Accounting, Organizations and Society 47 (2015) 1–13

Contents lists available at ScienceDirect

Accounting, Organizations and Society

journal homepage: www.elsevier.com/locate/aos

The role of innovation in the evolution of management accounting and its integration into management control☆

Robert H. Chenhall [a,*], Frank Moers [b]

[a] Department of Accounting, Monash Business School, Monash University, Australia
[b] Maastricht University School of Business and Economics, Department of Accounting & Information Management, The Netherlands

ARTICLE INFO

Article history:
Received 18 June 2015
Received in revised form
13 October 2015
Accepted 15 October 2015
Available online 6 November 2015

ABSTRACT

This paper aims to show how the design of management control systems (MCS) has developed in response to the need for organizations to address the challenges of operating in uncertain settings by embracing innovation. We examine how management accounting has evolved from a traditional, cybernetic approach to control operating within a closed system with little attention to adaptive processes into MCS that encompass a more dynamic, complex, open approach to management control that has provided a basis to facilitate innovation. We examine how the design and use of these MCS, that incorporate traditional and new practices, have evolved in ways that can support innovation where this is critical to survival. *Accounting Organizations and Society* (AOS) has been quite instrumental in pioneering many developments in this field. We draw on AOS, and other publications, to identify significant contributions that have been efficacious in theorizing changes in MCS with a particular concern for the context of innovation within which this takes place.

1. Introduction

In 1976, in the editorial to the first volume of *Accounting Organizations and Society* (AOS), Hopwood dedicated the journal to publishing research to help understand the social, organizational and behavioral aspects of accounting. In commenting on progress in employing these aspects of accounting he stated, generally, "we need to move towards a more coherent research tradition where new developments can be seen as building on and extending prior foundations" (Hopwood, 1976a, p. 3). One such area he noted as showing promise was in examining a contingent view of management accounting (MA) (specifically budgeting). This approach examines how organizational and environmental context are implicated in the processes and outcomes of MA. There followed a large body of literature that considered how the external environment, technology, organizational structure and strategy are related to the design of MA practices. More recently this body of literature has contributed to showing how consideration of MA practices has evolved into concern with more complex management control systems (MCS).

We define MCS as a set of many formal and informal input, process and output controls that are used by management to achieve organizational goals; the controls are connected by many complementarity relationships. MCS become more complex when they have many controls that are connected by many relationships that depend on their environmental and organizational context. For example, simple MA may involve the use of a budget to assess the extent to which a production process achieves a standard product cost. The focus is on the efficiency of internal operations which are assumed to be operating in settings that are relatively predictable with clearly defined hierarchical structures. Simple MA typically use only singe loop feedback where actual outcomes are compared with budgets and if necessary corrective action is taken or budgets are changed. More complex MCS may, for example, involve budgets for product planning and control where the budgets are linked in complementary ways to other controls. These controls may be, for example, capital investment systems, operational controls that include financial and non-financial data, and evaluation and incentive systems with both objective and subjective measures and informal personal control. More complex MCS are implemented in

☆ Our thanks for valuable comments provided by Margaret Abernethy, Chris Chapman, Tony Davila, Isabella Grabner, Ken Merchant, Karen Sedatole, Mike Shields, Nicole Sutton, Marc Wouters, and participants at the 40th Anniversary AOS conference.

* Corresponding author.
E-mail addresses: robert.chenhall@monash.edu (R.H. Chenhall), f.moers@maastrichtuniversity.nl (F. Moers).

http://dx.doi.org/10.1016/j.aos.2015.10.002
0361-3682/

ways that involve interactive processes between levels within the hierarchy and enable employees to deal directly with the contingencies in their work. The design and use of complex MCS are sensitive to the external environment and strategy of the organization, the technology of the organization, the structural arrangements and human resource concerns.

In this paper we examine the role of innovation as an element of context affecting the design and use of both traditional and new MA techniques to suit notions of control that are appropriate to manage innovation. We see MCS acting as a calculative practice focused on innovation. We consider how traditionally conceived MA has evolved into MCS to cater for more complex notions of control that are apposite for the generation of innovation.

The development of MCS over the past 40 years can be characterized as an evolution from relatively simple notions of control based on cybernetic processes within formal closed-systems, to encompass more complex, open controls. These more open controls have developed to cater for the needs of organizations to manage within increasingly uncertain and challenging settings, and in recent years, pressure to respond by developing innovation (Simons, 1995, p.105). The importance to organizations of being innovative has been recognized as a significant aspect of survival (Burns & Stalker, 1961; Tushman & O'Reilly, 1997). Innovation has been defined in general terms as the adoption of an idea or behavior, pertaining to a product, service, device, system, policy, or programme, that is new to the adopting organization (Danampour & Gopalakrishnan, 2001). Innovation may relate to products and technical processes (Dananpour & Evans, 1984), and to administrative arrangements (Damanpour, Walker, & Avellaneda, 2009; Evans, 1966).

Creativity and innovation are different but linked concepts. Creativity is the production of novel ideas, while innovation is the successful implementation of creative ideas (Amabile, Conti, Coon, Lazenby & Herron, 1996, pp. 1154–5). We adopt the view that innovation is the creation and implementation of new products, services and processes which result in significant improvement in outcomes. Individual and team creativity form the starting point for innovation, while successful innovation depends on other factors as well, such as organizational processes.

Accounting contingency studies have contributed to a body of research that has helped articulate the way we think about MCS (Chenhall, 2003, 2007). This has provided a more inclusive understanding of the meaning of control. This understanding is based on the challenges of ensuring that MCS are suitable for contemporary contextual settings of organizations where concern with innovation is pervasive. The need for organizations to be innovative has added to the challenges for control systems to help managers accomplish innovation. Innovation has direct affects on MCS and also indirect affects by way of other contextual variables. Innovation affects how strategy should be developed to ensure attention to new product or service offerings and how technologies and structures should be employed. This places innovation as a key overarching contextual variable to be considered in MCS design.

The paper is structured in the following sections. First, we commence by claiming that more complex notions of control have driven the development of MCS as a calculative practice to assist managers develop and implement innovation. By way of introduction, two fundamental characteristics of complexity in controls are identified. These are understanding how MCS are used and how controls act in combination. We discuss how Simon's (1995) Levers of Control (LOC) framework and related research provides a window into understanding these two aspects of MCS complexity as related to innovation. Second, we consider how more complex approaches to MCS have evolved to suit development of product innovations, and for performance evaluation in innovative settings. Third, we show how accounting researchers questioned the conventional idea that formal controls are unsuitable where innovation is important. We elaborate on how a more comprehensive understanding of the role of formal MCS can assist in developing and implementing innovation. We conclude that both formal and informal controls are appropriate in innovative settings. Fourth, we recognize that performance measurement is an important area of MCS and innovation. We show how the development of balanced scorecards (BSC) and the application of the LOC framework accommodate complex notions of MCS that are appropriate for performance evaluation in innovative settings. We critically evaluate these practices as they relate to innovation and suggest areas for development. Fifth, we acknowledge that innovation is not restricted to products and services and may apply to technology and organizational structure. We assess how MCS have evolved in response to innovations in these areas. In a final sixth section, we draw brief conclusions and suggestions for future research.

2. Taxonomies of MA usage, multiple controls and innovation

Developing understanding of how MCS research has adopted a more complex concept of control can be derived from examining how different types of MA practices and their usage have evolved in response to the challenges of managing in uncertain conditions, particularly by developing innovation.

MA can be seen as a calculative practice through which innovation is achieved. In the traditional accounting control paradigm, techniques such as budgets and standard costs are part of the processes that implement strategies (Anthony, 1965). When considering innovation, traditional control for implementation is still evident but MCS have developed a more encompassing notion of control.

These evolving ideas of control accommodate both original practices and also newer techniques, such as activity-based costing (ABC) and BSC, that map more closely onto organizational and behavior concerns affecting control. Also, in addition to implementation issues, MCS have developed in ways to assist in formulating innovation. This is achieved by considering how different practices, both traditional and newer, co-exist and how they are used to assist in forming, articulating, legitimizing and making visible the role of innovation to the organization. It is this notion of MA as an emerging set of calculative practices, and their development as more complex, open control systems, that moves the focus for enquiry from MA to MCS. These MCS provide an organizing rationale around which discourse and debates can take place concerning innovation (Miller, 2001, p. 386).

2.1. Taxonomy of control usage: LOC

Simons (1995) introduced the idea of the LOC framework which helps describe how MA has developed into MCS comprising multiple controls and different styles of usage of MA practices. This framework identified formal belief systems that indicate desired organizational direction, typically a balance between innovation and efficiency, and boundary controls that identify limits to the domain of activities. While these formal controls provide specific practices to define the parameters for innovation and efficiency, the remaining two levers, diagnostic and interactive controls, suggest different ways to use MA practices.

Specifically, diagnostic use of practices monitor organizational outcomes and correct deviations from preset standards thereby assisting in the efficient implementation of innovation (consistent with traditional, cybernetic type controls) (Simons, 1995, p. 59). Simons (1995, p. 60) notes that traditional profit plans and budgets are the most pervasive diagnostic controls in business firms. While

the aim of a diagnostic use of budgets is to monitor organizational compliance to strategies, they are used in a management-by-exception way, thereby freeing up senior managers' time to engage in more strategic activities, such as developing innovation.

Interactive use of MA practices focuses attention on strategic uncertainties and enables strategic renewal and innovation by stimulating dialog and debate throughout the organization (Simons, 1995, pp. 95–96). The ideal practices to be used interactively should be simple to understand, used by both senior and operational managers and be able to trigger revised action plans (Simons, 1995, pp.108–9). For example, to encourage innovation, budgets for profit planning represent an ideal practice to use interactively. They focus attention on changing customer needs and competitive new product introduction. Moreover, they are often the most omnipresent MA practice that connects different levels of management in organizations (Simons, 1995, p. 113). Other more broadly focused control systems may also be suitable, such as, project management systems, brand revenue systems, intelligence systems and human development systems (Simons, 1995, pp.108–9).

