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Simons' Levers of Control framework: Commensuration *within* and *of* the framework

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ABSTRACT

Purpose: Despite extensive adoption of Simons' Levers of Control (LoC) framework, there is still considerable diversity in its operationalization which impedes the coherent development of the literature and compromises its value to researchers. The purpose of this paper is to draw researchers back to the conceptual core of the framework as a basis for stable, consistent definitions of the domain of observables.

Design/Methodology/Approach: We derive the conceptual core of the framework from Simons' writings. We highlight instability in existing operational definitions of the LoC, weaknesses in the extent to which these definitions reference this conceptual core, and inconsistencies in the restriction of LoC to formal information-based routines.

Findings: We draw on the inconsistencies identified to build the case for commensuration or a "common standard" for the framework's use on two levels: the constructs within the framework (through reference to the conceptual core of the framework) and the framework itself (through explicit inclusion of informal controls).

Research implications: We illustrate the benefits of commensuration through the potential to guide the scope of the domain of observables in empirical LoC studies, and to study LoC as complementary or competing with other management control theories.

Originality/Value: Our approach to resolving tensions arising from inconsistencies in the empirical definitions of LoC differs from others in that we focus on the strategic variables underlying the framework to define the conceptual core. We believe this approach offers greater potential for commensuration at the level of the constructs within the framework and the framework itself.

INTRODUCTION

In 1995 Robert Simons published his book setting out his Levers of Control (LoC) framework, which theorizes the relationship between control systems and the formulation and implementation of business strategy. In a comprehensive review of the empirical literature adopting the LoC framework, Martyn, Sweeney, and Curtis (2016) find that it is commonly used in studies seeking to operationalize the elements of control systems and their interaction (e.g. Bedford, 2015; Frow, Marginson, & Ogden, 2010; Henri, 2006; Naranjo-Gil & Hartmann, 2006; Widener, 2007). These LoC studies have produced rich insights into the empirical manifestation of LoC and the outcomes and effects of particular levers. Martyn et al. (2016) also point to the application of the framework to contemporary issues such as Corporate Social Responsibility (Arjalies & Mundy, 2013), the economic crisis (Janke, Mahlendorf, & Weber, 2014), and environmental accounting (Rodrigue, Magnan, & Boulianne, 2013). The ongoing popularity of the framework suggests that it is useful for understanding the purpose of control systems and the way they are used. However, we draw on the results of empirical studies to date to argue that these contributions are not building a coherent body of knowledge. Our aim in this paper is to draw empirical researchers back to the conceptual core of the LoC framework as a basis for stable, consistent definitions of the domain of observables in empirical studies. More specifically, we seek commensuration or a common standard at two levels:

1. At the level of the constructs within the framework. We draw on Simons' writing to distil a conceptual core that has the potential for such a commensurate standard.
2. At the level of the framework itself. We argue for the explicit inclusion of informal controls in order to enhance the comparability of LoC as a descriptive control framework, commensurate in scope with alternative frameworks.

Positioning of the study: Addressing inconsistent construct definitions

The contribution of this paper needs to be assessed relative to previous critiques of the LoC framework (Bisbe, Batista-Foguet, & Chenhall, 2007; Collier, 2005; Ferreira & Otley, 2009; Tessier & Otley, 2012). A common theme in these critiques is the ambiguity and instability of the constructs integral to the framework. This is of course not a problem unique to this particular body of research. The ad hoc development of streams of literature in management accounting is well documented (Bisbe et al., 2007; Chenhall, 2003; Hartmann, 2000; Luft & Shields, 2003). These scholars identify common problems arising from inconsistent variable definitions, levels of analysis and/or causal model form and content. We examine the level of coherence of the literature in the context of this particular LoC framework for three reasons:

1. The framework represents a unique and compelling contribution to the management accounting literature¹ that will be under-exploited if empirical research based on the framework is fragmented. It is timely at this 25-year juncture to take stock and rethink its empirical application.
2. Literature adopting LoC has reached a level of maturity that allows insightful reflection on the diversity of empirical results. In particular, we have the opportunity to reflect on both qualitative and quantitative results in a key domain of management control research.
3. Importantly, we posit that the problems of inconsistency in this case are remediable because the conceptual underpinning of the LoC framework presents a robust foundation for consistent operationalization of constructs in further research. We contend that the inconsistent variable definitions in empirical studies of LoC arise from varying interpretations of the conceptual underpinnings of the framework.

Chenhall (2003, p. 130) asserts that while refinement of concepts and measurement is common in other social sciences, “it is not part of the MCS research tradition to spend more time on developing robust measures of the elements of MCS, particularly where there is ambiguity in the meaning of constructs”. We attempt to address this construct ambiguity in the context of LoC.

The problem of inconsistent construct definitions in the LoC literature is more fundamental than a lack of agreement on the attributes of specific levers. There are no standard construct definitions of the LoC adopted consistently in

¹ The value of this work was originally recognised by the Management Accounting Section of the American Accounting Association in 2000 when Simons received a notable contribution to management accounting literature award for his Levers of Control (1995) book.

empirical studies. In fact, in many cases catalogues of controls such as mission statements, codes of conduct and managerial meetings define the LoC². Definitions adopted in empirical studies are not only reflective of control practices that may differ between settings; the definitions are also divergent between studies (see Martyn et al. (2016) for a comprehensive overview of empirical measures used).

Most common operationalizations of LoC in the literature relate to diagnostic and interactive control systems (DCS and ICS). While definitions of these constructs by Widener (2007) and Henri (2006) have gained traction, they are themselves inconsistent in the way they are operationalized. Furthermore, the domain of observables in qualitative studies of LoC is quite different, and generally includes broader definitions than those adopted in quantitative studies, leading to parallel and inconsistent development of the quantitative and qualitative literatures.

In our view, this instability is compromising the utility of the LoC framework as a powerful tool to describe management control practices across a range of settings and contexts. Unstable construct definitions lead to difficulty interpreting inconsistent findings between studies and a failure to build a cumulative body of research.

Contribution of the study

² Cataloguing attributes and behaviors is not unusual in the development of complex constructs, as Glynn and Raffaelli (2010) point out in the context of the evolution of theories of “leadership”. However, lack of agreement about which behavior categories are relevant and meaningful makes it very difficult to compare and integrate the results of studies (Stinchcombe, 2002).

Our primary contribution from this study is to enhance commensuration as a basis for management control theory development by influencing the definition of domains of observables in empirical LoC studies. We do this in two ways. First, we distil parsimonious construct definitions that do not reference the specific control practices that have come to define the levers in empirical studies. We do this by drawing attention to the strategic variables that underpin the logic of the LoC. These strategic variables allow us to define the LoC by their purpose (or ‘ends’) rather than by the control practices (or ‘means’) that commonly characterize the levers in use. By drawing researchers back to the conceptual core of the framework, our approach to defining the LoC constructs differs from others. For example, Tessier and Otley (2012) express similar concerns with the ambiguity of LoC constructs but develop a different framework. Bisbe et al. (2007) focus on the conceptual definition of practice-based constructs more generally, using ICS in the LoC framework as an example. They conduct a rigorous review of the empirical literature and identify the formative elements of the ICS construct, which include elements such as face-to-face challenges and intensive use by both operating and top management. These formative elements thus incorporate control practices commonly identified in the empirical literature examining ICS. The elements of the LoC are already defined at a conceptual level in Simons’ writings. However we present a great deal of evidence to suggest that these conceptual definitions have been lost in the operationalization of the LoC constructs in the literature. Thus our contribution is to draw researchers back to the conceptual core of the framework, offering a basis for the domain of observables in LoC studies that is focused on purpose and robust to variations in control practice.

Second, we address commensuration at the level of the LoC framework. A second common theme in critiques of the LoC framework is the limited application of the framework to informal control systems (Collier, 2005; Ferreira & Otley, 2009). We consider the inclusion of informal controls in the framework through the lens of commensuration. We review the origins of the framework, the rationale for restricting the LoC to formal information-based routines and the ad hoc loosening of these boundaries within the accounting literature. We conclude that an explicit loosening of this constraint on the LoC is not inconsistent with the conceptual underpinnings of the framework, and the incorporation of informal controls significantly enhances commensuration at the level of the framework, rendering it comparable in scope to other control frameworks. Our contribution in advocating the explicit expansion of the scope of LoC to include informal controls is to expand the domain of observables in empirical studies, particularly quantitative studies, which have tended to adhere to Simons' information-based formal controls. This is notably different to the qualitative literature, which has incorporated many examples of informal controls, leading to parallel and inconsistent development of the two literatures. The systematic inclusion of informal control systems in the domain of observables of empirical studies enhances commensuration at the level of the theory.

