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**THE DEVELOPMENT OF NEW
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The Development of New Organizational Capabilities

ABSTRACT

Developing new capabilities is a strategic necessity for many organizations. It entails extensive learning dispersed across complex activity fields that extend beyond the firm. We generate a model and present propositions about new capability development that integrate perspectives from the strategy, learning, and social capital and network literatures. The model includes learning processes, contextual mediators, and learning mechanisms that can be intentionally designed to foster requisite learning and the institutionalization of new capabilities.

The Development of New Organizational Capabilities

INTRODUCTION

Developing new capabilities to address the demands and opportunities of today's ever-changing environment is a challenge confronting most organizations. Indeed, product-market competition can be seen as a superficial expression of the deeper competition over capabilities (Hamel, 1994). Organizational capabilities are the know-how that enables an organization to achieve its intended outcomes (Dosi, Nelson & Winter, 2000). Despite their importance, relatively little is known about how firms actually develop new capabilities. This article presents a theoretical framework and model for understanding new capability development.

Within the strategy literature, capabilities are examined from three perspectives. The resource-based model of firm behavior describes the business enterprise as a collection of resources, including those that offer unique sources of advantage that are difficult to imitate (e.g., Barney, 1991; Burgelman, 1994; Leonard-Barton, 1992; Penrose 1959; Teece & Pisano, 1994). The "dynamic capabilities" perspective posits that competitive leadership depends on the firm having the capacity to change its capabilities over time, especially in a rapidly changing technological environment (Iansiti and Clark, 1994; Teece, Pisano & Shuen, 1997). Finally, knowledge-based views of the firm focus on knowledge as a key competitive resource and stress the importance of transforming old capabilities into new ones both by recombining existing knowledge (Kogut & Zander, 1992) and by absorbing knowledge from outside the organization (Cohen & Levinthal, 1990).

While stressing the strategic importance of developing new capabilities, these literatures also point out that this entails a slow, difficult, and costly process with uncertain outcomes (Henderson & Cockburn, 1994). Development of new capabilities and the evolution of existing

capabilities surface an ongoing tension between change and continuity. Existing capabilities are deeply embedded in an organization, including in its routines and organizational frameworks (Daft and Weick, 1984; Galbraith, 1973; Nelson & Winter, 1982), and in its communication channels and problem-solving strategies (Henderson & Clark, 1990). They reflect a dominant logic or design (Abernathy and Utterback; 1978; Bettis & Prahalad, 1986; Nelson & Winter, 1982) and evolve through a series of incremental changes that build on and reinforce that logic. Radical innovation in particular creates unmistakable challenges for established firms since it destroys the usefulness of their existing capabilities (Pavitt, 2003; Tushman & Anderson, 1986).

The need for the development of new capabilities that represent discontinuous change often stems from change outside the organization, and knowledge and information required to underpin new capabilities often originate outside the firm. It is argued, however, that the ability of the organization to exploit external knowledge, while a critical to innovation, depends on the absorptive capacity of the firm—which depends on the availability within the firm of related knowledge (Cohen & Levinthal, 1990). Acquisition, evolution, and adaptation of capabilities rest on the ability of the organization to learn (Dosi, Nelson & Winter, 2000). A question of undeniable importance to firms in today's environment characterized by rapid advances in knowledge is how to enhance the learning processes required for capability development.

Many scholars have conceived of organizational learning as being facilitated by social capital (e.g., Nahapiet & Ghoshal, 1998) and as occurring through internal and/or external networks (e.g., Powell, 1998; Powell, Koput, and Smith-Doerr, 1996). Yet, typical structural depictions of networks say little about how they actually facilitate learning, other than through the flow of information and knowledge between connected nodes and facilitated by the absorptive capacity of the receiving organization. What occurs in and around linkages that

promotes the successful creation and/or exchange of knowledge, and how the knowledge that is exchanged through network links becomes absorbed by the organization in a manner that leads to new or extended capabilities are not, for the most part, examined.

We propose a model for understanding how organizations develop new capabilities that builds on the network, social capital and learning literatures. Building on earlier literature, we posit that the knowledge that underpins new capability development is accessed through internal and external networks and that the capacity to develop new capabilities depends on the existence of learning mechanisms (Friedman, Lipshitz & Overmeer, 2001; Shani & Docherty, 2003) that enable the organization to embed and institutionalize this knowledge. We stress that learning of new capabilities occurs in practice -- in collective activity systems that embody aspects of historical continuity and situated contingency (Engestrom, 1987; 1999; Leont'ev; 1978; Vygotsky; 1978). Our intent is to go beyond high level treatments of the conditions under which learning does or does not occur and to propose a systems model of new capability development to guide future research and practice. Our focus in this paper is on extending the conceptual tools for understanding and guiding purposeful learning of complex, multiple network, multi-level and multi-voice change that is inherent in capability development.

The rest of the paper is structured in three main sections. The first presents its theoretical background. In this we bring together concepts and research results from three streams of research which we regard as vital elements in the development of new organizational capabilities, namely the nature of organizational capabilities, the roles of social capital and social networks in capability development, and the learning processes involved. In the context of capability development, key features of learning processes are that they are multilevel, practice-based, and cross-community and take place in activity systems. Planned facilitation of learning is

achieved through the design of learning mechanisms. The second section presents our integrative model of new capability development that describes this development in terms of learning processes. The model specifies: a) the characteristics of these learning processes, b) different kinds of the learning mechanisms that may be designed to facilitate learning and c) learning mediators that may influence whether learning processes occur and whether they lead to new capabilities. A number of propositions regarding how the interactions between these factors influence new capability development are presented. The third section presents our agenda for research and managerial implications.

THEORETICAL BACKGROUND

Organizational Capabilities

Although defined and classified differently by different scholars, a capability is the capacity to undertake particular activities successfully in order to effect a desired end (Amit & Shoemaker, 1993; Grant, 1996; Helfat, 2003). Dosi, Nelson & Winter describe a capability as a “large-scale unit of analysis” with intended significant outcomes (2000: 4). They stress the importance of firm intentionality over time and of strategy in providing continuity that allows capabilities to grow and become manifest in the firm’s performances through the building of knowledge-based resources and routines, including search routines, decision routines, and operating routines (Nelson & Winter, 1982).

A common theme is that organizational capabilities are composite bundles of competences, skills and technologies, rather than single discrete skills, and are coherent. Organized activities in organizations are bound together to enable particular salient performances (Hamel, 1991; Tell, 2000). Pavitt (2003) has described corporate capabilities as consisting of

specialized and general technological skills and the organizational capabilities to access and combine them effectively. Such combination may be achieved through competence with organizationally pervasive technologies such as supply chain that provide a foundation for the assimilation of technologies developed elsewhere (Pavitt, 2003). The integral nature of capabilities is particularly salient in recent research on the nature of competition in the pharmaceutical industry. These firms' success is based not on a particular set of technical skills but on the firm's unique ability to combine capabilities such as research, clinical testing, and marketing (Henderson & Cockburn, 1994; Liyange, Greenfield & Don, 1999). This is consistent with Pavitt's view (2003) that the emergence of major technological capabilities is the main impetus for fundamental change—but the inability to match them with market and organizational capabilities is the major barrier.

Bogner & Thomas (1994) argue that a capability exists on two levels. On one level is the active component of the capability, the 'doing' of activities that exploit knowledge and skills better than the competition. On a second level there is a cognitive component of the capability. They propose that all relevant actions and skills are driven by a distinctive set of cognitive traits (e.g, shared values, recipes, integrated understandings of different aspects of competitive dynamics) that lie behind core skills and transform the mere doing of an act into a capability. Developing new capabilities thus entails approaches that lead to the necessary modifications of the company's cognitive traits and activity patterns.

A potential down-side of building core capabilities is that they also may become core rigidities (Leonard-Barton, 1992). Recognizing what of the firm's current knowledge is useful and what is not and acquiring and applying new knowledge when necessary may be quite difficult for an established firm because of the way knowledge is organized and managed

(Henderson & Clark, 1990). Radical change in particular may threaten the usefulness of many of the firm's capabilities (Tushman & Anderson, 1986), yet the embeddedness of these capabilities makes it difficult for a firm to recognize the degree of threat and to understand the nature of the change that is required (Afuah, 2001; Montverde, 1995).

To deal with the challenge of rigidity, researchers have advocated that organizations build in dynamic capabilities to address rapidly changing environments: capabilities to “integrate, build, and reconfigure internal and external competencies to address rapidly changing environments” (Teece et al. 1997, pp. 516). Elements of dynamic capabilities include absorptive capacity (Cohen & Levinthal, 1990; Van den Bosch, Van Wijk & Volberda, 2003), architectural capability (Henderson & Cockburn, 1994), combinative capability (Kogut & Zander, 1992) and learning capability (Abrahamson, 1999; Levinthal & March, 1994; Raelin, 2000; Shani & Docherty, 2003; Vera & Crossan, 2003). These constitute the ability to access, import, generate, and apply knowledge to enable the organization to accomplish new kinds of performances and achieve different outcomes. Indeed, much of the literature on organizational capabilities rests on the assumption that knowledge is the strategically most important resource of the firm. Knowledge grows through two generic processes (Ghoshal & Moran, 1996; Shumpeter, 1934), the combination of previously unconnected knowledge that leads to novel solutions and the exchange of knowledge between actors. Both of these are inherently social processes, and occur within a network of connections that characterizes any activity system. Thus, we turn in the next section to the related bodies of literature dealing with social networks and social capital.

Social Capital and Social Networks and Capability Development

Various scholars have investigated the communication flows in social networks with an eye to understanding how various network structures enable the exchange and combination of knowledge and thus facilitate the creation of new knowledge. (Kogut & Zander, 1992; Tsai 2002; Tsai & Ghoshal 1998). Social capital theory underpins the claim that networks play a central role in the acquisition of knowledge and the development of organizational capabilities. Nahapiet and Ghoshal define social capital as “the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit” (1998: 243). They identify three dimensions of social networks that influence the exchange of knowledge: structural, relational, and cognitive. Structural embeddedness has been found to create strong symmetrical ties, affect that motivates sharing; and network ties leading to advantages of access, timing, and referrals (Autio, Hameri & Vuola, 2004; Burt 1992). The strength of ties influences the type of knowledge that is exchanged (Hansen, 1999; Uzzi & Lancaster, 2003). Relational embeddedness is associated with trust, common norms, expectations, and obligations (Coleman, 1988; Fukuyama 1997; Putnam, 1993) all of which have been associated with willingness to share rich knowledge (Autio et al., 2004; Dore, 1983; Gulati & Garguilo, 1999; Powell 1998; Uzzi & Gillespi, 2002). Cognitive elements include shared representations, interpretations, and meaning systems (Cicourel, 1973; Giddens, 1974) that are important because knowledge is a social artifact that is embedded in a social context and sustained through ongoing relationships. Nahapiet and Ghoshal (1998) make the case that social and intellectual capital co-evolve, basing this claim in part on the concept that knowledge underpins and evolves through social practice (Giddens, 1984).