The diagnostic/interactive dichotomy has parallels with other more complex control characteristics such as mechanistic/organic (Chenhall, 2003), tight/loose (Merchant, 1985; Van der Stede, 2001) inflexible/flexible (Hopwood, 1972) and coercive/enabling (Ahrens & Chapman, 2004). However, the diagnostic-interactive classification has had the most pervasive effect on the research agenda that has considered how MCS are used. This growth in popularity is probably due to the growing interest in the 1990s of links between MCS and how managers can be encouraged to develop plans and practices to help ensure an organization's strategy provides a balance between innovation and efficiency (Simons, 1995, p.21). Simon's approach explicitly links the LOC framework to the role of MCS to assist in formulating and implementing strategy for innovation and efficiency, in a comprehensive and persuasive way. This extends notions of MCS to encompass the processes of dealing with organizational and behavioral dynamics (Simons, 1995, Ch 7). Studies by Henri (2006), Widener (2007) and Mundy (2010) have examined how interactive, diagnostic and combinations of these controls can attain improvements in innovation and performance.

2.2. Multiple management controls

A theme that underlies the LOC framework is that multiple controls, to effectively relate to innovation, should be considered collectively. The idea that considering a single control might lead to erroneous conclusions has been recognized since the early 1980s (Otley, 1980). This has prompted discussion on what practices and processes should be classified as management controls. Several attempts have been made to define the domain of management controls (Ferreria & Otley, 2009; Malmi & Brown, 2008; Otley, 1980).[1] There are two main interrelated issues that have emerged from broadening the study of MA from single practices to combinations of controls. First, what should be included in management control? Second, when is it necessary to study combinations of controls rather than single aspects of controls, and, if it is necessary to study combinations of controls, how is this best achieved?

[1] In this literature distinctions have been made between management accounting (MA), management accounting systems (MAS), management control systems (MCS) and organizational controls (OC). MA refers to a collection of practices such as budgeting or product costing, while MAS refers to the systematic use of MA to achieve some goal. MCS is a broader term that encompasses MAS and also includes other controls such as personnel or clan controls. OC is sometimes used to refer to controls built into activities and processes such as statistical quality control and just-in-time management.

Organizations tend to have a variety of formal and informal controls. There have been efforts by researchers to describe the array, or packages, of practices and processes that might be employed by organizations (Ferreria & Otley, 2009; Malmi & Brown, 2008). This has been useful in raising issues as to which organizational design choices should be classified as belonging to a management control package. For example, in considering what type of organizational structure best fits efforts to develop innovation, should organizational structure be treated as a contextual variable? Or, should organizational structure be considered as a design choice to assist in planning and controlling the innovative effort of the organization and as such be part of an organization's package of controls? In the first instance, accounting practices will be designed to provide the best fit with the form of structure, thereby enhancing effective innovation. In this approach it is implied that structural design is in place when designing the accounting system. The second approach would have accounting and structural arrangements be designed contemporaneously to be complementary, thereby enhancing innovation. Clearly, the intention of ensuring that accounting and structure act in harmony is common to both approaches. However, the theories driving each approach (e.g. contingency fit or complementarities), including which variables are exogenous to the design of MA, will be different as will be empirical analysis to examine the effects of each approach.

An important question in recognizing that multiple accounting practices can coexist is whether it is inappropriate to study only one practice without considering other controls. Here the notion of the difference between a package and a system of controls becomes important (Grabner & Moers, 2013). A package of controls recognizes that multiple controls exist and act collectively, whereas MCS require that there is some systematic relationship between the various controls. Elements of a package may be studied individually when there is no systematic relationship between them that could cause some misspecification of the effects of studying single practices. However, in MCS, where one control may act as a complement or substitute for another control, consideration of the joint effects of these controls is necessary. Clearly, several MCS may operate within a package of controls.

The issue of when to consider single of multiple controls and how to analyze multiple controls has been important in enabling MCS research to accommodate more complex notions of controls. How this has evolved from examining taxonomies that have considered the connection between multiple controls and innovation, such as the LOC, is illustrative of how contingency styled research into the role of MCS and innovation has advanced our thinking about how MCS have developed from simple forms of closed-systems control to encompass more complex, open control mechanisms.

3. MCS for developing and evaluating product innovation

While innovation can be directed at many organizational processes, product innovation has occupied the attention of many researchers. In this section we consider how more complex forms of MCS have evolved in response to efforts to develop innovative products, and to assess performance where innovation is important. At a more general level we consider how MCS can emerge in unpredictable ways during the process of innovation.

3.1. MCS and innovation in product development

While early MCS research had a strong focus on product costing there was little work that explicitly considered innovation in product development. Some research considered how attributes of

MCS differed depending on functions or structural units related to products such as marketing, production and research and development (R&D) (Abernethy & Brownell, 1997; Hayes, 1977; Rockness & Shields, 1984; 1988). The importance of innovation was apparent in these studies as it was within R&D that product innovation was seen to be generated.

Drawing on early contingency ideas of how control systems should fit organizational context (e.g. Burns & Stalker, 1961; Ouchi, 1977; Perrow, 1967; Thompson, 1967), one line of research showed that the importance of more complex MCS, in R&D work units, depended on the nature of the task. For example, Rockness and Shields (1984) found that the importance of input controls, such as social controls and expenditure budgets, were associated with little knowledge of the transformation process. However, behavior controls, such as rules and procedures, were most important when there were high levels of knowledge in the transformation process.

Abernethy and Brownell (1997) reported that personnel controls were more effective than behavioral or accounting controls when task uncertainty was high within R&D. Rockness and Shields (1988) discovered that social controls can substitute for expenditure budgets when controlling the planning and evaluation function in R&D settings. However, for the monitoring stage of control, the importance of budgets was high regardless of the importance of social control. At the rewarding stage, budgets were more important when the importance of social control was high.

Hayes (1977) found that R&D managers perceived financial measures of their department's performance to be less effective than in the case of production and marketing managers. Also, this research suggests that company controllers found it difficult to employ, effectively, measures of interdependence and the environment within R&D departments. This may possibly have been due to the difficulty that R&D managers have with cooperative activity and differences in the time horizons of these managers.

More recent studies have examined how more broadly-based MCS have developed to suit approaches to develop product innovations. Nixon (1998) reported a case study of performance management for product development. In this case study a broadly-based MCS focused on projects rather than functions, included target costing and tailored information that was relevant to different stages in the product development process. The MCS aimed to reconcile the project outcomes related to customer performance, quality and cost requirements with the company's contribution and cash flow needs, and with product portfolio and strategic considerations. The MCS also supported co-ordination and communications for the many disparate activities over the duration of project development.

Guilding (1999) found evidence on the usefulness of more broad scope planning information for prospector companies and for those following build strategies (both of which favor product innovation) compared to harvest strategies. In this study, the scope of the information related to competitor cost assessment, competitive position monitoring, competitor appraisal based on published financial statements, strategic costing and strategic pricing. Bouwens and Abernethy (2000) reported that the level of importance to operational decision making of more integrated, aggregated and timely information was correlated with customization strategies. Chenhall (2005) identified that integrative performance measurement systems (strategic and operational linkages, customer orientation and a supplier orientation) assisted organizations to develop competitive product innovation related to delivery, flexibility and low cost-price.

Collectively, a theme in this body of work is that more broadly based MCS are found to be particularly useful in settings where the environment is demanding due to customer needs for innovative products. Also, broad MCS are useful when the task setting for R&D is challenging due to high task uncertainty and low levels of knowledge of transformation processes.

3.2. Performance evaluation and product innovation

Research into the connection between the type of information used for performance evaluation and developing product innovation has shown that the conventional approach to financial accounting controls has limited usefulness. For example, Merchant (1990) found that pressure to meet financial targets was associated with a short-term focus and a discouragement of new ideas, at least for controls related to discretionary programs. This line of research has extended understanding of the beneficial attributes of performance evaluation information beyond traditional, financial accounting measures.

Evidence on the diminished role of financial accounting for performance evaluation in innovative settings was provided by Govindarajan (1988) who found that product differentiation strategies were associated with a de-emphasis on budgetary controls. Also, Van der Stede (2000) reported less rigid budgetary controls and more budgetary slack in these settings.

Concerning broader attributes of control in innovative settings, an early study by Govindarajan and Gupta (1985) showed that companies following build, compared to harvest strategies, that employed long term and subjective evaluation for managers' bonuses were associated with enhanced effectiveness. The argument underlying these results is that the innovative efforts needed to be successful when following a build strategy are inadequately reflected in short-term, focused accounting measures. Subsequent studies have relied on this argument to examine the determinants of the use of subjectivity in performance measurement. These studies have shown that the use of subjectivity increases with longer product development cycles (Bushman, Indjeikian, & Smith., 1996), and employee training which is seen as an investment with longer term consequences (Gibbs, Merchant, Van der Stede, & Vargus, 2004).

More recently, Grabner (2014) showed that creativity-dependent firms complement performance-based pay with subjective evaluations of non-task related performance to assure the development of products that are both creative and profitable. In addition, Höppe and Moers (2011) established that subjectivity is applied to a greater extent when the unpredictability in the environment is high, a characteristic that is typical for environments in which product innovation takes place.

Contemporaneous to the development of research on subjectivity was the development of research on the use of non-financial performance measures. One of the claimed benefits for using non-financial performance measures is that they are “leading indicators”, which makes them especially useful for incentivizing innovative, long-term oriented efforts. The literature in this area has focused directly on examining this claim (e.g. Banker & Mashruwala, 2007; Ittner & Larcker, 1998), as well as examining the extent to which innovation-oriented firms are more likely to use non-financial measures. Regarding the latter, Ittner, Larcker, and Rajan (1997), for example, find that firms that followed a prospector strategy, with its emphasis on product innovation, were more likely to emphasize non-financial performance measures in CEO bonus plans.

To summarize, research into the role of performance measurement in settings where innovation is important confirms that the traditional use of financial controls for evaluation is insufficient and potentially ineffective. Rather, broader controls, such as non-financial metrics and subjective measures, are more useful. This is because these measures are able to encourage and evaluate innovative effort, the effects of which have a longer time horizon.

