or more (Galbraith and Merrill, 1991).

1. Indicate the emphasis on short-term performance (one year or less) relative to long-term performance (three years or more) for subordinate compensation.	Based on short term performance / Equal emphasis / Based on long term performance	n/a	n/a

Structure

Decentralization is measured through five items representing key decision areas of firm top management. These items are based on the scales by Khandwalla (1973) and Gordon and Narayanan (1984), and have been employed extensively in the literature (e.g., Abernethy et al., 2004). As managers may selectively choose the decisions rights to allocate to subordinates (Khandwalla, 1973) the attributes may not empirically covary, indicating a formative measurement model.

Indicate the emphasis on short-term performance (one year or less) relative to long-term performance (three years or more) for subordinate compensation.	Top management has all influence / About the same / Subordinates have all influence		
1. Development of new products or services		0.701	n/a
2. The hiring and firing of managerial personnel		0.648	
3. Selection of large investments		0.682	
4. Resource allocations		0.703	
5. Pricing decisions		0.739	

Communication is measured using four items with end-points reflecting a continuum of mechanistic to organic processes (Burns and Stalker, 1961). Two of the items are from Covin et al. (2001) and Leifer and Huber (1977), while the remaining are modifications of items used by Chenhall and Morris (1995) and Covin et al. (2001).

1. Indicate how control information is typically communicated in your SBU	Through highly structured, formal channels of communication / Through very open, informal channels of communication	0.589	0.75
2. Indicate the accessibility of operational information in your SBU	Highly restrictive access to important operational information / Free flow of important operational information throughout the SBU	0.695	
3. Indicate the content of work-related communication between top management and subordinates	Top management decisions and mandates, instructional, direction giving / Information and idea sharing, consultative, advice giving	0.709	

4.	In general, the operating management philosophy in my SBU favours	Emphasis on giving the most say in decision making to formal line managers / Emphasis on giving the most say to the expert in a given situation even if this means bypassing formal line authority	0.609

Integrative Liaison Devices is captured through a formative four item index of the main lateral coordination mechanisms outlined by Galbraith (1973). The construct is comparable to those used in prior studies (Abernethy and Lillis, 1995).

	To what extent are the activities between sub-units in your SBU coordinated through…	N/A / Very low extent / Very high extent		
1.	Liaison personnel whose specific job is to coordinate the efforts of several sub-units		0.694	n/a
2.	Temporary task forces or committees set up to facilitate collaboration on specific projects		0.629	
3.	Permanent cross-functional teams		0.761	
4.	Matrix structures entailing multiple lines of authority, multiple responsibility assignments and overlapping team membership		0.680	

Hierarchy is measured by the number of hierarchical levels in the firm divided by the natural logarithm of the number of employees (Scott and Tiessen, 1999).

1.	The number of hierarchical levels divided by the natural logarithm of the number of employees	n/a	n/a

Policies and Procedures

Autonomy is captured reflectively using two items based on those employed by Kober et al. (2007) and Ito and Peterson (1986).

	To what extent…	Very low extent / Very high extent		
1.	Do subordinates conduct non-routine activities independent of top management involvement?		0.763	0.736
2.	Do subordinates have the freedom to create their own methods of getting work done if no standard procedures exist?		0.763	

Boundary Systems is based on the conceptualization of Simons (1995). Simons argues that boundary systems contain four dimensions: (1) they define appropriate conduct, (2) are used to limit search and experimentation, (3) are actively communicated by top management, and (4) sanctions are applied to subordinates engaging in unauthorized activities irrespective of the outcome. As these attributes are defining facets and do not necessarily covary the construct is considered formative. A single item is used to capture each attribute. Items are based on those developed by Widener (2007) and the descriptions of Simons (1995).

To what extent…	Very low extent / Very high extent

1. Are codes of conduct or similar statements relied upon to define appropriate behaviour?		0.655	n/a
2. Are there policies or guidelines that stipulate specific areas for, or limits on, opportunity search and experimentation?		0.724	
3. Does top management actively communicate risks and activities to be avoided by subordinates?		0.784	
4. Are sanctions or punishments applied to subordinates who engage in risks and activities outside organisational policy, irrespective of the outcome?		0.746	

Standardization is based on a three item reflective measurement model. One item relates to the use of policies and procedures to guide the day to day work activities of subordinates (Abernethy and Lillis, 1995; Gerdin, 2005; Simons, 1987) and two items capture the use of standardized methods of lateral coordination (Ruekert and Walker, 1987).