Finally, by drawing extensively on both quantitative and qualitative studies that have adopted the LoC framework, we provide insights into the parallel development in these literatures, a phenomenon that is common in management accounting. As noted in relation to contingency theory (Chapman, 1997),

methodologically these literatures should speak to each other when addressing similar research questions. Among other contributions, qualitative studies provide insights that enrich theory development and quantitative studies operationalize and test theories developed at least in part on rich observations from the field (Lillis & Mundy, 2005). In our analysis, we observe the potential to leverage joint contributions in both qualitative and quantitative LoC studies, but we do not see this occur. In that sense, our contribution is not to extend the framework – that has already been done. Rather, we draw together different streams of literature that are developing in independent, and inconsistent trajectories. This opportunity exists only when a field of study reaches a level of maturity in which there is a sufficient body of evidence in both quantitative and qualitative studies to support such comparative analysis.

Structure of the paper

The next section sets out our arguments for distinguishing the conceptual underpinnings of the LoC framework from the control practices in which the levers manifest. Following this, we adopt Libby, Bloomfield, and Nelson (2002) predictive validity framework as a lens to review empirical evidence on the LoC in the quantitative and qualitative literature, which points to the need for commensuration *within* the LoC framework. We then examine commensuration at the level *of* the framework, specifically considering empirical evidence of the application of the LoC beyond the domain of formal controls set out by Simons (1995). Next, we consider the benefits of commensuration through the potential to study MCS using LoC and two other perspectives: enabling/coercive

formalization (Adler & Borys, 1996) and personnel, action and results control (Merchant & Van der Stede, 2007). We show how the LoC framework can converse with these different theoretical perspectives to offer both alternative and complementary explanations of management control practices.

In concluding the paper, we discuss how a return to the conceptual underpinnings combined with an extension of the framework to include the full array of controls (formal and informal) available to management addresses existing criticisms of LoC in the literature.

CONCEPTUAL UNDERPINNINGS OF THE LEVERS OF CONTROL FRAMEWORK

The LoC framework sets out how MCS can be understood in relation to four different levers to control strategic variables. Simons derived the framework inductively from extensive observation of practice in North America (Simons, 1987, 1990, 1991, 1994) and presents it as a set of testable hypotheses about the operation, purpose and linkages between control system elements in practice. Simons identifies four levers each linked to a strategic variable as set out in Figure 1.

[INSERT FIGURE 1 SIMONS' LEVERS OF CONTROL FRAMEWORK HERE]

Simons (1995) starts from the principle that the strategy of a business can be described by four interrelated strategic variables and that to implement strategy successfully, top management must understand each of the four key strategic variables: core values, strategic uncertainties, risks to be avoided, and critical performance variables. This represents the core underpinning of the framework

and is based on Mintzberg's (1987) notion of strategy: as a plan, as a pattern of action, as a competitive position, and as an overall perspective. Each of these views of strategy is reflected in a strategic variable. Simons proposes that formal control systems are connected to strategy through their use as "levers" to manage these variables. In other words, the levers of control are the means by which the underlying conceptual dimensions of strategy (strategic variables) are managed. Managers activate particular levers by drawing on the range of control practices and systems at their disposal. Our interest is in the operational definitions of these levers in the extant literature.

Conceptual definitions for levers and strategic variables

In order to consolidate the conceptual core of the LoC framework, we draw on two principles:

1. The definitions of levers are linked conceptually to the underlying strategic variables that represent their purpose.
2. Control practices are independent of levers. The 'levers' represent the mobilization of control practices in ways that are goal directed (such as avoiding risks, managing strategic uncertainties) but are not limited to Simons' illustrations of practice.

While Simons does not provide specific definitions of the levers, he does provide concise descriptions for how control systems operate as levers in the early paragraphs of the relevant chapters of his 1995 book. We examine these descriptions together with the 'The Checklist Summary of the Levers of Control' in Appendix A of his book (Simons 1995). We compare these to the concise

descriptions included in his 1994 *Strategic Management Journal* paper that was published shortly before the book (Simons, 1994), where he introduces all four levers for the first time and includes a table of the characteristics of the four levers.

We review these sources to seek conceptual definitions for each of the levers and associated strategic variables. The definitions are adapted from wording taken from Simons' text. First we define the levers in terms of 'The use of control practices to...'. Second, we remove references associated with specific control practices. Third, we associate the definitions with the underlying strategic variables that represent their purpose, rather than the attributes of the levers. As such these definitions focus on the 'ends' or outcomes of the use of controls, rather than on the 'means' to achieve those ends, which may vary in different practice settings. Fourth, we exclude references to 'formal' control systems and senior management. The first three points are important to identify the common standard definitions of constructs within the framework (commensuration *within* the framework). The fourth allows us to loosen the constraints on the application of the framework (relative to other management control frameworks) and thus is important to allow for commensuration *of* the framework. The outcome of this analysis is presented in Table 1.

[INSERT TABLE 1 CONCEPTUAL DEFINITIONS OF STRATEGIC VARIABLES AND
LEVERS OF CONTROL HERE]

Table 1 identifies a definition of each strategic variable and lever of control based on its conceptual underpinnings. Commencing with the strategic variables, we note that Simons does not explicitly define them. However, in the

case of core values and risks to be avoided, their definition can be inferred from the definitions of the relevant levers of control. Core values are defined by the organization's basic values and purpose. Risks to be avoided are those that would take the organization outside its intended domain of activity. The definitions of strategic uncertainties and CSFs are less readily evident. As indicated in Table 1, these definitions require reference to other text in the book to gain an understanding of their meaning. Critical success factors are the "the small number of variables essential to achieving intended business goals" (Simons, 1995, p. 8) and strategic uncertainties are factors that could "undermine the current basis of competitive advantage" (Simons 1995, 9).

Simons offers clearer definitions of the control levers. In Table 1, we identify these definitions of the levers of control, stripped of practice examples. Thus, the 'belief' lever is defined as any control practice that communicates and reinforces firm values; the boundary lever focuses on practices that delineate the acceptable domain of activity for organizational participants; and diagnostic lever focuses on practices that monitor key outcomes and correct deviations from pre-set targets. Importantly, these conceptual definitions do not refer to mission statements, codes of conduct or budgets, which might be common practices that reflect these levers. Developing these definitions for Beliefs, Boundary and DCS levers is relatively straightforward; however, the ICS lever is more complex. Bisbe et al. (2007) identify ICS as a multidimensional practice-defined construct³, referring to five dimensions: i) intensive use by top management, ii) intensive use by operating managers, iii) pervasiveness of face-

³ Practice-defined constructs (such as activity-based costing or the balanced scorecard) capture phenomena as they are practiced (Bisbe et al., 2007; Luft & Shields, 2003). These constructs are defined by observable practices that reflect their presence or absence.

to-face challenges, iv) a focus on strategic uncertainties, and v) a non-invasive facilitating and inspirational involvement. While we concur with Bisbe et al.'s (2007) approach to identifying these dimensions of ICS as a practice based construct, our purpose is different. We are seeking parsimonious conceptual definitions for the LoC that are robust to variations in practices. We identify two dimensions that are likely to lead to commensuration in the empirical literature. In comparing our two dimensions to the five dimensions specified by Bisbe et al. (2007), both definitions encompass a focus on strategic uncertainties, consistent with a conceptual link to the relevant strategic variable. However, our definition also reflects the intended outcome of the remaining four elements specified by Bisbe et al. (2007) through the incorporation of the following wording from Simons' book: "...building internal pressure to break out of narrow search routines, stimulate opportunity-seeking and encourage the emergence of new strategic initiatives" (Simons, 1995, p. 95). We argue that this definition is robust to differences in practice.

The next section considers problems arising from the conceptualization and operationalization of variables in extant quantitative and qualitative literature with a view to demonstrating the value of building on a 'hardened' conceptual core of the framework.

COMMENSURATION *WITHIN* THE FRAMEWORK: EVIDENCE FROM THE LITERATURE

In reviewing prior literature, we do not set out to criticize either individual studies or the body of literature in general. The value of hardening the core of the

LoC framework is evident only as a result of this prior work. Glynn and Raffaelli (2010) point to the benefits of a proliferation of theories in the early stages of development of a field and the need for intentional narrowing as the field develops. We would not have reflected on the core underpinning of the framework and the breadth of practice that could be embraced within the framework without the work that has been done. In particular, we are now in a position to observe the extent to which observations of diverse practice challenge definitions that embed some, but not all relevant practices, and which identify some practices as uniquely associated with specific levers.

Following Bisbe et al. (2007), we interpret the empirical literature through the lens of Libby et al.'s (2002) predictive validity framework (Figure 2).

