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Importance of managing intangible assets in enhancing dynamic capabilities of firms: cases from Sweden and Germany

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The purpose of this article is to provide insights into our understanding of integrated learning incorporating interactive control systems and diagnostic control systems, through a new integrative learning framework related to management control systems (MCSs). The proposed framework can be used to analyze systematically the knowledge-creating ability of a firm. The study adopts a learning perspective under qualitative research methodology. Data were collected through interviews and analyzed in terms of the proposed integrative learning framework. The study finds that senior managers of large companies in Sweden and Germany consider that management of intangible assets is crucial in enhancing dynamic capabilities related to MCSs and that different companies use different strategies to achieve it. The findings of this study would be useful to other companies that struggle to survive in a highly competitive business environment. Further, the framework developed in this study may be used as a tool to analyze systematically the knowledge-creating ability of a company.

Keywords: *tangible resources; intangible resources; innovation; integrative learning; management control system; dynamic capabilities*

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The changing nature of the global economy requires dynamic management at firm level (Eisenhardt & Martin, 2000; Henri, 2006b; Teece, 2007; Witcher & Chau, 2007;). There seems to be a growing consensus that the basis of competitive advantage is changing from managing tangible resources to managing intangible resources (Hand & Lev, 2003; Høgh-Krohn & Knivsflå, 2000; Lev, 2008; Revellino & Mouritsen, 2009; Upton, 2003). Managing intangible resources requires dynamic capabilities. Eisenhardt and Martin (2000, p. 1107) define dynamic capabilities as ‘the firm’s processes that use resources – specifically the processes to integrate, reconfigure, gain and release resources – to match and even create market change.’ Dynamic capabilities have been defined by Teece (2007) in terms of intangible resources that enable firms to create, deploy, and protect the ability to achieve a superior long-run business performance. Winter (2003, p. 991) makes a distinction between ordinary capabilities and dynamic

capabilities, where the former permit a firm to ‘make a living’ in the short term while the latter focus on extending, modifying or creating ordinary capabilities.

The nucleus of dynamic capabilities signifies a capacity to renew competence (Teece, 2007, 2009). Eisenhardt and Martin (2000) and Grant (2007) emphasize the learning aspect of dynamic capabilities. Prahalad and Hamel (1990) describe the ability of employees to learn how to develop and manage capabilities, especially how to integrate different technologies by way of cross-functional management and collective learning as core competence. Thus, intangibility, learning, and cross-functional business processes seem to be at the center of dynamic capabilities.

The purpose of this study is to provide insights into our understanding of integrative learning between interactive control systems and diagnostic control systems by (1) formulating an integrative learning framework and (2) describing how senior managers of large firms from

Sweden and Germany use management control systems (MCSs) in assessing intangible resources. According to Simons (1995, p. 5), MCSs are defined as ‘formal, information-based routines and procedures managers use to maintain or alter patterns in organizational activities’. Furthermore, it is assumed that the use of formal MCSs may give rise to learning (cf., Otley, 1999), and integrative learning is learning arising from two or more formal MCSs (Simons, 1995). Combining integrative learning with the type of resources and management logic perspectives generates an integrative learning framework. Building on the levers of control (LOC) framework (Simons, 1995, 2000), this study raises the question whether successful, established firms operating in a dynamic environment are apt at dynamically managing integrative learning between interactive control systems and diagnostic control systems. The rest of the paper is presented in five sections. ‘Literature review’ section provides a review of the literature. ‘Theoretical framework’ section explains the theoretical framework adopted in this study, followed by the ‘Research design’ section. ‘Findings and discussion’ presents the findings of the study, and the final section provides concluding remarks.

Literature review

Prior studies have shown that in the modern economy, globalization, deregulation, innovation, and technological change determine to a large extent sustainable productivity gains (e.g. Hand & Lev, 2003; Teece, 2009). Although these forces are not new, they have far greater importance in the new environment, which is closely interlinked by information technology, and, as such, favors intangible resources. Bontis, Dragonetti, Jacobsen, and Roos (1999, p. 400) argue that, ‘a good part of the value generated by a company comes from intangible resources, and therefore these resources need to be monitored like the physical ones are.’ Although the value of intangible resources does not necessarily bring benefit to the innovator, the management of these resources is easily neglected. Further, unlike tangible resources, intangible resources almost never create value by themselves (Hand & Lev, 2003; Lev, 2008; Teece, 2007). Mouritsen (1998) asserts that the ability to manage human capital is the most critical skill required of management, and in the words of Simons (1995, p. 21) ‘balancing control and learning is critical to managing the tension between efficiency and innovation.’

MCS and dynamic capability

Henri (2006b, p. 529) examines, from a resource-based perspective, the relationships among the uses of one aspect of MCSs, performance measurement systems (PMSs), and the primary capabilities to gain competitive advantage, such as innovativeness, organizational learning, market

orientation, and entrepreneurship. His study indicates that an interactive use of PMSs fosters these capabilities and organizational learning by focusing attention on strategic priorities and stimulating dialog (Henri, 2006b, p. 544). However, one limitation of that study is that it only examined PMSs; other systems could provide similar or different conclusions. After reviewing the literature on strategic management framework, Witcher and Chau (2007, p. 529) conclude that a review of implementation and follow-up of strategy must work as a learning framework for the firm as a whole. Further, scholars within the field of management control (e.g. Henri, 2006b; Nixon & Burns, 2005) argue that there is a need for more interdisciplinary research, and that the MCS literature has devoted limited attention to the dynamic capability perspective (Henri, 2006b). Inadequate attention has been devoted to how a robust integrative learning framework can be used as a dynamic capability for analyzing and balancing the different aspects or components of MCSs (Simons, 1995) in order to create organizational capabilities (Grant, 2007; Henri, 2006b; Witcher & Chau, 2007).