To what extent…

1. Are the work activities of subordinates determined by standardised procedures or processes?	Very low extent / Very high extent	0.542	0.67
To what extent are the activities between sub-units in your SBU coordinated through…			
2. Pre-planning of activities between sub-units	N/A / Very low extent / Very high extent	0.511	
3. Standardised rules, programs or procedures that are formally or informally understood between sub-units		0.871	

Pre-Action Reviews is measured using two items. Items relate to two key dimensions outlined by Merchant and Van der Stede (2012) that differentiate between tight and loose application of pre-action reviews, and hence the construct is modeled formatively. One item relates to the frequency of conducting reviews, and the other measures the detail required from subordinates during the review process.

1. To what extent are formal pre-action reviews used to assess projects undertaken by subordinates?	Very low extent / Very high extent	0.856	n/a
2. How detailed are the reports or plans required from subordinates before initiating specific projects?	Little detail / Highly detailed	0.856	

Socio-Ideological

Selection is a reflective construct measured through two indicators. Items are based on those in Snell (1992) and Widener (2004).

1. How extensive is the recruitment and selection process (e.g., search for candidates, use of tests, multiple interviews) for a managerial position?	Not very extensive / Very extensive	0.738	0.71
2. How much importance is placed on selecting managers who have attitudes and values aligned to the SBU, not just on technical competence?	Very little / A great deal	0.738	

Socialization is developed as a formative construct. Items represent the formal methods of organizational socialization identified in the literature, being mentoring, social functions and training (Chatman, 1991; Harrison and Carroll, 1991).

To what extent are…	Very low extent / Very high extent		
1. training and development processes used to reinforce SBU objectives, expectations and norms?		0.788	n/a
2. Social events and functions used to develop and maintain commitment to the SBU?		0.765	
3. Mentoring, orientation and induction programs used to acclimatise new managers to acceptable behaviours, routines and norms?		0.850	

Belief Systems is based on the conceptualization of Simons (1995). Simons describes belief systems as containing four defining attributes: (1) they codify the values of the firm, (2) are actively communicated, (3) are used to create commitment to firm objectives, (4) they inspire and guide the search for new opportunities. As these attributes define the construct indicators are considered formative. Single items, based on those used by Widener (2007) and the descriptions of Simons (1995), are used to capture each dimension.

To what extent…	Very low extent / Very high extent		
1. Are the values, purpose and direction of the SBU codified in formal documents? (e.g., mission/value statements, credos, statements of purpose?)		0.825	n/a
2. Does top management actively communicate core values to subordinates?		0.864	
3. Are formal statements of values used to create commitment to the long-term vision of top management?		0.930	
4. Are formal statements of values used to motivate and guide subordinates in searching for new opportunities?		0.904	

Social Control is measured through a four item reflective scale. Two items, relating to the extent of shared norms and expectations, and the extent of commitment to firm objectives and values, are adaptations from the instrument used in Kober et al. (2007). The remaining two items are formulated with reference to literature on organizational culture and social control (Ouchi, 1979; Schein, 2004).

To what extent…	Very low extent / Very high extent		
1. Is there a sense of shared values, beliefs and expectations among employees?	Very low extent / Very high extent	0.832	0.87
2. Is there a consensus among employees on SBU objectives and direction?		0.808	
3. Are employees committed to the values and objectives outlined by top management?		0.886	
4. Does top management rely on the shared values and norms of employees to provide direction when faced with uncertainty?		0.676	

Technology is measured through six items from a previously validated construct by Snell (1992), which is originally based on Ouchi (1978) and Thompson (1967). Three items reflect the level of task programmability and three items relate to outcome measurability.

Please indicate the extent to which you agree or disagree with the following statements:	Strongly *dis*agree / Strongly agree

Outcome Measurability

1. Standards of desirable performance for subordinates are well defined   0.580   0.75

2. Results measures accurately depict how well subordinates have performed   0.806

3. Top management has several sources of objective data available that indicate how well subordinates are performing   0.754

Task Programmability

1. The actions subordinates take to achieve results are visible to top management   0.714   0.78

2. Effective and ineffective subordinates can be distinguished by observing the actions they take   0.668

3. The relationship between the actions that subordinates take and the eventual outcomes are well known by top management   0.835

Environment

Unpredictability is measured through five items that represent the primary dimensions of an organization's external environment. These dimensions are consistent with prior literature (Doty et al., 1993; Gordon and Narayanan, 1984). As unpredictability in one dimension does not necessarily imply the same in other dimensions the construct is formative.

Over the past three years how predictable or unpredictable have important actions or changes in the external environment been?	Very predictable / Very *un*predictable		
1. *Customers* (e.g., Level of demand, customer requirements)		0.681	n/a
2. *Suppliers* (e.g., Markets for key inputs, quality of resources)		0.652	
3. *Competitors* (e.g., Competitors entering or leaving, tactics/strategies)		0.700	
4. *Technological* (e.g., R&D advances, process innovations)		0.475	
5. *Economic / Regulatory*		0.681	

Turbulence is measured through five items. Items relate to the same dimensions used to assess unpredictability, with similar items used previously in the literature (Doty et al., 1993). As significant changes in one dimension do not necessarily imply turbulence in others the construct is formative.