3.3. Emerging MCS during the process of innovation

Recently, research has investigated how MCS are implicated in the processes involved in developing innovations. This has raised issues as to how innovation may emerge in unpredictable ways from the adaptive processes involved in innovative effort. For example, innovation may commence with an initial "soft" idea that adapts during development to challenges of competing interests and changing environmental concerns into something quite different from the initial idea. More complex controls are employed in different ways depending on the challenges presented during the process of innovation (Revellino & Mouritsen, 2007).

In this innovation-process approach, complexity of MCS has been captured as the difference between "short and long translations" (Mouritsen, Hansen, & Hansen, 2009). Short translations are where MCS are tightly coupled to decisions to regulate the innovation to ensure a profitable outcome. Long translations are where more open, complex MCS involve interactions between many MA practices. Long translations ensure that consideration is taken into account of the tensions between elements from the whole system of innovation, both within and outside the organization. Here the evolving innovative ideas might bring about an adjustment to strategic priorities.

4. Discovering control complexity and innovation

Early organizational research suggested that organizations following strategies requiring flexibility and innovation, such as entrepreneurial, prospector, differentiator and build strategies, would find more formal controls inappropriate and organic approaches would be more suitable (Burns & Stalker, 1961; Miles & Snow, 1978; Minzberg, 1987; Porter, 1980; Quinn, 1985). However, research findings in accounting revealed that formal, sophisticated control systems were used by firms following strategies with intense product competition requiring novel product offerings (Khandwalla, 1972). Simons (1987) reported that prospectors, that embraced innovation, employed forecast data, tight budgets and carefully monitored outputs. On the other hand, large defenders, with less ambitious approaches to innovation, did not use these practices.

Simons (1990) provided an important elucidation on these findings from MA research by focusing on how formal controls are used by firms following different strategies. Firms facing high levels of strategic uncertainties, due to rapidly changing markets with needs for innovation, used formal controls interactively to set agendas for debate. Firms following low cost strategies within more stable settings used formal controls in more diagnostic ways. This was a significant advance in thinking about how MA is used, rather than identifying the practices to suit context, which developed into the LOC framework (Simons, 1995). It is also an amplification of research into ideas about how formal and more informal combinations of practices, and uses of controls, may be employed to generate innovative outcomes (Chenhall, 2003, 2007). These issues are developed in the next sub-sections.

4.1. Elaborating on formal controls for managing innovation

In situations in which innovation is important, it is apparent that effective MCS require a focus on both innovation and efficiency. This has enabled MCS research to reconsider the roles of various practices and how they might operate in combination. It is in these situations where innovation is a key to survival that the simple predictive approach to prescribing financial plans, characterized by traditional MA controls, is incomplete and more complex notions of control are required. The role of formal controls provides an illustration of how research into the design of MCS within settings where innovation is an imperative has moved from simple prescriptions to a more inclusive appreciation of the control issues.

Initially it was believed that traditional formal controls were unsuitable in situations that necessitated innovative effort, while more organic controls support the generation of innovation (Burns & Stalker, 1961). At best, formal controls were seen as appropriate for formalizing plans to carry out innovative strategies and for evaluating their outcomes. Because of their prescriptive approach and inflexibility, formal MA practices were seen as an anathema to the looser, organic forms of control that were suitable for nurturing innovation. However, more recent research that accommodates a broad approach to control that is informed by both organizationally focused technical prescriptions and facilitating organizational processes, has shown how formal controls can assist in innovation.

Prescriptive roles for formal controls to enhance innovation have been presented in recent years, sometimes in more subtle forms than simple formal, cybernetic financial planning models. Formal controls can help enhance the potential for innovation by identifying possible areas of the business that are likely to produce innovation though planning techniques such as SWOT analysis and examining internal capabilities (Chakravarthy & Lorange, 1999). Davila (2000) found that formal controls, particularly non-financial measures related to costs and design, had a positive effect on product development performance, by responding to the information demands of projects.

Formal cost management practices, such as target costing, have been identified as useful to assist in profitable product development (Ansari, Bell, & Okano, 2007). Target costing, as conventionally conceived, is most effective when modeling cost behavior is relatively straightforward and costs are a dominant aspect of product development.[2] However, in many situations project development objectives require more innovative approaches to value creation than just cost reduction. In these cases a broader approach to cost management that accommodates costs around, rather than within, the project has been suggested (Davila & Wouters, 2004). Here cost management practices address the tension between technological innovation, product performance, time-to-market and cost effectiveness. Within this approach a broader external focus is achieved by parallel cost management teams, modular design for costs, clearly defined cost management strategies and cost policies and product portfolio analysis. For an elaboration of how broad approaches to cost management have enhanced product development see Davila and Wouters (2007, pp. 832–837).

While budgets are often identified with more static, traditional hierarchical control, they can be used in ways that are consistent with flexible modes of management that accommodate innovative effort. Drawing evidence from a case study, Frow, Marginson, and Ogden (2010) showed that 'continuous budgeting' provides an expectation to achieve preset targets but also allows budget revisions and a reallocation of resources when circumstances require an innovative response. Importantly, continuous budgets operated as an integral part of a broader MCS including strategically focused planning, performance plans and evaluation. Other controls covered improvement processes, customer centered interactions, fact-based displays of operations, and protocols for meetings.

A further prescriptive role for formal controls is to evaluate the

[2] Even where target costing is used for cost reduction it has been shown that using specific, rather than general cost targets to reduce costs, is effective when the production design process is sequential but not when it is concurrent. This was due to the task uncertainty in concurrent product design processes (Gopalakrishnan, Libby, Samuels, & Swenson, 2015).

extent to which innovative ideas are consistent with organizational objectives and whether they are economically feasible and viable in terms of implementation issues. Formal controls that focus on planning are useful for aligning potential innovations with objectives. The on-going use of formal controls helps managers learn about taking ideas to effective innovation and provides them with confidence in assessing the viability of developing and implementing the innovations (Davila, Epstein, & Shelton, 2006, pp. 233–234).

Formal controls can assist in motivating innovative behavior. They provide an expediting structure that can assist, encourage and motivate individuals to instigate innovative thinking (Haas & Kleingeld, 1999). Also, formal controls can be used for motivating managers by developing reward systems targeted on managers effectiveness in generating innovation (Simons, 2000, pp. 117–119). Formal controls to systematically evaluate managerial and senior staff personnel are relevant to assist in this area (Simons, 1995, pp. 117–119). An additional insight, provided by Marginson and Ogden (2005), is the way in which formal controls can be useful in ambiguous settings by providing managers with a "comfort zone" providing structure and certainty.

In summary, it is the pressure for organizations to be innovative that has highlighted the potential role of formal controls to help initiate and motive innovative effort. These formal controls, when instigated by innovation, can ensure confidence in taking projects from ideas to the launch stage which is likely to result in enduring effort into developing innovation (Simons, 1995, p. 160; Davila et al., 2006, pp. 222–227).

4.2. Combining formal and informal controls

While there are reasons to believe that there are separate advantageous effects to managing uncertainty and innovation from employing both formal and organic controls independently, theory and findings indicate potential combined benefits whereby formal controls can complement organic controls. Here organic systems provided a supportive culture to develop innovation and flexibility to identify opportunities from uncertain settings and formal systems curb excessive attention to potentially unviable innovations (Chenhall, 2003, 2007).

The conclusion that combinations of formal and informal controls are beneficial has encouraged theorizing about MCS design in a way that accommodates multiple controls, with interdependencies capturing the dynamic tension between contrasting controls. A variety of taxonomies have been developed to elaborate on combinations of controls. These include formal controls and organic decision processes (Chenhall & Morris, 1995; Ylinen & Gullkvist, 2014), diagnostic and interactive use of controls (Henri, 2006; Marginson, McAulay, Roush, & van Zijl, 2014; Mundy, 2010; Simons, 1995; Widener, 2007); coercive and enabling controls (Ahrens & Chapman, 2004; Chapman & Kihn, 2009; Wouters & Wilderom, 2008), formal controls, organic controls and social networking (Chenhall, Kallunki, & Silvola, 2011), as well as the early classifications of tight and loose (Merchant, 1985; Van der Stede, 2001) and inflexible and flexible (Hopwood, 1972).

Recently, research has provided an elaboration on the formal-informal distinction by exploring 'vernacular accountings'. This approach to describing MCS specifies the way MCS can be defined in terms of the 'hardness' or 'softness' of information and the source of legitimization of the MCS (Kilfoyle, Richardson, & MacDonald, 2013). Hardness depends on the extent to which individuals are prepared to act on the information, which is determined by the epistemological preferences of the users. Hardening information involves a social process whereby ambiguous information is made acceptable to users (Rowe, Shields, & Birnberg, 2012). Sources of legitimization are either the formal hierarchy or the local social order.

From the viewpoint of innovation, vernacular accountings are of particular interest. Vernacular accountings, which exist in parallel with formal MCS, provide an inventory of knowledge at the local level that enables innovation. This knowledge is based on hard information (that might include mental models, narratives, artifacts as well as inscriptions), which is regarded as legitimate by the local social order. This form of control may overcome the limitations of formal systems and provide local hard information to support innovation to address complex task environments, densely interconnected task environments in turbulent settings, and enhance efforts to learn through exploration (beyond formal systems) (Kilfoyle et al., 2013). There are research opportunities to develop understanding of how local vernacular accountings are (or are not) integrated into enterprise wide systems to contribute to organizational knowledge bases, learning and innovation.

5. Performance measurement complexity and innovation

When considering performance measurement systems, the most important advances in incorporating more complex notions of control that relate to innovation, arguably, have been strategic performance measurement systems, notably BSC (Kaplan & Norton, 1996, 2001, 2004, 2006, 2008), and the application of the LOC framework (Simons, 1995, 2000). As with many developments in MCS these topics have been more inclusive of organization and behavioral issues than traditional performance measures based on standard financial performance metrics and single loop feedback. In doing so they rely on theorizing about how information can be prepared and applied to have a motivating affect on innovative effort. They consider how coordination and control of innovation can be achieved by communications to assist in integration across the value chain, and how innovation can be aligned with strategy and organizational purpose.