Furthermore, the issues of how to manage upstream activities or innovative business processes (IBPs), such as concept development, technological development, and new business development, are gaining increased recognition. Downstream activities or standard business processes (SBPs) are rapidly becoming more automated and integrated through information technology. Management of IBPs requires integration across functions and development stages in a timely, effective manner. It has been argued that reliance on rigorous planning and MCSs that exercise control through detailed responsibility is no longer sufficient and that now the focus is on the ability to develop dynamic capabilities (e.g. Adler, 1999; Roberts, 2003).

Ambrosini and Bowman (2009) encourage scholars to integrate the dynamic capabilities perspective into other complementary fields of enquiry, such as management accounting.

At the core of managing intangible resources are learning and applying the acquired knowledge and capabilities in the value-creating process, which relate to competence. Hamel (1994, p. 11) defines ‘Competence’ as ‘a bundle of constituent skills and technologies’, while ‘core competence represents the integration of a variety of individual skills’. Similarly, Prahalad and Hamel (1990) and Morecroft, Sanchez, and Heene (2002) point out that when competence reflects the specialized expertise – the unique capability of the firm – resulting from collective learning, it becomes ‘core’. A firm’s ability to sustain a competitive advantage requires a continual development of its core competence(s) (Helleloid & Simonin, 1994). Hamel (1994) stresses the importance of identifying core competencies and coupling these with methods

of corporate organization and management control. Accordingly, as core competence is specific to every firm, it is likely that every firm has a unique learning style.

Today, MCSs are based on information technology, a technology that is decisive for a global company's knowledge-creating ability. Abouzeedan and Busler (2006) identify different characteristics related to the concept of 'Firm Impact Sphere' (FIP). These characteristics may be used to recognize if a global company is globalized from an information technology perspective. For example, networking is identified as firm-size growth mechanism, whereas management flexibility is another mechanism important for the 'Globalized' FIP (Abouzeedan & Busler, 2006, p. 253). Furthermore, given that global firms are engaged in bridging activities within the company as well with external partners, the use of Internet has become a key competitive factor. Abouzeedan and Busler (2007) introduce the concept 'Internetization Management' to describe the management style related to the use of Internet in a global setting.

Teece (2009) suggests that strategic advantage results when an organization can create the benefits from internally generated and externally generated competencies, which make it difficult for others to cope or enter the market. According to competence theory (Bhimani & Roberts, 2004; Hamel & Prahalad, 1994; Itami & Roehl, 1987; Wernerfelt, 1984), a firm's ability to learn and acquire new capabilities may be more important determinants of its competitive success in dynamic markets than its current endowment of unique resources (see also Barney, 1997; Kogut & Kulatilaka, 2001; Sanchez & Heene, 1997).

Argyris and Schön (1996, p. 16) point out that organizational learning occurs when individuals experience a problematic situation and enquire into it on the organization's behalf. Accordingly, individual learning is a necessary, but not a sufficient condition for competence development, which requires organizational learning. The output of individual learning may take the form of changes in individual's seeing, thinking, and acting. Integrative learning across elementary modes of learning is encouraged by innovation and development (cf., Kolb, 1984; see also Csikszentmihalyi, 1996; Nonaka, 1991). Nonaka (1991, p. 101) asserts, for example, that companies create knowledge by resolving contradictions and in order to make concepts transferable or explicit. As Nørreklit (2000, p. 72) states, the 'co-ordination of operations is of a statistical nature...', while 'the co-ordination of development ... is of a dynamic nature...'.

Ferreira and Otley (2009) and Broadbent and Laughlin (2009) set out frameworks for MCSs research, which include learning and change facilitation role. In the literature on MCSs there has been a tendency to adopt

specific aspects of control instead of adopting more comprehensive and integrated approaches (Chenhall, 2003; Ferreira & Otley, 2009; Malmi & Brown, 2008). Abernethy & Brownell (1997) assert that empirical research tends to ignore the interdependency between different control mechanisms within an MCS. Ferreira and Otley (2009, p. 264) 'argue that research would benefit from a framework that provides a broad view of the key aspects of an MCS' (see also Broadbent & Laughlin, 2009; Chenhall, 2003; Malmi & Brown, 2008). This more holistic approach to the management and control of organizational performance includes mechanisms for supporting and facilitating learning and change that relate to the knowledge-creating ability of the firm.

In recent years there has been an increase in the number of studies examining the relationship between innovation and MCSs. Contrary to a traditional view of accounting and control, where MCS is perceived as a hindrance to innovation (Abernethy & Brownell, 1997; Leonard-Barton, 1995; Ouchi, 1979), a growing body of literature has come to the conclusion that MCSs may foster productivity as well as innovation given that certain conditions are met (e.g. Bisbe & Malagueño, 2009; Bisbe and Otley, 2004; Cardinal, 2001; Chapman, 1998; Davila & Foster, 2005; Davila, Foster, & Li 2009; Dittillo, 2004; Langfield-Smith, 1997; Revellino & Mouritsen, 2009; Simons, 1990, 1991, 1995, 2000). Understanding how an organization can use its formal MCSs to support innovation seems to have emerged as an important research question. It has been pointed out that, on the one hand, MCS may be dynamic, flexible, and adaptive to fast-changing environments, and on the other hand being stable enough to frame cognitive models and communication patterns (Davila, 2005). Simons (1990, 1991, 1995) argue that the most innovative organizations use MCSs to a large extent, and this intensive use of MCSs may lead to increased innovativeness.