[INSERT FIGURE 2: The Predictive validity framework in a LoC context]

The predictive validity framework provides a valuable means to identify the disconnect between *our* conceptual definitions and operational definitions of key constructs adopted across both quantitative and qualitative studies. While not all qualitative studies identify relations among constructs, many of the LoC studies are functionalist in perspective and do, either implicitly or explicitly, adopt a domain of observables for the LoC constructs they study.

Evidence from the quantitative literature

In this section we consider the extent to which the operational measures (links 2 and 3 in Libby et al. (2002) framework in figure 2) are consistent with our conceptual definitions in Table 1. Martyn et al. (2016) provide a table of operational measures of each of the levers of control, included in 14 quantitative

studies published up to 2014. This table (adapted in Appendix A to identify examples of practice-related and conceptual items included in the operationalizations) provides the basis for our analysis of the consistency of the measures with our conceptual definitions.

It is evident from Appendix A that a) there is considerable diversity in the operational measures of the LoC, and b) there are many examples of measures of the levers which refer to specific control practices that do not form part of the conceptual definitions set out in Table 1. For example, the operationalization of ICS (the most frequently examined construct) typically focuses on the frequency and level of interaction between superior and subordinate management (e.g. Abernethy & Brownell, 1999; Bisbe & Otley, 2004; Henri, 2006). Similarly Widener's (2007) measure of belief systems refers to the presence of inspirational mission statements, and her measure of boundary systems refers to reliance on and awareness of codes of conduct.

The literature also provides examples of measures that capture conceptual elements of the levers. In the case of ICS, the measures adopted by Abernethy, Bouwens, and van Lent (2010), Janke et al. (2014) and Naranjo-Gil and Hartmann (2006, 2007) reference strategic uncertainties within their multi-item measures. For example, Abernethy et al. (2010) include an item "my superiors and I often use the planning and control system as a means of questioning and debating the factors affecting the strategy". An item within Widener's (2007) measure of belief systems "Our workforce is aware of the firm's core values" is clearly aligned with the conceptual underpinning of beliefs systems. More recently, Bedford's (2015) measure of beliefs systems captures the extent to

which formal statements in general (mission/value statements, credos and statements of purpose given as examples) are used to create commitment to the long-term vision and motivate and guide the search for opportunities. Bedford includes in his measure of boundary systems the existence of policies and guidelines to limit opportunity search and the presence of statements similar to codes of conduct which allow for systems other than those observed by Simons (1995) to have a role in managing risks to be avoided. Such measures are closer to the conceptual definitions of the LoC.

In contrast, there is considerably less variation in measures of DCS which have been operationalized as either “not interactive” (i.e. opposite ends of a continuum (Abernethy & Brownell, 1999; Davila, 2000) or as an independent construct (Henri, 2006; Naranjo-Gil & Hartmann, 2006; Su, Baird, & Schoch, 2015). Henri’s (2006) measure has been adopted by virtually all studies that follow and focuses on tracking progress towards goals, monitoring results, comparing outcomes to expectations and reviewing key measures. This is relatively closely aligned with Simons’ conceptual definition that focuses on monitoring results against expectations.

The common use in this literature of operational definitions drawing on a varying range of practice-defined elements (such as mission statements and frequency of discussion in meetings) without cross-referencing to the conceptual foundations of the constructs is problematic for the coherent development of the literature. Practice-defined attributes *may* capture common ways in which the strategic variables of core values, risks to be avoided, strategic uncertainties and critical performance variables are managed within organizations, but they do not

capture comprehensively the control systems firms use to address the strategic variables. This represents a weak link 2 in Libby et al.'s (2002) predictive validity framework and results in the risk that the body of literature does not accumulate coherently.

Implications for development of the literature

In the absence of a common standard for construct definition, the range of definitions adopted and the variation in practice contexts in which the models are tested produce inconsistent findings that do not build our knowledge about the framework. Reliance on empirical evidence to develop our understanding of the framework in this setting is problematic as the evidence itself is compromised by the variability in operational definitions guiding the data collection and by differences in contexts. Findings are potentially interpreted as more cumulative than they really are.

In this section we examine the way the LoC framework has been used to build our understanding of the antecedents and consequences of control system choices. We reinterpret the findings from the empirical LoC literature to demonstrate that the operationalization of LoC constructs is confounding the coherent development of the literature.

The distinction between DCS and ICS is of considerable interest in the management accounting literature. However, the distinction has been difficult to operationalize. Hall (2010) points to a lack of focus on the nature of the interactive control process itself in developing items for questionnaires. The following in-depth examination of the Henri (2006) and Widener (2007) studies illustrates the consequences of this. Findings from these two studies, which are

frequently referred to as inconsistent in the literature, may not in fact lack consistency. This is an important illustration of the issues that arise when construct definitions reflect practices.

Using the predictive validity framework, Figures 3 and 4 illustrate one of the research questions addressed by the Henri (2006) and Widener (2007) studies along with their operationalization of the DCS and ICS levers. Among other questions, Henri (2006, p. 529) examines the extent to which “diagnostic and interactive uses of MCS contribute *specifically* to the creation and maintenance of capabilities leading to strategic choices” (italics in original). Of interest in this paper are the conclusions he draws in relation to organizational learning (OL) as Widener (2007) examined this also. Henri’s (2006) confirmatory factor analysis validates two coherent factors interpreted as representing diagnostic and interactive use of performance measures. His findings support the proposition that ICS/DCS are related in opposite ways to OL (positive for ICS, negative for DCS). In other words, Henri’s finding tells us that monitoring outcomes against plan is not effective at generating OL, but discussion, debate, challenge and shared goals do support the development of OL. Interestingly, so does a focus on CSFs, which would typically be associated with DCS as discussed in the previous section. Widener (2007) also examines among other issues the relationship between ICS/DCS and OL. In contrast, Widener applies an exploratory factor analysis to the same set of DCS items as Henri, and finds all nine items load on one factor, which she calls DCS. Widener is, like Henri, focused on discussion and debate, but it is top management involvement that differentiates DCS and ICS. The fact that Henri and Widener find different associations with OL is potentially

easily explained. Henri establishes the importance of debate and challenge in building OL. Widener establishes the importance of dialogue and debate and top management involvement in debate in effectively leveraging attention within the firm and building OL. They are different, not necessarily conflicting findings, but given that some of the same items are included in the DCS measure in one study and in the ICS measure in the other, the studies are not speaking directly to the difference between DCS and ICS in terms of either antecedents or consequences. Learning is a function of dialogue within the firm in both cases. In Widener this is attributed to DCS; in Henri it is attributed to ICS. Hence while link 1 (figures 3 and 4) sought to establish a relationship between ICS/DCS and learning, what is actually tested is a relationship between dialogue and learning. The same measure is used, but the critical link with the conceptual underpinning is confounded in the operationalization of these key constructs (refer figures 3 and 4).

More recent studies also assess a range of antecedents and consequences of ICS/DCS and adopt a variety of operational definitions of these key constructs that in many cases are not grounded in the conceptual underpinnings. For example, Su et al. (2015) examine the moderating effect of organizational life cycle on the relationship between ICS/DCS and performance. Su et al. (2015) maintain that the relationship between ICS and performance is grounded in social exchange theory where through an interactive approach, “management show respect for subordinates’ ideas and are willing to consult with them in decision making processes” (p. 42). However, this argument is about the consequences of consultation and engagement, not the management of strategic

uncertainties. They find a significant positive association between ICS and performance at the growth stage and a significant negative association at the revival stage. However, addressing a research question on how management of strategic uncertainties impacts on performance for companies at different organizational life stages is likely to result in the formation of alternative hypotheses and produce different results. Other examples include Chong and Mahama (2013) who focus on the presence of dialogue and information sharing in theorizing a relationship between ICS and team effectiveness. They acknowledge the similarity between interactive use of budgets and leadership/management style; however, they draw conclusions on what they refer to as ICS. Marginson et al.'s (2014) paper highlights how theoretically different relationships between ICS and psychological variables can be argued depending on whether one focuses on the debate and discussion dimension of ICS or the strategic uncertainty dimension. They refer to media selection research to support a negative relationship between ICS and role ambiguity based on the debate and discussion element. However, focusing on the strategic uncertainty dimension leads them to expect a positive relationship between ICS and role ambiguity. While they find a negative relationship between ICS and role ambiguity, their measure of ICS is based on Henri's and includes a focus on CSFs.

In these examples the inherent inconsistencies in identifying LoC arise not because of weak construct validity, but because of lack of agreement on the scope of the underlying construct. That is, each researcher defines and observes the underlying levers differently, leading to empirical results that do not build coherently.

Evidence from the qualitative literature

While qualitative researchers are not faced with the challenge of developing measurement instruments, they do approach the field with a domain of observables which guide data collection in “continuous back and forth questioning of interpretations and discussion of recorded field data” (Ahrens & Chapman, 2006, p. 833). This is generally implicit (because qualitative researchers rarely describe their domain of observables *ex ante*) and we can only interpret the domain of observables from reported findings. Thus qualitative researchers often use the LoC as an analytical framework, providing substantial evidence about the operation of the levers in practice.

