Synthesizing management control frameworks

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Summary

Purpose – The purpose of this paper is to investigate the holistic nature of control systems to understand how they operate across organizational levels and manage change.

Design/methodology/approach – This paper takes an analytical approach using the viable system model (VSM) to assess the two main frameworks of control reported in the accounting literature.

Findings – The VSM provides an elegant framework for management control systems with explicit consideration of: multiple levels of control, communication channels, interactions with the environment, and the mechanisms for attaining balance between stability and change.

Practical implications – The evaluation of current management control systems produces specific suggestions for improving the levers of control framework

Originality/value – The VSM has not previously been aligned with management control frameworks.

Keywords Control, Change management, Management activities, Corporate strategy, E-learning

Paper type Conceptual paper

Introduction

This paper reports the initial phase of a larger research project addressing the management control systems supporting e-learning changes within a university setting. At the case site, the apparent lack of coordination between the change efforts arising in different locations and organizational levels suggested weaknesses in the system of control. Little is published in accounting-based research about how control systems operate across organizational levels and how they manage change. This paper uses the viable system model to assess how well these issues are addressed in two accounting based frameworks of control.

Management control systems (MCS) encompass the organizational structure and the set of formal and informal information-based routines, procedures, processes, and practices that can be used to influence goal attainment within organizations (Bisbe and Otley, 2004). They are also expected to maintain stability while enabling change and to ''help organizations to balance short-term with long-term objectives and to compete for today while preparing for tomorrow'' (Nixon and Burns, 2005). This broad perspective of control, which permits a wide variety of mechanisms to be viewed as components of MCS and enables organizations to have very different MCS, makes it difficult to develop an integrated view of control systems. This is a serious problem because effective control does not arise from the existence of control mechanisms, but depends on the mechanisms working together in a coordinated fashion (Simons, 2000, Otley, 1999).

An initial review of the management accounting-based control literature identified two commonly known frameworks, namely Ferreira and Otley's (2006) performance management and control framework and Simons' (2000) levers of control. These frameworks do not, however, address how control systems operate across organizational

levels or enable organizational change. A subsequent review, of literature outside the accounting domain, identified two related models of control, namely the viable system model (Beer, 1994) and the model of systemic control (Schwaninger, 2001). The levers of control is the most commonly known and applied framework for management accounting-based control research. Research in this area can be enhanced by developing the levers of control framework rather than supplanting it with a model such as the viable system model (VSM). A comparison of the accounting control frameworks with the VSM-based models provided insights for extending the levers of control framework. More specifically, the levers of control could be enhanced by more explicitly considering multiple organizational levels, and channels for feedback and communication.

The structure of the paper is as follows. The first two sections review the accounting-based frameworks and the viable system-based models of control. The subsequent section evaluates the appropriateness of these frameworks for investigating how control systems operate over multiple levels and induce change. The final section discusses how the levers of control framework could be extended to make it more appropriate for multi-level investigations of control and organizational change.