LOC and integrative learning

Simons' (1995, 2000) LOC framework focuses on how managers make use of MCSs to deal with the tensions between the organization's simultaneous need of innovation and efficiency. Simons (1995, p. 160) underlines that all four control systems of an MCS – that is, belief systems, boundary systems, diagnostic control systems, and interactive control systems – have elements of both control and learning, and all four work simultaneously. Diagnostic control systems support single-loop learning, which keeps a process within desired bounds. Interactive control systems facilitate double-loop learning, which leads to question about the basis on which strategies have been formulated (Simons, 1995, p. 160). Bisbe and Otley (2004, p. 711) emphasize diagnostic use to motivate, monitor, and reward achievement of specific goals and

interactive use to stimulate organizational learning and the emergence of new ideas and strategies. Belief systems (used to inspire and direct the search for new opportunities) and boundary systems (used to set limits on opportunity-seeking behavior) set the acceptable domain of activity for those working within the organization.

Bisbe and Malagueño (2009, p. 372) identify two streams of empirical research that draw on the LOC framework – one of which examines the use and integration between different levers (see also Chenhall, 2005; Tuomela, 2005; Widener, 2007). This interest in the use and integration of levers is not surprising in that the LOC framework does not provide a clear understanding of the relationship between the identified levers (Bisbe & Otley, 2004, p. 712). Another body of research focuses on providing an in-depth understanding of the features and effects of individual levers, particularly of the lever of interactive control systems (Abernethy & Brownell, 1997; Bisbe & Otley, 2004; Heidmann, 2008). However, little emphasis has yet been placed on integrative learning between LOC (Chenhall, 2005). Simons (1995, p. 153) clarifies that ‘the power of the control levers does not lie in how each is used alone but rather in how they complement each other when used together’. The dynamic relationship between the levers implies that innovative organizations must achieve simultaneously high degrees of learning and high degrees of control (Simons, 1995, p. 158).

Bisbe and Otley (2004) conclude that the impact of innovation on performance is moderated by the style of use of MCS, or in the view of Simons, integrated learning related to MCSs. Thus, it deserves further attention.

Gavetti and Levinthal (2000) use computer simulations to examine the role and relationship between search processes that are forward-looking (i.e. interactive use of MCS), based on actors’ cognition, and those that are backward-looking (i.e. diagnostic use of MCS), or experience based. The authors conclude that the cognition itself may change as a result of prior experiences, and, consequently, efforts at understanding action-outcome linkages can be interpreted as a higher-order form of experiential learning. This indicates that the theory of experiential learning (Kolb, 1984) may be appropriate when studying integrative learning (for example, skills in connecting knowledge from multiple sources and experiences, and understanding issues and positions contextually) related to MCSs (Csikszentmihalyi, 1996; Kolb, 1984; Nonaka, 1991). By introducing a resource dimension to single-loop and double-loop learning related to MCSs (Simons, 1995), it may improve the LOC framework conceptually as well as analytically. Whereas resources are capable of producing value to the organization, there is a distinct difference between tangible and intangible economic resources, which may have an integrative learning implication. For example, *ceteris*

paribus, learning interaction between an interactive control system and a diagnostic control system would be easier when both are focusing on intangible resources, than when one focusing on tangible resources while the other focusing on intangible resources. At a fundamental level, the learning interaction between the two types of resource system is dealt with, according to the experiential learning theory (Kolb, 1984), in a sequential way, applying one learning mode at a time. A more advanced (non-sequential) form of integrative learning may take place at what Gavetti and Levinthal (2000) terms higher-order form of experiential learning.

Zollo and Winter (2002) argue that dynamic capabilities constitute the firm’s systematic methods for modifying routines and procedures, namely learning mechanisms (see also Eisenhardt & Martin, 2000). Successful integration between interactive information-based routines and procedures and diagnostic information-based routines and procedures in a dynamic environment may indicate a dynamic capacity related to MCSs (Eisenhardt & Martin, 2000; Simons, 1995; Teece, 2009; Zollo & Winter, 2002).

Theoretical framework

The literature maintains that research would benefit from an MCS framework that includes mechanisms for supporting and facilitating learning and change that relate to the knowledge-creating ability of the firm (cf., Ferreira & Otley (2009); see also Broadbent & Laughlin, 2009; Chenhall, 2003; Malmi & Brown, 2008). The LOC framework, which is based on the dynamic tension between single-loop learning (diagnostic use) and double-loop learning (interactive use) (Simons, 1991, 1995), is extended in the framework developed for this study (Table 1) to include a business process dimension and a resource dimension in order to capture integrative learning.

Towards an integrative learning framework

Given the importance of intangible resources for innovation and growth (Hand & Lev, 2003; Lev, 2008; Revellino & Mouritsen, 2009; Upton, 2003), single-loop learning (diagnostic use) and double-loop learning (interactive use) are perceived from a tangible and an intangible resource dimension. In other words, tangible and intangible dimensions are considered for both diagnostic and interactive uses of MCSs.

Dynamic capability consists of skills and knowledge applied in business processes that enable firms to coordinate or integrate activities in order to create new capabilities and renew the firm’s resource base (cf., Teece, 2007; see also Eisenhardt & Martin, 2000; Prahalad & Hamel, 1990). It relates to ensuring that balancing of MCSs is exercised through SBPs (based on single-loop learning) and IBPs (based on double-loop learning).