In achieving a fit between observations and theory we find that qualitative researchers detect a much broader range of practices constituting the levers of control in action than the constrained set of practices assigned to the levers in quantitative studies. Qualitative researchers observe belief systems being mobilized within a range of MCS elements. For example, Mundy (2010) identifies the strategic planning process and Marginson (2002) and Tuomela (2005) identify attention to performance metrics as mechanisms to communicate the organization’s values. In relation to boundary systems, Collier (2005) describes a spread sheet used to manage cash flow and monitor market share as a risk management boundary system. Tuomela (2005) points to the use of financial data (in protecting the organization from financial risk) and non-financial data (in detailing the strategic boundaries) as a boundary lever. Mundy (2010) gives an example of a product development process operating to establish limits on opportunity-seeking behavior which, in this context, represents an example of a

boundary system. Frow et al.'s (2010) findings illustrate how a "performance excellence process" can operate as a boundary system as it defines and communicates organizational direction and strategy. Arjalies and Mundy (2013) find that intranet systems for communities of practitioners are used to manage strategic uncertainties.

Qualitative researchers, in analyzing the use of control systems in the field, have drawn attention to the use of multiple control systems to lever a single strategic variable in a given organization. For example, Mundy (2010) notes that, the strategic planning process, the product development process, and the operating expense system all play a role as boundary levers in managing limits around the pursuit of opportunities. Similarly, the strategic planning process, divisional budgeting process and the product development process can be used to manage strategic uncertainties, although Mundy found a suppression of this role within many of these systems. Tuomela (2005) points to the use of financial data as both a boundary lever and a diagnostic lever in managing CSFs. The risk management spread sheet described by Collier (2005) as a boundary lever is also used as a diagnostic lever.

Further, Mundy (2010) explicitly acknowledges the role of single control systems in managing multiple strategic variables. Frow et al. (2010) study a "performance excellence process" which is used to manage *all four* strategic variables. While PMS have purposes such as management of CSFs, Frow et al. (2010) also identify their role in managing both core values and setting organizational boundaries.

By drawing attention to the use of multiple control systems to lever a single strategic variable, and the use of specific control systems as a lever for multiple strategic variables, qualitative researchers provide strong support for separating conceptual underpinnings of the levers of control from the set of control practices that may be mobilized to manage the underlying strategic variables.

Difficulties with the application of constructs are, however, also evident in the qualitative literature, particularly the overemphasis on dialogue and debate, and the absence of a focus on strategic uncertainties in categorizing control systems as ICS. For example, Batac and Carassus (2009) conclude that where dialogue and discussion leads to a review of decisions made this can be compared to the concept of interactive control. Ostergren (2009) interprets a focus on ability to adapt to new conditions as consistent with interactive use and a focus on balancing budgets and cost effectiveness as consistent with diagnostic use. In a theoretical paper, Gond, Grubnic, Herzig, and Moon (2012) use the labels interactive and diagnostic to characterize modes of use of MCS and sustainability control systems. Their conceptualization of DCS is based on the absence of a vision for the future (p. 210).

Takeaways from the review of empirical LoC studies

Overall the review of empirical qualitative and quantitative literature highlights three things. First, quantitative studies have adopted a range of operational definitions and domains of observables representing the levers, most of which are based on Simons' observations of practice. Second, qualitative studies identify a much broader range of practices that are used as levers to pursue the goals reflected in strategic variables. They provide evidence that a single control

system can be used to address multiple strategic variables and that multiple control systems can be used to influence a single strategic variable. Third, while we could identify specific control practices from the findings of qualitative studies that could be incorporated in LoC constructs, this would exacerbate rather than mitigate the inherent problem. That is, we could argue for the inclusion of, for example, strategic planning systems or PMS as important elements of the beliefs system construct. However, this would expand the list of practices that *may* reflect the LoC in specific settings and further exacerbate the underlying problem of instability in construct definition. Instead, we propose higher-level definitions of the levers, which are not dependent on practice examples.

Our observation of the diverse ways in which individual controls may be mobilized as control levers is consistent with the current emphasis on controls as a 'package' in the management accounting literature. A set of control practices may constitute a control system where the control practices are interdependent (Grabner & Moers, 2013) or a control package which refers to the collection of controls or control systems (Malmi & Brown, 2008). The distinction between means and ends in LoC studies enhances the power of the framework to support the analysis of both packages of controls (Malmi & Brown, 2008) and multifaceted control systems (Grabner and Moers 2013) such as that described by Frow et al. (2010), as any control practices that constitute a system or package can be analyzed based on the strategic variables they influence and the ends that they achieve.

We described the core of the LoC framework in Table 1. We argue that operational measures of the LoC constructs should consistently reference this core to enhance commensuration *within* the LoC framework. For example where the domain of observables includes ICS, researchers would seek evidence of control systems which “focus attention on strategic uncertainties and build internal pressure to break out of narrow search routines, stimulate opportunity-seeking and encourage the emergence of new strategic initiatives” (Table 1; Simons, 1995, p. 59) rather than evidence of debate and dialogue. Empirical models incorporating beliefs systems would be commonly understood as including controls which “communicate and reinforce systematically the basic values, purpose and direction for the organization” (Table 1; Simons, 1995, p. 34), not necessarily mission statements. A common standard definition for these constructs is critical for us to build a cumulative understanding of the antecedents and consequences of these control system choices. While not guaranteeing the coherent development of the literature, this approach does remove one key source of instability *within* the LoC framework.

It is not only important to extend the domain of observables to allow for the mobilization of a full range of formal controls as levers. We also explain in the next section how a comprehensive package of controls typically includes informal controls.

COMMENSURATION AT THE LEVEL OF THE FRAMEWORK

In this section we consider a key benefit of loosening the restriction of the LoC framework to formal information-based routines in order to accommodate informal controls that operate as levers.

Simons' original formulation of the LoC limits the framework to the use of formal information systems by top managers in large private sector firms (consistent with his empirical data). This leads us to question whether the domain of observables in empirical LoC work should be limited by the boundaries specified by Simons or extended to other settings and other types of control systems. We question particularly whether the LoC are conceptually limited to information-based routines or whether Simons simply restricts his domain of observables in the same way that control system researchers routinely narrow their domain of observables to define the scope of their study. However, Simons LoC is a control systems *framework* rather than a study of specific control practices. Commensuration is important in the development of frameworks to facilitate the assessment of alternative and complementary theories of observed practice. The exclusive focus on formal control systems is frequently pointed out as a limitation of Simons' framework (Ferreira & Otley, 2009; Marginson, 1999).

This exclusion of informal controls is at odds with conventional definitions of control systems in the accounting literature. In a review of contingency literature, Chenhall (2003) defines management control as "broader than MAS" and encompassing personnel or clan controls. The accounting literature has commonly adopted frameworks that reflect both formal and informal controls (Flamholtz, Das, & Tsui, 1985; Merchant, 1985; Otley, 1994; Ouchi, 1979).

Merchant (1985), Ouchi (1979) and Rockness and Shields (1984) are classic frameworks that underpin the management control literature and all embrace a range of social, clan and personnel controls. While previous research has noted that informal controls are often overshadowed by formal controls (Jollands, Akroyd, & Sawabe, 2015; Pitkänen & Lukka, 2011), their importance to our understanding of control in practice is plainly evident in the burgeoning literature on informal controls (Ahrens & Chapman, 2004; Cardinal, Sitkin, & Long, 2004; Chenhall, Hall, & Smith, 2010; Newman, 2014; Nixon & Burns, 2012; Roberts, 2004; Spector & Brannick, 1995). In the context of contingency research, Otley (2016, p. 45) points out “the ‘package’ concept has not yet been taken seriously in the design of most empirical studies although this is fundamental to the design of future studies”. He points to the need for studies to explain the control mechanisms that are observed to be deployed over time. A loosening of the constraint on the LoC framework to include both the formal and informal control practices in a package would provide an opportunity for the LoC framework to contribute to this research.

There would appear to be no conceptual reason to limit the range of controls that managers may lever to address the strategic variables they face, and to impose such limits inhibits commensuration as the LoC framework is less comprehensively applicable than rival theories and frameworks. In fact, the domain of observables has been extended several ways in previous work.

When we look at LoC-inspired field studies, we find evidence of the importance of combining formal and informal control in understanding the design, effectiveness and impact of MCS. For example, Collier (2005) points to the role of

informal controls in communicating core values, opportunities and risks to be avoided, and debating strategic uncertainties. Chenhall et al.'s (2010) case study provides an example of a beliefs system which provides clarity of purpose and, in combination with a strong professional work force, serves to lever the strategic variable "risks to be avoided", thus removing the need for any reliance on the code of conduct in the organization. However, self-control resulting from professionalism of the workforce would not form part of the formal "information-based" control systems specified by Simons.

