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Sensemaking, Knowledge Creation, and Decision Making

Organizational Knowing as Emergent Strategy

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This chapter introduces the perspective of strategy as the outcome of organizational sensemaking, knowledge creating, and decision making. The first three sections examine the processes by which an organization constructs meaning, creates knowledge, and makes decisions that drive patterns of action. The ensuing sections show how the three processes are interconnected to form cycles of learning and adaptation. Through these cycles, the organization traces out a growth trajectory that defines its strategic position.

An organization processes information to make sense of its environment, to create new knowledge, and to make decisions (Choo 1998). Sensemaking constructs the shared meanings that define the organization's purpose and frame the perception of problems or opportunities that the organization needs to work on. Problems and opportunities become occasions for creating knowledge and making decisions. An organization possesses three types of knowledge: tacit knowledge in the experience and expertise of individuals; explicit knowledge codified as artifacts, rules, and routines; and cultural knowledge held

as assumptions, beliefs, and values. The creation of new knowledge involves the conversion, sharing, and combination of all three types of knowledge. The results of knowledge creation are innovations or extensions of organizational capabilities. Whereas new knowledge represents a potential for action, decision making transforms this potential into a commitment to act. Decision making is structured by rules and routines and guided by preferences that are based on interpretations of organizational purpose and priorities. Where new capabilities or innovations become available, they introduce new alternatives as well as new uncertainties. Decision making, then, selects courses of action that are expected to perform well given the understanding of goals and the conditions of uncertainty. Thus, the capacity to develop organizational knowledge is distributed over a network of information processes and participants. Rather than being centrally controlled and coordinated, the capacity to develop knowledge emerges from the complex, unpredictable patchwork of processes in which participants enact and negotiate their own mean-

ings of what is going on, stumble upon and wrestle with new knowledge to make it work, and creatively improvise and bend rules and routines to solve tough problems.

Sensemaking

Weick (1979, 1995) presents a model of organizational sensemaking based on a conceptualization of organizations as “loosely coupled” systems in which individual participants have great latitude in interpreting and implementing directions. He stresses the autonomy of individuals and the looseness of the relations linking individuals in an organization. The purpose of organizational information processing is to reduce the *equivocality* of information about the environment. Weick summarizes his organizing model as follows:

The central argument is that any organization is the way it runs through the processes of organizing. . . . This means that we must define organization in terms of organizing. Organizing consists of the resolving of equivocality in an enacted environment by means of interlocked behaviors embedded in conditionally related processes. To summarize these components in a less terse manner, organizing is directed toward information processing in general, and more specifically, toward removing equivocality from informational inputs. (Weick 1979, pp. 90–91)

Weick (1995) describes how people enact or actively construct the environment that they attend to by bracketing experience and by creating new features in the environment. Sensemaking is induced by changes in the environment that create discontinuity in the flow of experience en-

gaging the people and activities of an organization (Weick 1979). These discontinuities constitute the raw data that have to be made sense of. The sensemaking recipe is to interpret the environment through connected sequences of enactment, selection, and retention (Weick 1979). In enactment, people actively construct the environments that they attend to by bracketing, rearranging, and labeling portions of the experience, thereby converting raw data from the environment into equivocal data to be interpreted. In selection, people choose meanings that can be imposed on the equivocal data by overlaying past interpretations as templates to the current experience. Selection produces an enacted environment that provides cause–effect explanations of what is going on. In retention, the organization stores the products of successful sensemaking (enacted or meaningful interpretations) so that they may be retrieved in the future.

Organizational sensemaking can be driven by beliefs or by actions (Weick 1995). In belief-driven processes, people start from an initial set of beliefs that are sufficiently clear and plausible and use them as nodes to connect more and more information into larger structures of meaning. People may use beliefs as expectations to guide the choice of plausible interpretations, or they may argue about beliefs and their relevance when these beliefs conflict with current information. In action-driven processes, people start from their actions and grow their structures of meaning around them, modifying the structures in order to give significance to those actions. People may create meaning to *justify* actions that they are already committed to, or they may create meaning to *explain* actions that have been taken to manipulate the environment. Figure 5.1 summarizes the sensemaking process.