Over the past three years how many changes have occurred that have had a material impact on the nature of your business?	Very *few* changes / Very *many* changes		
1. *Customers* (e.g., Level of demand, customer requirements)		0.664	n/a
2. *Suppliers* (e.g., Markets for key inputs, quality of resources)		0.579	
3. *Competitors* (e.g., Competitors entering or leaving, tactics/strategies)		0.734	
4. *Technological* (e.g., R&D advances, process innovations)		0.623	

| 5. *Economic / Regulatory* | | 0.625 | |

Complexity is assessed using two items. Items capture the diversity of customer requirements and competitor strategies. These dimensions are considered to be the primary sources of environmental complexity (Miller and Friesen, 1983). The items are formative as complexity in one dimension need not correlate with complexity in the other.

1. How diverse in nature are the product/service requirements of your customers to each other?	Very similar / Very diverse	0.861	n/a
2. How diverse are the strategies and tactics of your key competitors to each other?		0.861	

Hostility is captured through three items that relate to the dimensions of competition, resources and strategic opportunities. Items are developed based on the discussion of munificence by Castrogiovanni (1991) and the instruments of Tan and Litschert (1994) and Miller and Freisen (1983). The construct is measured formatively as dimensions do not necessarily covary.

1. How intense is the competition for your main products/services?	Very low intensity / Very high intensity	0.662	n/a
2. How difficult is it to obtain the necessary inputs for your business?	Very low difficulty / Very high difficulty	0.751	
3. How many strategic opportunities are currently available to your business?	Very few / Very many	0.411	

Strategy is elicited through eleven items that reflect a wide range of generic strategic orientations. Items are obtained from the instruments of Chenhall (2005), Chenhall and Langfield-Smith (1998), and Ittner et al. (2003), with minor modifications to reflect the industry diversity of firms in the sample.

Indicate the emphasis your SBU places on the following strategic priorities relative to your competitors	Very low emphasis / Very high emphasis		

Low Cost

1. Low cost products / services	0.729	0.78
2. Low price	0.888	

Innovation

1. Being first to market with new products / services	0.657	0.73
2. Extensive range of products / services	0.509	
3. Rapid volume or product / service mix changes	0.653	
4. Experimenting with new products / services	0.773	

Customer Focus

1. Providing high quality products / services	0.518	0.77
2. Accurately meeting delivery agreements	0.635	
3. Providing effective after-sales services and support	0.584	
4. Providing fast delivery of products/services	0.669	
5. Superior customer services	0.814	

Acknowledgements

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Table 1
Description of ideal types (comparable types shown in the same row)

Mintzberg (1979, 1989)	Burns and Stalker (1961)	Bruns and Waterhouse (1975); Merchant (1981)	Ouchi (1977, 1979); Eisenhardt (1985); Snell (1992)	Speklé (2001)	Vosselman (2002)
Machine bureaucracy	Mechanistic	Administrative	Output	Results-oriented bureaucracy	Weakly bureaucratic
Structure: Highly formalized, standardized rules and procedures, limited decentralization, hierarchical channels of communication, extensive planning. *Context*: Old, large firms; simple and stable environments; routine technology.	*Structure*: Hierarchical coordination and control, individual accountability, centralized authority, standardized procedures, formal and vertical patterns of communication. *Context*: Stable, predictable environments.	*Structure*: Clearly defined hierarchical authority, decentralized decision making, vertical communication, highly formalized, standardized rules and procedures, detailed planning and budgeting systems. *Context*: Large, diverse firms; complex technology.	*Structure*: Hierarchical authority, limited decentralization, predetermined targets, performance dependent rewards. *Context*: High outcome measurability	*Structure*: Hierarchical authority structure, predetermined targets, tight individual accountability, performance based rewards. *Context*: Low uncertainty; high outcome measurability.	*Structure*: Hierarchical authority structure, predetermined targets based on aggregate financial information, vertical information flows. *Context*: Low uncertainty.
			Behaviour	Action-oriented bureaucracy	Strongly bureaucratic
			Structure: Centralized authority, standardized rules and procedures, direct monitoring and supervision, evaluation based on behavioural conformance. *Context*: High task programmability.	*Structure*: Hierarchical authority structure, standardized behaviours, codified rules and procedures, detailed monitoring and supervision. *Context*: Low uncertainty; high task programmability.	*Structure*: Hierarchical authority structure, codified rules and procedures, pre-action reviews, action accountability, vertical information flows. *Context*: Low uncertainty.
Adhocracy	Organic			Exploratory	
Structure: Decentralized authority, coordination through mutual adjustment, informal and organic communication, extensive liaison devices. *Context*: Young, smaller firms; complex and dynamic environments; sophisticated technology.	*Structure*: Mutual adjustment, decentralized authority, little formalization, shared accountability, fluid ad-hoc structure, lateral and emergent patterns of communication. *Context*: Dynamic, uncertain environments.			*Structure*: Mutual adjustment, little formal control, long-term performance evaluation based on emergent standards, extensive information sharing through open communication channels. *Context*: High uncertainty.	
Simple		Interpersonal			
Structure: Centralized authority, coordination through direct supervision, little formalization. *Context*: Young, small firms; simple, dynamic and potentially hostile environment; non-sophisticated, non-routine technology.		*Structure*: Centralized authority, coordination through direct personal supervision, little formalization, rudimentary budgeting systems. *Context*: Small firms; simple technology.			
Missionary			Input/Clan		
Structure: Emphasis on ideological control through selection, socialization, and indoctrination, highly informal and loose structures, collective authority. *Context*: Small firms.			*Structure*: Emphasis on internalization of shared values and beliefs through selection, socialization and peer monitoring, highly informal and implicit structure, minimal formal control. *Context*: Low outcome measurability; low task programmability.		