In contrast, when we look at quantitative studies based on the LoC framework, we find no reference to informal controls. The operationalization of the levers is generally in the context of either specific formal control systems (e.g. Bisbe and Otley (2004) examine interactive and diagnostic use of budgeting systems, balanced scorecards and project management systems) or in the context of control systems in general (e.g. Su et al., 2015) refer to 'controls' in their statements measuring ICS and DCS). Hence, informal controls are either excluded or not explicitly included in previous quantitative studies. Simons' (1995) decision to limit the domain of observables to formal control systems may have been intended to limit the complexity of the model or may have been influenced by the practice environments that he studied. Simons' concept of beliefs system was developed in organizations where there was a change in top management and management attention and energy was devoted to communicating and systematically reinforcing (and sometimes changing) core values (Simons, 1994). In four of the ten organizations Simons (1994) studied, the newly appointed managers believed they had a strong mandate for change

and formal mission statements were used as a beliefs system to modify core values in the first three months. Simons (1995) maintains that formal beliefs systems are vital for managers who are engineering organizational change. Supporting the suggestion that reliance on formal and informal controls may vary by context, Bruining et al. (2004) find that formal methods of communicating changed values are used to replace informal methods of communication following a significant change. Also, Marginson (1999) finds that during a period of strategic change, a formal cultural change program (described by Marginson as a beliefs system) was introduced to move the organization from a focus on efficiency to a focus on creativity. However, Marginson (1999) finds extensive use of other informal controls such as social control which he concludes at times act as a substitute for administrative control. Both Simons (1995) and Su et al. (2015) suggest the use of informal controls to manage strategic variables in a start-up life cycle phase. This further suggests that Simons' practice examples are particularly pertinent to the large mature companies he studied.

Overall, the qualitative literature demonstrates the application of the LoC framework outside the context specified by Simons. These contributions represent extensions of the domain of observables, but the validity of these extensions is not generally discussed in the literature. In addition, operational definitions of LoC underlying the quantitative empirical literature consistently reference Simons "formal information-based routines". Similar to the divergent definitions of the control practices that firms mobilize, substantive differences in the scope of controls admitted within the framework in different branches of the

literature compromises the extent to which studies build coherently on each other. The adoption of a set of core conceptual definitions that are robust across a broad range of controls mechanisms and contexts, facilitates the inclusion of informal controls and by extension, commensuration at the level of the framework.

THE BENEFITS OF COMMENSURATION IN LINKING FRAMEWORKS

The benefits of commensuration arise not only in coherent development of theory within the LoC literature, as outlined above, but also ultimately in the linking of commensurate frameworks. If different theories relating to similar settings lack a common standard by which they can be assessed, compared, and articulated, theory development is impaired (Glynn & Raffaelli, 2010). To illustrate this, we consider how the LoC framework could articulate with enabling and coercive formalization (Adler & Borys, 1996; Ahrens & Chapman, 2004) and with Merchant and van der Stede's (2007) personnel, action, and results controls to explain and predict the way controls are used. Previous research has linked LoC to these two frameworks. Taking enabling/coercive formalization, Adler and Chen (2011) refer to the ability of DCS to "constrain innovation and opportunity-seeking" (Simons, 1995, p. 91) as negative outcomes and maintain that they result from the coercive form that DCS often take. Naranjo-Gil and Hartmann (2006, p. 30) "propose that the diagnostic use of MAS, the use of financial MAS information, and the use of MAS for performance evaluation are control elements that contain considerable similarity with the coercive use of MAS" and that the enabling use of MAS "resembles a combination of the interactive use of MAS, the use of non-formal MAS information, and a

dominant use of MAS for resource allocation decisions". The attempts by these authors to assess the common ground between the LoC framework and enabling/coercive theory illustrate the difficulty of achieving this without greater reflection on the core underpinning of the levers. Ideally, researchers would consider, for example, the ways in which systems which monitor organizational outcomes and correct deviations from pre-set standards of performance can also be expected to vary in flexibility, repair and internal and global transparency (Adler & Borys, 1996). Similarly, it is interesting to consider whether ICS as a means of addressing strategic uncertainties operates differently in the context of enabling or coercive attributes of underlying control systems. These questions connect the frameworks at a conceptual level rather than labeling specific control practices as inherently coercive or enabling.

As another illustration of the importance of commensuration in linking frameworks, Anderson, Christ, Dekker, and Sedatole (2015) examine the descriptive validity of Simons' (1995) LoC as well as Merchant and Van der Stede's (2007) and Jensen and Meckling's (1992) control frameworks in the context of control in inter-firm alliances. In assessing the descriptive validity of the frameworks, Anderson et al. (2015) do not start from the premise that the frameworks are commensurate. In fact they note that LoC is focused on "how control is achieved", Merchant and Van der Stede (2007) focus on "objects of control" and Jensen and Meckling (1992) focus on "tools of control" (Anderson et al., 2015, p. 39). Importantly however, Anderson et al. (2015) do not constrain their domain of observables to Simons' illustrations of practices within firms. The intra-firm setting in itself is a novel application of Simons LoC, in

which the control mechanisms that typically characterize LoC within firms are unlikely to be relevant. They interpret the levers by their purposes rather than the means, thus achieving commensuration as we define it. Their construct definitions for coding observed controls to the LoC are not dissimilar to ours (see p. 42), and they subsequently code a broad range of controls to each lever. Their comparison of the descriptive validity of the Merchant and Van der Stede (2007) framework and Simons' (1995) LoC framework is made possible by the comparable scope and level of analysis of the two frameworks. That is, at a definitional level, results, action, personnel and cultural controls are at a similar level of aggregation to belief, boundary, diagnostic and interactive controls. One framework defines controls by categories of "objects of control", the other by categories of "how control is achieved", providing interesting opportunities to connect these frameworks and enhance our understanding of control practice. This would not be the case if one framework was defined at the control practice or mechanism level (e.g. codes of conduct and mission statements) and the other at a higher conceptual level (e.g. action and cultural controls). It is also notable that comparing these frameworks requires the acceptance of informal controls as a potentially important LoC, as Anderson et al. (2015) examine the links between Simons' belief controls and Merchant and Van der Stede's personnel and cultural controls. Overall, their study suggests that there is value in commensuration in that it provides clarity over the intent and scope of specific control frameworks, allowing researchers to consistently draw on multiple frameworks for the purpose of rich description and theory building.

In this section, we have illustrated how greater commensuration of and within the LoC framework can bring benefits of linking the LoC to other frameworks and theories. We do not claim that the LoC should be used as an additional framework in studies that rely on Adler and Borys (1996) and Merchant and Van der Stede's (2007) frameworks. Rather, we show how it could be used to converse with other perspectives such as these and how this may be beneficial.

CONCLUSION

In the 25 years since Simons first conceptualized the LoC in the literature (Simons, 1991), empirical studies have led to an expansion in our understanding of the LoC framework; however, they have not resulted in a coherent body of knowledge. As we have shown, the operationalization of the control levers, and the theoretical link between the control levers and antecedents/consequences, has been based on a set of characteristics drawn from Simons' illustrations from practice. *Prima facie*, using practice-defined variables is not in itself problematic. To be of any use to researchers, the elements of Simons' framework, and most critically, the levers themselves, need to be operationalized. The significance of this step is, however, perhaps insufficiently acknowledged. Instead, by drawing on Simons' illustrations, researchers adopt measures of levers of control that represent the control practices found in Simons' framework, and use these in tests of Simons' framework.

The purpose of our paper is to draw empirical researchers back to the conceptual core of the framework as a basis for stable, consistent definitions of

the domain of observables in empirical studies. We have built the case for commensuration or a “common standard” for the use of Simons’ framework on two levels: at the level of the constructs within the framework (through reference to the conceptual core of the framework) and at the level of the framework itself (through explicit inclusion of informal controls within the scope of the framework). Thus, the primary contribution of the study is to enhance commensuration as a basis for management control theory development by influencing the definition of domains of observables in empirical LoC studies. Achieving greater commensuration *within* the framework matters because it influences the attributes of constructs that become embedded in the literature. Given the extent to which the literature has adopted a range of control practices as integral to the definition of LoC constructs, the findings are likely to be unstable across a range of empirical settings and indeed studies with purportedly contradictory findings on the consequences of ICS/DCS (e.g. Henri, 2006; Widener, 2007) may actually have consistent findings.