5.1. BSC and innovation

BSC have evolved from combinations of financial and non-financial measures to mechanisms for developing and implementing strategy. The use of BSC in an interactive way, combines ideas related to BSC and the LOC, which is seen as transforming BSC from a simple control mechanism based on a performance measurement system to an interactive management system for strategy execution (Kaplan, 2009, pp.1265–1266). Kaplan's (2009) conclusions suggests that for the innovative firm, BSC can be used interactively to: mobilize innovation and change through executive leadership; translate and align innovation to the strategy; motivate employees to make innovation their everyday job; and govern to make innovation a continual processes.

Part of the research agenda into the development of BSC has been to refine the notion of control that is at the foundation of this comprehensive performance measurement system. This has involved criticisms of BSC from researchers who are concerned that the approach lacks rigor, that terminology is loose, constructs are ill defined, the notion of causal strategy maps are difficult to apply, and implementation issues are not given careful consideration (see Journal of Accounting and Organizational Change, 8, 4, 2012 for a special edition on BSC). However, BSC have had a significant impact on how accountants, and others, think about relating MCS to strategy and innovation, based on broad notions of control.

It may be expected that the control imperatives employed in BSC-type approaches will continue to be refined with advances in the approach having particular relevance for how BSC may help achieve innovation. Concern with modeling causality within BSC

strategic maps may be addressed by applying more dynamic methodologies such as systems dynamics. BSC can provide a focus on stakeholders other than shareholders and the primacy of financial matters, which is particularly pertinent in the not-for-profit sectors. Attention will likely be directed at ensuring that the measures used in BSC are congruent, valid and reliable, and strategy maps are comprehensible to managers. Concerns with human resources will help focus on intangible assets. Implementation issues will draw attention to the need for strong and focused leadership. It will be important to ensure that IT is developed to support efficient communications. Structural issues will be debated concerning matters such as the appropriate roles of senior and operational management, and concerns about the role of empowerment, particularly in flatter organizational structures.

5.2. LOC and innovation

As with BSC, the LOC, as a framework for comprehensive control to assist in balancing innovation and efficiency, has been subjected to a variety of reflections. First, the framework is based on a restricted definition of controls, specifically formal controls. Controls to be used within the framework are defined as "the formal, information-based routines and procedures managers use to maintain or alter patterns in organizational activities" (Simons, 1995, p. 5). Thus, when considering the use of controls it is formal controls, which excludes more informal controls such as organic controls, clan controls and enabling controls (Ferreria & Otley, 2009). This is particularly important for the study of innovation as organic processes are an integral part of idea generation. Care is required when theorizing about interactive use of formal controls not to confuse this application with the potential influence of organic, clan or enabling controls. While there may be commonalities in purpose between an interactive use of formal controls and more open, organic controls they are different forms of control having different theoretical processes and potential outcomes on innovation.

As with many MA practices the precise meaning of the different aspects of the LOC is not clear (Tessier & Otley, 2012) (see Bisbe, Basista-Foguet, & Chenhall (2007) for a discussion of defining interactive controls). Definitional issues can lead to ambiguity in meaning of constructs and difficulties in the legitimacy of the conceptual model. This is not to say that the definition of the LOC is not subject to change. For research to remain relevant any evolutionary changes in the constructs and the conceptual model will require careful consideration with subsequent attention to measurement of constructs. Most research has focused on the interactive and diagnostic use of controls, excluding belief and boundary systems. This is a limitation as to be most effective in balancing innovation and efficiency, the LOC framework was envisaged to operate with the four levers working in combination. An important area of work is to identify which and how many formal controls should be employed interactively and diagnostically (Bisbe & Malagueño, 2009). Additionally, research should investigate in what circumstances are different uses of different controls appropriate to support innovation (Abernethy & Brownell, 1999; Bisbe & Otley, 2004; Tuomela, 2005).

Notwithstanding issues related to the conceptual development of the LOC framework, the affects of the framework, particularly the interactive use of controls on innovation, learning, adaptation and strategic change have been well supported (e.g. Abernethy & Brownell, 1999; Bisbe & Otley, 2004; Henri, 2006; Kober, Ng, & Paul, 2007; Moulang, 2013).

Developments may be expected in refining how the application of the LOC relates to different aspects of the process of generating innovation (Tessier & Otley, 2012). The process of innovation involves a series of stages, typically defined as initiation or discovering a need for innovation, ideation or generating ideas, integration or elaboration, and finally implementation (Eveleens, 2010; Teece, 2010). The LOC may have different roles across these aspects of innovation and in integrating them (Davila, Foster, & Oyen, 2010, pp. 285–6). Similarly, the LOC may have different functions depending on whether innovation is radical or exploitative, with the former involving more novelty and uncertainty (Davila, 2005; Van de Ven, Andrew, Polley, Garud & Venkataraman, 1999; Ylinen & Gullkvist, 2014). The special circumstances of the role of MCS and innovation for firms at early stages of development, also, warrants special attention (Davila, Foster, & Li, 2009).

At the individual level, the association between LOC and an individual's motivation to be creative provides opportunities for important insights into developing innovation. Adler and Chen (2011) suggest that it is likely that an optimal mix of interactive and diagnostic controls will be positively associated with three motivational factors that are required for large-scale collaborative creativity, which involves both individual creativity and coordination with others. These factors are intrinsic motivation (persistence with interesting tasks), identified motivation (persistence with uninteresting tasks), and interdependent self-construal's (collectivist values).

The LOC may also have motivational affects at the team level. Chong & Mahama (2014) found that interactive (but not diagnostic) controls enhanced team effectiveness in a biotech setting where innovation is an imperative for success. The association between interactive controls and team effectiveness was mediated by the role of perceived collective efficacy.

Additionally, it will be useful to examine the circumstances when particular controls are best employed interactively and diagnostically, and how the framework relates to other aspects of control. There is also the issue of the extent to which the application of the framework may assist in increasing the relevance of MCS to managers innovative strategic decision making. The important concern here being how the LOC can enhance efforts to sensitize employees to develop emergent innovations within the acceptable domain of organizational action.

Overall, BSC and the LOC have been significant in influencing the way management accounting has developed more complex systems to evaluate performance where innovation is important. They have emphasized the usefulness of MCS for strategic management. Also, they have enhanced the relevance of management accountants to many other functional areas and emerging concerns such as sustainable development and environmental issues. BSC and the LOC have stimulated extensive research into many aspects of performance management in settings where innovation is an imperative. Of importance are issues such as the meaning of causality within strategy models, developing congruent, valid and reliable measurement, concern with communications within and across organizations, and human relations issues associated with performance management.

6. Innovation in technology and structure and complex control

Developing products and services is often the focus for innovation, however innovation is more pervasive covering technologies and administrative structures. MCS research has been mindful of the way innovation in technology and organizational structure has encouraged development in thinking about MCS.

6.1. Innovation in technology and complex control

Revelations that conventional costing was inappropriate for

contemporary business technologies and operations encouraged developments to provide enhanced understanding of costing, with newer costing systems being developed including ABC, target costing and life-cycle costing. These approaches to costing represent an important illustration of how costing evolved from a practice firmly focused on traditional notions of MA to one that is pertinent to wider MCS with its more comprehensive orientation to control.

Research interest in costing as part of MCS appeared to intensify as ABC gained broad acceptance. ABC was seen as an improved costing methodology with a more strategically focused approach, evolving, first, into activity-based management (ABM) and then into strategic cost management (SCM). Using ideas from ABM and SCM has provided managers with an enhanced approach to control in settings of strategic importance. This has been the case particularly when developing innovation, as these approaches to costing focus on market based issues as well as improved costing. ABM and SCM link information related to innovative market opportunities with the need to efficiently employ resources in the pursuit of innovation.

Related practices, such as target costing (Ansari et al., 2007) and life-cycle costing (Berliner & Brimson, 1988), also provide approaches that focus on how contemporary accounting, as a calculative practice, can be used as organizing rationales. Here any proposed innovation is subjected to heightened scrutiny in terms of market driven constraints and long-term economic considerations of the innovation. Advancements such as ABM, and its elaborations, have provided potentially powerful tools to employ in interactive ways to provide rich information for debate and dialog between senior and operational managers. This can assist managers to identify the viability of novel product and service innovations and new ways of developing, marketing and producing both new and existing products and services.

Innovative advances in manufacturing technologies have raised the importance of managing interdependencies within the value chain to ensure that innovative product and service ideas can be resourced and scheduled effectively. Much of the work on Activity-Based Cost Management (ABCM) and integrated cost systems (Kaplan & Cooper, 1998), and elaborations such as target costing (Ansari et al., 2007) and life cycle costing (Berliner & Brimson, 1988) were a response to innovations in manufacturing. These approaches sought to provide an integrated approach whereby costs of products or services could be related to the activities involved in resource consumption from suppliers through production to customers, and across the life cycle of the product. A great deal of this work drew on innovative theories and ideas on control from production management but then focusing on the financial impact of improvements from these techniques.

There has been a wide variety of MCS that have developed in response to innovation in manufacturing. These include the provision of non-financial performance measures (Abernethy & Lillis, 1995), quality costing (Atkinson, Hohner, Mundt, Troxel, & Winchell, 1991), theory of constraints (Goldratt & Cox, 1992), customer focused accounting (Foster & Sjoblom, 1996), supply chain management (Dekker, 2003), open book accounting (Carr & Ng, 1995), lean accounting (Maskell & Baggaley, 2003), time-based activity-based costing (Kaplan & Anderson, 2004) and total cost of ownership (Wouters, Anderson, & Wynstra, 2005).

We can expect further challenges from technology innovations such as semi-customization and additive manufacturing. These innovations make it possible for end users to participate in the design of customized, innovative products. The technologies enable a design-driven manufacturing process, where design determines production and not the other way around. Additive manufacturing provides a high degree of design freedom, the optimization and integration of functional features, the manufacture of small batch sizes at reasonable unit cost, and a high degree of product customization even in serial production (Excell & Nathan, 2010). Also developments in nano-manufacturing have had an impact on business (Uldrich & Newberry, 2003). Nano-scale materials can be used to produce the next generation of products that provide higher performance at a lower cost and improved functionality. These types of technological advances are likely to provide a novel context with implications for how MCS are to operate.