An interesting corollary of Weick’s model is that organizational action often occurs first and is then interpreted or given meaning. The con-

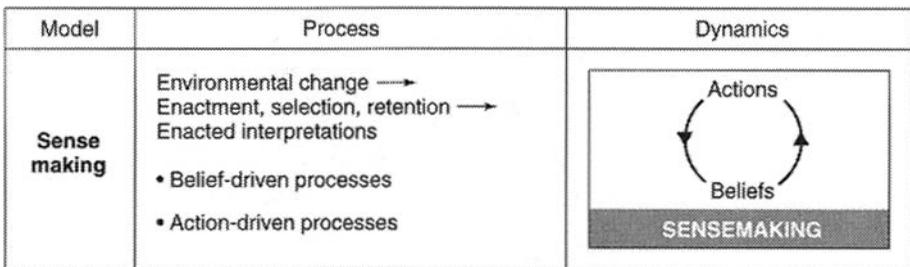


Figure 5.1 Sensemaking.

nection between action and planning is thus topsy-turvy:

Our view of planning is that it can best be understood as thinking in the future perfect tense. It isn't the plan that gives coherence to actions. . . . It is the reflective glance, *not* the plan per se, that permits the act to be accomplished in an orderly way. A plan works because it can be referred *back* to analogous actions in the past, not because it accurately anticipates future contingencies. . . . Actions never performed can hardly be made meaningful, since one has no idea what they are. They simply are performed and *then* made sensible; they *then* appear to be under the control of the plan. (Weick 1979, p. 102)

While Weick emphasizes retrospective sense-making, Gioia and Mehra (1996) have suggested an important role for *prospective* sensemaking:

If retrospective sense making is making sense of the past, prospective sense making is an attempt to make sense for the future. Retrospective sense making is targeted at events that have transpired; prospective sense making is aimed at creating meaningful opportunities for the future. In a loose sense, it is an attempt to structure the future by imagining some desirable (albeit ill-defined) state. It is a means of propelling ourselves forward—one that we conceptualize in the present but realize in the future. (p. 1229)

Sensemaking in strategy would then include both prospective “sense-giving” that articulates a collective vision for the organization and ret-

rospective “sense-discovering” that notices and selects actions and outcomes that work well for the organization.

Knowledge Creating

An organization has three kinds of knowledge: tacit knowledge in the expertise and experience of individuals; explicit or rule-based knowledge in artifacts, rules, and routines; and cultural knowledge in the assumptions and beliefs used by members to assign value and significance to new information or knowledge. Knowledge creating is precipitated by the recognition of gaps in the organization’s existing knowledge. Such knowledge gaps can stand in the way of solving a problem, developing a new product, or taking advantage of an opportunity. Organizations then create new knowledge by converting tacit to explicit knowledge, integrating and combining knowledge, and acquiring or transferring knowledge across boundaries (figure 5.2).

In *knowledge conversion* (Nonaka and Takeuchi 1995, Nonaka 1994, this volume), the organization continuously creates new knowledge by converting the personal, tacit knowledge of individuals who develop creative insight to the shared, explicit knowledge by which the organization develops new products and innovations. Tacit knowledge is shared and externalized through dialogue that uses metaphors and analogies. New concepts are created and the concepts are justified and evaluated according to its fit with organizational intention. Concepts are tested and elaborated by building archetypes or prototypes. Finally, concepts that have been created, justified, and modeled are moved to other levels of the organization to generate new cycles of knowledge creation.