Table 1. An integrative learning framework of management control systems (MCS)

Management logic		
Type of resources	Standard Business Processes (SBP) – (Clear causal relationship – Single-loop learning)	Innovative Business Processes (IBP) – (Blurred causal relationship – Double-loop learning)
Tangible resources	(Quadrant 1) Tangible SBP Accommodative ABC Value engineering EVA Experience curve Kaizen costing Standard costing	(Quadrant 2) Tangible IBP Divergent New production philosophy Strategic business planning Genuinely new business channel Target costing Life cycle costing Product/market portfolio Business strategy Balanced scorecard
Intangible Resources	(Quadrant 3) Intangible SBP Convergent Project management Routine R & D Process improvement Networking Learning curve	(Quadrant 4) Intangible IBP Assimilative Strategic management of knowledge Complex R & D IPR-strategy Business Development Intellectual Capital

The MCSs of an organization, which is broadly defined to encompass both strategic and operational aspects (Chenhall, 2005), as well as structural and process-related aspects, may be understood in two dimensions, i.e. learning dimensions and resources dimensions. The learning dimension relates to the nature of the business processes and their interrelationships, and this can be described as management logic. Managers can focus on SBPs and assume that explicit causal relationships exist among them, or they can focus on innovative business practices and recognize that the causal relationships among them are both blurred and dynamic.

According to the dynamic capabilities framework, the learning mechanisms vary with whether the processes are based on explicit casual relationships or whether the relationships can be characterized as opaque and dynamic (Ambrosini & Bowman, 2009; Eisenhardt & Martin, 2000; Zollo & Winter, 2000). Dynamic capabilities related to the former resemble the traditional conception of routines, relying heavily on existing knowledge, while dynamic capabilities related to the latter are simple, experiential, unstable processes that rely much less on existing knowledge and much more on rapidly creating new knowledge and iterative execution (Eisenhardt & Martin, 2000, p. 1106). Changes at the SBP level are made in a step-by-step mode (single-loop learning), while changes in the IBPs involve

transformation at a more fundamental level (double-loop or generative learning). Learning leads to improved efficiency and the development of distinct competencies, and different organizations will develop expertise in different methods of learning, depending upon their needs and experiences (Helleloid & Simonin 1994; March, 1994). Organizational learning and MCSs are intertwined as organizational learning constructs – knowledge acquisition, information distribution, information interpretation and organizational memory – are an integral part of the processes found in MCSs (Levitt & March, 1988; Malina & Selto, 2004).

How integrative learning relates to organizational learning can be explicated by referring to Huber (1991) and Nevis, DiBella, and Gould (1995). Huber (1991) defines organizational learning in terms of four learning-related constructs – *knowledge acquisition*, *information distribution*, *information interpretation*, and *organizational memory*. Drawing on Huber's (1991) model of organizational learning, Nevis et al. (1995) merge the *information interpretation* and the *organizational memory* constructs into integration of learning that is broadly available and can be generalized to new situations. Integrative learning refers to the assimilation and utilization (*information interpretation* and *organizational memory*) learning processes across different domains (for example, different MCSs).

The resource dimension relates to the type of resources emphasized, such as tangible and intangible resources. The tangible resources consist of physical and financial resources, whereas intangible resources relate to the members of the firm or the organization as a whole. The intangible resources of a firm are of three main types: competencies (skill and knowledge), attitude (motivation and leadership qualities), and intellectual agility (e.g. innovation and entrepreneurship, the ability to adapt and cross-fertilize) (Bontis et al., 1999; Roos & Roos, 1997). These resources may also be identified as relationships (e.g. suppliers, customers, alliances, local communities, shareholders), organization (e.g. structure, culture, routines, and processes), and renewal and development (e.g. R&D and new plants) (Bontis et al., 1999; Roos & Roos, 1997).

Ferreira and Otley (2009, p. 275) maintain that incorporation of change dynamics into the analysis of MCS design adds to our understanding of how different aspects or components of an MCS interrelate with each other. They maintain that this would link to the wider area of management accounting change (e.g. Baines & Langfield-Smith, 2003; Scapens & Jazayeri, 2003). However, the framework suggested by Ferreira and Otley (2009), which is based largely on Otley's (1999) performance management framework and Simons' (1995) LOC framework, does not explicitly include an integrative learning perspective.

The integrative learning framework related to MCSs developed in this study focuses on the interrelationships between the learning and resource dimensions. These interrelationships allow us to explain MCSs by examining whether such systems (or at least the major aspects or components) are primarily directed at tangible resources or intangible resources, and whether they are applied to standard business practices or IBPs.

Main features

The main features of the suggested framework highlight learning, business processes, and resources and are based on the assumptions that (1) a firm may be conceived as a learning entity (i.e. the firm as a repository of knowledge) and (2) individual learning may lead to organizational learning without any interruption from internal political or other reasons (Kim, 1993; March & Olsen, 1975). Schein (1992) argues that, given the rapid changes in technology, shortened product life cycles, and innovations in the work-organization, organizations have to learn more faster, which calls for a learning culture that operates as 'a perpetual learning system.' Henri (2006a, p. 77) concludes that PMSs, which form part of MCSs, are used by flexibility value firms to a greater extent than control value firms, and that PMS is also used by firms to stimulate and guide innovation, creativity, change, and learning. Accordingly, control values

refer to predictability, stability, formality, rigidity, and conformity while flexibility values apply to spontaneity, change, openness, adaptability, and responsiveness.

Experiential learning theory

The experiential learning theory portrays the process that explains accounting knowledge acquisition (Riahi-Belkaoui, 2004). Theoretically there are two dialectically opposed forms of grasping or understanding knowledge, based on (1) the type of resources and (2) management logic. There are also four different forms of learning (knowledge) represented by four quadrants of Table 1. They are: accommodative (*Quadrant 1*), divergent (*Quadrant 2*), convergent (*Quadrant 3*), and assimilation (*Quadrant 4*). The accommodative learning style encompasses a set of abilities that can best be termed as active skills – committing oneself to objectives, seeking and exploiting opportunities, influencing and leading others, and being personally involved (solve problems in an intuitive trial-and-error manner) (Kolb, 1984). The divergent learning style is associated with valuing skills – being sensitive to people's feelings, listening with an open mind, gathering information, and imagining implications of ambiguous situations (generation of alternative ideas and implications). The convergent learning style is linked to decision skills – creating new ways of thinking and doing, experimenting with new ideas, choosing the best solution to problems, and making decisions (hypothetico-deductive reasoning). Finally, the assimilation learning style refers to thinking ability – reflected in organizing information, building conceptual models, testing theories and ideas, designing experiments, and analyzing (create theoretical models). The complexity and integration of the different learning styles form the foundation on which the dynamic capability related to MCSs is based. Thus, in order to develop a dynamic capability the company must be able to effectively balance all four quadrants at any development level.