Although particular network studies have tended to examine either internal or external networks, the emerging view is that capability development depends on both robust internal and external linkages (Blyler & Coff, 2003; Meeus, Oerlemans & Hage, 2001; Oliver, 2001; Powell, 1998). Similarly, researchers may focus on networks at a single level of analysis (individual level, organizational level, inter-organizational), although the value of network linkages at any level may depend on the cross-level knowledge that results, for example, in turning individual knowledge gained through personal networks into organizational level practice routines.

Different researchers have focused on the importance of informal and formal networks, with some work suggesting that they are useful for different purposes. For example, individual level boundary-spanning social networks, governed by the norms of professional networks of practice, facilitate organizational learning and flexibility, enabling firms to switch from one source of knowledge to another without incurring costs of hierarchical or market exchanges (Grant, 1996; Kreiner & Schultz, 1993; Liebeskind, Oliver, Zucker & Brewer, 1996). On the other hand, formal interorganizational ties support knowledge commercialization and encompass transfers of “commoditized” knowledge in the form of intellectual property rights and of assets essential for commercial development (Oliver & Liebeskind, 1998). Taken as a whole, the network literature can be interpreted to have found that the value to a firm derived from different kinds of networks is complementary.

Network contribution to organizational capability development stems from the system of network linkages as a whole. For example, Reagans and McEvily (2003) found that understanding the impact of dyadic tie strength is insufficient to understand the transfer of knowledge: knowledge transfer increases with social cohesion (density) and the range of linkages in the surrounding network. Several studies of pharmaceutical firms have emphasized

the importance of this range of linkages. Henderson and Cockburn (1994) found that the development of new approaches to effective drug discovery involves the simultaneous ability to move discipline knowledge rapidly across the firm's boundaries, and within the firm to share and combine knowledge across the boundaries of scientific disciplines and therapeutic areas.

Liyange, Greenfield & Don speak of the "continuous stream of functions and activities revolving around the generation, diffusion, transfer, and management of knowledge across individuals, groups, and organizations" (1999: 375).

Implied in network research is that if the right kinds of linkages are set up at the right levels, then knowledge will flow and new or improved capabilities will result. Yet the number of empirical studies that find barriers to learning through network linkages (e.g., Larsson, Bengtsson, Henriksson, & Sparks, 1998; Larsson, Bengtsson, Henriksson, & Sparks, 1999) is a compelling reminder that this is not the case. Increasingly it is understood that the real challenge is to turn the learning that individuals derive from network links into organizational learning that can be used to guide action and become embedded in organizational routines (Powell, 1998). A number of scholars have emphasized the skills that are required for this to happen, including the collaboration and integration skills that underpin the ability to synthesize new knowledge with collaborators and to absorb it internally (Liyange, Greenfield & Don, 1999; Simonin, 1997). Others emphasize the contextual attributes that have to be in place to support such learning, including trust, management intent and attitudes, and governance processes (Dunbar, Garud, & Raghuram, 1996; Goshal & Moran, 1996; Olve, Petri, Roy, J. & Roy, S., 2003; Sako, 2000; Tripsas & Gavetti, 2003). Yet it is also clear that these factors may be insufficient to underpin capability development, which occurs in the context of and through the activities of a complex activity system characterized not only by a dynamic tapestry of multi-faceted networks but also

by historically generated knowledge systems. Cohen and Levinthal (1990) posit that the firm's ability to absorb and apply new knowledge does not simply depend on the organization's direct interface with the external environment, but on transfers of knowledge across and within subunits that may be quite removed from the original point of contact, and that may or may not have the related knowledge required for successful absorption.

Given the complexity of factors that are in operation, we propose that the development of new capabilities will depend fundamentally on the existence of requisite learning processes in the organization, and that these processes are more likely to be present to the extent that learning mechanisms are purposefully built into the organization's design. Learning is the focus of our next section.

Learning and Capability Development

We have argued above that the development of new organizational capabilities requires systemic change across levels and boundaries. Clearly the learning processes entailed in such change are likewise systemic. March (1991; March & Leavitt, 1988) was one of the first to translate learning concepts from individual psychology to an organizational context, and today there are almost as many definitions of organizational learning as there are writers on the topic. In this paper our point of departure is Pedler's definition of a learning organization as 'an organization that facilitates the learning of all its members and continuously transforms itself in order to achieve its strategic aims' (1991: 28). This definition emphasizes the comprehensive character of the learning endeavors, individual, collective and organizational, and on their strict focus on the strategic aims of the organization in the effective and sustainable achievement of the goals of its key stakeholders. In this section we examine three dimensions of organizational learning that are critical to the development of new capabilities: 1) learning at multiple levels; 2)

practice-based learning; and 3) cross-community learning. We then propose activity theory as an overarching framework for understanding the complexity of the capability development challenge. Finally, we describe the concept of learning mechanisms, and the role that they play in creating learning capability in an organization.

Multiple Level Learning

The educationalist Dewey (1933[1986]) defined the starting point of a learning process as the recognition of a problem, an unexpected situation – something missing, something not quite right – that initiates a process of reflection. In Kolb’s model, individual learners engage in ‘*concrete experience*’; for example organizational or network members engage in the practices that gather information from the external environment (1984). For Kolb, concrete experience is followed by three steps: *reflective observation*, *abstract conceptualisation* (drawing conclusions from experience), and finally, *experimentation* to test the conclusions and interpretations and to generate new information to continue the learning, thus completing a cycle. Schon articulates a very similar cycle of individual learning, including four activities: experiencing, reflecting, interpreting and taking action (1984). He sees reflection as a key to learning as it enables managers develop the ability to uncover and make explicit to themselves what they have planned, discovered and achieved in practice.

Because we are interested in how new capabilities become embedded in social practice, we must move beyond a consideration of individual learning and focus on collective learning. In an impressive body of work, Weick (1993.a, 1993.b, 1995; Weick & Roberts, 1993) has developed the perspective that organizing is sensemaking. Furthermore, Weick has posited that learning in the form of sensemaking goes on continually throughout the organization as individuals and groups make small and large adjustments as they learn from experience.

Organizational sense-making results in shared understandings that align diverse, dynamic and dispersed activities that occur in many elements of the organizational system—different projects, different levels and functions, and at the individual, team, and business level. Two collective sense-making approaches operate simultaneously and in interaction with one another (Weick, 1995). “Intersubjective sensemaking” is necessary to make sense of ambiguous situations (where formal knowledge frameworks are insufficient to create meaning) and/or where tacit knowledge is being applied. This form of collective sensemaking entails person-to-person interaction to share interpretations and explore possible meanings. This interactive process may yield new knowledge about system interactions. “Generically subjective sensemaking” entails the application of articulated (codified) knowledge to make sense of an experience or solve a problem. Codified knowledge such as is learned in school, embedded in tools, algorithms, methodologies and processes, or is articulated in strategies, goals, roles, and structures, technology roadmaps, and system architectures, may have been yielded by past intersubjective sensemaking, but now exist as shared frameworks that can shape attention and guide behavior.

In describing transformative adult learning, Mezirow (2000) also sees it as a social process that includes contextual understanding, critical reflection on assumptions, and validating meaning by assessing reasons. Transformative learning involves ‘participation in constructive discourse to use the experience of others to assess reasons for our taken-for-granted frames of reference and making an action decision based on the insight’. Habermas (1984) distinguishes between two main domains of learning: instrumental and communicative. The former concerns learning to control and manipulate the environment or other people, as in task-related problem solving to improve performance. The latter concerns learning what others mean when they communicate with you. This often involves feelings, intentions, values and moral issues and

requires critical reflection on the assumptions being communicated. Discourse presents an opportunity for a high degree of disagreement, even conflict, with an increased probability of questioning existing premises, of making sense in a new way (Bjerlöv, 1999; Bjerlöv & Docherty, 2005). Group discussions and dialogues also give individuals the opportunity to articulate their tacit knowledge (externalization), discuss, interpret and integrate their experiences in shared lessons and shared understanding.

Several learning frameworks deal explicitly with inter-level learning—i.e., with the links between the individual, group, organizational, and network levels in a systemic approach. For example, Vera and Crossan (2003 & 2004) focus on the dynamic interplay within and between these levels in terms of four processes: 1) intuiting within individuals, 2) interpreting between the individual and the group, 3) integrating or developing a shared understanding in the group, and 4) embedding the learning in the organization and institutionalizing it for use at the individual and group levels. Learning processes that result in change in individual and shared thought and action are both affected by and embedded in the institutions of the organization. According to Vera and Crossan, organizational learning occurs when individual and group learning are institutionalized by becoming embedded in the repositories such as routines, systems, structure, culture and strategy (Vera & Crossan, 2003). The model of learning of the Hitotsubashi school of knowledge management also focuses on a cycle of knowledge production. In their case the individual's experience-based tacit knowledge becomes shared conceptual knowledge through dialogue and reflection. It then becomes explicit when it is systematized and applied, and becomes a basis for the cycle to begin again (Nonaka & Takeuchi, 2004; Nonaka & Takeuchi, 1995).

Practice-Based Learning

The cycles of systemic learning described above can break down at any point if the social processes in the organization do not support them. There is a long history of theory that portrays learning and the creation of knowledge as innately social processes among individuals, occurring in a social context (Berger & Luckman, 1966; Giddens, 1984; Vygotsky, 1962; Wenger, 1998; Wittgenstein, 1953). Organizational learning is a social/cultural process rather than an individual/cognitive process (Easterby-Smith, Snell & Gherardi, 1993; Teece & Pisano, 1994). We are particularly concerned with learning that changes practice; specifically with learning that embeds new capabilities into the practice of the organization. Practice-based learning theorists describe learning as situated and claim that learning and doing cannot be separated (Brown & Duguid, 2002; Schon, 1983). Polanyi (1966) argues that comprehension of knowledge is both intellectual and practical. Although the explicit articulation of knowledge may be possible, in use the explicit always possesses an implicit dimension. Thus, acquiring knowledge does not automatically lead to being able to use it. We learn how through practice and the continual dialogue or exchange of experiences, sensemaking, interpretation and developing of shared understandings (Björklöv & Docherty, 2005; Orr, 1990; Orr, 1996; Weick, 1995). Collaboration in carrying out tasks enables the sharing of the tacit and explicit aspects of knowledge, and the development of new routines that become part of an organization's new capability (Hamel, 1991; Ingram & Baum, 1995; Pavitt, 2003).