Table 2

Definitions of management control constructs

Construct	Definition
Strategic Planning	
Mode	Mode of developing the long-term ends and means of the firm - ad-hoc, adaptive and emergent, to formalized, deterministic and deliberate (Brews and Hunt, 1999; Mintzberg, 1994)
Participation	Involvement of subordinates in strategic planning processes (Ketokivi and Castaner, 2004; Shields and Young, 1993)
Measurement	
Diagnostic	Monitoring activity through deviations from preset standards of performance (Simons, 1995)
Interactive	Regular involvement in subordinate activities by management to encourage debate, creative behaviors and address strategic uncertainties (Bisbe et al., 2007; Simons, 1995)
Tightness	Individual accountability for meeting pre-established performance targets (Merchant, 1985b, 1998; Van der Stede, 2001)
Cost Control	Financial performance measures of cost efficiency and effectiveness (Kober et al., 2007; Simons, 1987)
Measure Diversity	Broad scope and non-financial performance measures (Henri, 2006; Ittner et al., 2003)
Compensation	
Performance Pay	Performance-contingent rewards and incentives (Fisher, 1995; Shields and Young, 1993)
Subjective / Objective	Method of determining individual compensation – subjective to objective (Fisher, 1995; Govindarajan and Gupta, 1985)
Short / Long Term	Time horizon used for individual compensation – short to long term (Fisher, 1995; Govindarajan and Gupta, 1985)
Structure	
Decentralization	Locus of authority - centralized to decentralized (Abernethy et al.,2004; Gordon and Narayanan, 1984)
Hierarchy	Vertical differentiation of firm structure - flat to tall (Scott and Tiessen, 1999)
Communication	Nature, direction and content of communication patterns - mechanistic to organic (Burns and Stalker, 1961; Chenhall and Morris, 1995)
Integrative Liaison Devices	Horizontal structural arrangements overlaying traditional functional structures (Abernethy and Lillis, 1995; Galbraith, 1973)
Policies and Procedures	
Autonomy	Work activities conducted in the absence of direct observation or involvement by management (Bruns and Waterhouse, 1975; Kober et al., 2007)
Boundary Systems	Statements defining acceptable or unacceptable domains of activity (Simons, 1995)
Standardization	Rules and procedures specifying the means of conducting work activities (Daft and Macintosh, 1984)
Pre-action Reviews	Processes of scrutinization and authorization prior to activity performance (Merchant and Van der Stede, 2012; Speklé, 2001)
Socio-Ideological	
Selection	Search, evaluation and recruitment of employees according to a set of criteria, such as value alignment (Chatman, 1991; Harrison and Carrol, 1991)
Socialization	Processes whereby individuals come to appreciate prevailing norms and beliefs in the firm (Chatman, 1991; Harrison and Carrol, 1991)
Belief Systems	Statements communicating the basic values and premises for action of the firm (Schein, 2004; Simons, 1995)
Social Control	Reliance on shared values, norms and beliefs to direct work activities (Ouchi, 1979; Schein, 2004)