Our review of the literature illustrates that instability in construct meaning is compromising the inherent value of the LoC as a conceptual framework for MCS research. As noted in the introduction, the problem of instability in construct definitions is not of course limited to the LoC literature, with both practice-defined variables and inconsistent variable definitions in widespread evidence in the literature more generally. Luft and Shields (2003) point to persistent challenges in integrating literature in management accounting - variables which are given the same name may capture different phenomena because they are at

different levels of analysis or are identified/analyzed using a different theoretical perspective, or variables with different names may capture similar phenomena.

While a hardening of the core of the framework should lead to more consistent operational definitions of LoC constructs in future research, we acknowledge that these definitions may evolve over time. However, we anticipate that the evolution will be at a conceptual level. Conflicting findings would challenge the descriptive validity of the underlying framework rather than representing differences in operational definitions. As control practices change over time they would be accommodated as dynamic representations of underlying goal-driven mechanisms. Thus, virtual conversations may replace meetings, agile project management systems may set boundaries for new product development, and social networks may be used to drive corporate values but they would be identifiable as levers because of their use to effect change in the strategic variables they manage.

Commensuration *within* the LoC framework is a first step to the development of commensuration *of* the LoC framework. We argue that the adoption of conceptual definitions for core elements of the framework facilitates the extension of the domain of observables of the LoC to incorporate informal controls. This addresses previous criticisms in the literature of a failure of the framework to sufficiently emphasize socio-ideological controls and inadequacy in dealing with the range of informal controls that exist in different size organizations (Ferreira & Otley, 2009).

We believe that a hardening of the core elements of the LoC framework offers an opportunity to facilitate the coherent development of this particular body of

research and will lead to a greater understanding of the LoC in the context of other theories. The popularity of the LoC framework, and its potential to guide holistic MCS research, suggests that this is an important endeavor.

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Figure 1: Simons' Levers of Control Framework (Simons, 1995)

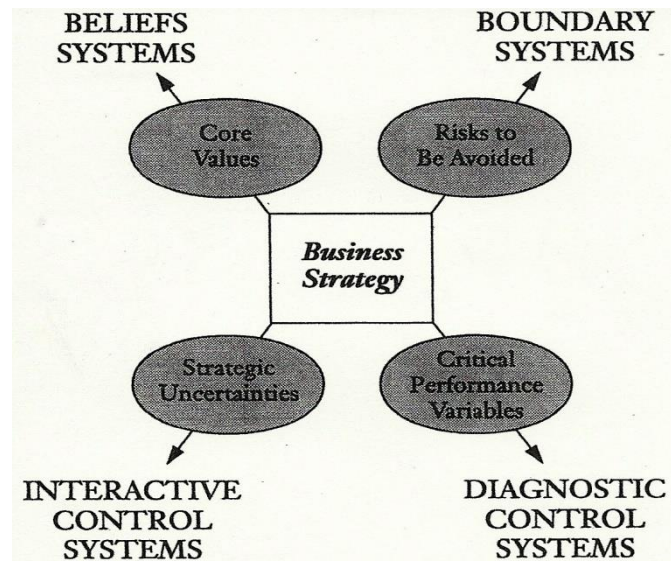


Figure 2: Predictive validity framework (adapted from Libby et al., 2002)

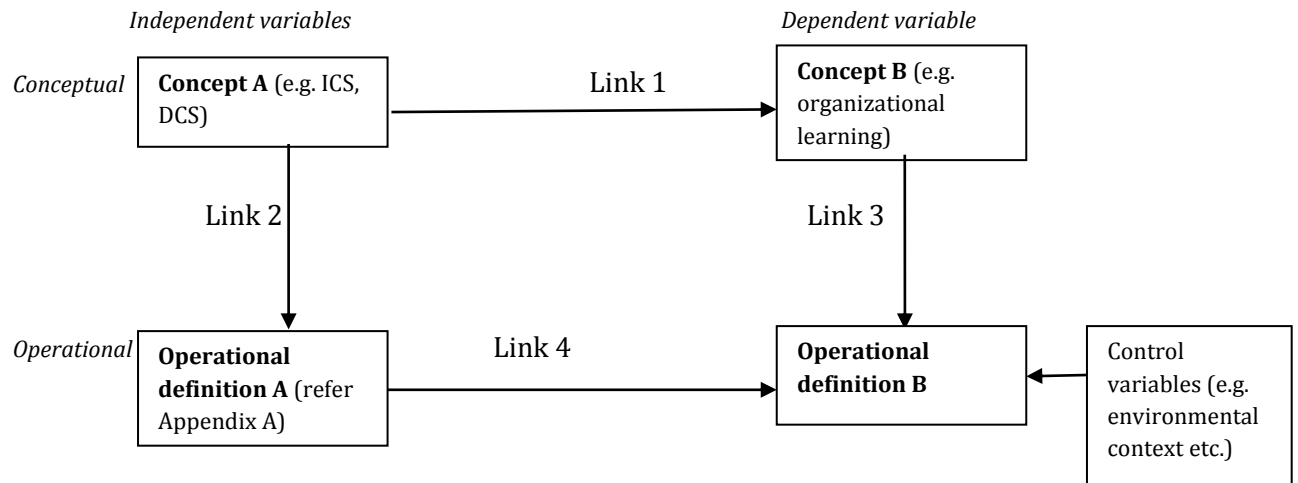


Figure 3: Predictive validity framework (Libby et al., 2002) adapted for relevant research questions in Henri's (2006) study

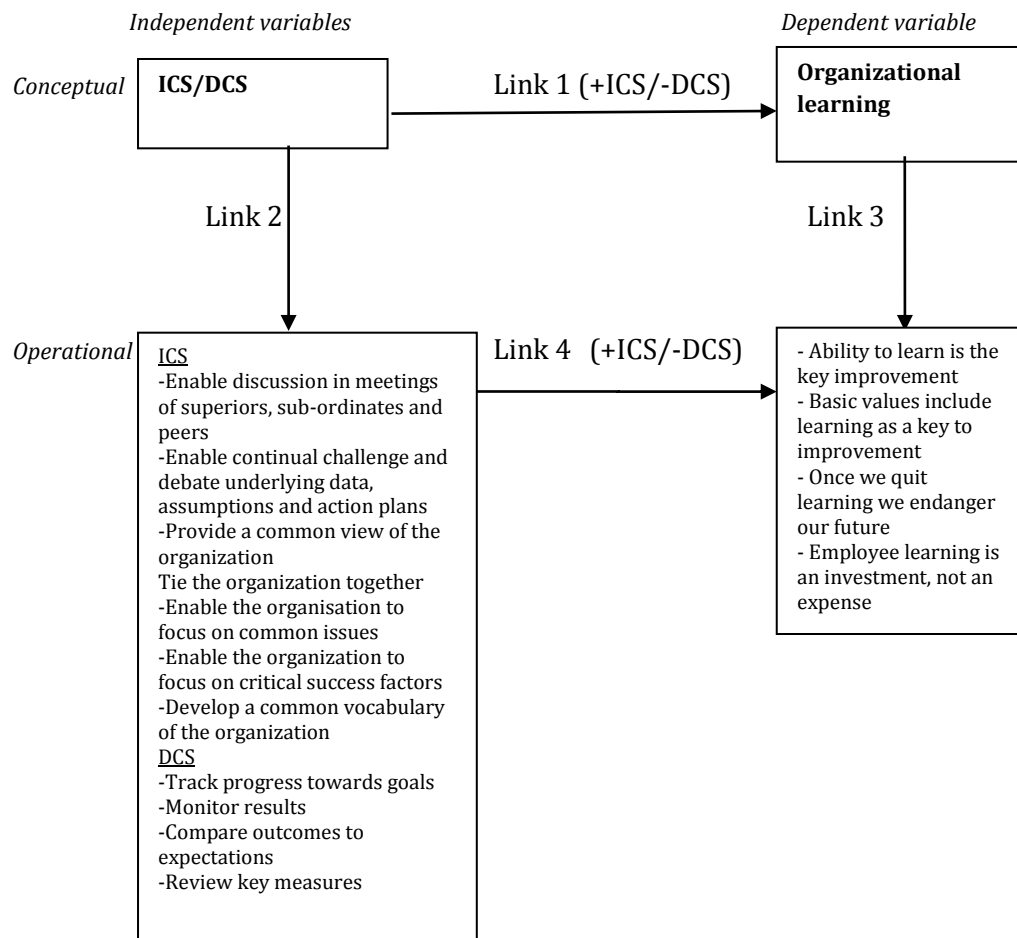


Figure 4: Predictive validity framework (Libby et al., 2002) adapted for relevant research questions in Widener's (2007) study