Accounting based frameworks of control

Management control studies typically examine how control systems support the achievement of organizational objectives. This research addresses a wide variety of seemingly disparate control systems and presents a confusing and fragmented understanding of their design and operation. In order to better understand control systems integrative control frameworks of control systems have been proposed. Two that purport to provide holistic representations of organizational control systems are the performance management and control framework (Ferreira and Otley, 2006)[1] and the levers of control framework (Simons, 2000). These frameworks, particularly the levers of control, are the basis of many management control studies and appear to be generally accepted. Consequently, few questions have been raised about their limitations or how their usefulness might be extended. The following sub-sections provide brief descriptions of each framework.
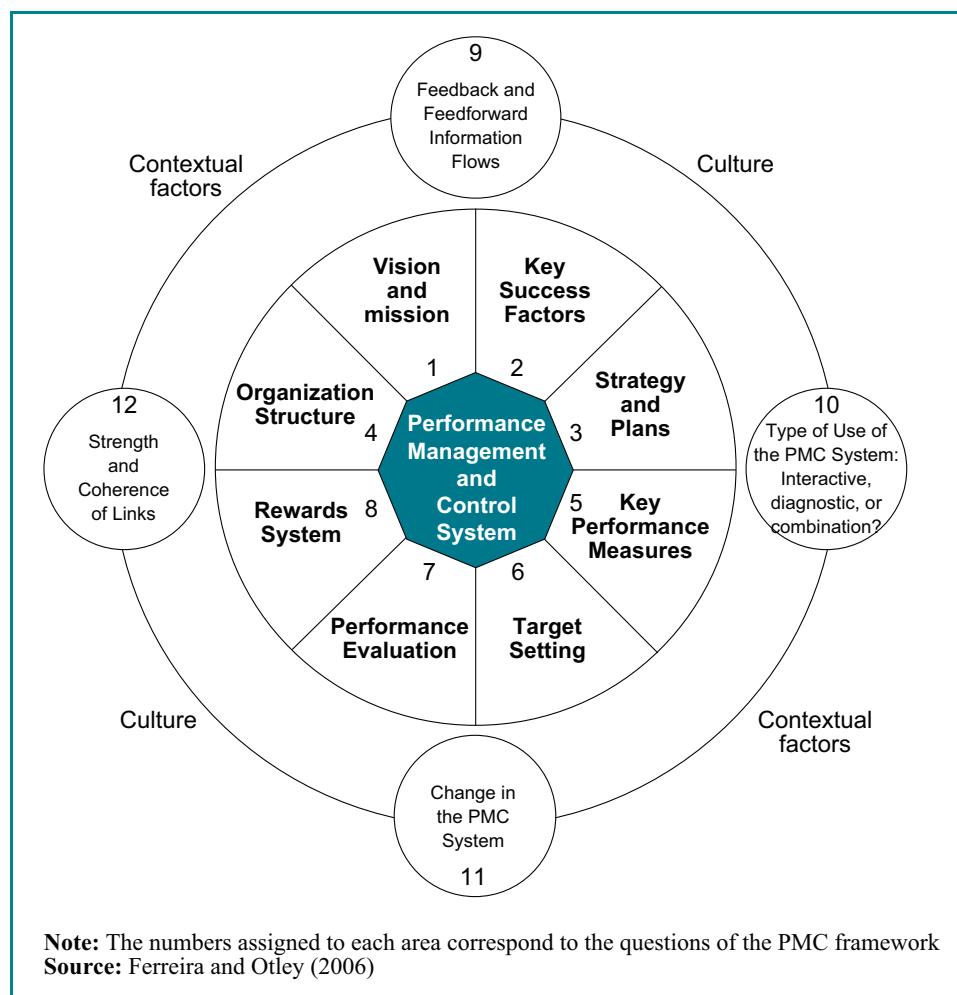
The performance management and control (PMC) framework

Ferreira and Otley's (2006) framework addresses the role of control in managing organizational performance. The framework is presented as a series of 12 extensively inter-connected questions and as a diagram[2] (Figure 1). The questions address the overall scope of management control systems within organizations and encompass the following areas:

1. Vision and mission.

2. Key success factors.

3. Strategy and plans.

4. Organization structure.

5. Key performance measures.

6. Target setting.

7. Performance evaluation.

8. Reward systems.

9. Feedback and feedforward information flows.

10. Type of use of control systems – diagnostic, interactive or combination.

11. Changes in the performance management and control system.

12. Linkages between components – including the strength and coherence of the links.

Note: The numbers assigned to each area correspond to the questions of the PMC framework
Source: Ferreira and Otley (2006)

Ferreira and Otley (2006) suggest the framework is useful for developing a rapid overview and appreciation of the mechanisms that contribute to organizational control. The framework appears to be quite comprehensive and responses to these questions will provide insights into the operation of organizational control systems. However, the number of components included makes it difficult to synthesize the responses into a coherent and comprehensible description of control. Therefore, adopting this framework for research may produce fragmented views of various aspects of the system rather than an overall assessment of control.

A review of Figure 1 raises additional issues about the framework. It is unclear whether the components in the outer ring are of lesser importance than those in the inner ring. Furthermore, the components in the outer and inner rings appear to be ''apples and oranges''; some refer to more concrete aspects of the system (e.g. key success factors) while others refer to subjective characteristics (e.g. strength and coherence of links). These observations suggest that the framework may not provide a generalizable, coherent depiction for control systems and may be challenging to apply.

Levers of control framework

A second integrative framework for management control is Simons' (2000) levers of control. This framework is designed to control the implementation of strategy by integrating the use of four key control systems, namely the belief, boundary, diagnostic and interactive control

systems (Figure 2). Belief systems, (the ellipse) which establish the core values of the organization and underpin all its activities, are commonly expressed in vision and mission statements. Boundary systems (the edge of the rectangle) establish behavioral constraints and set limits for the activities being undertaken. For example, guidance about acceptable realms and modes of behavior may be delivered through codes of conduct. Diagnostic systems (the upper portion inside the rectangle) support efforts to implement the current strategic plan. They are used to coordinate organizational efforts by setting targets and monitoring performance against them. These tend to be internally focused and anchored in the current time frame. Interactive systems (the lower portion inside the rectangle) enable top management to monitor strategic uncertainties and to alter the organization's intended strategy. These systems also enable top management to identify emergent strategies developing at the operational level as units respond to changes in the wider environment. These tend to be externally focused and future oriented.