Table 3

Definitions of context constructs

Construct	Definition
Technology	
Outcome Measurability	Extent to which outcomes of subordinate activity can be validly and reliably captured in quantitative standards of performance (Eisenhardt, 1985; Ouchi, 1977)
Task Programmability	Extent to which subordinate actions required to achieve an objective are known and visible to top management (Eisenhardt, 1985; Ouchi, 1977)
Environment	
Unpredictability	Inability to anticipate variations among elements of the environment and assess the effect of material changes on the organization (Child, 1972; Dess and Beard, 1984; Miller and Friesen, 1983)
Turbulence	Rate of change and instability in the environment (Dess and Beard, 1984; Mintzberg, 1979)
Complexity	Range and diversity of environmental factors relevant to firm operations (Child, 1972; Dess and Beard, 1984)
Hostility	Degree of threat from competitors for market demand, necessary resources and opportunities for growth (Child, 1972; Khandwalla, 1973; Miller and Friesen, 1983)
Strategy	
Low Cost	Emphasis on cost and efficiency of operations and competition through low price (Chenhall, 2005; Porter, 1980)
Innovation	Emphasis on differentiation through new product development (Ittner et al., 2003; Porter, 1980)
Customer Focus	Emphasis on differentiation through customization and flexible response to customer demands (Chenhall and Langfield-Smith, 1998; Porter, 1980)

Table 4
Demographic data

	n
Panel A: Industry classification	
Agriculture, forestry, fishing	10
Mining	18
Construction	26
Manufacturing	151
Transportation, utilities	31
Wholesale	22
Retail	20
Finance, insurance, real estate	41
Services	78
Other	3
Total sample	400
Panel B: Size of organizations	
0–250	184
251–500	116
501–1000	54
1001–2500	32
2500+	14
Total sample	400

Table 5
Descriptive data

	Mean	Std. Dev.	Min.	Max.	Skewness	Kurtosis
Strategic Planning						
Mode (Informal / Formal)	3.64	1.27	1.00	7.00	0.30	-0.60
Participation	3.41	1.51	1.00	7.00	0.32	-0.89
Measurement						
Diagnostic	5.51	0.83	1.90	7.00	-0.72	0.80
Interactive	4.78	1.03	1.40	7.00	-0.48	0.05
Tightness	4.32	0.98	2.00	6.75	-0.16	-0.59
Cost Focus	5.05	1.10	1.67	7.00	-0.61	-0.07
Measure Diversity	4.26	1.06	0.00	7.00	-0.53	0.63
Compensation						
Performance Pay	4.56	1.42	1.00	7.00	-0.47	-0.38
Subjective / Objective	4.63	1.75	1.00	7.00	-0.52	-0.81
Short / Long Term	2.44	1.34	1.00	7.00	0.80	-0.08
Structure						
Decentralization	2.48	0.80	1.00	5.80	0.45	0.23
Hierarchy (Flat / Tall)[a]	3.87	1.81	1.08	7.00	0.17	0.17
Communication (Mech. / Org.)	4.10	0.96	1.00	6.75	-0.14	-0.26
Integrative Liaison Devices	3.29	1.22	0.00	6.50	-0.14	-0.39
Policies and Procedures						
Autonomy	4.98	1.05	1.50	7.00	-0.68	0.08
Boundary Systems	4.68	1.03	1.50	7.00	-0.35	-0.03
Standardization	4.43	0.95	1.33	6.33	-0.62	-0.08
Pre-Action Reviews	4.37	1.19	1.00	7.00	-0.42	-0.32
Socio-Ideological						
Selection	5.44	1.04	1.50	7.00	-0.92	1.04
Socialization	4.08	1.19	1.00	7.00	-0.27	-0.37
Belief Systems	4.53	1.36	1.00	7.00	-0.32	-0.55
Social Control	4.57	1.03	1.50	7.00	-0.30	-0.28
Technology						
Outcome Measurability	4.85	0.96	2.00	7.00	-0.54	-0.10
Task Programmability	4.72	1.04	1.33	7.00	-0.57	0.11
Environment						
Unpredictability	3.61	0.91	1.00	6.00	-0.06	-0.28
Turbulence	3.72	0.99	1.40	6.40	0.13	-0.34
Complexity	3.45	1.29	1.00	7.00	0.31	-0.43
Hostility	4.41	0.83	1.67	7.00	-0.04	0.33
Strategy						
Low Cost	3.82	1.45	1.00	7.00	0.19	-0.76
Innovation	4.10	1.10	1.00	7.00	-0.06	-0.28
Customer Focus	5.63	0.85	2.80	7.00	-0.63	0.10
Size[b]	5.82	0.91	4.61	8.70	0.92	0.36
Listed	0.55	0.50	0.00	1.00	-0.19	-1.97
Age[c]	0.68	0.47	0.00	1.00	-0.75	-1.44

[a] For ease of comparison the hierarchy variable has been transformed using the softmax scaling procedure to a range of 1–7. The softmax procedure is a linear transformation of a variable for values within a specified span of standard deviations. Outlier values are truncated, so the distribution reaches maximum and minimum values asymptotically. This is appropriate for the hierarchy variable, which has a small number of extreme outlier values. A standard deviation response of 3 is chosen, meaning that 99.7 percent of cases are transformed linearly, preserving the inherent meaning of the variable (Pyle, 1995).