Social network theorists view collaboration in social networks as the locus for organizational learning (Bouty 2000; Brown & Duguid 1991; Liebeskind, 1996; Murray 2002; Wenger 1998). Practice oriented communities can create a vital link between organization strategy and changes emerging outside the organization (Schenkel, 2005). They are also

significant repositories for the development, maintenance, and reproduction of knowledge, and they are the source of social identity (Coleman, 1988). Learning by individuals is not merely the acquisition of information; it also involves acquiring the ability to act in the world in ways that are recognized by communities of belonging (Fleck, 1979; Giddens, 1984; Schon, 1983).

Although facilitating practice-based learning, networks of practice also raise issues of power and conflict that naturally arise in social interaction and that may limit learning (Contu & Wilmott, 2000; Fox, 2000). Resources, power, authority, legitimacy, and different alternatives are defined and at stake within practice (Bourdieu & Wacquant, 1992; Ortner, 1989). Practice is a process of structuring (Giddens, 1979) in which individuals and groups struggle for a share of these resources, power, authority, legitimacy, and different alternatives (Carlisle, 1997). As in any social network, individuals in central positions wield power over resources. Newcomers to the community or organizational changes may threaten these positions, affecting the current set of relationships. From the firm's point of view, core rigidities and competency traps may evolve when individuals attempt to preserve the status quo and limit new insights (Levitt & March, 1988; Leonard-Barton, 1992). Thus, communities of practice may turn into cages in which individuals learn not to learn (Wenger, 2000). Thus the importance of learning that reaches across communities, enabling the infusion of new knowledge. This will be discussed next.

Cross-Community Learning

Research suggests that innovation often comes at the intersection of communities of practice (Brown & Duguid 2001; Tuomi, 2002). The advancement of organizational knowledge and capabilities is enabled in part because individuals are simultaneously members of multiple social networks, within each of which learning may occur that may enable new forms of action (Brown & Duguid, 1991; Van Maanen & Barley, 1984). Yet successful cross-community

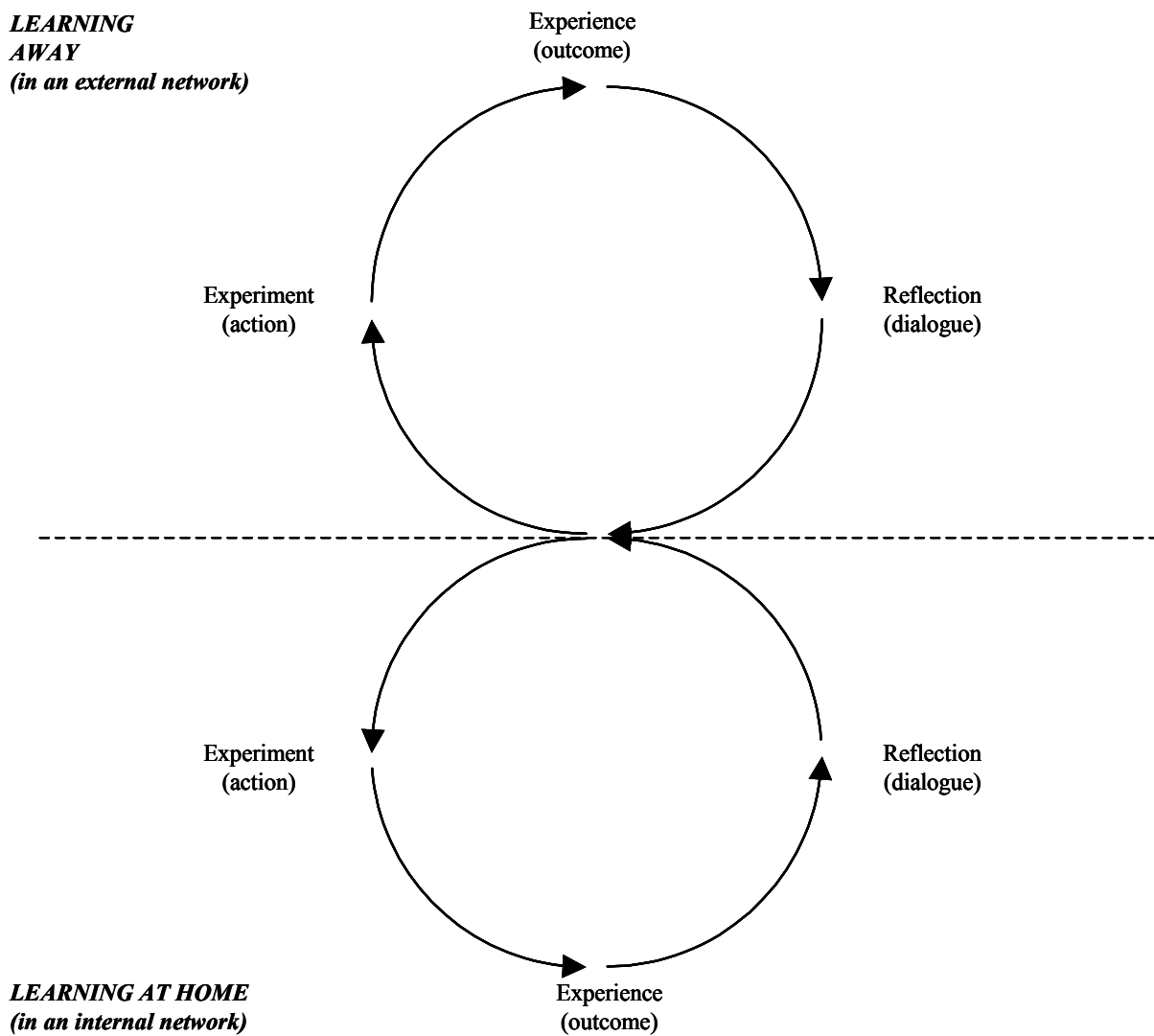
learning requires overcoming the difficulties in communication between members of different communities of practice that result because knowledge is localized, embedded, and invested in practice and identity (Carlile, 2002; Fleck, 1979; Wenger 1998). Meaning shifts when ideas flow from one community to another, as the new community filters out novelty, and tries to fit the new ideas within an existing way of thinking (Bechky, 2003; Tuomi, 2002) and existing patterns of practice.

Developing new organizational capabilities entails changing practice in multiple organizational sub-systems. Organizations are complex technological systems that have been hierarchically decomposed into interdependent sub-systems, implying multiple traditions of practice, multiple forms of problem-solving behavior, and multiple communities of practice (Dosi, G., Hobday, M. & Mengo, L., 2003; Dougherty, 2001). Knowledge is especially likely to be deeply embedded in the practice of a sub-system or community to the extent that it entails high levels of interdependence between individuals and teams and work that is not easily divided up or modularized, high levels of experience required to become proficient, and many site-specific elements (Birkinshaw, Nobel, & Ridderstråle, 2002). The need to share practice in order to exchange and combine knowledge across communities involves disembedding from one community and re-embedding it in another (Birkinshaw et al., 2002; Giddens, 1990)—thus “translation” may be a better descriptor than “diffusion” when considering how knowledge moves from one community to another and/or when the knowledge of two communities are combined (Callon, 1986; Latour, 1987; Law & Hassard, 1999).

The two interlinked processes of learning in an external network (learning away) and learning in one’s own organization (learning at home) can be conceptualized by extending Kolb’s model of individual-level experiential learning (Kolb 1984). Individuals or groups who

engage in ‘concrete experience’ that exposes them to information from the external environment may follow that with reflection and conceptualisation that enables the drawing of conclusions from experience. Finally, these conclusions may be tested through experimentation, perhaps in the “back-home” environment.

FIGURE 1
Home and Away - The Learning Across Boundaries



(Docherty et al., 2003, adapted from Kolb 1984)

If this cycle is seen as operating both at ‘home’ and ‘away’, we can arrive at the model set out in figure 1. This is in effect a ‘figure eight’ process model which offers a useful means for analysing the dynamics of learning through internal and external networks. Clearly, however, there is no guarantee that any network will successfully progress through all stages of both cycles. For whatever reason, network members may refuse to move on to the next stage of the process or be faced with obstacles, say in their home organisation. It may be the case that learning takes place in the external (away) network but little or no advances are made with regard to the internal (home) network (Knight, 2002). Kolb and others (e.g., Bessant & Francis, 1999) would argue that full learning can only be deemed to have taken place when all stages of the learning cycle are complete – in the case of learning networks this consists of movement around both cycles in a ‘figure eight’.

There are additional barriers to moving across organizational boundaries, such as motivation, power, opportunism and suspicion. Willingness of both parties to be transparent with their knowledge and learning intent among organizations impact the effectiveness of joint projects and alliances that are often set up to create new capabilities in sectors experiencing high velocity change in knowledge and skills (Larsson et al, 1998). The different partners contribute distinctive knowledge and skills. The dilemma of expecting learning from interorganizational activity is that it may be individually rational for an organization to take more knowledge than it gives — to choose not to be transparent about its knowledge (Hamel, 1991). Thus in understanding how cross-boundary learning occurs, it is useful to expand one’s view to consider the dynamics of a larger activity system.

Activity Theory

Activity theory stems from the cultural-historical school in Russian psychology (Vygotsky, 1978; Leont'ev, 1978) in which activity is an integrating concept that transcends the dualism between the individual and the broader society. It seems particularly suitable for conceptualizing the development of organizational capabilities because the unit of analysis is the activity system: 'object-oriented, collective and culturally mediated human activity' (Blackler, 1995). Activity systems are not defined by organizational boundaries—they can exist within or across organizations. They are not defined by particular communities of practice. Activities are often the composite of many different disciplines, units, functions, and logics of practice. Activity and constructivist approaches to knowledge emphasize that knowledge is collectively constructed in interaction with the world, situated in practice and relational, mediated by artifacts, embedded in a historical context, and dynamic (Blackler, 1995; Blackler, Crump, & McDonald, 1999; Blackler, Crump, & McDonald, 2000). Development occurs simultaneously on multiple levels—including culturally, organizationally, and individually.