Collectively, the control systems exert both positive and constraining influences over organizational activities. Belief and interactive systems stimulate organizational activities and boundary and diagnostic systems establish limits for them.

The levers of control framework is easy to understand and has been applied to numerous and varied investigations of control systems. The integrity of the framework relies on all four systems being considered during investigations of management control as effective control comes not from ''using each one alone but in how they complement each other'' (Simons, 2000). Nonetheless, Vaassen (2002) argues that even when all systems are included the levers of control analysis, the final product may be no more than ''a raw sketch of a control system''. Features from both frameworks will be seen in the viable system model which is described next.

Figure 2 Levers of control
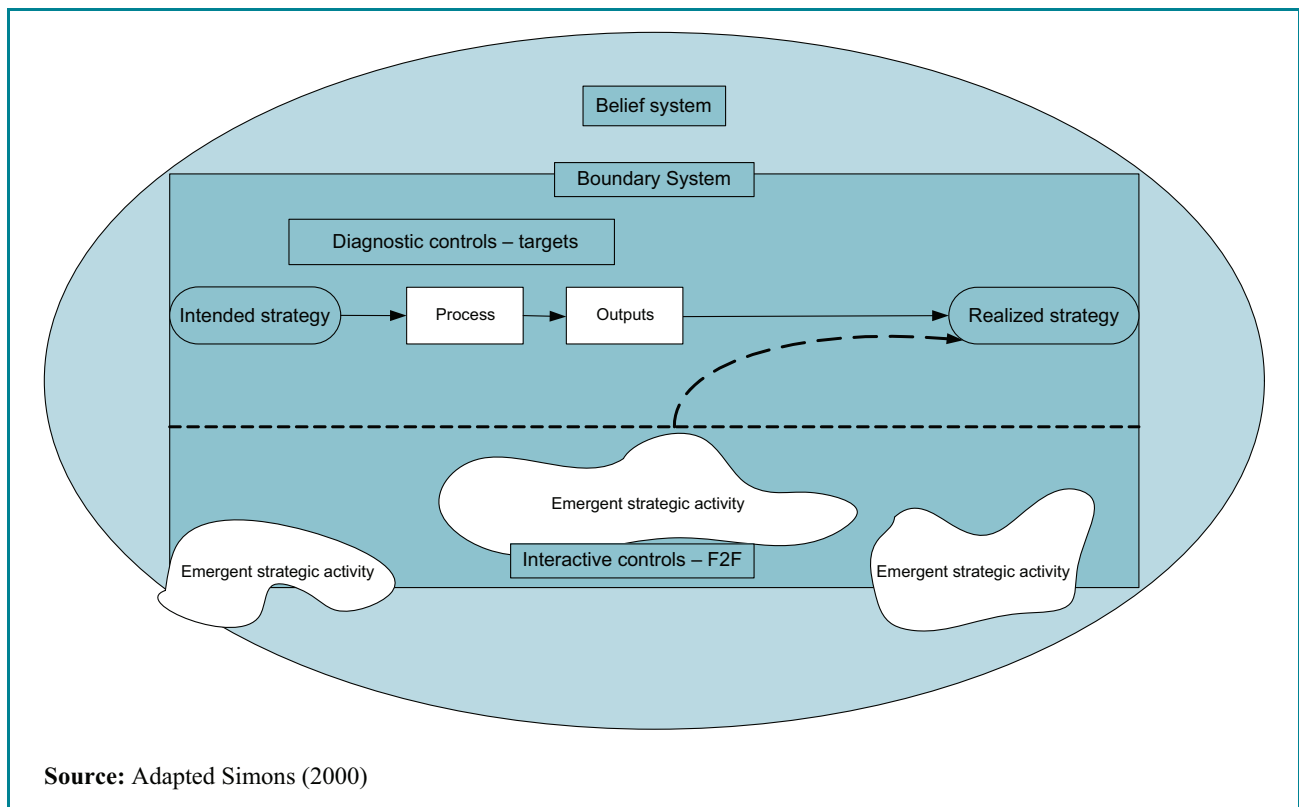
Source: Adapted Simons (2000)

Viable system-based models of control

The viable system model (VSM), developed by Beer (1994), provides a detailed view of control, and is applicable to all types of systems (Jackson, 1991). It specifies the necessary and sufficient conditions for systems to be viable, that is, to be able to respond appropriately to threats and opportunities in their environments, even if the changes were not foreseen at the time the system was designed (Jackson, 1991).

The VSM identifies five functions that must be performed by a system and specifies the nature of the feedback and communications that link them. The five functions are commonly referred to as systems 1 to 5 or labelled as operations (system 1), coordination (system 2), control (system 3), audit (system 3*), intelligence (system 4) and policy (system 5) (Beer, 1994). The five components of the VSM and their communication channels are viewed as ''necessary and sufficient'' to ensure viability (Beer, 1994).