Business processes

The distinction between standard and IBPs has long been discussed in the literature (e.g. Cyert & March, 1963; March & Simon, 1958). Unlike standard business practices (operations), the steps involved in innovation cannot be formalized or pre-specified in detail in many cases. It can be argued that the management styles appropriate for these two categories of business processes are different. Given the nature of innovation being messy, involving false starts, recycling between stages, dead ends, jumps out of sequence, etc., the question arises as to whether or not it is possible to manage innovation. Each of the MCSs may be consisting of one or more routines, which are firm-specific and must be learned.

Resources

The practical implications of the difference between tangible and intangible resource emphases have long been recognized within the management control literature (Ouchi, 1979; Thomson, 1967). The intangible resource emphasis is based on the 'firm as repository of knowledge' approach to the theory of the firm (Marshall, 1969; Penrose, 1959). The cause and effect relationship associated with production of physical products is easy to understand, and the goals are clearer and less ambiguous compared to the situation when the main focus of management lies in appropriating the learning capacity and knowledge of the members of the organization in order to make the processes work.

Referring to Table 1, the more complex the systems included in any quadrant is, the higher the need for integration. And, *ceteris paribus*, migrating across quadrants either horizontally or vertically implies a higher need of integration. It follows from the experiential learning theory of development that all transactions among the different quadrants have to be equally well integrated in order to develop a dynamic capability assignable to MCSs.

Research design

Data were collected through interviews of senior managers of firms and analyzed in terms of the framework developed for this purpose.

Data collection

In order to capture the integrative uses of MCS as well as the dynamic tension between diagnostic and interactive uses of formal MCSs (Bisbe & Otley, 2004) managers' perceptions were obtained from in-depth personal interviews of 11 senior managers of carefully selected companies in Germany and Sweden. The interviews lasted one to two and a half hours, and covered a range of different themes, or concepts of learning and management. Triangulation method was adopted to assess the validity of interview responses by comparing them with other types of evidence, i.e. company documents and one of the author's personal observations and knowledge of the companies in question.

Following a case-based approach, six large, established, listed German (designated as P, R, and T) and Swedish companies (designated as Q, S, and U), operating in three different industries, i.e. automotive (Q and P, included in Group QP), forest products (T and U) and electric engineering (S and R, included in Group SR), were selected (Table 2) Each of the selected companies has a long history, and the companies operate in industries where the use of MCSs is considered to be useful (cf., Dittilo, 2004).

The companies were selected on the basis of four main criteria (or, boundaries). First, for a company to be

selected, it must be a leading-edge company in its field of business and characterized by its longevity and innovativeness. Second, its position must be based on knowledge of its core competence (or competencies). Third, it must have well developed strategic and management control models. Finally, it must have business units operating on both the Swedish and German (speaking) markets. The studied theoretical construct is *integrative learning*, and the sampling strategy aims at finding instances of integrative learning and examining and elaborating on the theoretical construct in an overall learning context (Miles & Huberman, 1994, p. 28). The rationale for choosing companies (cases) from (1) the Swedish and German (speaking) markets and (2) from different industries is that learning conforms to culture (Nevis et al., 1995; Schiller, 2001). Companies operating on the German market (P, R, and T) are referred to the Germanic cultural cluster, whereas companies operating on the Swedish market (Q, S, and U) are assigned to the Nordic cultural cluster (Hofstede, 1984; Trompenaars & Hampden-Turner, 1997). Furthermore, regarding different industries there are indications that organizational culture vary more across industries than within them (Chatman & Jehn, 1994).

The data were analyzed by using the integrative learning framework related to the MCSs developed in this study (Table 1). The unit of analysis is company level. If there is no difference between companies within one Group for a specific aspect, the Group is considered to constitute a case.

Findings and discussion

The findings of this study are discussed below under tangible diagnostic use of MCSs; intangible diagnostic use of MCSs; tangible interactive use of MCSs; intangible interactive use of MCSs; and integrative learning experiences.

Tangible diagnostic use (Quadrant 1)¹

Tangible diagnostic use refers to accommodative learning that may result in active skills and a tendency to solve problems in a trial-and-error manner (Kolb, 1984). It is directed at clear causal relationships attributable to tangible resources like the products, distribution channels and equipment located in an operative environment. According to Simons (1991, 1995), diagnostic control mechanisms facilitate single-loop learning (see also Otley, 1999).

Examples given in Table 3 indicate that tangible diagnostic use may take many different forms.

¹'Quadrants' refer to those of the proposed integrative learning framework.