According to activity theory (Leont'ev, 1978, in Engeström, 1999), local activity reflects and draws on historically formed mediating artifacts--cultural resources that are common to the larger society. The activity system is populated by and change is effected by "multiple voices" (communities or stakeholders), each with their own traditions, points of view, interests, and resources. Minimum elements in this system include activities, the subject, object, mediating artefacts (tools and methods), rules, communities, and division of labor. Continuous transition and transformation between the various elements of an activity system result from the simultaneous operation of hierarchically and collectively driven activity, individual goal-driven action, and the routines built into the system (Leont'ev, 1978, in Engeström, 1999). At any point

in time there is a “zone of proximal development” that provides a range of possible action and cognition in which an individual or group can perform with support from the environment. Thus, activity theory builds in a political dimension that is missing in many strategic and knowledge based analyses of capabilities.

Activity systems are formed and transformed over periods of time. Expansive learning—change that creates new forms of activity—is generated by contradictions and tensions within and between existing systems of activity. For example, when one activity system produces tools that are used in another activity system, change in either of these systems may trigger learning processes in the others. The actual process of learning within and across activity systems resembles Dewey’s (1986) cycle of experimental learning, Schon’s (1983) reflective practice, and Weick’s (1995) sensemaking. But since the basis is in cultural-historical activity, learning and the sources of innovative practice are inherently social. Engeström (1999) maintains that this kind of explanation makes it possible to include both historical continuity and local, situated contingency in the analysis of how change occurs.

In practice, activity theorists deal with learning and change in collective activity systems, in which the object-oriented actions are always, explicitly or implicitly, characterized by ambiguity, surprise, interpretation, sense making, and potential for change. Current activity theory scholars aim to develop conceptual tools to understand dialogue, multiple perspectives and networks that characterize activity systems and to explain how they change. New forms of activity are literally learned as they are created. Thus, the study of development of new capabilities is the study of the activities through which they are created. Empirical research focuses on the interaction between ‘activity networks’ that need to develop joint cognitive maps, shared understanding, new routines, and a changed division of labor to realize joint goals

(Blackler & Kennedy, 2004; Lave & Wenger, 1991). Engstrom (2001), for example, chronicles a paediatrics health care chain from primary and hospital care units that engaged in a series of boundary-crossing laboratories to generate a new way of working in which practitioners and parents collaboratively plan and monitor the child's trajectory of care.

Activity theory nicely captures the complexity of capability development in a highly interconnected world. Its academic focus on understanding how change emerges through a complex system of interlocking activities leads naturally to a pragmatic focus on the conditions that can be created to enable new forms of activity to be created by the multiple actors involved. We posit that an organization can purposefully build learning mechanisms that make it more likely that new capabilities will be developed.

Learning Mechanisms

We refer to conscious, planned proactive features that enable and encourage organizational learning as 'learning mechanisms' (Friedman et al., 2001; Popper & Lipshitz, 1998; Shani & Docherty, forthcoming). These features can encourage a dynamic learning capability in general, including the learning required for the development of a particular new organizational capability. We propose that the capability to learn can be designed rather than left to evolve or be encouraged through the current activities of the organization (Ellström, 2001; Fenwick 2003; Lipshitz, Popper & Oz, 1996; Shani & Docherty, 2003). The learning processes needed to create a new organizational capability can be planned at the individual, collective, organizational, and interorganizational levels, and specific features can be designed to initiate, facilitate, monitor, and reward this learning. Acknowledging the complexity of the activity field in which the new capabilities must take hold, and its inherent path dependence, learning

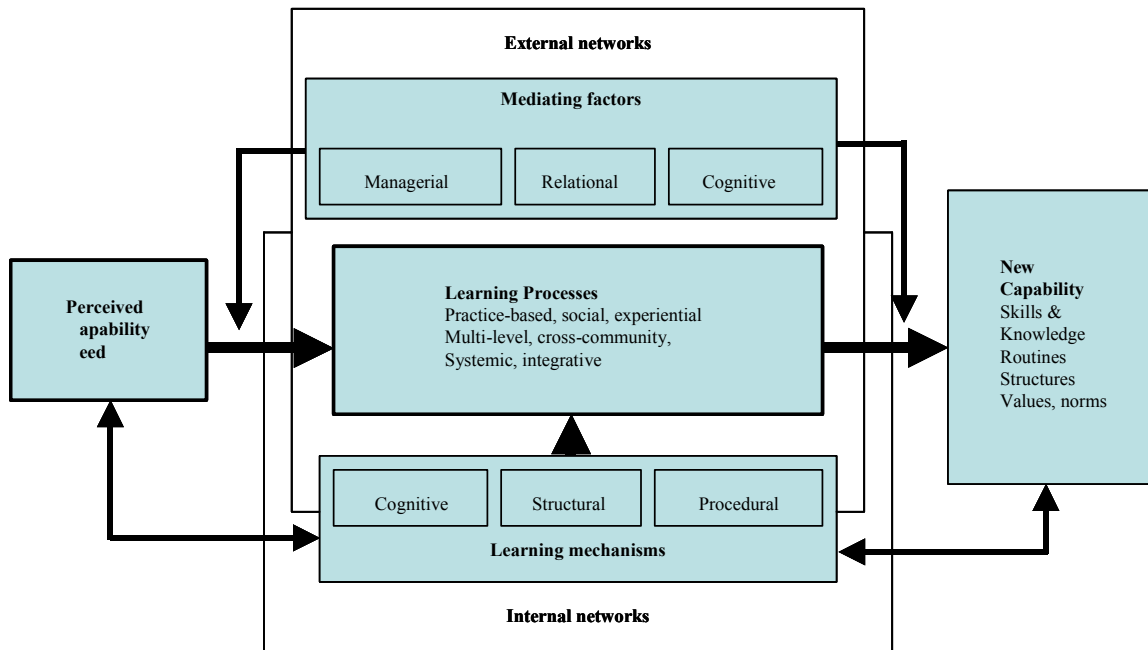
mechanisms will have to be multi-faceted, including cognitive or cultural, structural and procedural elements.

After presenting a summary theory-based model of new capability development in the next section, we will focus in more detail on various kinds of learning mechanisms and the research propositions that stem from this framework.

A MODEL OF NEW CAPABILITY DEVELOPMENT

Figure 2 presents an integrative and dynamic systems model of the development of new organizational capabilities that broadly reflects activity theory and is based on the strategic capabilities, social network, and learning literatures. The central flow in the model is from the perceived need for a new capability to the learning processes that, if successful, result in the bundle of components forming the new capability. The learning processes occur in the context of and are enabled by the web of internal and external networks that constitute the larger activity system. These processes often occur across communities, and involve many individuals and groups within and often outside the organization, leading to systemic learning at the individual, collective, organizational and interorganizational level. The essence of the learning processes is practice-based sensemaking as embodied in experience-based learning and enabled through reflection, conceptualization and experimentation.

FIGURE 2
A Model of the Development of A New Capability



The quality and efficiency of the organization’s learning processes and their effectiveness in leading to the institutionalization of new organizational capabilities are affected by two other kinds of features: learning mechanisms and contextual learning mediators. Learning mechanisms are cognitive, structural, or procedural features that encourage and facilitate learning processes and that are often consciously designed and implemented for that purpose. They occupy a pivotal role in the model because of their direct relationship to learning processes, and because of their two-directional relationship to both the perception of capability needs and to new capabilities. The organization’s learning mechanisms often lead to the identification of a capability need, and that in turn may lead to the establishment of additional learning mechanisms. The establishment of learning mechanisms may be integral to the new capability (such as, for example if the new

capability is itself dynamic), and the new capability that is set up may generate an ongoing need for additional structures, frameworks, and procedures to evolve the capability.

Contextual learning mediators are historically embedded conditions that exist in the activity system. Three main groupings of mediators are mentioned extensively in the literature on learning in networks and on organizational learning of new capabilities: managerial, relational, and cognitive. Management mediators include the strategic intent and the perceived need for the new capability (Dunbar et al., 1996; Quinn, 2003), management commitment and resource allocation to the development of the new capability, and the governance and reward structure applying to the endeavor (Dilschmann, Docherty & Stjernberg, 1994; Olve et al., 2003). The relational mediators include trust (Bogenrieder, 2002; Goshal & Moran, 1996; Sako, 2000) and power, both of which refer to the relations between the members of different networks within and external to the organization that constitute the various activity systems that are potential participants in the learning of a new capability. Cognitive mediators include absorptive capacity, “the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends” (Cohen & Levinthal, 1990: 128). This rests on the knowledge, experience and skills already existing in the organization that are relevant to the new capability, as well as the shared value and prevailing representations regarding learning within the organization (Friedman et al., 2001; Tripsas & Gavetti, 2003). The resource investment – physical and mental - in the development of a new capability is crucial and requires shared value within the firm that centers on the importance of continuous learning, as knowledge boundaries are extended.

Mediators have emerged or evolved in the context of practice, often without conscious reflection on their relevance to learning. Organizations may be high or low on such variables as

trust, openness of information sharing, absorptive capacity, and engagement of employees in decisions—all factors that have been found in a wealth of studies to relate to learning capability in organizations and alliances. These factors mediate the flow from perceived capability need to the development of new capabilities. They make it more or less likely that the felt need for a new capability will lead to the necessary learning processes and/or that learning processes that do unfold will indeed lead to the institutionalization of the elements of a new capability.

Concentrated power, for example may limit the willingness of powerful individuals to participate in learning processes that may change practice in such a way as to limit their power, and/or their support for the implementation of changes that are suggested through the organization's reflection and planning processes.

Five high level overarching propositions stem from this system model of new capability development:

Proposition 1: The development of new capabilities can be accelerated by the establishment of learning mechanisms appropriate to the new practices that have to be institutionalized.

Proposition 2: The greater the complexity of the new capability, the more difficult and pervasive the requisite learning processes and the more important the presence of purposefully designed learning mechanisms for the successful development of the new organizational capability.

Proposition 3: The greater the gap between current practice and needed practice the more difficult and pervasive the requisite learning processes and the more important the presence of purposefully designed learning mechanisms for the successful development of the new organizational capability.

Proposition 4: Learning mediators can promote or inhibit learning processes even when the need for change is well understood in the organization.

Proposition 5: Learning mediators can promote or inhibit the institutionalization of the elements of a new capability even when learning processes are carried out, and learning mechanisms are in place.

Because of the large amount of attention that has been paid to the learning mediators in existing empirical studies, and the general agreement that these factors can impede or facilitate the learning required for new capability development, we will not discuss them in further detail. Rather, we will focus on the newer concept of learning mechanisms, and present further testable propositions with respect to this element of the model.