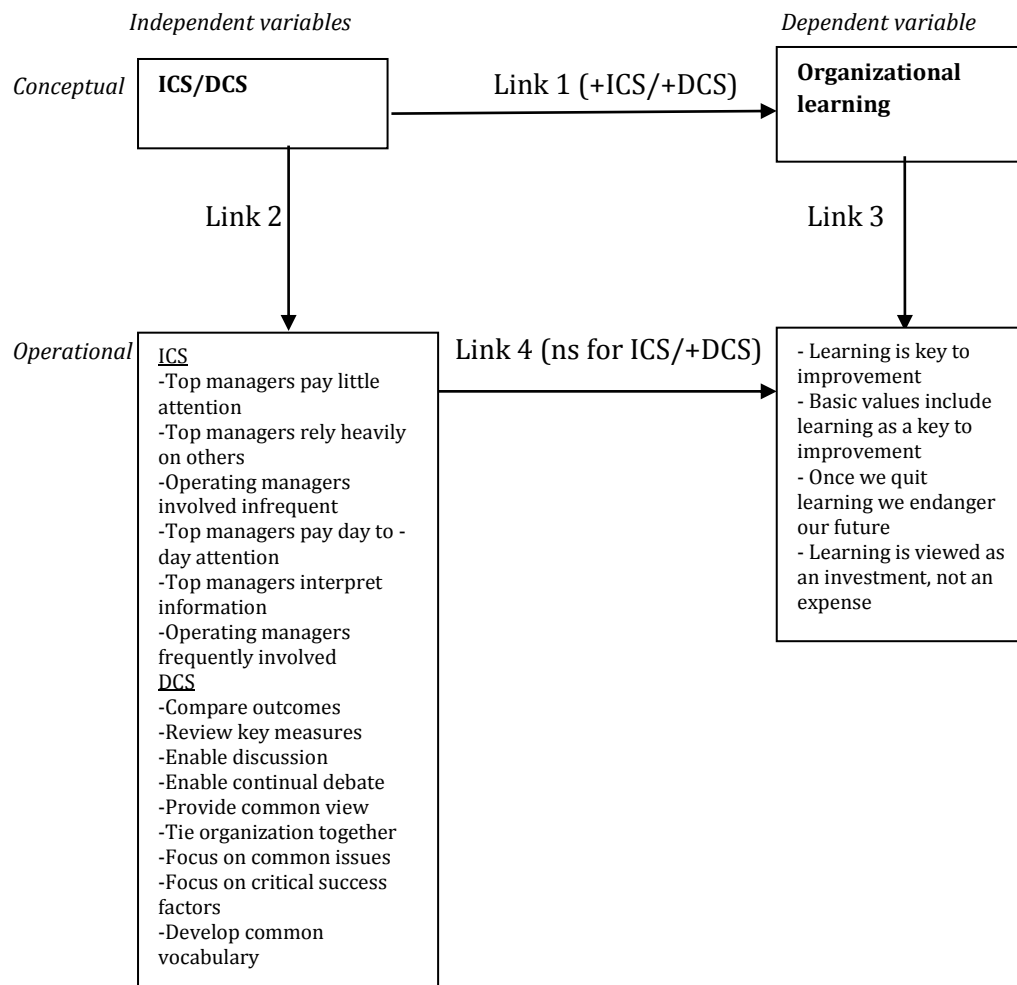


Table 1: Conceptual definitions of strategic variables and levers of control

Strategic variable	Lever of Control
Core values: The 'basic values, purpose and direction for the organization' (Simons, 1995 p. 34)	Beliefs lever: The use of control practices to communicate and reinforce systematically the basic values, purpose and direction for the organization <i>Source: Text in Simons, 1995 p. 34</i>
Risks to be avoided: 'The acceptable domain of activity for organizational participants' (Simons, 1995 p. 39)	Boundary lever: The use of control practices to delineate the acceptable domain of activity for organizational participants and establish limits, based on defined business risks, to opportunity seeking <i>Source: Text in Simons, 1995 p. 34</i>
Critical Success Factors: The small number of variables essential to achieving intended business goals (Simons, 1995 p. 8)	Diagnostic lever: The use of control practices to monitor key organizational outcomes and correct deviations from pre-set standards of performance <i>Source: Text in Simons, 1995 p. 59</i>
Strategic uncertainties: Uncertainties that could undermine the current basis of competitive advantage (Simons, 1995 p.9)	Interactive lever: The use of control practices to focus attention on strategic uncertainties and build internal pressure to break out of narrow search routines, stimulate opportunity-seeking and encourage the emergence of new strategic initiatives <i>Source: Text in Simons, 1995 p. 93</i>

Appendix 1: Measures of LoC Used in Empirical Studies (adapted from Martyn et al., 2016) and examples of items reflecting conceptual core vs. control practices⁴

Beliefs System		
Study	Items included in measure	Examples of items reflecting conceptual core/control practice
Bedford (2015) MAR	<div><div>1.</div><div>To what extent are the values, purpose and direction of the SBU codified in formal documents? (e.g. mission/value statements, credos, statements of purpose?)</div></div> <div><div>2.</div><div>To what extent does top management actively communicate core values to subordinates?</div></div> <div><div>3.</div><div>To what extent are formal statements of values used to create commitment to the long-term vision of top management?</div></div> <div><div>4.</div><div>To what extent are formal statements of values used to motivate and guide subordinates in searching for new opportunities?</div></div>	<div><div>•</div><div>Conceptual core: Our workforce is aware of the firm's core values (Widener, 2007)</div></div> <div><div>•</div><div>Control practice: Our mission statement clearly communicates the firm's core values to our workforce (Widener, 2007)</div></div>
Widener (2007) AOS	<div><div>1.</div><div>Our mission statement clearly communicates the firm's core values to our workforce</div></div> <div><div>2.</div><div>Top managers communicate core values to our workforce</div></div> <div><div>3.</div><div>Our workforce is aware of the firm's core values</div></div> <div><div>4.</div><div>Our mission statement inspires our workforce</div></div>	
Boundary System		
Study	Items included in measure	Examples of items reflecting conceptual core/control practice
Bedford (2015) MAR	<div><div>1.</div><div>To what extent are codes of conduct or similar statements relied upon to define appropriate behavior?</div></div> <div><div>2.</div><div>To what extent are there policies or guidelines that stipulate specific areas for, or limits on, opportunity search and experimentation?</div></div> <div><div>3.</div><div>To what extent does top management actively communicate risks and activities to be avoided by subordinates?</div></div> <div><div>4.</div><div>To what extent are sanctions or punishments applied to subordinates who engage in risks and activities outside organizational policy, irrespective of the outcome?</div></div>	<div><div>•</div><div>Conceptual core: Our firm has a system that communicates to our workforce risks that should be avoided (Widener, 2007)</div></div> <div><div>•</div><div>Control practice: Our workforce is aware of the firm's code of business conduct (Widener, 2007)</div></div>
Widener (2007)	<div><div>1.</div><div>Our firm relies on a code of business conduct to define appropriate behavior for our workforce</div></div> <div><div>2.</div><div>Our code of business conduct informs our workforce about behaviors that are off-limits</div></div>	

⁴ This table has been adapted from the original to identify examples of conceptual core and control practice items included in the operationalization and to include a more recent operationalization of beliefs and boundary systems taken from Bedford (2015)

AOS	<ol style="list-style-type: none"> Our firm has a system that communicates to our workforce risks that should be avoided Our workforce is aware of the firm's code of business conduct 	
Control Systems Used in an Interactive Manner		
Study	Items included in measure	Examples of items reflecting conceptual core/control practice
Abernethy & Brownell (1999) AOS; Abernethy, Bouwens and Van Lent (2010) MAR	<ol style="list-style-type: none"> I often use budgeting information as a means of questioning and debating the ongoing decisions and actions of department/clinical managers (Abernethy & Brownell, 1999)/My superiors and I often use the planning and control system as a means of questioning and debating the factors affecting the strategy (Abernethy et al., 2010) The budget process is continuous – it demands regular and frequent attention from managers at all levels (Abernethy & Brownell, 1999)/The planning and control system is continuous – it demands regular and frequent attention from managers at all levels (Abernethy et al., 2010) There is a lot of interaction between top management and department/unit managers in the budget process (Abernethy & Brownell, 1999)/The planning and control system is used throughout the year to develop and present new programs, services, and strategies (Abernethy et al., 2010) I use the budget process to discuss with my peers and subordinates changes occurring in the hospital (Abernethy & Brownell, 1999)/I use the planning and control systems to discuss with my peers and subordinates changes occurring in my organization (Abernethy et al., 2010) 	<ul style="list-style-type: none"> Conceptual core My superiors and I often use the planning and control system as a means of questioning and debating the factors affecting the strategy (Abernethy et al., 2010) Control practice: The extent to which the senior management uses budgets to enable the team to focus on common issues (Chong and Mahama, 2013)
van der Stede (2001) MAR	<ol style="list-style-type: none"> Corporate superiors call me in to discuss budget deviations in face-to-face meetings My corporate superiors, myself, and my own subordinates often form a team to discuss and solve budgeting matters Budget matters are discussed regularly with my corporate superior even if there are no negative budget deviations to report I consult with my corporate superior on how to achieve my budget Indicate the typical frequency with which you communicate with the corporate parent for budget-related issues (formal) (reverse coded) Indicate the typical frequency with which you communicate with the corporate parent for budget-related issues (informal) (reverse coded) 	
Bisbe and Otley (2004) AOS; Bisbe and Malagueno (2009) EAR	<ol style="list-style-type: none"> The main aim of budget tracking is (1) to ensure that previously established objectives are met vs. (7) to force us to continually question and revise the assumptions upon which we base our plans (Bisbe and Malagueno, 2009 only). (1) Only when there are deviations from planned performance are budget tracking (follow-up)* reports the main subject for face-to-face discussion with my executive team vs. (7) Whether there are deviations from planned performance or not, budget tracking (follow-up)* reports are the main subject for face-to-face discussion with my executive team. (1) I pay periodic or occasional attention to budgets (e.g. setting objectives, analysing periodic tracking (follow-up)* reports vs. (7) I pay regular and frequent attention to budgets. I use them permanently. (1) For many managers in my company, budgets require periodic or occasional attention, but not permanent attention vs. (7) In my company, budgets require permanent attention from all managers. 	