[b] Size is the natural logarithm of the number of employees.

[c] Age is a dichotomous variable, having a value of 0 if an early-stage firm, and 1 if it is a mature firm (over 20 years old).

Table 6
Pearson bivariate correlations [a]

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Strategic Planning (1)																
Planning Participation (2)	-0.36															
Diagnostic (3)	-0.25	0.10														
Interactive (4)	-0.38	0.26	0.65													
Tightness (5)	-0.23	0.09	0.41	0.22												
Cost Focus (6)	-0.18	0.03	0.26	0.28	0.18											
Measure Diversity (7)	-0.37	0.26	0.40	0.52	0.13	0.17										
Performance Pay (8)	-0.26	0.22	0.42	0.35	0.43	0.15	0.20									
Objective Pay (9)	-0.16	0.09	0.33	0.23	0.45	0.10	0.11	0.50								
Long Term Pay (10)	-0.02	0.14	-0.07	0.13	-0.25	-0.05	0.16	-0.06	-0.21							
Decentralization (11)	-0.02	0.22	-0.02	0.12	0.03	-0.15	0.12	0.15	0.11	0.21						
Hierarchy (12)	-0.04	-0.10	0.02	-0.08	0.08	-0.02	-0.05	0.06	-0.01	-0.14	-0.06					
Communication (13)	-0.02	0.22	0.04	0.18	-0.17	-0.10	0.17	-0.02	-0.01	0.33	0.29	-0.20				
Liaison Devices (14)	-0.21	0.28	0.23	0.39	0.10	0.14	0.37	0.22	0.13	0.10	0.18	-0.11	0.19			
Autonomy (15)	-0.14	0.15	0.22	0.22	0.20	0.06	0.22	0.19	0.08	0.07	0.21	-0.10	0.25	0.14		
Boundary Systems (16)	-0.26	0.13	0.27	0.36	0.12	0.21	0.38	0.25	0.17	0.13	0.01	0.00	0.03	0.43	0.11	
Standardization (17)	-0.28	0.17	0.26	0.36	0.11	0.23	0.42	0.14	0.15	0.05	-0.02	-0.02	0.00	0.42	-0.02	0.48
Pre-Action Reviews (18)	-0.40	0.30	0.28	0.43	0.19	0.20	0.43	0.28	0.15	0.16	0.14	0.01	0.18	0.39	0.19	0.46
Selection (19)	-0.29	0.17	0.23	0.31	0.10	0.11	0.34	0.26	0.14	0.00	0.08	-0.06	0.12	0.22	0.21	0.32
Socialization (20)	-0.40	0.27	0.31	0.47	0.09	0.12	0.48	0.28	0.18	0.22	0.13	-0.05	0.21	0.40	0.16	0.45
Belief Systems (21)	-0.40	0.29	0.23	0.37	0.10	0.19	0.44	0.23	0.17	0.11	0.16	-0.05	0.11	0.38	0.11	0.47
Social Control (22)	-0.32	0.33	0.30	0.42	0.05	0.11	0.47	0.24	0.15	0.14	0.18	-0.03	0.25	0.30	0.20	0.34
Task Programmability (23)	-0.35	0.24	0.49	0.53	0.35	0.29	0.41	0.43	0.33	-0.07	0.03	-0.05	0.04	0.32	0.25	0.33
Outcome Measurability (24)	-0.23	0.22	0.39	0.47	0.15	0.23	0.35	0.33	0.24	0.02	0.07	-0.11	0.13	0.30	0.14	0.21
Environmental Predictability (25)	0.02	0.03	-0.13	-0.07	-0.15	0.04	0.02	-0.05	-0.12	0.05	0.10	-0.04	0.02	0.09	-0.06	0.07
Environmental Turbulence (26)	-0.08	0.14	0.02	0.05	-0.02	0.05	0.16	0.06	-0.13	0.09	0.06	-0.07	0.03	0.18	0.03	0.13
Environmental Complexity (27)	-0.05	0.13	-0.06	0.04	-0.13	-0.04	0.05	0.02	-0.06	0.18	0.17	-0.07	0.09	0.10	0.03	0.08
Environmental Hostility (28)	0.01	-0.02	0.04	0.04	0.05	0.03	-0.02	-0.02	-0.04	-0.03	-0.01	0.01	-0.09	0.01	0.01	0.05
Strategy Low Cost (29)	-0.04	-0.08	0.02	0.04	0.06	0.19	0.08	0.01	-0.04	0.01	-0.07	-0.06	-0.04	0.01	-0.01	0.05
Strategy Innovation (30)	-0.07	0.03	0.14	0.24	0.01	0.07	0.16	0.14	0.08	0.14	0.09	-0.03	0.16	0.22	0.15	0.10
Strategy Customer Focus (31)	-0.18	0.08	0.29	0.35	0.09	0.11	0.33	0.14	0.08	0.11	0.06	0.00	0.13	0.10	0.14	0.21
Size (32)	-0.15	0.16	0.05	0.15	0.03	0.08	0.07	0.15	0.12	0.00	0.20	-0.22	0.01	0.12	0.02	0.03
Listed (33)	-0.14	0.00	0.10	0.08	0.20	0.02	0.03	0.22	0.18	-0.07	0.02	-0.07	-0.04	0.10	0.05	0.11
Age (34)	-0.16	0.08	0.10	0.07	0.17	0.02	0.19	0.10	0.11	-0.10	-0.01	-0.03	0.01	0.06	0.04	0.12