Table 2. List of companies and interviewee profiles

Company	Description of company	Interviewee profile (s)
Q	Car manufacturing in Sweden, relatively small compared to some of its competitors	<i>Interviewee 1:</i> A senior manager responsible for staff function, reporting directly to the top Executive Group (Director f Strategic Scale and Scope)
P	At the time of the interviews, this was a subsidiary of Company Q, operating in Germany, mainly as a distribution and service center. It employed about 1,400 people.	<i>Interviewee: 2</i> Vice CEO, Financial Director
S	A parent company with foreign subsidiaries including in Germany. The SR Group is decentralized with some 1,000 companies, organized into seven business segments, including power generation and transmission, Oil, Gas and Petrochemicals, and Financial Services, employing over 200,000 people. Company S employs over 24,000 people.	<i>Interviewee: 3</i> Personnel Director <i>Interviewee: 4</i> CEO of Company S <i>Interviewee: 5</i> Vice CEO, responsible for finance and control <i>Interviewee: 6</i> Head of Business Academy (HR) <i>Interviewee: 7</i> Director f Future Centre
R	A subsidiary of Company S, operating in Germany, with 50 subsidiaries and more than 60 production sites, employing over 29,000 people.	<i>Interviewee: 8</i> Vice CEO <i>Interviewee: 9</i> Director of Marketing-Controlling
T	This company is organized into three strategic business areas, hygiene products, packaging and graphic paper. The Group employs 30,000 people in more than 30 countries	<i>Interviewee: 10</i> Vice CEO Business Development
U	The largest forest products company in the world, employing 25,000 people. Its Fine Paper section employs 8,000 people	<i>Interviewee: 11</i> Financial Director

Intangible diagnostic use (Quadrant 3)

Intangible diagnostic use refers to convergent learning, which is linked to decision skills – creating new ways of thinking and doing, experimenting with new ideas and choosing the best solution to problems (Kolb, 1984). It focuses on intangible resources, that is, non-physical or non-financial resources and rights, for example trade secrets, that have a value to the company, such as new

knowledge, new process ideas and models, and creating a new network and a new project management model. Intangible diagnostic use together with tangible diagnostic use is described as single-loop learning (Simons, 1991, 1995) (Table 4).

Table 4. Intangible diagnostic use (Quadrant 3)

Company	Intangible diagnostic use
Q	Process improvement linked to management accounting
P	Intranet system, along with an external follow-up of how well the company was doing in the eyes of the customers
S	Success implies a process of constant change, and the dynamic market sets the pace and direction of the development work
R	Initiating and sustaining continuous change processes based on innovative thinking originated from customers and suppliers
T	Emphasizes the importance of creating a flexible learning organization
U	Day-to-day development work carried out in local laboratories at the individual mills

Table 3. Tangible diagnostic use (Quadrant 1)

Company	Tangible diagnostic use
Q	ABC project to identify cause-and-effect relationships associated with the cost of a car engine
P	Extensive training program for its distribution partners
S	Delegated decision authority down to the organizational level affected by the decision
R	Responsibility and accountability were grouped according to competence area and operative area
T	Explicitly related changes in its sales of products to the need for competence improvement
U	Comprehensive within-mill training programs to develop the knowledge and skills of all its employees

Tangible interactive use (Quadrant 2)

Tangible interactive use is attributable to divergent learning, which is associated with valuing skills including the generation of alternative ideas and implications. It is linked to upstream activities or IBPs and focuses on blurred causal relationships among tangible resources. Unlike SBPs, the steps involved in IBPs cannot be formalized or pre-specified in detail in many cases (Cyert & March, 1963; March & Simon, 1958). According to Simons (1995), interactive control mechanisms facilitate double-loop learning in that tangible interactive use is underpinned by an organic, constructive learning approach (Bisbe & Otley, 2004) (Table 5).

Intangible interactive use (Quadrant 4)

Chenhall (2005, p. 404) emphasizes that a distinctive characteristic of MCSs is their role of accommodating and facilitating the capacity to innovate by encouraging learning. This role explicitly manifests itself in intangible interactive use and hence refers to assimilation learning, which relates to organizing information, building conceptual models, testing theories and ideas, designing experiments and analyzing (Kolb, 1984).

Intangible interactive use is attributable to upstream activities or IBPs and focuses on blurred causal relationships linked to intangible resources (Hand & Lev, 2003; Lev, 2008; Teece, 2007). Interactive control mechanisms assist double-loop learning (Simons, 1995) (Table 6).

Integrative learning experiences

Integrative learning between tangible interactive use (Quadrant 2) and intangible interactive use (Quadrant 4)

The SR Group provides an example of integrative learning experience between tangible interactive use and intangible interactive use. The SR Group was rapidly turning into a service- and knowledge-based global company within the field of electrical and electronic engineering, and they had recognized that human crea-

Table 5. Tangible interactive use (Quadrant 2)

Company	Tangible interactive use
Q	Technological transfer among different model generations and among existing models
P	Multicultural management teams that focused on competence development work in each product segment
SR Group	Cross-fertilization is considered to be a significant facilitator of double-loop learning
T	Lowering the cost per consignment of paper produced through a new and innovative production concept
U	Allocated most of its development efforts to specialized mills that were good at double-loop learning

Table 6. Intangible interactive use (Quadrant 4)

Company	Intangible interactive use
Q	Vast number of external and internal research projects, including 20 doctoral student positions
P	Furnished information about product improvements upstream to the R&D department in Sweden
SR Group	R&D activities are organized into dedicated centers of excellence in specific fields of technology
T	Employs a more centralized strategy regarding R&D compared with Company U
U	Employs a more decentralized strategy regarding R&D compared with Companies Q and T

tivity and individual initiative were far more important as sources of competitive advantage than homogeneity and conformity. This had triggered the two electrical engineering companies to develop an explicit strategic management model that related to the IBPs.