Systems 1 to 3 collectively manage operations while systems 3, 4 and 5 form the meta-system[3]. The inclusion of system 3 in both the operational and the meta systems indicates its key role as the hinge between current operations and future planning and development.

The VSM is presented in Figure 3 as a comprehensive diagram depicting the functions and communication links required for viability (Leonard and Bradshaw, 1993). The lines in the
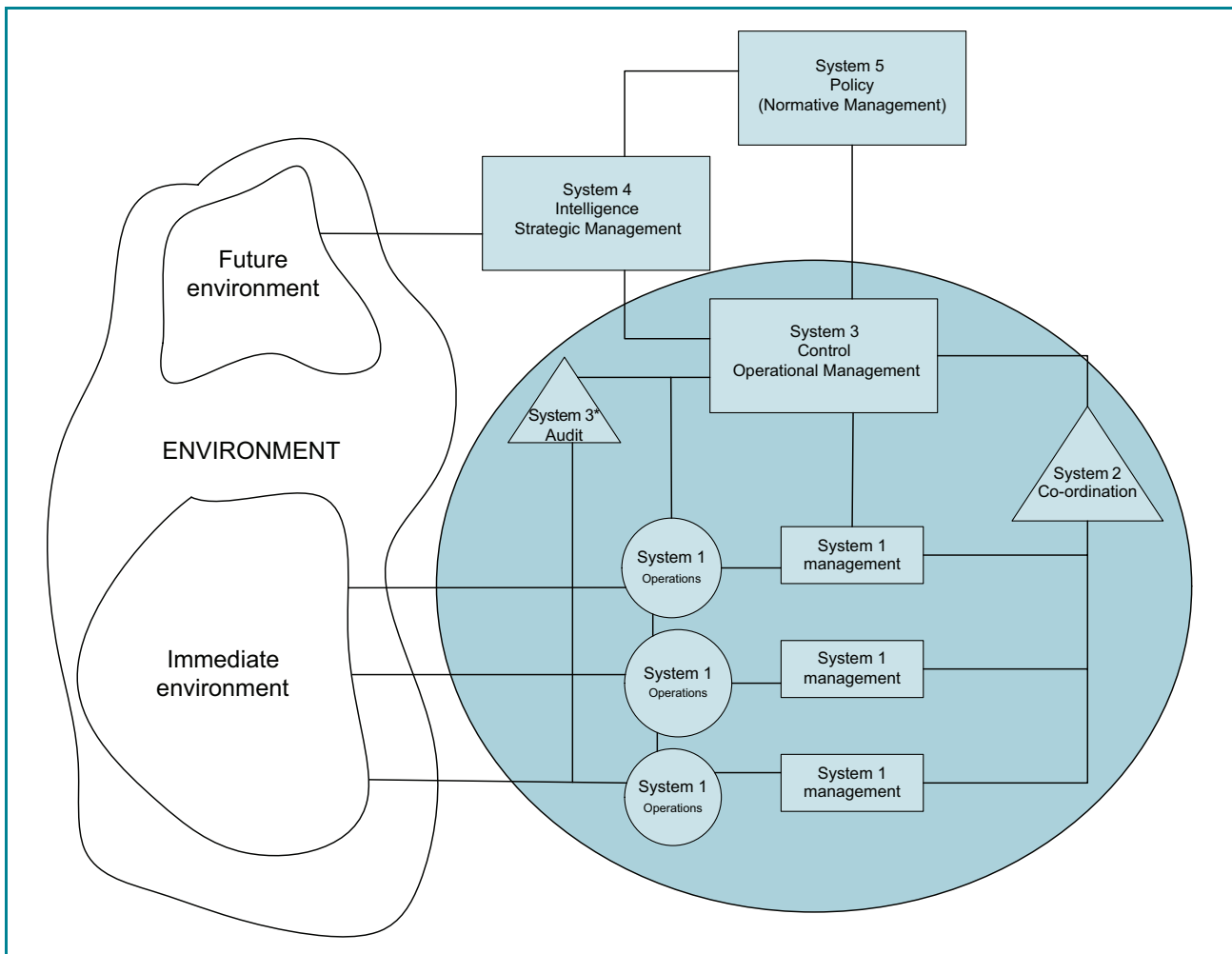
Figure 3 Viable system model

diagram represent the feedback and communication channels between functions and between the system and its environment (Jackson, 1991). This prescribed pattern for communications allows the right type of information to be transmitted in the correct format to the location where it is needed, and indicates how the systems interacts with and responds to changes in its environment.