[a] Correlations with an absolute value higher than 0.10 are significant at $p<0.05$

Table 6 (cont.)
Pearson bivariate correlations [a]

	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)
Pre-Action Reviews (18)	0.43																
Selection (19)	0.35	0.35															
Socialization (20)	0.42	0.45	0.47														
Belief Systems (21)	0.45	0.48	0.45	0.64													
Social Control (22)	0.39	0.40	0.43	0.60	0.59												
Task Programmability (23)	0.37	0.38	0.31	0.38	0.30	0.38											
Outcome Measurability (24)	0.30	0.28	0.29	0.40	0.31	0.41	0.62										
Environmental Predictability (25)	0.02	0.06	-0.03	0.06	0.00	0.02	-0.02	-0.01									
Environmental Turbulence (26)	0.10	0.14	0.05	0.15	0.07	0.08	0.02	-0.01	0.52								
Environmental Complexity (27)	-0.01	0.06	-0.01	0.09	0.09	0.10	-0.01	-0.04	0.27	0.28							
Environmental Hostility (28)	0.05	0.00	0.06	-0.03	0.00	0.00	0.06	-0.04	0.08	0.05	0.06						
Strategy Low Cost (29)	0.06	0.06	-0.09	-0.02	-0.02	-0.02	0.00	-0.04	0.11	0.05	-0.03	0.13					
Strategy Innovation (30)	0.03	0.09	0.06	0.16	0.11	0.11	0.10	0.06	0.13	0.21	0.16	-0.04	0.05				
Strategy Customer Focus (31)	0.21	0.20	0.27	0.31	0.26	0.30	0.22	0.26	0.04	0.14	-0.02	0.10	0.06	0.20			
Size (32)	0.06	0.07	0.10	0.11	0.09	0.10	0.08	0.09	-0.01	0.00	0.01	0.05	0.06	-0.04	0.02		
Listed (33)	0.03	0.01	0.08	0.05	0.08	0.00	0.06	-0.04	-0.06	-0.05	0.07	0.07	-0.01	0.02	-0.09	0.08	
Age (34)	0.04	0.12	0.12	0.05	0.12	0.09	0.08	0.05	-0.03	-0.01	0.05	0.02	0.05	0.04	0.13	0.10	0.04

[a] Correlations with an absolute value higher than 0.10 are significant at $p<0.05$

Table 7

Results of *K*-Means clustering of management control constructs[a,b]