MA has always had strong links to the technology of organizations with traditional costing systems designed differently for jobs, batches and processes. Recognizing that MA had not maintained its relevance to advances in technology stimulated developments in costing systems such as ABC, and then ABM and SCM. As innovations in technology emerged, management accountants and others have been very active in designing a wide variety of MCS to suit the new technologies. These systems incorporate a broad scope, typically transforming traditional costing and performance measurement practices into comprehensive MCS, capturing costs and value along the value chain.

6.2. Innovation in organizational structure and complex control

It is recognized widely that MCS should be consistent with the intent of structural arrangements within and between organizations. Structural arrangements aim to ensure that individual managers are provided with decision making rights to implement a certain degree of delegation within the organization. Additionally, the structural arrangements aim to support efforts for coordination and integration between the various decision making segments within and between organizations. In this section we explore, first, how MCS research has been concerned with the challenge of matching control systems with the levels of differentiation and integration within the organization. Next, we examine how MCS research has explored how controls can be designed in ways to suit more innovative “horizontal” structures that provide a lateral dimension to managing the value chain. Finally, we discuss how MCS research has addressed the control implications for structures that have evolved to manage inter-organizational relationships.

As managers recognized the need to address uncertainty and innovation it became apparent to early researchers that organizational structures should be designed to delegate autonomy to those with potential to manage local uncertainty and to identify and generate innovative ideas. At the same time structures were required to ensure integration of ideas across the organization and that ideas were consistent with the overall organization goals (Lawrence & Lorsch, 1967). Elements of structure such as decentralization and divisionalization indicate how an organization delegates and differentiates decision rights, while specialization, rules, and liaison mechanisms provide integration and coordination.

Differentiation was seen as the appropriate structure to generate innovative decision making, particularly in more uncertain settings. However, the more differentiated the organization the more the difficulties of integration that will preserve the decision rights of managers to act independently in response to local environmental conditions, thus the less useful are rules and standardization. More complex integration is required using mechanisms and processes such as direct contact between managers, liaison roles and personnel, temporary task forces, permanent interdepartmental teams, creating an integrating role and translating this into a linking-managerial function (Galbraith, 1973; 2005; Lawrence & Lorsch, 1967).

The specification of structure as comprising differentiation and integration to encourage innovation has required consideration of MCS to support the appropriate combination of these attributes of

structure. Research has confirmed that aggregated measures, such as divisional profit, suit differentiated structures and decentralization (Abernethy, Bouwens, & van Lent, 2004; Bruns & Waterhouse, 1975; Chenhall & Morris, 1986; Gul, Tsui, Fong, & Kwok, 1995; Merchant, 1981). Evidence suggests that aggregate financial performance measures that have the properties of good incentive measures (i.e. congruity of measures with desired outcomes, high sensitivity, precision and verifiability) can complement the delegation choice, which results in increased delegation (Moers, 2006). Studies have shown that integration requires formal MA such as budgets, formal patterns of communications and participation in budgets (Bruns & Waterhouse, 1975; Merchant, 1981). Also, integration can be effected by transfer pricing systems based on various rules, market or cost based, and negotiation (Spicer, 1988). These approaches have largely employed conventional, simple approaches to control.

The need to integrate interdependent decentralized units has presented challenges to MCS design of preserving decentralized managers' decision rights while ensuring effective integration between the decentralized units. Here the role has become apparent of more complex management controls involving non-financial performance measures to track the effectiveness of managing interdependencies within decentralized organizations. Gibbs et al. (2004) found that subjective measures used to assess bonuses were related to high levels of departmental interdependencies. This was seen to assist in rewarding cooperation between departments and to overcome performance measurement noise due to the influence of other departments. Abernethy et al. (2004) found that if one division has interdependencies such that the focal division affects another division's performance then corporate use of divisional summary measures such as income becomes less important which was then associated with increased use of firm summary measures and specific divisional non-summary measures such as quality and product cost (although where the focal division's performance is affected by other divisions then there was an increase in use of the divisional summary measures).

Faced with a need to prosper in increasingly competitive global markets organizational theorists have devised a number of innovations in structural arrangements. One such innovation is a move away from traditional decentralized divisions with vertical structures to lateral structures, processes and information to support a horizontal dimension to the organization (Galbraith, 2005). The emergence of these “horizontal organizations” presents challenges for control that have implications for the role of MCS (Chenhall, 2008). Certainly, with the development of more complex control models based on more comprehensive approaches to costing, such as ABC, and performance measurement systems, such as BSC, there has been the opportunity to focus on lateral flows and interdependencies between parts of the value chain. Despite this, most approaches to ABC and BSC propose that MCS be designed to operate within conventional vertical structures. This means that divisions or departments act as responsibility centres that cut vertically across the value chain. Target Costing represents one approach that has fully embraced the ethos of the horizontal organization, at least as it relates to product development and competitive analysis (Schonberger, 1996).

While the benefits of horizontal organizations have been proposed widely, there is a view that more holistic performance management systems, such as BSC, should not employ structures involving horizontal structural arrangements. It is argued that horizontal structures could impede innovative effort because of confusion of joint responsibilities focused on product development and sales on the one hand and functional activities that cut across product boundaries on the other (Kaplan & Norton, 2006, p. 36). The tendency to maintain traditional vertical structures even when lateral resource flows are important was noted by Hopwood (1976b). Hopwood claimed that traditional vertical structures are more powerful than arrangements to manage lateral relations which, he suggested, are more fragile and need considerable support to maintain visibility.

In the main, MCS research related to consideration of intra-organizational processes has been concerned with team-based structures that aim to provide an horizontal approach (Chenhall & Langfield-Smith, 2003; Chalos & Poon, 2000; Ditillo, 2004; Drake, Haka, & Ravenscroft, 1999; Scott & Tiessen, 1999; Young & Selto, 1993). However, recently there has been more general theorizing as to how MCS might operate within horizontal organizations that aim to ensure innovation (for example, Anderson, 2007; Hansen & Mouritsen, 2007; Jørgensen & Messner, 2010, p. 202; Mouritsen, 1999; Mouritsen & Hansen, 2006). This area holds promise to explore how MCS can be designed and operated to support the intent of innovation employing control paradigms informed by horizontal structural arrangements (see Chenhall, 2008 for an overview).

As well as intra-organizational interdependences, innovative inter-organizational operational logistical relationships present challenges to structuring the value-chain with implications for the application of MCS. Faced with innovation to manage growth in inter-organizational relationships to create competitive advantage, MCS research has examined a variety of practices to assist in supply chain management including value chain analysis (Dekker, 2003), inter-organizational cost management (Fayard, Lee, Leitch, & Kettinger, 2012), enterprise resource planning (Chapman, 2005; Dechow & Mouritsen, 2005), analysis of joint ventures (Kamminga & Van der Meer-Kooistra, 2007) and supplier-customer alliances (Cooper & Slagmulder, 2004; Dekker, 2003, 2004; Håkansson & Lind, 2004). Additionally, work has considered measures to assess the benefits of supplier partnerships (Seal, Cullen, Dunlop, Berry, & Ahmed, 1999), and using total cost of ownership for sourcing decisions (Van den Abbeele, Roodhooft, & Warlop, 2009; Wouters et al., 2005), and open book accounting (Kajüter & Kulmala, 2005).

Triggered, in part, by an increased need for innovation there has been growth in interest in structural arrangements related to inter-firm strategic alliance networks. During the 1980s and 1990s there was a dramatic increase of R&D alliances in high-tech industries. This inspired a growing literature on these strategic alliances as a critical determinant of firm innovation (Hagedoorn, 2002). Strategic alliances have also become more popular compared to join ventures since the 1990s (e.g. Anderson & Sedatole, 2003). These developments have, more recently, influenced the management control literature by creating a focus on issues that are significant for inter-firm alliances. These include trust (Van der Meer-Kooistra & Vosselman, 2000; Vosselman & Van der Meer-Kooistra, 2009), alternative forms of contracting (Anderson, Glenn, & Sedatole, 2000; Krishnan, Miller, & Sedatole, 2011), partner selection (Dekker, 2008), as well as risk management (Anderson, Christ, Dekker, & Sedatole, 2014).

Consideration of innovation in organisational structure has been central to the design of MCS for many years. There has been considerable concern focused on how MCS should be consistent with the extent to which decision rights are delegated. More recently this has promoted research into the qualities of information to be used in assessing managers in delegated settings, such as congruity, sensitivity, precision and verifiability. Innovations in structural arrangements to ensure integration and co-ordination promoted deliberation on the need for more elaborate controls, involving non-financial and subjective measures, to protect decision rights but encourage integration. Recently, innovations in developing horizontal organizations have produced developments

in MCS including target costing, assessment of teams, and inter-organizational accounting such as supply-chain accounting. The design of MCS for the horizontal organization presents many challenges for practitioners and researchers. Finally, as organizations become involved in networks involving other entities, the boundaries between what is internal and external become blurred and consequently the role of MCS will likely change.

7. Conclusion

In this paper we have sought to demonstrate how MCS have evolved from control parameters based on simple closed systems, employing mainly a financial-based logic to more complex calculative practices. This evolution has been a response to the challenges of managing in uncertain conditions, where innovation has become an imperative. These complex MCS incorporate both the design and use of controls and are based on notions of control that engage with organizational and behavioral processes. We show that innovation has been a key variable that has motivated thinking about control in more complex ways. Concern with innovation has elevated it to an overarching contextual variable. Innovation has explicit direct effects by way of generating novel products, services and processes. Also, innovation acts indirectly on organizational outcomes as it is implicated in dealing with the organization's external environment, its strategy, technology and structure.

It seems clear that innovation will remain a key to successful organizational adaptation. As such innovation will continue to occupy the attention of MCS researchers. In this review it is apparent that a dominant proportion of early MCS research into innovation focused on product innovation. However, innovation is more diverse than this and the focal objectives of innovation can also be services, processes and business models. We offer some suggestions as to areas for future research that may elaborate on existing work, or examine ideas not yet explored in the MCS literature.