The model is recursive, so that the basic pattern is repeated multiple times, like a set of Russian Babushka dolls. Each model is embedded in a higher-level system and can be decomposed to reveal lower level systems embedded in it. The collection of systems works as a unified whole through structures and mechanisms that emphasise the relationships among the parts.

In the management arena, the VSM has been adapted to produce the model for systemic control (Schwaninger, 2000). This model reorganizes the five VSM components into three groups to reflect three logical management perspectives, namely operational management (equivalent to systems 1, 2, 3 and 3*), strategic management (system 4), and normative management (system 5). The meaning of operational and strategic management needs no elaboration. Normative management encompasses the development and maintenance of corporate identity, and the mission, vision, and values of the organization.

These perspectives are intuitively appealing. They clearly distinguish between the management of day-to-day operations, future planning activities and ''branding'' efforts to maintain organizational identity and values. They are also familiar and easily understood in various management domains. Accordingly, the labels operational, strategic and normative management will be adopted in the following discussion of the VSM. Figure 3 shows these labels in the relevant locations and encloses the components of operational management in the large circle.

Operational management focuses on the ''inside and now'' of the organization and works to maintain the stability of operations. Operational control addresses the efficient execution, coordination and control of the activities performed in the group of operational units. It is responsible for allocating resources to support the day to day work of the organization (system 1); minimizing friction between operational units by coordinating their activities through prescribed routines, policies and standard operating procedures (system 2); creating roles, processes and procedures to develop synergy and promote efficiency over and above that which is possible by an individual operating unit acting on its own (system 3); monitoring and auditing information supplied by the operational units and investigating deviations from expected performance targets (system 3*). In summary, operational management allocates resources, optimizes performance, implements policies, monitors routine performance via performance indicators and investigates non-routine events to attain short term performance goals.

Strategic and normative management are future oriented and externally focused. They adopt an ''outside and then'' perspective that looks at the bigger picture and longer term. Strategic management (system 4) is the intelligence gathering role. It collects and analyzes information about changing conditions from internal and external sources and assesses its impact on organizational strategy. It identifies opportunities and threats and ensures that the system can survive in a changing environment; it uses benchmarks to assess organizational performance relative to competitors; and it develops strategic options.

Strategic management acts as an information clearing house for operational units. It receives and aggregates information from multiple operational units and redistributes it back to them when immediate action is required. Strategic management also liaises between operational and normative management. It shields the normative function from information irrelevant to major strategic decisions by filtering and aggregating information received from operational management (Jackson, 1991).

Normative management (system 5) develops the organization's overall vision and strategy and establishes its ground rules. Its description as ''an interactive assemblage of

managers'' (from Beer, reported in Jackson (1991)) suggests it is reliant on management debate and discussion. It sets strategic direction and policies, establishes values and objectives, provides the means of enforcing the rules, changes organizational structure as required, and monitors the tension between the demands of current operations and future preparedness. How this tension is managed determines whether the status quo is maintained or change is introduced.

The recursive nature of the VSM is reflected in the model of systemic control. Operational, strategic and normative management issues are addressed at multiple levels (Schwaninger, 2001) although the issues are framed differently at each level. This is in sharp contrast to management accounting research where the question of how these issues are framed and reframed at successive organizational levels, and the coherence of these interpretations across levels, is rarely addressed. Similarly, little attention has been paid in the accounting-based control literature to the mechanisms that resolve the contradictory tensions amongst the three management perspectives. The two accounting frameworks and the VSM are evaluated next to identify areas of similarity and dissimilarity.

Evaluating accounting-based control frameworks

The relationship between control systems and change across multiple organizational levels suggests four criteria by which to assess the suitability of the accounting frameworks. An appropriate framework would:

1. represent a complete system;

2. apply to multiple organizational levels;

3. explicitly consider the feedback and communication links between the system components and organizational levels; and

4. encompass mechanisms for change.

Levers of control framework

Simons' addresses the issue of completeness by stating that all four control systems must be operational although he does not claim that the inclusion of all four is sufficient to produce a complete system of control. This raises the possibility that some essential components are omitted from the levers of control framework. Comparing the levers of control to the VSM suggests where to focus attention. Simons' levers can be easily mapped onto a viable system model, as shown in Figure 4. Simons' belief and boundary systems are seen as equivalent to normative management, interactive controls with strategic management, and diagnostics controls with operational management.

In comparison to the VSM, the levers of control omits the environment and the operational units. Furthermore, although Simons acknowledges that effective com-mun-ication channels are needed to move information up the line from employees to senior management where it can be used to adapt business strategies, the levers of control does not address how communication channels should be designed or how the various systems communicate with each other. Hartmann and Vaassen (2003, p. 123) note this absence in the levers of control framework stating ''What is missing . . . is the explicit recognition of the information and communication infrastructure that underlies these processes''.