* = minor wording changes for Bisbe and Malagueno (2009)		
Naranjo-Gill and Hartmann (2006) JMAR; Naranjo-Gill and Hartmann (2007) AOS; Janke and Mahlendorf (2014) MAR	1. 2. 3. 4. 5. 6.	Set and negotiate goals and targets (Naranjo-Gill and Hartmann, 2006, 2007)/Encourage new goals and priorities (Janke and Mahlendorf, 2014) Debate data assumptions and action plans (Naranjo-Gill and Hartmann, 2006, 2007) Signaling key strategic areas (Naranjo-Gill and Hartmann, 2006, 2007, Janke and Mahlendorf, 2014) Challenge new ideas and ways for doing tasks (Naranjo-Gill and Hartmann, 2006, 2007, Janke and Mahlendorf, 2014) Involvement in permanent discussion/attention with subordinates (Naranjo-Gill and Hartmann, 2006, 2007)/Permanently involve subordinates (e.g. in discussions) (Janke and Mahlendorf, 2014) Learning tool (Naranjo-Gill and Hartmann, 2006, 2007, Janke and Mahlendorf, 2014)
Henri (2006) AOS; Margison, McAulay, Roush and Van Zijl (2010) ABR; Chong and Mahama (2013); Marginson, McAulay, Roush and Van Zijl (2014)	1. 2. 3. 4. 5. 6. 7.	Enable discussion in meetings of superiors, sub-ordinates and peers (Henri, 2006)/Encourage discussion in meetings (Marginson et al., 2010, Marginson et al., 2014)/Enable discussion in meetings of superiors and team members (Chong and Mahama, 2013) Enable continual challenge and debate of underlying data, assumptions and action plans (Henri, 2006, Marginson et al., 2010)/Enable continual challenge and debate underlying data, assumptions and action plans of your team (Chong and Mahama, 2013)/Encourage continual challenge and debate of underlying data, assumptions and action plans (Marginson et al., 2014) Provide a common view of organization (Henri, 2006, Marginson et al. 2010, Marginson et al., 2014) Tie the organization together (Henri, 2006, Marginson et al. 2010, Marginson et al., 2014) Enable the organization to focus on common issues (Henri, 2006)/Enable your area to focus on common issues (Marginson et al., 2010, Marginson et al., 2014)/Enable your team to focus on common issues (Chong and Mahama, 2013) Enable the organization to focus on critical success factors (Henri, 2006)/Enable your area to focus on critical success factors (Marginson et al., 2010, Marginson et al. 2014)/Enable your team to focus on critical success factors (Chong and Mahama, 2013) Develop a common vocabulary in the organization (Henri, 2006)/Develop a common vocabulary in your area (Marginson et al., 2010, Marginson et al., 2014)/Develop a common vocabulary in your team (Chong and Mahama, 2013)
Widener (2007) AOS	1. 2. 3. 4. 5.	Top management pays little day-to-day attention on the PM system (reverse coded) Top management relies heavily on staff specialists in preparing and interpreting information from the PM system (reverse coded) Operating managers are involved infrequently and on an exception basis with the PM system (reverse coded) Top management pays days-to-days attention to the PM system Top management interprets information from the PM system

6. Operating managers are frequently involved with the PM system			
Control Systems Used in a Diagnostic Manner			
Study	Items included in measure		Examples of items reflecting conceptual core/control practice
Henri (2006) AOS; Widener (2007) AOS; Marginson, McAulay, Roush and Van Zijl (2010) ABR; Chong and Mahama (2013) MAR; Marginson, McAulay, Roush and Van Zijl (2014) MAR	<div><div>1.</div><div>Track progress towards key goals (Henri, 2006)/Track progress towards goals (Widener, 2007, Marginson et al., 2010, Marginson et al., 2014)/Track your team’s progress towards goals (Chong and Mahama, 2013)</div></div> <div><div>2.</div><div>Monitor results (Henri, 2006, Widener, 2007, Marginson et al., 2010, Marginson et al., 2014)/Monitor your team’s results (Chong and Mahama, 2013)</div></div> <div><div>3.</div><div>Compare outcomes to expectations (Henri, 2006, Widener, 2007, Marginson et al., 2010, Marginson et al., 2014)/Compare your team’s outcomes to expectations (Chong and Mahama, 2013)</div></div> <div><div>4.</div><div>Review key measures (Henri, 2006, Widener, 2007, Marginson et al., 2010, Marginson et al., 2014)/Review your team’s key measures (Chong and Mahama, 2013)</div></div> <div><div>5.</div><div>Enable discussion in meetings of superiors, subordinates and peers (Widener, 2007)/Enable continual challenge and debate of underlying data, assumptions and action plans (Widener, 2007)</div></div> <div><div>6.</div><div>Provide a common view of the organization (Widener, 2007)</div></div> <div><div>7.</div><div>Tie the organization together (Widener, 2007)</div></div> <div><div>8.</div><div>Enable the organization to focus on common issues (Widener, 2007)</div></div> <div><div>9.</div><div>Enable the organization to focus on critical success factors (Widener, 2007)</div></div> <div><div>10.</div><div>Develop a common vocabulary in the organization (Widener, 2007)</div></div>		<div><div>•</div><div>Conceptual core: Enable the organisation to focus on critical success factors (Widener, 2007)</div></div> <div><div>•</div><div>Control practice: Evaluate and control subordinates tightly (Naranjo Gill and Hartmann, 2006)</div></div>
Naranjo-Gill and Hartmann (2006) JMAR	<div><div>1.</div><div>Follow up preset plans and goals</div></div> <div><div>2.</div><div>Follow up significant exceptions and deviations</div></div> <div><div>3.</div><div>Evaluate and control subordinates tightly</div></div> <div><div>4.</div><div>Align performance measures with strategic goals</div></div>		
Control Systems Used in Interactive/Diagnostic Manner as alternative choices			
Study	Items included in measure		Examples of items reflecting conceptual core/control practice
Davila (2000) AOS	<div>“The information was used constantly in the interactions with my team. Frequently it was the main topic of our conversation.” (ICS)</div> <div>“The information was used to monitor the project, but it was not discussed with my team except when it reported events that fell below plans or expectations.” (DCS)</div>		<div><div>•</div><div>Conceptual core: ... primarily used to inform top management if actions or outcomes are not in accordance with plans (DCS) (Abernethy and Brownell, 1999)</div></div> <div><div>•</div><div>Control practice: ... the information provided by the system is interpreted and</div></div>

Abernethy & Brownell (1999) AOS	<p>“The information generated by the budgeting system is an important and recurring agenda addressed by the highest level of management. The budgeting process demands frequent and regular attention from managers at all levels of the organization and the information provided by the system is interpreted and discussed in face-to-face meetings with subordinates and peers. The budget process relies on the continual challenge and debate of underlying data, assumptions and action plans.” (ICS)</p> <p>“The budgeting system is a process aimed at achieving predetermined outcomes and the information produced by the system is used primarily to inform top managers if actions or outcomes are not in accordance with plans. Staff specialists (i.e. finance departments) play a pivotal role in preparing and interpreting the information produced by the system. Data are reported through formal reporting procedures and top managers tend to be involved in the process infrequently and on an exceptions basis.” (DCS)</p>	discussed in face-to-face meetings with subordinates and peers (ICS) (Abernethy and Brownell, 1999)
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