It is apparent that little MCS work has been undertaken in considering innovation in services. This area may involve service functions like marketing operations or transportation, and service industries like banking or health care. The role of MCS related to these service areas would seem to offer many opportunities for research. A similar line of argumentation applies to the role of MCS to innovations in business models.

Concern with the mechanisms of innovation is an important part of studying innovation. Our review has shown that there has been considerable work that has considered innovations in technological procedures and in administrative arrangements related to innovation, both within and between organizations. However there has been only limited work in considering how innovations emerge from the dynamic, adaptive processes of organizations, often in unpredictable ways. This line of research is likely to provide a deeper analysis of the evolution of the information flows and control processes that are part of the success (or failure) in the production of innovations over a period of time. Consequently, we may expect more research to focus on understanding how MCS relate to more complex notions of innovation that examine the mechanisms and processes by which novel products, services and processes are identified and developed within organizations.

Research could clarify if there are differences in the design and use of MCS between highly innovative, risk taking ventures driven by entrepreneurs who are the owner-operators of their ventures and the more prevalent intrapreneurs operating within companies. Intrapreneurs operate within companies that accept the burden of risk and provide the means for overall guidance for innovation, whereas entrepreneurs personally accept this risk. It seems likely that entrepreneurs have little need of formal MCS as they are highly motivated and can rely on personal controls. As their ventures grow in size and innovativeness starts to depend on intrapreneurs then MCS will have a role in assisting coordination and control but without stultifying the innovative culture of the organization. Another somewhat related area of research could identify if different MCS are likely to be required for active and passive innovators. Active innovation is a continual process and does not rely on the pull of market pressure, competition or falling profits. Passive innovation is more spasmodically driven by shocks that threaten the competitive position of the organization.

While there has been some work on differences in MCS design for the stages in the innovative process (initiation, ideation, elaboration, implementation), it would be informative to examine how these stages are interrelated and the implications for MCS. Also, there may be scope to investigate the processes involved in how MCS can assist in generating a rapid, timely response to “needs” for innovation and the ability to elaborate and implement the novel ideas quickly enough to gain competitive advantage. Research might explore if there are differences in the design of MCS between innovations that are market (demand pull) or technology driven (discovery push), or a combination of both.

Finally, the issue of open innovation has attracted considerable attention from both management scholars and practitioners since Chesbrough's (2003) book on this topic. Open innovation is defined as “the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively” (Chesbrough, 2006). It implies opening the boundaries of R&D and it has become an important element for improving a company's innovation process. Examples of open innovation include: sharing knowledge with partners; licensing of fully developed ideas from external bodies or entering into arrangements where external bodies develop or market the organization's ideas; R&D focused on external rather than internally developed ideas; and joint ventures. Opening the boundaries of innovation and R&D has implications for the design of MCS. For example, Cassiman and Valentini (2015) suggest that future research should more carefully examine the costs of organizing for open innovation, costs which are clearly affected by MCS.

To conclude, MA practices were initially based on simple cybernetic controls where goals and standards are set, inputs and outputs are compared with goals and standards and, as a consequence, appropriate corrective actions are taken or goals and standards are revised. These processes involved, in the main, financial data and the setting was assumed to be relatively stable, with tractable technologies and clear lines of responsibility within a hierarchal structures. As the importance of the influence of environmental uncertainty was recognized, organizations were compelled to develop strategies that focused on product and service innovations to provide competitive advantage. As a consequence, technologies and organizational structures were designed to help achieve the requirements for innovations in effective ways. It is in this setting that MCS developed in response to the need for control systems that were sufficiently open to external factors to help identify possible innovative products and services. Also, examining the way in which MCS were implemented drew attention to understanding uses of MCS, such as interactive or enabling, that were supportive of innovation effort. Given the identification of innovative ideas, MCS could then assess the efficiency and effectiveness with which organizational processes and individual behavior could deliver the innovations to market in cost effective ways. It is the evolution of openness, flexibility and comprehensiveness in the design and implementation of MCS that has provided a basis upon which efforts for innovation can be motivated and sustained.

References

Abernethy, M. A., Bouwens, J., & van Lent, L. (2004). Determinants of control systems design in divisionalized firms. *The Accounting Review, 79*(3), 545–570.

Abernethy, M. A., & Brownell, P. (1997). Management control systems in research and development organizations: the role of accounting, behavior and personnel controls. *Accounting, Organizations and Society, 22*(3/4), 233–248.

Abernethy, M. A., & Brownell, P. (1999). The role of budgets in organizations facing strategic change: an exploratory study. *Accounting, Organizations and Society, 24*(3), 189–204.

Abernethy, M., & Lillis, A. (1995). The impact of manufacturing flexibility on management control system design. *Accounting Organizations and Society, 20*(4), 241–258.

Adler, P. S., & Chen, C. X. (2011). Combining creativity and control: understanding individual motivation in large-scale collaborative creativity. *Accounting, Organizations and Society, 36*(2), 263–285.

Ahrens, T., & Chapman, C. (2004). Accounting for flexibility and efficiency: a field study of management control systems in a restaurant chain. *Contemporary Accounting Research, 21*(2), 1–28.

Amabile, T. M., Conti, H., Coon, J., Lazenby, & Herron, M. (1996). Assessing the work environment for creativity. *Academy of Management Journal, 39*(5), 1154–1184.

Anderson, S. W. (2007). Managing costs and cost structure throughout the value chain: research on strategic cost management. In C. S. Chapman, A. G. Hopwood, & M. D. Shields (Eds.), *Handbook of management accounting research* (Vol. 2, pp. 481–506). Amsterdam, The Netherlands: Elsevier.

Anderson, S. W., Christ, M. H., Dekker, H. C., & Sedatole, K. L. (2014). The use of management controls to mitigate risk in strategic alliances: field and survey evidence. *Journal of Management Accounting Research, 26*(1), 1–32.

Anderson, S. W., Glenn, D., & Sedatole, K. L. (2000). Sourcing parts of complex products: evidence on transactions costs, high-powered incentives and ex-post opportunism. *Accounting, Organizations and Society, 25*(8), 723–749.

Anderson, S. W., & Sedatole, K. L. (2003). Management accounting for the extended enterprise: performance management for strategic alliances and networked partners. In A. Bhimani (Ed.), *Management accounting in the digital economy*. London: Oxford Press.

Ansari, S., Bell, J., & Okano, H. (2007). Target costing: uncharted research territory. In C. S. Chapman, A. G. Hopwood, & M. D. Shields (Eds.), *Handbook of management accounting research* (Vol. 2, pp. 507–530). Amsterdam, The Netherlands: Elsevier.

Anthony, R. N. (1965). *Management planning and control systems: A framework for analysis*. Boston: Harvard Business School Press.

Atkinson, J. H., Hohner, G., Mundt, B., Troxel, B., & Winchell, W. (1991). *Current trends in cost of quality: Linking the cost of quality and continuous improvement*. Montvale NJ: National Association of Accountants.

Banker, R., & Mashruwala, R. (2007). The moderating role of competition in the relationship between nonfinancial measures and future financial performance. *Contemporary Accounting Research, 24*(3), 763–793.

Berliner, A., & Brimson, J. A. (1988). *Cost management for today's advanced manufacturing—the CAM-I conceptual design*. Boston, Mass: Harvard Business School Press.

Bisbe, J., Basista-Foguet, J.-M., & Chenhall, R. H. (2007). Defining and measuring attributes of management control systems: a methodological note on the risks of theoretical misspecification. *Accounting Organizations and Society, 32*(7/8), 789–820.

Bisbe, J., & Malagueño, R. (2009). The choice of interactive control systems under different innovation management modes. *European Accounting Review, 18*(2), 371–405.

Bisbe, J., & Otley, D. (2004). The effects of the interactive use of management control systems on product innovation. *Accounting, Organizations and Society, 29*(8), 709–737.

Bouwens, J., & Abernethy, M. A. (2000). The consequences of customization on management accounting system design. *Accounting, Organizations and Society, 25*(3), 221–259.

Bruns, W. J., Jr., & Waterhouse, J. H. (1975). Budgetary control and organizational structure. *Journal of Accounting Research, Autumn, 13*, 177–203.

Burns, T., & Stalker, G. (1961). *The management of innovation*. London: Tavistock.

Bushman, R., Indjeikian, R., & Smith, A. (1996). CEO compensation: the role of individual performance evaluation. *Journal of Accounting and Economics, 21*, 161–193.

Carr, C., & Ng, J. (1995). Total cost control: Nissan and its U.K supplier partnerships. *Management Accounting Research, 6*, 347–365.

Cassiman, B., & Valentini, G. (2015). Open innovation: are inbound and outbound knowledge flows really complementary? *Strategic Management Journal*. http://dx.doi.org/10.1002/smj.2375.

Chakravarthy, B., & Lorange, P. (1999). Steps in the strategy process. In B. de Wit, & R. Meyer (Eds.), *Strategy synthesis: Resolving strategy paradoxes to create competitive advantage* (pp. 114–120). London: Thompson.

Chalos, P., & Poon, M. C. C. (2000). Participation and performance in capital budgeting teams. *Behavioral Research in Accounting, 12*, 199–229.

Chapman, C. S. (2005). Not because they are new: developing the contribution of enterprise resource planning systems to management control research. *Accounting, Organizations and Society, 30*(7/8), 685–689.

Chapman, C. S., & Kihn, L.-A. (2009). Information system integration: enabling control and performance. *Accounting, Organizations and Society, 34*(2), 151–169.

Chenhall, R. H. (2003). Management accounting within its organizational context: findings from contingency modelling and directions for future research. *Accounting, Organizations and Society, 28*(2/3), 127–168.

Chenhall, R. H. (2005). Integrative strategic performance measurement systems, strategic alignment of manufacturing, learning and strategic outcomes: an exploratory study. *Accounting, Organizations and Society, 30*(5), 395–422.