Learning mechanisms: Designing for new capability development

Learning mechanisms are organizational features that foster requisite learning processes. Although some may simply emerge informally, our argument in this paper is that learning mechanisms can be purposefully designed to support the acceleration of new capability development. Because the learning of new organizational capabilities necessarily occurs in the context of a complex activity system, the mechanisms must foster learning processes that are: 1) Practice-based; 2) Social and experiential; 3) Multi-level; 4) Cross-community, and 5) Systemic and integrative (see Figure 2). Literature on learning mechanisms identifies three focuses: cognitive, structural, and procedural. Together these match the complexity of the new bundle of competencies and features that constitute a new capability. Although we argue that a tapestry of the three different kinds of learning mechanisms must be designed to house and stimulate the requisite learning of a new capability, we will first discuss learning mechanisms with each of these focuses.

Cognitive learning mechanisms

Cultural or cognitive mechanisms are the bearers of language, concepts, symbols, theories, frameworks, and values for thinking, reasoning, and understanding consistent with the new capabilities. Cognitive mechanisms are management's main means for creating an

understanding among all employees on the character, need, and priority of the new capability and the learning and changes required to realize it. They include company value and mission statements, strategy documents, policies and plans, management–union or company-partner joint agreements. These are among the systemic frameworks that underpin generically subjective sensemaking (Weick, 1995) and enable various elements of the activity system to operate with shared meaning. Cognitive learning mechanisms are a foundational part of the emergent multi-level and cross-community social fabric of the firm, and underpin the dispersed practice-based learning processes. As an illustration, value and mission statements have been shown to be important stable reference points and new capability enablers for organizations in complex, ever-changing, high speed growth industries, such as the information and communication technologies (ICT) industry and certain investment services (Lapidoth, 1996).

Structural learning mechanisms

Structural mechanisms are organizational, physical, technical, and work system infrastructures that encourage practice-based learning. Organizational mechanisms house and enable the collaboration and discourse required for collective learning of new practice—the intersubjective, or person-to-person sensemaking entailed as individuals and groups learn from experience (Weick, 1995). These may include communication channels, the establishment of lateral structures to enable learning of new practice across various core organizational units; changes to the work organization, including the delineation of roles and the establishment of teams with shared accountability and thus a mutual need to learn; formal and informal fora for joint exploration and debate, networks for mutual learning; and learning-specific structures such as parallel learning structures, bench-learning structures, and process improvement teams. The physical structure may be laid out to facilitate contact between members of various units and/or

multiple organizations for sharing and combining of knowledge (Bushe & Shani, 1991).

Technology mechanisms may include learning centers, e-learning programs, databases and data warehouses, e-mail, and document and data sharing systems. Technology mechanisms facilitate virtual contact between members that stimulates collective sensemaking, or provide access to key process and content documents that provide generic frameworks that are generated to guide the enactment of the new capability.

The work organization can be designed to facilitate collective reflection and learning. For example, new knowledgeable experts may be temporarily or permanently added to a unit, or new units or teams may be composed that combine different knowledge bases to work together on specific topics. If these are cross-community groupings, they will facilitate home and away learning. For example, joint expert problem-solving brings together temporary groups of discipline experts with varying kinds and degrees of experience of the new capability to learn from one another in the process of addressing real problems of practice (Dixon, 2001). Cross level groups can be established to facilitate the institutionalization of new knowledge and practice at the larger organization level. For example, 'development forums', composed of a vertical slice from an organization trying to develop new capabilities can be established not only to share experiential learning laterally, but more importantly to house multi-level interpretation of these experiences through the lens of their alignment with the new strategies, and to guide further management activities to facilitate the emergence of shared understanding and to institutionalize the change (Bjerlöv & Docherty, 2005).

Procedural mechanisms

Procedural mechanisms concern the rules, routines, methods, and tools that can be institutionalized in the organization to promote and support learning (Pavlovsky, Forslin & Reinhardt, 2001). These may include tests and assessment tools and methods, standard operating procedures, and methods for specific types of collective learning, such as action learning or de-briefing routines. Learning processes may be built directly into practice routines if steps are defined in the work processes themselves where people share knowledge and/or combine it. The focus of the routine or work process will influence the degree to which the procedural learning mechanism is multi-level and cross-community boundaries. Organizations may also adopt methodologies to facilitate the conduct of dialogues for collective reflection in groups, and build these as pervasive core routines to carry out the learning required to implement new capabilities. These may be within or cross organizational. ‘Start conferences’ (Emery, 1982), ‘democratic dialogues’ (Gustavsen, 2001), work-based dialogue (Bjerlöv & Docherty, 2005), and de-briefing procedures (Lipshitz, Popper & Friedman, 2002) are different methods that have been successfully applied to allow participants to systematically learn from each others’ experience through reflection, collective interpretation, and the encoding of new knowledge in new practices and/or repositories.

Building a Tapestry of Learning Mechanisms

Developing new capabilities entails the planned co-ordination of an organization’s efforts regarding dynamic effectiveness: learning, transformation and innovation. It is not a question of a handful of interventions, but of a sustained effort involving a broad tapestry of interventions to achieve both cognitive and behavioral changes in the organization (Bogner & Thomas, 1994; Shani & Docherty, 2003). The learning is of such a magnitude that it cannot happen solely

through “special” learning events. It must form a natural part of individuals’ and groups’ work and of the collaboration and cooperation between groups and organizations, i.e. it must be practice-based. This may require changes in routines, job descriptions, project specifications, reward and evaluation systems, and governance practices.

Structural, procedural, and cognitive mechanisms combine to facilitate the learning processes in different types of learning collectives, within work groups, and between individuals or groups from different communities and/or levels in an organization, and between organizations. These must address different competence, experience, values, professional or organizational identity, goals and priorities. It is especially important to ensure efficiency in the learning across internal and external boundaries, where different learning contexts exist on each side of the boundary. Two examples here are integrating learning from the ‘home and away’ contexts such as by re-integrating newly skilled experts who have participated in cross-organizational learning into the new capability learning activities of their old organization (Docherty et al., 2003), and/or by integrating newly recruited experts in the new capability into well-established groups in the organization (Justesen, 2004).

Particular learning mechanisms often entail cognitive, structural and procedural dimensions. For example, Emery’s ‘start conferences’ and Gustavsen’s ‘democratic dialogues’, which are used to facilitate learning in cross-community, cross-level and interorganizational groups, have both structural and procedural components. The structure includes the main stakeholders in the organization(s), levels, and communities. The process includes analysis and specification of the new capability, identification of the facilitating and obstructing conditions in the organization(s), and agreement to the key tasks to be addressed. These are discussed in different constellations during a two-day workshop. Cognitive frameworks are shared and

emerge, and behavioral action plans are created. Such dialogues are carried out at regular intervals during the transformation or development process.

Common to the three types of learning mechanisms during the development of new organizational capabilities is that they stimulate the development of a new shared meaning and enable learning and the generation of knowledge across multiple networks and communities, across the different hierarchical levels of the organization and across organizational boundaries. They build learning into the routines of the organization, making it synonymous with the creating of new practice. Several more propositions are evident:

Proposition 6: New capability development is enabled and accelerated to the extent that the organization builds learning mechanisms in all three categories: structural, procedural and cognitive.

Proposition 7: The greater the extent to which learning mechanisms span different boundaries, connect and give voice to different actors in the relevant activity systems, the greater the means of developing a new capability.

Proposition 8: The development of new organizational capabilities is accelerated by learning mechanisms that explicitly address the connection to and capacity to absorb external knowledge by fostering the full home and away learning cycle.

Proposition 9: Learning mechanisms that are integrated with practice are the most likely to result in the change of practice required to affect a new capability.

DISCUSSION AND CONCLUSION

Developing new organizational capabilities is a fundamental challenge that organizations and managers face today. This challenge has been addressed in a number of literatures, including those that have addressed strategy, learning processes, learning mechanisms, and the role of different types of networks. We have synthesized these perspectives to create a systemic model of how new capabilities are developed. The development of new capabilities starts with

perceived need and unfolds through complex learning processes that occur in the context of a complex web of internal and external networks and that, if successful, ultimately result in a new, coherent bundle of competencies and elements that underpin the new capability. The model includes mediators of learning, and mechanisms that can be intentionally established to foster the requisite learning. We emphasized that learning new capabilities occurs in practice within a complex activity system that extends well beyond the organization, and that embodies learning history and situated contingencies. Our focus has been to extend the conceptual tools for understanding and guiding purposeful learning of complex systemic, multiple network, multi-level, and multi-voice change that is inherent in capability development. Building upon the model, we generated a series of propositions about learning and the development of new capabilities to guide research about how such new capabilities are created in practice. To conclude, we discuss these future research directions and the managerial implications of this perspective.

Future Research Directions

A clear implication of the model developed above is the need to transcend traditional discipline-based research orientations. The scientific body of knowledge relevant to new capability development has been largely disciplinary focused. The business strategy literature focuses on resources, dynamic capabilities, and knowledge-based views of how the firm uses capabilities to maintain strategic leadership. The organizational learning literature focuses on learning at different levels, learning processes, and learning mechanisms. The network literature has focused on social capital based perspectives of linkages required for knowledge to be shared and combined. The complex activity system in which new capabilities are developed cannot be fully understood through the lens of one of these three perspectives.

We have argued that networks play an important role in capability development. Future research should seek better understanding of the interaction between internal and external networks—a critical focus given the activity theory perspective that new capabilities develop in the context of a complex web of cross-cutting and mutually interacting activity systems that are often not delineated by organizational boundaries. Much current research investigates either internal networks or external networks. Much network research also tends to concentrate on networks at one specific level, while the reality is that there are simultaneous and mutually interacting networks at multiple system levels. As Monge and Contractor (2003) point out, in order to understand one network level, the other related levels of networks need to be understood, and networks need to be examined simultaneously through multiple theoretical frameworks. Our capability development model is multi-level in a very broad sense. Future research needs to concentrate on the interaction between the various levels within and across networks and organizations, as well as on how the different types of networks individually and collectively impact capability development.

The complex dynamics of learning at multiple levels, practice-based learning, and cross-community learning is a third crucial focus for further scientific investigation. As with the development of new knowledge (Nonaka & Takeuchi, 1995), the development of new capabilities requires a complex cycle that entails the generation of knowledge by individuals as they individually and collectively address key problems, and the sharing of this knowledge with the team so that it ultimately becomes organizationally institutionalized and part of the fundamental knowledge of the firm upon which further knowledge can be generated. In the development of new capabilities, strategic intent is also critical; this entails the governance, guidance, integration, resourcing, and stimulation of learning activities spread across the web of

connections within and outside of the organization (Mohrman, Tenkasi & Mohrman, 2003). Mechanisms for articulation of learning and change across the many aspects of a complex activity system is a promising future focus.