Implementation of Balanced Scorecard within the SR Group in Europe was made at a local level as the Group was still highly decentralized and the benefits of BSC primarily related to the operational level. The ideas behind the Future Centre were integrated into the operational activities of Company S, which together with its research orientation articulated the competence strategies (*Quadrant 4*). In line with their business strategy, the Group had identified two global R&D laboratories – Automation Technologies and Power Technologies. This strategy is in concert with the measures for innovation processes in the Group (*Quadrant 2*), which will facilitate its transformation from a global electrical engineering company to a global knowledge and service company. Hence, integrative learning takes place between *Quadrant 2* and *Quadrant 4*. That is, SR Group has developed a dynamic capability (cf., Eisenhardt & Martin, 2000; Grant, 2007; Teece, 2007, 2009). There was also an example where a company failed to achieve integrative learning between Quadrants 2 and 4. For example, the strategy of Company Q, ‘small is beautiful’ illustrates how deeply intertwined and interdependent the competence strategy and the business strategy are, highlighting the link between Tangible IBP and Intangible IBP (*Quadrant 2*) and (*Quadrant 4*). That is, at that time Company Q did not succeed in creating a dynamic capability assignable to *Quadrants 2 and 4*.

Integrative learning among tangible diagnostic use (Quadrant 1), tangible interactive use (Quadrant 2), and intangible interactive use (Quadrants 4)

The SR Group in Germany provides examples of integrative learning experiences among *Quadrants 1, 2, and 4*. Company R underlined that competence development

took place within the matrix structure, business segments, and business areas, on one hand, and geographic segments and regions on the other. This implies that each business unit and each company decides how they should look in the eyes of their customers, what they must excel at, and how they can continue to improve and create value, in short, what competence improvement activities they should engage in. This means that the Group was far too decentralized to be governed by one major strategy only, be it a business strategy or a competence strategy. To some extent, each company had adopted a particular focus. Company R had an extensive rotation of people between research centers, research projects, and operational responsibilities (integrative learning between *Quadrant 1* and *Quadrant 2* giving rise to a dynamic capability), while Company S focused on customer value (Chenhall, 2005) and improvement projects like T50 (50% reduction in all lead times) integrate these quadrants.

The SR Group had a very high rate of R&D expenditure to net sales (8.5%) and hence could be considered as a highly innovative company. This is clearly reflected in the managers' perceptions on competence development and competence strategy. They focused on IBPs and in particular, intangible resources (*Quadrant 4*). At the SR Group, the idea that competence development enhances all layers of the organization seemed to set out from the individual employee or manager and related the work of the individuals to the need of the market on an ever-increasing pace (cf., Sanchez & Heene, 1997; see also Barney, 1997; Kogut & Kulatilaka, 2001).

Integrative learning among intangible diagnostic use (Quadrants 3) and intangible interactive use (Quadrants 4), supported by tangible interactive use (Quadrants 2)

In the case of Company Q, the business idea that 'small is beautiful' was formulated following the unsuccessful merger attempt between Company Q and a French company in 1993. Interviewee 1 stated, 'When it was broken off, Company Q got very determined - now we have to go down the road ourselves, we have to dare to take a run'. The business strategy and the competence strategy were designed in line with this idea. Apart from the core values of safety, quality, and environmental care, competence development efforts were put into design and styling issues and how to offset the disadvantages of being a small carmaker. This represents an extension of strategy from *Quadrant 3* to *Quadrant 4*. Areas such as plant design, plant operation, research and development, including pre-production and technology were considered from a competence strategy (*Quadrant 4*) point of view. Management practices that did not support 'small is beautiful' were discontinued. A follow-up feedback reporting on whether or not profit plans and quotas were met, on month-to-month basis (*Quadrant 2*) was integral to the business strategy.

Integrative learning between intangible diagnostic use (Quadrants 3) and intangible interactive use (Quadrants 4)

The head of the European region within Company P had formed multicultural management teams that focused on competence development work in each product segment and furnished information about product improvements upstream to the research and development department in Sweden (c.f., Abouzeedan & Busler, 2007). This reflects support from Intangible SBP to Intangible IBP (from *Quadrant 3* to *Quadrant 4*). Thus, Company P had succeeded in developing a dynamic capability related to these two Quadrants. The lack of emphasis on competence strategy at Company P was understandable given that it was supportive of the parent company's strategy. Company P's intranet system, along with an external follow-up of how well the company was doing in the eyes of the customers, i.e. *Quadrant 3*, played an important part in this strategy.

Other combinations of integrative learning

At Company U, issues concerning product development, IT, leadership, customer relations and stock market relations, etc. were discussed in broad terms at the senior management level. Company U's business strategy of large-scale production and specialization (*Quadrant 2*) was supplemented with a competence strategy (*Quadrant 4*) aiming at minimizing the machine downtime and increasing delivery reliability (identified dynamic capability assignable to the *Quadrants 2 and 4*). And this was achieved by constantly improving and updating the production equipment, and by running comprehensive training programs to develop the skills of all employees. At Company U, the focus was set on business strategy, while the competence strategy was complementary to the main focus. The managers' perceptions on competence strategy tended to emphasize the need to link Tangible IBP with Intangible SBP (*Quadrant 2* with *Quadrant 3*). Their competence strategy also had elements of Intangible IBP (*Quadrant 4*), for example, the resources of Company U's Corporate Research were available to all paper and pulp mills within the Company (dynamic capability attributable to the integration between *Quadrant 4* on the one hand and, *Quadrant 3*, and *Quadrant 2* on the other).

Company T's business strategy of concentrating all production on one mill set the competence strategy (*Quadrant 4*) focused on how to manage the increased frequency of setup times due to running the entire product range on one equipment. Interviewee 10 claimed that their engineers had succeeded in finding new and innovative ways of dealing with the complexity relating to the frequency of setup times. This means that one major element of Company T's competence strategy was directed at developing competence supportive of this

new production philosophy. However, as in the case of Company U, the main focus was on the business strategy (*Quadrant 2*). Hence, Company T had succeeded in creating a dynamic capability referable to *Quadrant 2* and *Quadrant 4*.