Chenhall, R. H. (2007). Theorizing contingency research in management accounting. In C. S. Chapman, A. G. Hopwood, & M. D. Shields (Eds.), *Handbook of management accounting research* (Vol. 1, pp. 163–205). Amsterdam, The Netherlands: Elsevier.

Chenhall, R. H. (2008). Accounting for the horizontal organization: a review essay. *Accounting, Organizations and Society, 33*(4/5), 517–550.

Chenhall, R. H., Kallunki, J.-P., & Silvola, H. (2011). Exploring the relationships between strategy, innovation and management control systems: the roles of social networking, organic innovative culture and formal controls. *Journal of Management Accounting Research, 23*(1), 99–128.

Chenhall, R. H., & Langfield-Smith, K. (2003). The role of employee pay in sustaining organisational change. *Journal of Management Accounting Research, 15*, 117–143.

Chenhall, R. H., & Morris, D. (1986). The impact of structure, environment and interdependence on the perceived usefulness of management accounting systems. *The Accounting Review, 61*(1), 16–35.

Chenhall, R. H., & Morris, D. (1995). Organic decision and communication processes and management accounting systems in entrepreneurial and conservative business organizations. *Omega: International Journal of Management Science, 23*(5), 485–497.

Chesbrough, H. (2003). *Open innovation*. Boston, MA: Harvard Business School Press.

Chesbrough, H. (2006). Open innovation: a new paradigm for understanding industrial innovation. In H. Chesbrough, W. Vanhaverbeke, & J. West (Eds.), *Open Innovation: Researching a new paradigm* (pp. 1–12). Oxford, UK: Oxford University Press.

Chong, K. M., & Mahama, H. (2014). The impact of interactive and diagnostic uses of budgets on team effectiveness. *Management Accounting Research, 25*(3), 206–222.

Cooper, R., & Slagmulder, R. (2004). Interorganizational cost management and relational context. *Accounting, Organizations and Society, 29*(1), 1–26.

Damanpour, F., Walker, R. M., & Avellaneda, C. N. (2009). Combinative effects of innovation types and organizational performance: a longitudinal study of service organizations. *Journal of Management Studies, 46*(4), 650–675.

Danampour, F., & Gopalakrishnan, S. (2001). The dynamics of the product and process innovations in organizations. *Journal of Management Studies, 38*(1), 45–46.

Dananpour, F., & Evans, W. M. (1984). Organizational innovation and performance: the problem of organizational lag. *Administrative Science Quarterly, 29*, 329–409.

Davila, A. (2000). An empirical study on the drivers of management control systems' design in new product development. *Accounting Organizations and Society, 25*(4/5), 383–409.

Davila, A. (2005). The promise of management control systems for innovation and strategic change. In C. S. Chapman (Ed.), *Controlling Strategy: Management, accounting and performance measurement* (pp. 37–61). Oxford, UK: Oxford University Press.

Davila, A., Epstein, M. J., & Shelton, R. (2006). *Making innovation work: How to manage it, measure it, and profit from it*. Upper Saddle River, NJ: Wharton School Publishing.

Davila, A., Foster, G., & Li, M. (2009). Reasons for management control systems adoption: insights from product development systems choice by early-stage entrepreneurial companies. *Accounting, Organizations and Society, 34*(3/4), 322–347.

Davila, A., Foster, G., & Oyen, D. (2010). Accounting and control, entrepreneurship and innovation: venturing into new research opportunities. *European Accounting Review, 18*(2), 281–311.

Davila, A., & Wouters, M. (2004). Designing cost-competitive technology products through cost management. *Accounting Horizons, 18*(1), 13–26.

Davila, A., & Wouters, M. (2007). Management accounting in the manufacturing sector: managing costs at the design and production stages. In C. S. Chapman, A. G. Hopwood, & M. D. Shields (Eds.), *Handbook of management accounting research* (Vol. 2, pp. 831–858). Amsterdam, The Netherlands: Elsevier.

Dechow, N., & Mouritsen, J. (2005). Enterprise resource planning systems, management control and the quest for integration. *Accounting, Organizations and Society, 30*(7/8), 691–733.

Dekker, H. C. (2003). Value chain analysis in interfirm relationships: a field study. *Management Accounting Research, 14*, 1–23.

Dekker, H. C. (2004). Control of inter-organizational relationships: evidence on appropriation concerns and coordination requirement. *Accounting, Organizations and Society, 29*(1), 27–49.

Dekker, H. C. (2008). Partner selection and governance design in interfirm relationships. *Accounting, Organizations and Society, 33*(7/8), 915–941.

Ditillo, A. (2004). Dealing with uncertainty in knowledge-intensive firms: the role of management control systems as knowledge integration mechanisms. *Accounting, Organizations and Society, 29*(3/4), 401–421.

Drake, A. R., Haka, S. F., & Ravenscroft, S. P. (1999). Cost system and incentive structure effects on innovation, efficiency and profitability in teams. *The Accounting Review, 74*(3), 323–345.

Evan, W. M. (1966). Organizational lag. *Human Organizations, 25*, 51–53.