The VSM makes clear that different types of communication channels are appropriate for different types of information. Channels to convey routine diagnostic control information are different from the channels used to discuss strategic uncertainties. Similarly, the attributes of channels used to coordinate the activities of operational units are different from those used to conduct investigations of those operations. When communication channels are not appropriately designed for their intended purpose the effectiveness of the control system will be reduced.

Figure 4 Viable system with levers of control

Combining VSM and LOC
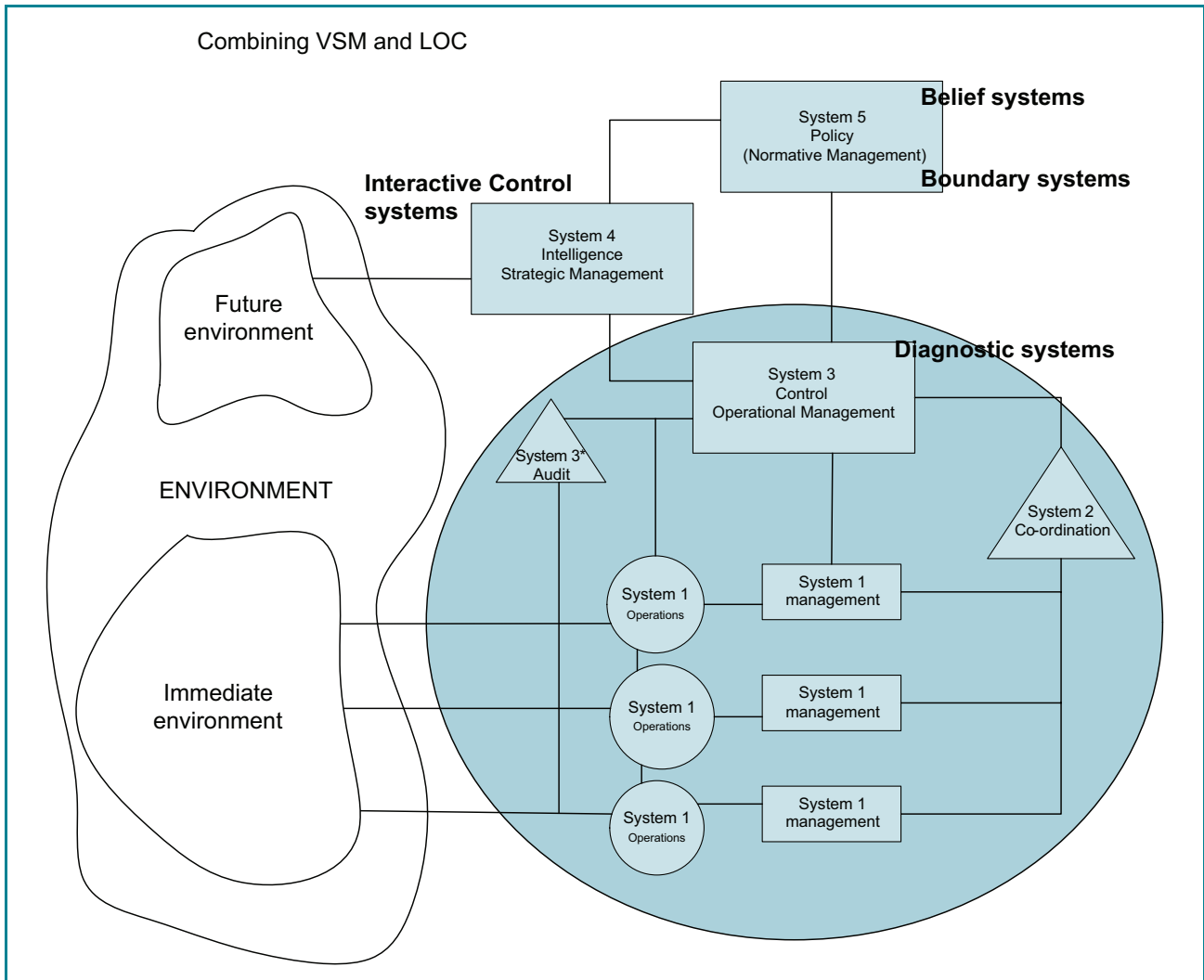
The levers of control framework privileges the top down view of organizational control. It focuses on the control activities of senior management and assumes that the activities and decisions undertaken at this level filter down to all other organizational levels. Yet, if as noted above, appropriate communication channels are absent then the control actions of senior management are unlikely to exert the intended influence. The use of the levers of control by top management is assumed to influence lower organizational levels; few studies apart from Marginson (2002) have investigated how control actually operates across levels.