New capability development inherently entails learning that changes practice. Practice-based learning raises complex issues of power, information sharing, knowledge sharing, secrecy-based tensions, and conflict dynamics. These relational, managerial and cognitive context attributes, which we refer to in our model as mediating factors, may conflict with the desire to develop new organizational capabilities. An underlying premise of our model is that by establishing learning mechanisms, an organization can impact these contextual variables by promoting learning processes that change practice and yield learning. Yet, the extent to which organizations can successfully design features and carry out learning processes in the face of powerful contextual counter-forces is an empirical question.

More generally, our perspective is that organizations do not need to be victims of their past but can consciously design mechanisms to foster the learning required to go from the perceived need for the development of new capabilities to the generation of the bundle of features and competencies that constitute that capability. Yet activity theorists, strategic change theorists, and indeed many empirical cases suggest that building fundamentally new capabilities is at best a slow and probabilistic process—given the extent to which current practices are path dependent and embedded in a set of constraints that are built into the fabric of a complex activity system. There is a distinct need for longitudinal studies that will generate deeper understanding of the complex dynamics between learning processes, learning mechanisms and learning mediators—and for case descriptions of how these elements can be successfully addressed.

Better understanding the critical design features of various learning mechanisms and strategies for ensuring their articulation across the organization requires additional research. Fundamentally, the organization must embark on an implementation strategy of continual experimentation and learning by doing--in which people are encouraged to question established practices, and to test new ideas, tools and methods. While accelerating and guiding the process of dispersed practice-based learning, there must also be integrative mechanisms that allow articulation of change across the organization and integration at multiple systems levels. A balance is required between the formal design of the development process and the encouragement and monitoring of informally emerging ideas. An additional research direction is the exploration of this balance—how to achieve it, and how it contributes to dynamic learning capability. What are the limits to the designing of development and learning processes – when does designing cease to be functional and become dysfunctional (Boud, Cressey & Docherty, 1985)? How does strategic management of the implementation of new competencies take place without disrupting the creative development processes existing in the operational levels of the organization?

Managerial Implications

In today's dynamic global knowledge economy, managers and employees are likely to find themselves leading organizational capability transitions. It is imperative for managers to understand that approaches to developing new organizational capabilities have to be designed, managed, and sustained. Managers need a mental model of the factors that influence the development of new organizational capabilities, of the demanding learning challenges, and of the learning mechanisms that can be put in place to foster that learning. While learning is largely practice based, learning mechanisms are often seen by managers as separate from work and/or as

a distraction from the pressing business of starting to operate differently. Managers have an urge to define what needs to be done and tell employees to “get on with it”. Yet changes in practice require participants to go through cycles of learning. A major change in mindset is the realization that when an organization is developing and enhancing new capabilities, learning is a core organizational work process. In today’s dynamic economy, this is likely to be the prevailing state of affairs, not just an aberration due to a market discontinuity. The organization has to be designed to facilitate this important work, just as it has to be designed to facilitate the other key routines that comprise the organization’s capabilities. This is the essential nature of the organization with dynamic learning capabilities—learning is a key work process, or routine.

We have started the process of providing a comprehensive framework that can aid managers in designing the organizational features (learning mechanisms) and the learning activities (learning processes) required to develop and enhance new organizational capabilities. Design is thought to be a blend of theory, knowledge of the particular industry/sector and of practice, and the contributions of those who participate in the redesign process (Mackenzie, 1986). Designing learning processes and learning mechanisms has both technical and political aspects. The manager as designer of the dynamic learning system facilitates the purposeful alignment of people, resources, and tasks around this important work process--one that cuts across organizational boundaries and activities, takes place in the context of practice, and that links in key stakeholders who can unleash or prevent changes to practice.

A key component of the practice based learning entailed in new capability development is that managers must reflect on, learn about and change the managerial practices of the firm. The facilitation of collective reflection is a key element of managerial practice in the organization with dynamic learning capabilities. Design is conceived as a reflexive methodology

of intervention – a type of enlightened, self-critical process that embraces differences in practice and science and thus leads to new knowledge and novel solutions. Facilitating collective reflection requires managers to open up existing policies, procedures and routines to scrutiny and redesign in order to uncover their impact on the firm’s ability to learn and develop new organizational capabilities.

In conclusion, the study of the development of new organizational capabilities offers a theoretically exciting area for management and organizational research and important areas for practice. It is inherently interdisciplinary, and thus offers the opportunity for the combination of knowledge that may foster break-throughs in the understanding of complex activity systems that in today’s world of necessity extend beyond the confines of an individual organization. This offers the possibility to develop deep knowledge of the kinds of interventions that can fundamentally influence the performance capabilities of organizations and activity systems. In this article, we have introduced a literature based framework and propositions that can guide this research, and simultaneously a set of concepts that can inform and guide managerial practice in an era when organizations are continually faced with the necessity to develop and extend organizational capabilities.

REFERENCES

- Abernathy, W. J., & Utterbeck, J. M. 1978. Patterns of industrial innovation. *Technology Review*, 80: 40-47.
- Afuah, A. 2001. Dynamic boundaries of the firm: Are firms better off being vertically integrated in the face of technological change? *Academy of Management Journal*, 44 (6): 1211-1229.
- Amit, R.A., P. J. H. 1993. Strategic assets and organizational rent. *Strategic Management Journal*, 14: 33-46.
- Autio, E., Hameri, A-P, & Vuola, O. 2004. A framework of industrial knowledge spillovers in big-science centers. *Research Policy*, 33: 7-126.
- Barney, J. B. 1991. Firm resources and sustained competitive advantage. *Journal of Management*, 17 (1): 99-120.
- Bechky, B. 2003. Sharing meaning across occupational communities: The transformation of understanding on a production floor. *Organization Science*, 14: 312-330.
- Berger, P. L. & Luckman, T. 1966. *The social construction of reality*. London: Penguin Books.
- Bessant, J., & Francis, D. 1999. Using learning networks to help improve manufacturing competitiveness. *Technovation*, 19: 373-381.
- Bettis, R., & Prahalad, C. 1986. The dominant logic: A new linkage between diversity and performance. *Strategic Management Journal*, 7: 485-501.
- Birkinshaw, J., Nobel, R., & Ridderstråle, J. 2002. Knowledge as a contingency variable: Do the characteristics of knowledge predict organization structure. *Organization Science*, 13: 274-289.
- Bjerlöv, M. 1999. *Om lärande i verksamhetsanknytna samtal: En studie av prat och lärande i möten på en arbetsplats (On learning in work-related conversations: A study of talking and learning at meeting at workplace)*. Report series. Work and Health no. 1999:1. Stockholm: National Institute for Working Life.
- Bjerlöv, M., & Docherty, P. 2005. Collective Reflection under Ambiguity. In D. Boud, P. Cressey & P. Docherty (Eds.), *Productive Reflection at Work: Learning for Changing Organisations*: 93-105. London: Routledge.
- Blackler, F. 1995. Knowledge Work and Organizations: An overview and interpretation. *Organization Studies*, 16: 1021-46.

- Blackler, F., Crump, N., & McDonald, S. 1999. Managing Experts and Competing through Innovation: An Activity Theoretical Analysis. *Organization*, 6: 5–31.
- Blackler, F., Crump, N., & McDonald, S. 2000. Organizing Processes in Complex Activity Networks. *Organization*, 7: 277–300.
- Blackler, F., & Kennedy, A. 2004. The design and evaluation of a leadership programme for experienced chief executives from the public sector. *Management Learning*, 35: 181-203.
- Blyle, M., & Coff, R.W. 2003. Dynamic capabilities, social capital, and rent appropriation: Ties that split peas. *Strategic Management Journal*, 24: 677-686.
- Bogenrieder, I. 2002. Social architecture as a prerequisite for organizational learning. *Management Learning*, 33: 197-212.
- Bogner, W. C., & Thomas, H. 1994. Core competence and competitive advantage: A model and illustrative evidence from the pharmaceutical industry. In G. Hamel & A. Heene (Eds.), *Competence-based competition*: 111-144. Chichester: Wiley.
- Boud, D., Cressey, P., & Docherty, P. (Eds.). 2005. *Productive reflection at work: Learning for changing organization*. London: Routledge.
- Boud, D., Keogh, R., & Walker, D. (Eds.). 1985. *Reflection: Turning experience into learning*. London: Kogan Page.
- Bourdieu, P., & Wacquant, L.J.D. 1992. *An invitation to reflexive sociology*. Cambridge: Polity Press.
- Bouty, I. 2000. Interpersonal and interaction influences on informal resource exchanges between R&D researchers across organizational boundaries. *Academy of Management Journal*, 43: 50-65.
- Brown, J. S., & Duguid, P. 1991. Organizational learning and communities of practice. *Organization Science*, 2: 40-57.
- Brown, J. S., & Duguid, P. D. 2001. Knowledge and organization: A social practice perspective. *Organization Science*, 12: 198-213.
- Burgelman, R. A. 1994. Fading memories: A process theory of strategic business exit in dynamic environments. *Administrative Science Quarterly*, 39: 24-56.
- Burt, R. 1992. *Structural holes: The social structure of competition*. Cambridge: Harvard University Press.