Eveleens, C. (2010). *Innovation management; a literature review of innovation process models and their implications* (pp. 1–16). Nijmegen, NL.
Excell, J., & Nathan, S. (2010). *The rise of additive manufacturing*. The Engineer. May, download www.the engineer.co.uk.
Fayard, D., Lee, L. S., Leitch, R. A., & Kettinger, W. J. (2012). Effect of internal cost management, information systems integration, and absorptive capacity on inter-organizational cost management in supply chains. *Accounting Organizations and Society, 37*(3), 131–206.
Ferreria, A., & Otley, D. (2009). The design and use of performance management systems: an extended framework for analysis. *Management Accounting Research, 20*(4), 263–282.
Foster, G., & Sjoblom, L. (1996). Quality improvement drivers in the electronics industry. *Journal of Management Accounting Research, 8*, 55–86.
Frow, N., Marginson, D., & Ogden, S. (2010). "Continuous" budgeting: reconciling budget flexibility with budget control. *Accounting Organizations and Society, 35*(4), 393–498.
Galbraith, J. (1973). *Designing complex organizations*. USA: Addison Wesley Publishing Company.
Galbraith, J. (2005). *Designing the customer-centric organization, a guide to strategy, structure, and process*. San Francisco: Jossey Bass.
Gibbs, M., Merchant, K. A., Van der Stede, W. A., & Vargus, M. E. (2004). Determinants and effect of subjectivity in incentives. *The Accounting Review, 79*(2), 409–436.
Goldratt, E. M., & Cox, J. (1992). *The goal: A process of ongoing improvement*. Great Barrington, MA: North River Press.
Gopalakrishnan, M., Libby, T., Samuels, J. A., & Swenson, D. (2015). The effect of cost goal specificity and new product development process on cost reduction performance. *Accounting, Organizations and Society, 42*, 1–11.
Govindarajan, V. (1988). A contingency approach to strategy implementation at the business unit level: integrating administrative mechanisms with strategy. *Academy of Management Journal, 31*(4), 828–853.
Govindarajan, V., & Gupta, A. K. (1985). Linking control systems to business unit strategy: impact on performance. *Accounting, Organizations and Society, 10*(1), 51–66.
Grabner, I. (2014). Incentive system design in creativity-dependent firms. *The Accounting Review, 89*(5), 1729–1750.
Grabner, I., & Moers, F. (2013). Management control as a systems or package? Conceptual and empirical issues. *Accounting, Organizations and Society, 38*(6), 407–419.
Guilding, C. (1999). Competitor-focused accounting: an exploratory note. *Accounting, Organizations and Society, 24*(7), 583–595.
Gul, F., Tsui, J. S. L., Fong, S. C. C., & Kwok, H. Y. L. (1995). Decentralization as a moderating factor in the budgetary participation-performance relationship: some Hong Kong evidence. *Accounting and Business Research, 25*(98), 107–113.
Haas, M., & Kleingeld, A. (1999). Multilevel design of performance measurement systems: enhancing strategic dialogue throughout the organization. *Management Accounting Research, 10*, 233–261.
Hagedoorn, J. (2002). Inter-firm R&D partnerships: an overview of major trends and patterns since 1960. *Research Policy, 31*, 477–482.
Håkansson, H., & Lind, J. (2004). Accounting and network coordination. *Accounting, Organizations and Society, 29*(1), 51–72.
Hansen, A., & Mouritsen, J. (2007). Management accounting and operations management: understanding the challenges from integrated manufacturing. In C. S. Chapman, A. G. Hopwood, & M. D. Shields (Eds.), *Handbook of management accounting research* (Vol. 2, pp. 729–752). Amsterdam, The Netherlands: Elsevier.
Hayes, D. (1977). The contingency theory of managerial accounting. *The Accounting Review, 52*(1), 22–39.
Henri, J.-F. (2006). Management control systems and strategy: a resource-based perspective. *Accounting, Organizations and Society, 31*(6), 529–558.
Höppe, F., & Moers, F. (2011). The choice of different types of subjectivity in CEO annual bonus contracts. *The Accounting Review, 86*(6), 2023–2046.
Hopwood, A. (1972). An empirical study of the role of accounting data in performance evaluation. *Journal of Accounting Research*, 156–182. Supplement.
Hopwood, A. G. (1976a). Editorial: the path ahead. *Accounting, Organizations and Society, 1*(1), 1–4.
Hopwood, A. G. (1976b). The design of information systems for matrix organizations. In K. Knight (Ed.), *Matrix organizations* (pp. 195–208). Farnborough, Hants, England: Gower Press.
Ittner, C., & Larcker, D. (1998). Are non-financial measures leading indicators of financial performance? An analysis of customer satisfaction. *Journal of Accounting Research, 36*(3), 1–35.
Ittner, C., Larcker, D., & Rajan, M. (1997). The choice of performance measures in annual bonus contracts. *The Accounting Review, 73*, 231–255.
Jørgensen, B., & Messner, M. (2010). Accounting and strategising: a case study from new product development. *Accounting, Organizations and Society, 35*(2), 184–204.
Kajüter, P., & Kulmala, H. (2005). Open-book accounting in networks: potential achievements and reasons for failures. *Management Accounting Research, 16*(2), 179–204.
Kamminga, P. E., & Van der Meer-Kooistra, J. (2007). Management control patterns in joint venture relationships: a model and an exploratory study. *Accounting, Organizations and Society, 32*(1/2), 131–154.
Kaplan, R. S. (2009). Conceptual foundations of the balanced scorecard. In C. S. Chapman, A. G. Hopwood, & M. D. Shields (Eds.), *Handbook of management accounting research* (Vol. 3, pp. 1253–1269). Oxford, UK: Elsevier.
Kaplan, R. S., & Anderson, S. R. (2004). Time-based activity-based costing. *Harvard Business Review, 82*(11), 131–138.
Kaplan, R. S., & Cooper, R. (1998). *Cost and effect: Using integrated cost systems to drive profitability and performance*. Boston, Mass: Harvard University Press.
Kaplan, R. S., & Norton, D. P. (1996). *The balanced scorecard: Translating strategy into action*. Boston, Mass: Harvard Business School Press.
Kaplan, R. S., & Norton, D. P. (2001). *The strategy focused organization: How balanced scorecard companies thrive in the new business environment*. Boston, Mass: Harvard Business School Press.
Kaplan, R. S., & Norton, D. P. (2004). *Strategy maps: Converting intangible assets into tangible outcomes*. Boston, Mass: Harvard Business School Press.
Kaplan, R. S., & Norton, D. P. (2006). *Alignment: Using the balanced scorecard to create corporate synergies*. Boston, Mass: Harvard Business School Press.
Kaplan, R. S., & Norton, D. P. (2008). *The execution premium: Linking strategy to operations for competitive advantage*. Boston, Mass: Harvard Business School Press.
Khandwalla, P. N. (1972). The effect of different types of competition on the use of management controls. *Journal of Accounting Research, 10*(2), 275–285.
Kilfoyle, E., Richardson, A., & MacDonald, L. D. (2013). Vernacular accountings: bridging the cognitive and the social in the analysis of employee-generated accounting systems. *Accounting, Organizations and Society, 38*(5), 382–396.
Kober, R., Ng, J., & Paul, B. J. (2007). The interrelationship between management control mechanisms and strategy. *Management Accounting Research, 18*, 425–452.
Krishnan, R., Miller, F., & Sedatole, K. (2011). The use of collaborative interfirm contracts in the presence of task and demand uncertainty. *Contemporary Accounting Research, 28*(4), 1397–1422.
Lawrence, P., & Lorsch, J. (1967). *Organization and environment*. Homewood, Ill: Irwin.
Malmi, T., & Brown, D. A. (2008). Management control systems as a package—opportunities, challenges and research directions. *Management Accounting Research, 19*(4), 287–300.
Marginson, D., McAulay, L., Roush, M., & van Zijl. (2014). Examining a positive psychological role for performance measures. *Management Accounting Research, 25*(1), 63–75.
Marginson, D., & Ogden, S. (2005). Coping with ambiguity through the budget: the positive effects of budgetary targets on managers' budgeting behaviours. *Accounting, Organizations and Society, 30*(5), 435–456.
Maskell, B., & Baggaley, B. (2003). *Practical lean accounting*. NY: Productivity Press.
Merchant, K. (1981). The design of the corporate budgeting system: influences on managerial behavior and performance. *The Accounting Review, 4*, 813–829.
Merchant, K. (1985). *Control in business organisations*. Boston: Pitman.
Merchant, K. (1990). The effects of financial controls on data manipulation and management myopia. *Accounting, Organizations and Society, 15*(4), 297–313.
Miles, R. W., & Snow, C. C. (1978). *Organizational strategy, structure and process*. New York: McGraw Hill.
Miller, P. (2001). Governing by numbers: why calculative practices matter. *Sociological Research, 68*(2), 379–396.
Minzberg, H. (1987). The strategy concept I: five Ps for strategy. *California Management Review, 30*(1), 11–24.
Moers, F. (2006). Performance measure properties and delegation. *The Accounting Review, 81*(4), 897–924.
Moulang, C. (2013). Performance measurement system use in generating psychological empowerment and individual creativity. *Accounting and Finance, 55*(2), 519–544.
Mouritsen, J. (1999). The flexible firm: strategies for a subcontractor's management control. *Accounting, Organizations and Society, 24*(1), 31–55.
Mouritsen, J., & Hansen, A. (2006). Management accounting, operations and network relations: debating the lateral dimension. In A. Bhimani (Ed.), *Contemporary issues in management accounting* (pp. 266–290). Oxford, UK: Oxford University Press.
Mouritsen, J., Hansen, A., & Hansen, C. O. (2009). Short and long translations and innovation management. *Accounting, Organizations and Society, 34*(6/7), 738–754.
Mundy, J. (2010). Creating dynamic tensions through a balanced use of management control systems. *Accounting, Organizations and Society, 35*(5), 499–523.
Nixon, B. (1998). Research and development performance measurement: a case study. *Management Accounting Research, 9*, 329–355.
Otley, D. T. (1980). The contingency theory of management accounting: achievement and prognosis. *Accounting Organizations and Society, 5*(4), 413–428.
Ouchi, W. G. (1977). The relationship between organizational structure and organizational control. *Administrative Science Quarterly, 22*(1), 95–113.
Perrow, C. (1967). A framework for the comparative analysis of organizations. *American Sociological Review, 32*(2), 194–208.
Porter, M. (1980). *Competitive strategy*. New York: The Free Press.
Quinn, J. B. (1985). Managing innovation: controlling chaos. *Harvard Business Review*, 73–84. May-June.
Revellino, S., & Mouritsen, J. (2007). The multiplicity of controls and the process of innovation. *European Accounting Review, 18*(2), 341–369.
Rockness, H., & Shields, M. (1984). Organizational control systems in research and development. *Accounting, Organizations and Society, 9*(2), 165–177.
Rockness, H., & Shields, M. (1988). An empirical analysis of the expenditure budget in research and development. *Contemporary Accounting Research, 4*(2), 568–581.

Rowe, C., Shields, M. D., & Birnberg, J. G. (2012). Hardening soft accounting information: games for planning organizational change. *Accounting Organizations and Society, 37*(4), 260–279.
Schonberger, R. J. (1996). *World class manufacturing: The next decade*. New York: The Free Press.
Scott, T. W., & Tiessen, P. (1999). Performance measurement and managerial teams. *Accounting, Organizations and Society, 24*(3), 107–125.
Seal, W., Cullen, J., Dunlop, A., Berry, T., & Ahmed, M. (1999). Enacting a European supply chain: a case study on the role of management accounting. *Management Accounting Research, 10*, 303–322.
Simons, R. (1987). Accounting control systems and business strategy: an empirical analysis. *Accounting Organizations and Society, 12*(4), 357–374.
Simons, R. (1990). The role of management control systems in creating competitive advantage: new perspectives. *Accounting Organizations and Society, 15*(1/2), 127–143.
Simons, R. (1995). *Levers of control: How managers use innovative control systems to drive strategic renewal*. Boston, Mass: Harvard Business School Press.
Simons, R. (2000). *Performance measurement and control systems for implementing strategies*. New York: Prentice Hall.
Spicer, B. H. (1988). Towards an organizational theory of transfer pricing process. *Accounting, Organizations and Society, 13*(3), 303–322.
Teece, D. J. (2010). Business models, business strategy and innovation. *Long Range Planning, 43*(2/3), 172–194.
Tessier, S., & Otley, D. (2012). A conceptual development of Simon's levers of control framework. *Management Accounting Research, 23*, 171–185.
Thompson, J. D. (1967). *Organizations in action*. New York: McGraw Hill.
Tuomela, T.-S. (2005). The interplay of different levers of control: a case study of introducing a new performance measurement system. *Management Accounting Research, 16*, 293–320.
Tushman, M. L., & O'Reilly, C. A., III (1997). *Winning through innovation: A practical guide to leading organizational change and renewal*. Boston, MA: Harvard Business School Press.
Uldrich, J., & Newberry, D. (2003). *Next big thing is really small: How nanotechnology will change the future of your business*. New York: Crown Publishing Group.
Van den Abbeele, A., Roodhooft, F., & Warlop, L. (2009). The effect of cost information on buyer-supplier negotiations in different power settings. *Accounting Organizations and Society, 34*(2), 245–266.
Van der Meer-Kooistra, J., & Vosselman, E. G. J. (2000). Management control of interfirm transactional relationships: the case of industrial renovation and maintenance. *Accounting, Organizations and Society, 25*(1), 51–77.
Van der Stede, W. A. (2000). The relationship between two consequences of budgetary controls: budgetary slack creation and managerial short-term orientation. *Accounting, Organizations and Society, 25*(6), 609–622.
Van der Stede, W. A. (2001). Measuring 'tight budgetary control'. *Management Accounting Research, 12*(1), 119–137.
Van de Ven, A., Andrew, H., Polley, D. E., Garud, R., & Venkataraman, S. (1999). *The innovation journey*. New York: Oxford University Press.
Vosselman, E. G. J., & Van der Meer-Kooistra, J. (2009). Accounting for control and trust building in inter-firm transactional relationships. *Accounting Organizations and Society, 34*(2), 267–283.
Widener, S. K. (2007). An empirical analysis of the levers of control framework. *Accounting, Organizations and Society, 32*(7/8), 757–788.
Wouters, M., Anderson, J. C., & Wynstra, F. (2005). The adoption of total cost of ownership for sourcing decisions - a structural equations analysis. *Accounting, Organizations and Society, 30*(2), 167–191.
Wouters, M., & Wilderom, C. (2008). Developing performance-measurement systems as enabling formalization: a longitudinal field study of a logistics department. *Accounting, Organizations and Society, 33*(4/5), 488–516.
Ylinen, M., & Gullkvist, B. (2014). The effects of organic and mechanistic control in exploratory and exploitative innovations. *Management Accounting Research, 25*(1), 93–112.
Young, S. M., & Selto, F. H. (1993). Explaining cross-sectional workgroup performance differences in a JIT facility: a critical appraisal of a field-based study. *Journal of Management Accounting Research, Fall*, 300–326.