Simons' view is that the levers of control is a strategic management tool for the exclusive use of senior management, although it is not clear why this should be so. It has been suggested that strategic management also occurs at levels below senior management. Schwaninger (2001) argues that strategic management activities are undertaken at multiple organizational levels. This perspective implies that Simons' framework could be applied to investigate strategic control at multiple organizational levels.

The levers of control framework addresses how top down changes are introduced to the organization. Innovation and change are stimulated within the organization through belief

systems and senior management's interactive use of control systems (Simons, 2000). It is assumed that ongoing, face-to-face discussions between top managers about strategic uncertainties stimulate innovative responses throughout the organization although it is unclear how management determines when to initiate this discussion. The framework does not include links between interactive control systems and the environment making it unclear how strategic uncertainties are monitored.

Emergent strategic activity is recognized in the levers of control. It encompasses changes initiated at lower levels of the organization in response to shifts in the business environment. Although Simons' (2000) holds that interactive control system will identify and exploit these changes, it is unclear how these new patterns of behavior are brought to top management attention. In non-crisis situations management attention is focused on maintaining and optimizing current operations, making it likely that signals for change will be ignored.

The VSM provides a more detailed explanation of how control systems support change. Autonomous operational units (systems 1) develop novel responses to changes in their immediate environments. The changes introduced by these units to optimize their own performance are constrained by the existing business model, resource allocations, and policies established by normative management. Local responses that produce highly beneficial results are likely to be appropriated at the organizational level and incorporated into future organizational routines (Devine, 2005). Developments in the external environment which might lead to more widespread organizational change are constantly monitored by strategic management (system 4).

Performance management and control framework (PMC)

Uncertainties about the completeness of the PMC framework and the necessity of its individual components have been expressed. Ferreira and Otley (2006, p. 46) remark that the PMC questions are ''clearly not exhaustive'' and that there is no ''prior assumption as to whether the existence or absence of a particular feature is a good or bad thing''. If components can be added or dropped as required, then the framework becomes less useful as a generic model for control systems. The VSM might help identify the essential components of the PMC if there was a closer correspondence between the components of each framework.

Ferreira and Otley (2006) acknowledge the need for a multilevel analysis of control systems. They state there is ''clearly a need to study how control mechanisms are transmitted and adapted at different levels in the organization''. They suggest that the framework be applied independently to each organizational level but do not specify how the independent analyses can be integrated to deliver a multi-level analysis. Unlike the VSM, this framework has not been developed to guide integrated multi-level analysis and will be more difficult to apply in these settings.

While communication flows and feedback are included as components of the PMC, it is unclear how they are influenced by or contribute to the overall framework. There is no indication which components of the model are to be linked together, where feed-back arises, or of the strength of the connections required. To connect all elements would add a complexity that might confuse rather than enlighten investigations into the operation of the control system. An assessment of organizational control is not possible without an understanding of the critical communication and feedback flows. Insights from the VSM are not useful here as it is clear which elements are connected.

Change is included as a component of the PMC, but there is no discussion of how and why changes arise in the system. Perhaps changes in the system reflect changes in the contextual setting. The PMC diagram (Figure 1) includes change as a separate component of the system, when it is more logical that changes will occur within the components of the system. To manage change, one must first know where it is likely to arise.

Figure 5 Comparison of VSM to levers of control and performance management and control frameworks

Viable Systems Model (Beer, 1995)	Levers of Control (Simons, 2000)	Framework for Management Control Systems (Ferreira & Otley, 2006)
System 1: Operations Undertake productive work	**Not explicit**	**Not explicit**
System 2: Coordination Co-ordinates units stability, efficiency & effectiveness via routines and SOPs	**Diagnostic control systems** Used to monitor outcomes & correct deviations from preset performance	**Plans, Key Performance Indicators, Targets, Performance Evaluation, Reward Systems** heavily weighted toward performance measurement
System 3: Management Control Optimizes collective efficiency of units, allocates resources, monitors performance via indicators, & supervises coordination systems		
System 4: Intelligence Identifies opportunities & threats in environment	**Interactive control systems** influence experimentation & opportunity-seeking	**Strategy** Rational view to strategy & planning
System 5: Policy Establishes organizational values & objectives, balances attention present with the future, "interactive assemblage of managers"	**Belief systems** As mission statements to motivate organizational participants to search for & create opportunities to accomplish overall mission **Boundary systems** Conserve resources by limiting their use to defined product markets and acceptable risk levels	**Vision & Mission, Key Success Factors,** includes change implied need to introduce variation into stable current activities
Information channels/linkages Link each element and the system to its environment	**Not explicit**	**Feedback & Feed forward systems & Linkages**

Comparison of control frameworks

From the preceding analyses it appears there is a more direct correspondence between the VSM and the levers of control framework than between the VSM and the performance management and control framework. Figure 5 presents a comparison of these approaches. The first column shows the five VSM function and columns 2 and 3 show the corresponding functions of the two accounting frameworks. As noted earlier, the components of the levers of control framework reflect the ''necessary and sufficient'' elements identified by the VSM. It is more difficult to determine how to group the components of the PMC so that they align with those of the viable system model. Although some individual elements can be directly matched, it is unclear how the others correspond to any particular VSM component. It therefore seems more useful to focus attention on how insights from the VSM can enhance the levers of control framework rather than the performance management and control framework. Consequently, the PMC will not be discussed in the following section.