	C1	C2	C3	C4	C5	ANOVA		MCP
	Simple	Results	Action	Devolved	Hybrid	*F*-Stat	Sig.	Games-Howell
Strategic Planning								
Mode (Inf. / Formal)	<u>3.45</u>	4.00	4.57	4.07	**5.25**	37.22	0.000	5>3*>2,4*>1
Participation	<u>2.49</u>	2.93	2.81	4.14	**4.17**	29.08	0.000	4,5>1,2,3
Measurement								
Diagnostic	<u>4.70</u>	5.71	5.26	5.28	**6.08**	54.22	0.000	5>2>3,4>1
Interactive	<u>3.67</u>	4.51	4.63	5.01	**5.61**	77.37	0.000	5>4*>2,3*>1
Tightness	<u>3.59</u>	**4.94**	4.12	3.72	4.72	43.82	0.000	2,5>3*>1,4*
Cost Control	<u>4.56</u>	5.00	5.16	4.79	**5.47**	10.11	0.000	5>1,2,4; 3>1
Measure Diversity	<u>3.23</u>	3.85	4.44	4.54	**4.97**	54.85	0.000	5>3,4>2>1
Compensation								
Performance Pay	<u>3.21</u>	5.31	3.40	4.45	**5.39**	72.33	0.000	2,5>4>1,3
Subjective / Objective	<u>3.24</u>	**5.76**	3.33	3.97	5.55	62.28	0.000	2,5>4*>1*; 2,5>3
Short / Long Term	2.19	<u>1.86</u>	2.21	**4.00**	2.27	37.75	0.000	4>1,2,3,5; 5*>2*
Structure								
Decentralization	<u>2.11</u>	2.49	<u>2.11</u>	**3.12**	2.50	19.92	0.000	4>2,5>1,3
Hierarchy (Flat/Tall)	4.27	4.24	**4.29**	<u>2.86</u>	3.73	8.31	0.000	1,2,3,5>4
Communication (Mech./Org.)	3.91	3.73	<u>3.71</u>	**4.92**	4.22	21.89	0.000	4>5>2,3; 4>1
Integrative Liaison Devices	<u>2.11</u>	2.98	3.44	3.80	**3.89**	40.03	0.000	3*,4,5>2*>1
Policies and Procedures								
Autonomy	<u>4.43</u>	4.94	4.50	**5.52**	5.25	16.29	0.000	4>2*>1,3*; 5>1,3
Boundary Systems	<u>3.57</u>	4.47	**5.19**	4.88	5.18	48.90	0.000	3,4,5>2>1
Standardization	<u>3.35</u>	4.26	**5.17**	4.35	4.93	69.05	0.000	3,5>2,4>1
Pre-Action Reviews	<u>3.08</u>	4.03	4.65	4.66	**5.14**	59.77	0.000	5>3,4>2>1
Socio-Ideological								
Selection	<u>4.72</u>	5.11	5.68	5.27	**6.09**	31.12	0.000	5>3*>1,2,4*
Socialization	<u>2.81</u>	3.49	4.49	4.35	**4.96**	82.49	0.000	5>3,4>2>1
Belief Systems	<u>3.08</u>	3.87	4.81	4.90	**5.58**	86.03	0.000	5>3,4>2>1
Social Control	<u>3.59</u>	4.04	4.62	4.82	**5.38**	73.24	0.000	5>3,4>2>1
Cluster Membership	74	88	52	65	121			

[a] Pairs indicated by an asterisk (*) are significant at the 0.10 level. All others are significant at the 0.05 level or better.
[b] Underlined figures denote the lowest value on each variable. Bold numbers denote the highest value on each variable.

Table 8

Comparison of context constructs across clusters[a,b]

	C1	C2	C3	C4	C5	ANOVA		MCP
	Simple	Results	Action	Devolved	Hybrid	*F*-Stat	Sig.	Games-Howell
Technology								
Outcome Measurability	<u>3.60</u>	4.78	4.68	4.58	**5.45**	57.36	0.000	5>2,3,4>1
Task Programmability	<u>4.05</u>	4.73	4.79	4.81	**5.46**	34.00	0.000	5>2,3,4>1
Environment								
Unpredictability	3.64	<u>3.43</u>	**3.82**	**3.82**	3.52	2.80	0.026	3*,4>2*
Turbulence	3.56	<u>3.47</u>	**3.92**	3.80	3.88	3.34	0.010	3*,5>2*
Complexity	3.37	<u>3.28</u>	3.65	**3.72**	3.40	1.48	0.206	-
Hostility	4.38	4.35	**4.74**	<u>4.34</u>	4.35	2.54	0.039	3*>2*,4*,5*
Strategy								
Low Cost	<u>3.78</u>	**3.84**	3.79	3.82	3.83	0.03	0.999	-
Innovation	3.78	4.08	<u>3.73</u>	4.33	**4.36**	5.66	0.000	4,5>1,3
Customer Focus	<u>5.22</u>	5.40	5.69	5.63	**6.02**	13.95	0.000	5>3,4*>1*; 5>2
Other								
Size (Employees)	394	548	<u>372</u>	575	**752**	3.25	0.012	5>1,3
Listed [c]	<u>0.42</u>	0.58	0.50	0.52	**0.64**	11.19	0.025	5>1
Age [c]	0.58	0.70	0.69	<u>0.57</u>	**0.74**	9.20	0.056	-

[a] Pairs indicated by an asterisk (*) are significant at the 0.10 level. All others are significant at the 0.05 level or better.
[b] Underlined figures denote the lowest value on each variable. Bold numbers denote the highest value on each variable.
[c] Dichotomous variables (listed, age) are assessed using chi-square tests and Bonferroni pairwise comparisons.

Table 9

Results of predictive discriminant analysis[a]

	Group	Predicted Group Membership					Total
		1	2	3	4	5	
Count	1	49	9	6	8	2	74
	2	15	38	14	8	13	88
	3	6	5	26	10	5	52
	4	8	13	13	19	12	65
	5	2	8	11	16	84	121
%	1	66.2	12.2	8.1	10.8	2.7	100
	2	17.0	43.2	15.9	9.1	14.8	100
	3	11.5	9.6	50.0	19.2	9.6	100
	4	12.3	20.0	20.0	29.2	18.5	100
	5	1.7	6.6	9.1	13.2	69.4	100

[a] Correctly classified cases are shown along the diagonal from top-left to bottom-right.