- Bushe, G. R., & Shani, Abraham. B. (Rami). 1991. *Parallel learning structures: Increasing innovations in bureaucracies*. Reading, MA: Addison Wesley.
- Callon, M. 1986. *Power, action and belief: A new sociology of knowledge*. London: Routledge.
- Carlile, P. R. 1997. *Understanding knowledge transformation in product development: Making knowledge manifest through boundary objects*. Doctoral dissertation, University of Michigan.
- Carlile, P.R. 2002. A pragmatic view of knowledge and boundaries: Boundary objects in new product development. *Organization Science*, 13: 442-455.
- Chaiklin, S., & Lave, J. (Eds.). 1993. *Understanding Practice: Perspectives on activity and context*. Cambridge: Cambridge University Press.
- Cicourel, A. V. 1973. *Cognitive sociology: Language and meaning in social interaction*. Harmondsworth, Middx: Penguin Education.
- Coleman, J. S. 1998. Social capital in the creation of human capital. *American Journal of Sociology*. 94: 95-120.
- Cohen, & Levinthal. 1990. Absorptive capacity: A new perspective on learning and participation. *Administrative Science Quarterly*, 35: 128–52.
- Contu, A., & Wilmott, H. 2000. Comment on Wenger and Yanow. Knowing in Practice: A ‘delicate’ flower in the organizational learning field. *Organization*, 7: 269-27.
- Daft, R. L., & Weick, K. E. 1984. Toward a model of organizations as interpretative systems. *Academy of Management Review*, 9 (2): 284-295.
- Dewey, J. 1986. How we think: A restatement of the relation of reflective thinking to the educative process. In J.A. Boydston (Ed.), *Later works 8*: 15-352. Carbondale and Edwardsville: Southern Illinois University.
- Dilschmann, A., Docherty P., & Stjernberg T. 1994. *Kompetensstrategier - bärande lärdomar (Competence Strategies–Significant Lessons)*. Stockholm: Arbetsgivarverket.
- Dixon, N. 2001. *Common Knowledge*. Boston, MA: Harvard Business School Press.
- Docherty, P., Huzzard, T., DeLede, J., & Totterdill, P. 2003. *Home and away: Learning in and learning from organizational networks in Europe*. Innoflex Research report. Brussels, EU.
- Dore, R. 1983. Goodwill and the spirit of market capitalism. *British Journal of Sociology*, 34: 459-482.

- Dosi, G., Hobday, M., & Marengo, L. 2000. *Problem-solving behaviours, organisational forms and the complexity of tasks*. LEM Papers Series, 2000/06. Pisa: Sant'Anna School of Advanced Studies, Laboratory of Economics and Management (LEM).
- Dosi, G., Nelson, R. R., & Winter, S. G. (Eds.). 2000. *The nature and dynamics of organizational capabilities*. New York: Oxford University Press.
- Dougherty, D. 2001. Re-imagining the differentiation and integration of work for sustained product innovation. *Organization Science*, 12 (5): 612-631.
- Dunbar, R. L. M., Garud, R., & Raghuram, S. 1996. A frame for deframing in strategic analysis. *Journal of Management Inquiry*, 5: 23-34.
- Easterby-Smith, M., Snell, R., & Gherardi, S. 1993. Organizational learning: Diverging communities of practice. *Management Learning*, 29: 259-272.
- Emery, M. 1982. *Searching for new directions in new ways for new times*. Canberra: Office of the Ministry of Labour and Office of the Quality of Working Life Centre.
- Engeström, Y. 1987. *Learning by expanding. An activity-theoretical approach to developmental research*. Helsinki: Orienta-Konsultit.
- Engeström, Y. 1999. Activity theory and individual and social transformation. In Y. Engeström, R. Miettinen & R.-L. Punamäki (Eds.), *Perspectives on activity theory: 19-38*. Cambridge: Cambridge University Press.
- Engeström, Y. 2001. Expansive learning at work: Toward an activity theory re-conceptualization. *Journal of Education and Work*, 14: 133-56.
- Fenwick, T. J. 2003. Professional growth plans: Possibilities and limitations of an organization-wide employee development strategy. *Human Resource Development Quarterly*, 14: 59-77.
- Fleck, L. 1979. *Genesis and development of scientific fact*. Chicago: The University of Chicago Press.
- Fox, S. 2000. Communities of practice, Foucault and actor-network theory. *Journal of Management Studies*, 37: 853-867.
- Friedman, V. J., Lipshitz, R., & Overmeer, W. 2001. Creating conditions for organizational learning. In A. B. Antal, M. Dierkes, J. Child & I. Nonaka (Eds.), *Handbook of organizational learning and knowledge: 757-774*. New York: Oxford University Press.
- Fukuyama, F. 1997. *The end of order*. London: Centre for Post-collectivist Studies.

- Galbraith, J. 1973. *Organization Design*. Reading, MA: Addison Wesley.
- Giddens, A. 1974. *Positivism and sociology*. London: Heinemann Educational Books, Ltd.
- Giddens, A. 1979. *Central problems in social theory: Action, structure, and contradiction in social analysis*. Berkeley: University of California Press.
- Giddens, A. 1984. *The constitution of society*. Berkeley, CA: University of California Press.
- Giddens, A. 1990. *The consequences of modernity*. Stanford: Stanford University Press.
- Ghoshal, S., & Moran, P. 1996. Bad for practice: A critique of the transaction cost theory. *Academy of Management Review*, 21: 13–47.
- Grant, R. M. 1996. Prospering in dynamically competitive environments: Organizational capability as knowledge integrators. *Organization Science*, 7: 375-387.
- Gulati, R., & Garguilo, M. 1999. Where do inter-organizational networks come from? *Annual Journal of Sociology*, 104: 1439-1493.
- Gustavsen, B. 2001. Theory and practice: The mediating discourse. In P. Reason & H. Bradbury (Eds.), *Handbook of action research: Participative inquiry and practice*: 17–26. London: Sage Publications.
- Habermas. 1984. *Knowledge and human interests*. Boston: MIT Press.
- Hamel, G. 1994. The concept of core competence. In G. Hamel & A. Heene (Eds.), *Competence-based competition*: 11-33. Chichester: Wiley.
- Hamel, G. 1991. Competition for competence and interpartner learning within international strategic alliances. *Strategic Management Journal*, 12: 83–103.
- Hansen, M. 1999. The search-transfer problem: The role of weak ties in sharing knowledge across organization subunits. *Administrative Science Quarterly*, 44: 82-111.
- Helfat, C. E. (Ed.). 2003. *The Strategic Management Society Blackwell handbook of organizational capabilities: Emergence, development, and change*. Malden, MA: Blackwell Publishing.
- Henderson, R. M., & Clark, K. B. 1990. Architectural Innovation: The reconfiguration of existing product technologies and the failure of established firms. *Administrative Science Quarterly*, 35: 9-30.
- Henderson, R. M., & Cockburn, I. M. 1994. Measuring competence? Exploring firm effects in pharmaceutical research. *Strategic Management Journal*, 15: 63-84.

- Ianisti, M., & Clark, K. B. 1994. Integration and dynamic capability: Evidence from product development in automobiles and mainframe computers. *Industrial and Corporate Change*, 24: 521-542.
- Ingram, P., & Baum, J. A. C. 1997. Chain affiliation and the failure of Manhattan hotels, 1898-1980. *Administrative Science Quarterly*, 42 (1): 68-102.
- Justesen, S. 2004. Innoversity in communities of practice. In P. Hildreth & C. Kimble (Eds.), *Knowledge Networks: Innovation through Communities of Practice*: 79–95. Hershey, PA: Idea group publishing.
- Knight, L. 2002. Network learning: Exploring learning by interorganizational networks. *Human Relations*, 55 (4): 427-454.
- Kogut, B., & Zander, U. 1992. Knowledge of the firm, combinative capabilities and the replication of technology. *Organization Science*, 3: 383-397.
- Kolb, D. 1984. *Experiential learning*. Englewood Cliffs, NJ: Prentice Hall.
- Kreiner, K., & Schultz, M. 1993. Informal collaboration in R-and-D: The formation of networks across organizations. *Organization Studies*, 14 (2): 189-209.
- Lapidoth, J., Jr. 1996. *Organisatoriskt lärande i ett tillväxtföretag (Organizational Learning in a high growth company)*. Stockholm: National Institute for Working Life.
- Larsson, R., Bengtsson, L., Henriksson, K., & Sparks, J. 1998. The interorganizational learning Dilemma: Collective knowledge development in strategic alliances. *Organization Science*, 9: 285–305.
- Larsson, R., Bengtsson, L., Henriksson, K., & Sparks, J. 1999. Barriers to interorganizational learning: Developing collective knowledge across corporate boundaries. *Advances in Management Cognition and Organizational Information Processing*, 6: 115–147.
- Latour, B. 1987. *Science in action: How to follow scientists and engineers through society*. Cambridge: Harvard University Press.
- Lave, J., & Wenger, E. 1991. *Situated learning: Legitimate peripheral participation*. Cambridge University Press: Cambridge.
- Law, J., & Hassard, J. (Eds.). 1999. *Actor network theory and after*. Oxford: Malden, Blackwell.
- Leonard-Barton, D. 1992. Core capabilities and core rigidities: A paradox in managing new product development. *Strategic Management Journal*, 13: 111-126.

- Leont'ev, A. N. 1978. *Activity, consciousness and personality*. Englewood Cliffs, Prentice Hall.
- Levinthal, D.A. & March, J.G. 1994. The myopia of learning. *Strategic Management Journal*, 14: 95-112.
- Levitt, B., & March, J. G. 1988. Organizational learning. *Annual Review of Sociology*, 14: 319-340.
- Liebeskind, J., Oliver, A. L., Zucker, L., & Brewer, M. 1996. Social networks, learning, and flexibility: Sourcing scientific knowledge in new biotechnology firms. *Organization Science*, 7: 428-443.
- Liebeskind, J. P. 1996. Knowledge, strategy and theories of the firm. *Strategic Management Journal*, 17: 45-62.
- Lipshitz, R., Popper, M., & Friedman, V. J. 2002. A multifacet model of organizational learning. *Journal of Applied Behavioral Science*, 38 (1): 78-98.
- Lipshitz, R., Popper, M., & Oz, S. 1996. Building learning organization. *Journal of Applied Behavioral Science*, 32: 292-305.
- Liyanage, Greenfield, & Don. 1999. Towards a fourth generation R&D management model-research networks in knowledge management. *International Journal of Technology Management*, 18: 372-393.
- Mackenzie, K. D. 1986. *Organization design: The organizational audit and analysis technology*, New York: Ablex.
- March, J. G. 1991. Exploration and exploitation in organizational learning. *Organizational Science*, 2: 71-87.
- March, J. G., & Levitt, B. 1988. Organizational learning. *Annual Review of Sociology*, 14: 319-40.
- Meeus, M. T. H., Oerlemans, L. A.G., & Hage, J. 2001. Patterns of interactive learning in a high-tech region. *Organization Studies*, 22: 145-172.
- Mezirow, J., & Associates. 2000. *Learning as transformation: Critical perspectives on a theory in progress*. San Francisco, CA: Jossey-Bass.
- Mitroff, I. I., & Kilmann, R. H. 1984. *Corporate tragedies: Product tampering, sabotage and other catastrophes*. New York: Praeger.
- Mohrman, S. A., & Cummings, T. G. 1989. *Self-designing organizations: Learning how to create high performance*. New Jersey: Addison-Wesley.