Extending the levers of control framework

The similarities between the VSM and the levers of control framework, noted earlier, make it feasible to consider how the VSM could be used to extend this framework. Enhancing the levers of control framework will help direct attention towards aspects of control systems that are currently overlooked in management control systems research.

The core elements of the VSM and the levers of control framework appear to be the same. However, the levers of control framework does not explicitly consider multiple levels, communications between components and between levels, and interactions with the environment. The levers of control identifies the need for four interacting control systems but does not discuss whether or how they operate at different organizational levels. It is unclear whether Simons intends that all four exist at each level within the organization. The VSM explicitly acknowledges the recursive nature of organizations and includes multiple levels in

its organizational analysis. It specifies that each function must operate at each level of recursion and interact with its counterparts both within and across levels, and can thus address organizations whose parts are both vertically and horizontally interdependent (Jackson, 1991, p. 118). Extending the levers of control framework to include multiple levels is a fruitful avenue for research to obtain insights into the operation of control across organizational levels.

Second, the levers of control framework could be extended to recognize the importance of communication channels. The framework does not currently specify how the four control systems communicate with each other to coordinate and balance each one's influence or operate as a cohesive whole. It is hard to imagine, for example, how the belief and boundary systems could be effective if the communication channels cannot adequately disseminate the message throughout the organization. In addition to channels appropriate for carrying routine communications – in support of the diagnostic control systems – channels are required to handle non-routine messages. The levers of control framework does not address the need for different types of communication channels to facilitate the operation of the four control systems. The VSM explicitly models the communication links between the key management functions. This ensures that the information being transferred is in the form required by the receiving location. Furthermore, the levers of control does not focus attention on how localized changes initiated at the operational level are communicated to the strategic or normative management functions to initiate changes in organizational strategy or policy. There is thus a need for research to extend the levers of control framework to ensure greater attention is paid to the existence and operation of the various communication channels would strengthen the framework.

Interaction between the control system and the environment is an implicit rather than an explicit component of the levers of control framework. The framework accepts that the strategic uncertainties developing in the environment are discussed in the interactive control system but, with no explicit connection to the environment, it is unclear how senior management becomes aware that these need to be discussed. While Simons' view limits consideration of the impact of environmental change to the senior management group the VSM proposes that environmental changes must be considered at multiple organizational levels. The VSM explicitly models interactions between both operational and strategic management with their respective environments at multiple levels.

The levers of control framework recognizes the tension between the various control systems and states that this needs to be managed. Diagnostic systems are designed to maintain the stability of current operations, and to support localized, incremental changes that can improve their efficiency. Interactive use of management systems signals the need for more widespread change. The tension between the two systems must be managed. Similarly, belief systems stimulate experimentation while boundary systems constrain and direct it. The levers of control framework does not clarify how these tensions are coordinated and balanced; it simply assumes that they will be managed. The VSM specifically addresses how the tensions arising amongst the systems should be managed. It specifies that normative management is responsible for balancing the tensions arising between strategic and operational managements. An extended levers of control framework needs to more explicitly focus attention on the mechanisms required to balance these tensions to maintain stability and enable required change.

Conclusions

Based on the comparisons between the VSM and the two accounting frameworks, the VSM provides a superior depiction of management control systems. However, the accounting frameworks have an established position in the accounting literature and this paper has argued that, rather than supplanting the accounting frameworks, it might be more acceptable to enhance the levers of control using insights gleaned from the VSM. While there is a direct correspondence between the components of the levers of control framework

and the five functions of the VSM, the VSM provides greater detail about how control systems operate. The usefulness of the levers of control framework for management control research will be enhanced by including explicit consideration of multiple levels of control, communication channels, interactions with the environment, and the mechanisms for attaining balance between stability and change.

Notes

1. This extends Otley's earlier framework. See Otley (1999).

2. The diagram includes two additional aspects not explicitly addressed by the questions, namely organizational culture and contextual factors

3. There are variations in how these are grouped and classified. Beer (1994) groups systems 4 and 5 into the meta-system. Bititci *et al.* (1997) classify systems 3, 4 and 5 as the met- system.

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