Integrative learning and dynamic capabilities

Dynamic capabilities related to MCSs (Ambrosini & Bowman, 2009; Eisenhardt & Martin, 2000; Grant, 2007) can be described in the four development dimensions identified by the experiential learning theory of development, namely, affective complexity, perceptual complexity, symbolic complexity, and behavioral complexity (Kolb, 1984). For example, the complexity and integration of the different learning styles (*Quadrant 1* and *Quadrant 4*) form the foundation on which the dynamic capability related to MCSs is based. Thus, in order to develop a dynamic capability the company has to be able to effectively balance all four quadrants or the affective, perceptual, symbolic, and behavioral complexity at any development level.

Given the business firms as learning organizations, intangibility, learning, and cross-functional business processes seem to be at the center of dynamic capabilities. As the analysis indicates, the successful, established firms operating in a dynamic environment seem, on the whole, to be able to balance two or more elementary forms of learning, thereby creating dynamic capabilities associated with MCSs. Furthermore, in a situation in which a company has problems with integrating different control mechanisms it is likely to experience difficulties in improving its capacity for integrative learning.

Conclusions

The study explains the perceptions of senior managers with regard to integrative learning and, hence, to developing dynamic capabilities. The perceptions of most interviewees highlight the fact that intangible resources were intertwined with learning preconditions.

The SR Group and QP Group had more elaborate and articulated views on competence strategy and development. They seemed to have the best linkage between *Intangible diagnostic use* and *Intangible interactive use* and, thus presumably the best integrative learning, and the dynamic capability given the strategic context. For example, the SR Group equated competence development to instrumental learning (learning that takes place as a direct consequence of an incentive) and had created centers of excellence to facilitate the learning process. They also emphasized the importance of both knowledge creation and dissemination throughout the organization. Company S, in particular, stood out, as their senior manager seemed to have the most advanced understanding of how to relate IBPs to SBPs. It had succeeded in creating a dynamic capability assignable to the integra-

tion between *diagnostic use* and *interactive use*. The company considered itself as an advanced learning organization, which recognized the importance of both individual and integrative learning. The development of its core competencies was based on integrative learning rather than on individual learning.

Company Q seemed to be the second-most advanced company in terms of competency development, integrating *Intangible interactive use* on the one hand and *Tangible diagnostic use* and *Intangible diagnostic use* on the other. Their commitment to IBPs was reflected in the decision to create 20 doctoral student positions in order to advance more knowledge-intensive work environment.

This article contributes to the LOC literature with an integrative learning framework, which deepens our understanding of the LOC framework. This is significant, especially with regard to the increasingly dynamic economic/business environment. Furthermore, by focusing on the interdependency between different control mechanisms operating at the same time in the same company, our understanding of MCSs will be more comprehensive (cf., Abernethy & Brownell, 1997; Abouzeedan and Busler, 2006).

This study also provides valuable insights into our understanding of the issues associated with the 'soft side' of MCSs. The cyclical learning and knowledge patterns underlying the proposed framework indicate that there ought to be a logical balance between the identified management control quadrants, stressing the importance of a proper information and communication flow between the identified quadrants. Thus, the framework may be used as a tool to analyze the knowledge creating ability or integrative learning of a company. It shows the importance of the integration of systems enhancing the long-term innovation capacity with systems facilitating short-term cost-cutting and efficiency. Furthermore, this study offers a robust integrative learning framework related to MCSs and an analysis of how senior managers in six large companies perceive the use of the MCSs specifically designed for their firms, given a dynamic business environment. The article demonstrates how the use and integration of different aspects or components of MCSs can be developed into a dynamic capability. Regarding the relationship between MCSs and strategy, Henri (2006b, p. 530) argues that this link may occur at the capabilities level rather than at the strategic level (see also Witcher & Chau, 2007). In order to analyze empirical data from a dynamic capability perspective, the study presents an MCS framework based on intangibility, learning, and cross-functional business processes. A firm's ability over time to dynamically manage and balance the different aspects of their MCSs indicates that they have developed dynamic capabilities related to MCSs.

Finally, this article contributes to the MCSs literature by identifying integrative learning linkages that may form the basis of creating dynamic capabilities for the co-ordination and combination of different categories of MCSs. Hence, by adopting a comprehensive and integrated approach, this article identifies the interdependency between different systems or control mechanisms operating at the same time in the same company.

Implications of the findings

This study demonstrates the importance of incorporating the issues related to integrative learning and dynamic capabilities with MCSs. This has implications, among other things, for management accounting research, if MCSs are to be an integral part of management accounting within modern organizations. The insights provided in this paper would help researchers refocus management accounting in their attempts to meet the current challenges related to the type of contribution that management accounting can make toward developing dynamic capabilities of firms.

Further, this study shows how six large companies in automotive, electric engineering, and forest products industries attempted to cope with the issues related to competence and competence development in adopting strategies to suit their circumstances. There may be lessons for other companies that are trying to address similar issues, for example, in developing key performance indicators to evaluate managers. Furthermore, this study has identified integrative learning linkages that may create dynamic capabilities, which may be useful to other companies. Given that a firm's knowledge-creating ability may affect their relative competitiveness, the identified learning framework is useful for analyzing systematically dynamic capabilities related to MCSs. By applying this learning framework, managers can identify potential dynamic capabilities and improve those capabilities in terms of affective, perceptual, symbolic, and behavioral complexity.

This study is based on interviews of senior managers of six large companies in automotive, forest, and electrical engineering industries in Germany and Sweden. Future research could extend the coverage to include other industries to examine if the strategies adopted to develop dynamic capabilities in order to survive in the ever-changing market place are different. Another interesting avenue for further research would be to include a few major companies in Asia to see if there is an impact of culture on their efforts at developing dynamic capabilities.

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