- Mohrman, S. A., Tenkasi, R. V., & Mohrman, A. M., Jr. 2003. The role of networks in fundamental organizational change: A grounded analysis. *The Journal of Applied Behavioral Science*, 39 (3): 301-323.
- Monge, P. R., & Contractor, N. S. 2003. *Theories of communication networks*. Oxford: Oxford University Press.
- Monteverde, K. 1995. Technical dialog as an incentive for vertical integration in the semiconductor industry. *Management Science*, 41: 1624–1638.
- Moran, P., & Ghoshal, S. 1996. Theories of economic organization: The case for realism and balance. *Academy of Management Review*, 21 (1): 58-72.
- Murray, F. 2002. Innovation as community-evolution of scientific and technological networks: Exploring tissue engineering. *Research Policy*, 31: 1389-1403.
- Nahapiet, J., & Ghoshal, S. 1998. Social capital, intellectual capital, and the organizational advantage. *Academy of Management Review*, 23: 242-266.
- Nelson, R. R., & Winter, S. G. 1982. *An evolutionary theory of economic change*. Cambridge, MA: Harvard University Press.
- Nonaka, I., & Takeuchi, H. 1995. *The knowledge-creating company*. New York: Oxford Press.
- Nonaka, I. & Takeuchi, H. (Eds.). 2003. *Hitotsubashi on knowledge management*. Singapore: J. Wiley & Sons, Asia.
- Oliver, A. L. 2001. Strategic alliances and the learning life-cycle of biotechnology firms. *Organization Studies*, 22: 467-489.
- Oliver, A. L., & Liebeskind, J. P. 1998. Three levels of networking for sourcing intellectual capital in biotechnology: Implications for studying interorganizational networks. *International Studies of Management & Organization*, 27: 76-103.
- Olve, N. G., Petri, C. J., Roy, J., & Roy, S. 2003. *Making scorecards actionable: Balancing strategy and control*. Chichester: Wiley.
- Orr, J. 1990. Sharing knowledge, celebrating identity: Community memory in a service culture. In D. Middleton & D. Edwards (Eds.), *Collective remembering*: 169–89. London: Sage.
- Orr, J. 1996. *Talking about machines: An ethnography of a modern job*. Ithaca, NY: ILR Press.

- Ortner, S. B. 1989. *High religion: A cultural and political history of Sherpa Buddhism*. Princeton: Princeton University Press.
- Pavitt, K. 2003. Innovative routines in large firms: What the evidence suggests. In C. Helfat (Ed.), *The SMS Blackwell handbook of organizational capabilities*: 264-268. Malden, MA: Blackwell Publishing.
- Pavlovsky, P., Forslin, J., & Reinhardt, R. 2001. Practices and tools of organizational learning. In M. Dierkes, A. Berthoin Antal, J. Child & I. Nonaka (Eds.), *Handbook of organizational learning and knowledge*: 775– 793. Oxford: Oxford University Press.
- Pedler, M. 1991. The need for self-learning organizations as part of an overall business/management strategy. In B. Nyhan (Ed.), *Developing people's ability to learn: A European perspective on self-learning competency and technological change*: 128-140. Brussels: European Interuniversity Press.
- Penrose, E. 1959. *The theory of the growth of the firm*. New York: Oxford University Press.
- Polanyi, M. 1966. *The tacit dimension*. New York: Doubleday.
- Pondy, L. R. 1970. Toward a theory of internal resource-allocation. In M. N. Zald (Ed.), *Power in organization*: 270–311. Nashville, TN: Vanderbilt University Press.
- Popper, M., & Lipshitz, R. 1996. Organizational learning mechanisms: A structural and cultural approach to organizational learning. *Journal of Applied Behavioural Science*, 34: 161 – 79.
- Powell, W. W. 1998. Learning from collaboration: Knowledge and networks in the biotechnology and pharmaceutical industries. *California Management Review*, 40: 228-241.
- Powell, P. W., Koput, K.W., & Smith-Doerr, L. 1996. Interorganizational collaboration and the locus of innovation: Networks of learning in biotechnology. *Administrative Science Quarterly*, 41: 116-145.
- Putnam, R. D. 1993. The prosperous community: Social capital and public life. *The American Prospect*, 4 (13): 35-42.
- Quinn, J. B. 2003. Commentary on Karim–Mitchell and Helfat–Raubitchek Chapters. In C. E. Helfat, (Ed.), *The SMS and Blackwell handbook on organizational capabilities: Emergence, development and change*: 253–256. Malden, MA: Blackwell Publishing.
- Raelin, J. A. 2000. *Work-based learning: The new frontier of management development*. New Jersey: Addison Wesley.

- Reagans, R., & McEvily, B. 2002. Network structure and knowledge transfer: The effects of cohesion and range. *Administrative Science Quarterly*, 48: 240-267.
- Sako, M. 2000. Does trust improve business performance? In C. Lane & R. Bachmann (Eds.), *Trust within and between organizations: Conceptual issues and empirical applications*: 88–117. Oxford: Oxford University Press.
- Schenkel, A. 2005. Disciplined reflection or communities of practice. In D. Boud, P. Cressey & P. Docherty (Eds.), *Productive reflection at work: Learning for changing organisations*: 69-79. London: Routledge.
- Schon, D.A. 1983. *The reflective practitioner: How professionals think in action*. New York: Basic Books.
- Shani, A. B. (Rami), & Docherty, P. 2003. *Learning by design: Building sustainable organizations*. Oxford: Blackwell Publishing.
- Shani, A. B. (Rami), & Docherty, P. 2005. Learning by design: Key mechanisms in organization development. In T. Cummings (Ed.), *Handbook of organization development*: AX-CY. Thousand Oaks, CA: Sage.
- Shumpeter, J. A. (1934; reprinted in 1962). *The theory of economic development: An inquiry into profits, capital, credit, interest and the business cycle*. Cambridge, MA: Harvard University Press.
- Simonin, B. L. 1997. The importance of collaborative know-how: An empirical test of the learning organization. *Academy of Management Journal*, 40: 1150-1174.
- Stebbins, M., Freed, T., Shani, A.B. (Rami), & Doerr, K. 2005. The limits of reflexive design in a secrecy-based organization. In D. Boud, P. Cressey & P. Docherty (Eds.), *Productive reflection at work: Learning for changing organisations*: 80-99. London: Routledge.
- Teece, D. J., & Pisano, G. 1994. The dynamic capabilities of firms: An introduction. *Industrial and Corporate Change*, 3 (3): 537-56.
- Teece, D. J., Pisano, G., & Schuen, A. 1997. Dynamic capabilities and strategic management. *Strategic Management Journal*, 18 (7): 509-530.
- Teigland, R., Fey, C. F., & Birkinshaw, J. M. 2000. Knowledge dissemination in global R&D operations: An empirical study of multinationals in the high-technology industry. *Management International Review*, Special issue on International Management of Technology, 1.
- Tell, F. 2000. *Organizational capabilities: A study of electrical power transmission equipment manufacturers, 1879–1990*. Dissertation no. 41, Department of Management and Economics, University of Linköping.

- Tripsas, M., & Gavetti, G. 2003. Capabilities, cognition and inertia: Evidence from digital imaging. In C. E. Helfat (Ed.), *The SMS Blackwell handbook of organizational capabilities: Emergence, development and change*: 393-412. Oxford: Blackwell Publishing.
- Tsai, W., & Ghoshal, S. 1998. Social capital and value creation: The role of intrafirm networks. *Academy of Management Journal*, 4: 464-476.
- Tsai, W. 2002. Social structure of “coopetition” within a multiunit organization: Coordination, competition, and intraorganizational knowledge sharing. *Organization Science*, 13: 179-190.
- Tuomi, I. 2002. *Networks of Innovation: Change and meaning in the age of Internet*. Oxford: Oxford University Press.
- Tushman, M. L., & Anderson, P. 1986. Technological discontinuities and organizational environments. *Administrative Science Quarterly*, 31: 439-465.
- Uzzi B., & Gillespie, J. J. 2002. Knowledge spillover in corporate financing networks: Embeddedness and the firm's debt performance. *Strategic Management Journal*, 23: 595-618.
- Uzzi, B., & Lancaster, R. 2003. Relational embeddedness and learning: The case of bank loan managers and their clients. *Management Science*, 49: 383-399.
- Van den Bosch, F. J., Van Wijk, R., & Volberda, H. W. 2003. Absorptive capacity: Antecedents, models and outcomes. In M. Easterby-Smith & M. A. Lyles (Eds.), *The Blackwell handbook of organizational learning and knowledge management*: 278-302. Oxford: Blackwell Publishing.
- Van Maanen, J., & Barley, S. R. 1984. Occupational communities: Culture and control in organizations. In B. M. Staw & L. L. Cummings (Eds.), *Research in organizational behavior*: 6: 287-365. Greenwich, CO: JAI Press.
- Vera, D., & Crossan, M. 2003. Organizational learning and knowledge management: Toward an integrative framework. In M. Easterby-Smith & M. Lyles (Eds.), *Handbook of organizational learning and knowledge management*: 122-141. Oxford: Blackwell Publishing.
- Vera, D., & Crossan, M. 2004. Strategic leadership and organization learning. *Academy of Management Review*, 29: 222-240.
- Vygotsky, L. S. 1962. *Thought and language*. Cambridge: MIT Press.

- Vygotsky, L. S. 1978. *Mind in society: The development of higher psychological processes*. Cambridge: Harvard University Press.
- Vygotsky, L. S. 1986. *Mind and Thought*. Cambridge: MIT Press.
- Weick, K. E. 1993a. Sensemaking in organizations: Small structures with large consequences. In J. Murningham (Ed.), *Social psychology in organizations: Advances in theory and research*: 10–37. Englewood Cliffs, NJ: Prentice-Hall.
- Weick, K. E. 1993b. The collapse of sensemaking in organizations: The Mann Gulch disaster. *Administrative Science Quarterly*, 38: 628–52.
- Weick, K. E. 1995. *Sensemaking in organizations*. Thousand Oaks, CA: Sage.
- Weick, K. E., & Roberts, K. H. 1993. Collective mind in organizations: Heedful interrelating on flight decks. *Administrative Science Quarterly*, 38: 357–81.
- Wenger, E. 1998. *Communities of practice: Learning, meaning, and identity*. Cambridge: Cambridge University Press.
- Wenger, E. 2000. Communities of practice and learning systems. *Organization*, 7 (2): 225-246.
- Wittgenstein, L. 1953. *Philosophical investigations*. Oxford: Basil Blackwell.