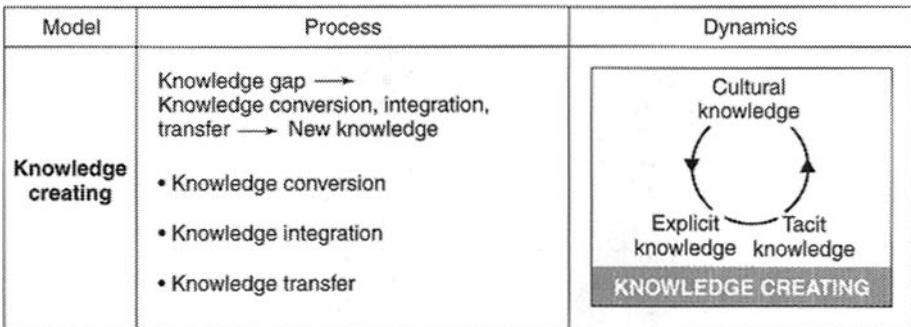


Figure 5.2 Knowledge creating.

Grant (1996, chap. 8 this vol.) sees organizational capability as the outcome of *knowledge integration*—the result of the organization's ability to coordinate and integrate the knowledge of many individual specialists. In Grant's view, knowledge creation is an individual activity, and this means that the primary role of the organization is to apply knowledge rather than to create it. More specifically, the organization exists as an institution that "can create conditions under which multiple individuals can integrate their specialist knowledge" (p. 112). The fundamental task of the organization is to integrate the knowledge and coordinate the efforts of its many specialized individuals. The key to efficient knowledge integration is to establish mechanisms that combine efficiency in knowledge creation (which requires specialization) and efficiency in knowledge deployment (which requires integrating many types of knowledge).

Grant identifies four mechanisms for integrating specialized knowledge that economize on communication and coordination: rules and directives, sequencing, routines, and group problem solving and decision making. Rules and directives regulate the actions among individuals and can provide a means by which tacit knowledge is converted into readily comprehensible explicit knowledge. Sequencing organizes production activities in a time sequence so that each specialist's input occurs independently in a pre-assigned time slot. Routines can support relatively complex patterns of behaviors and interactions among individuals without the need to specify rules and directives. Group problem solving and decision making, in contrast with the other mechanisms, rely on high levels of communication and nonstandard coordination methods to deal with problems that are high in task complexity and task uncertainty. All four mechanisms depend upon the existence of common knowledge for their operation. Common knowledge may take the form of: a common language between organizational members, commonality in the individuals' specialized knowledge, shared meanings and understandings among individuals, and awareness and recognition of the individuals' knowledge domains (Grant 1996, this volume).

An organization may be perceived as a repository of capabilities, which are "determined by the social knowledge embedded in enduring individual relationships structured by organizing principles" (Kogut and Zander 1992, p. 396). These organizing principles establish a common

language and set of mechanisms through which people in an organization cooperate, share, and transfer knowledge. They enable sets of functional expertise to be communicated and combined so that the organization as a whole can exist as integrated communities:

Creating new knowledge does not occur in abstraction from current abilities. Rather, new learning, such as innovations, are products of a firm's *combinative capabilities* to generate new applications from existing knowledge. By combinative capabilities, we mean the intersection of the capability of the firm to exploit its knowledge and the unexplored potential of the technology. (p. 390)

While Kogut and Zander (1992), Grant (1996), and others regard organizations as institutions for combining and integrating knowledge, Tsoukas (1996) suggests that there may be limits to the extent that organizational knowledge may be integrated. Tsoukas views organizations as "distributed knowledge systems in a strong sense: they are de-centered systems. A firm's knowledge cannot be surveyed as a whole: it is not self-contained; it is inherently indeterminate and continually reconfiguring" (p. 13). The utilization of organizational knowledge cannot be known by a single agent—no single individual or agent can fully specify in advance what kind of knowledge is going to be relevant, when and where. There is no "master control room" where knowledge may be centrally managed:

Organizations are seen as being in constant flux, out of which the potential for the emergence of novel practices is never exhausted—human action is inherently creative. Organizational members do follow rules but how they do so is an inescapably contingent-cum-local matter. In organizations, both rule-bound action and novelty are present, as are continuity and change, regularity and creativity. Management, therefore, can be seen as an open-ended process of coordinating purposeful individuals, whose actions stem from applying their unique interpretations to the local circumstances confronting them. . . . A necessary condition for this to happen is to appreciate the character of a firm as a discursive practice: a form of life, a community, in which individuals come to share an unarticulated

background of common understandings. Sustaining a discursive practice is just as important as finding ways of integrating distributed knowledge. (pp. 22–23)

Knowledge transfer across organizational boundaries can involve tacit, explicit, and cultural knowledge to varying degrees. In a small number of cases, the transfer is largely accomplished through a movement of explicit knowledge (e.g., an algorithm, a protein sequence). Transfers of such well-defined packages of codified knowledge typically require a substantial amount of collateral knowledge in the receiving organization to decode and apply the new information. In a larger number of cases, the transfer of explicit knowledge is accompanied and facilitated by human experts from the source organization. Experts interpret the meaning of the new information and deal with the detailed questions arising from trying to use the new information in its new setting. Thus, tacit knowledge is necessary to assimilate and apply new explicit knowledge effectively. There are important cases when the movement of explicit knowledge is not enough, even when accompanied by tacit knowledge—cultural knowledge is also necessary. This is especially so when organizations are trying to learn new practices or systems of work that are woven into organizational networks of roles, relationships, and shared meanings. Consider Toyota's production system, an example of a tight integration of tacit, explicit, and cultural knowledge:

Toyota's knowledge of how to make cars lies embedded in highly specialized social and organizational relationships that have evolved through decades of common effort. It rests in routines, information flows, ways of making decisions, shared attitudes and expectations, and specialized knowledge that Toyota managers, workers, suppliers and purchasing agents, and others have about different aspects of their business, about each other, and about how they can all work together. (Badaracco 1991, p. 87)

When General Motors wanted to learn the Toyota production system, it established the NUMMI (New United Motor Manufacturing, Inc.) plant in 1984 as a joint venture with Toyota in order to facilitate the learning of "intimate, embedded knowledge." The NUMMI group took over a General Motors facility at Fremont, California.

Work at NUMMI was organized based on Toyota's lean production system that seeks to utilize labor, materials, and facilities as efficiently as possible. Although much has been published about Toyota's production system, without the NUMMI experience GM might have permanently missed the essence of Toyota's management process. Co-practice to learn the system was necessary because the capabilities were "tacit know-how in action, embedded organizationally, systemic in interaction and cultivated through learning by doing" (Doz and Hamel 1997, p. 570). Badaracco (1991) concluded that, through NUMMI, GM had the chance to learn first-hand Toyota's collaborative approach to worker and supplier relationships, just-in-time inventory management, and efficient plant operations. For Toyota, the project helped it learn about managing U.S. workers, suppliers, and logistics and about cooperating with the unions and the state and local governments.

Scores of GM managers and thousands of workers have worked at NUMMI or at least visited the operation. It would have been much simpler for GM to buy from Toyota the manual *How to Create the Toyota Production System*, but the document does not exist and, in a fundamental sense, could not be written. Much of what Toyota "knows" resides in routines, company culture, and long-established working relationships in the Toyota Group. (Badaracco 1991, p. 100)

Many firms form alliances for the purpose of sharing and transferring knowledge. Only recently has research begun to examine the conditions and processes by which knowledge is exchanged in multifirm arrangements (Fischer et al., this volume). One finding is that the tacitness of the knowledge can influence knowledge sharing outcomes. A critical factor in a firm's ability to assimilate and utilize new knowledge is its "absorptive capacity" (Cohen and Levinthal 1990), which is a function of the level of prior related knowledge that the firm already possesses. The absorptive capacity argument has been broadened to include not only technical similarities (experience in related technical areas and complementary assets) but also nontechnical similarities (organizational structures, compensation practices). The exchange of knowledge between organizations involves both bringing in external knowledge and letting out (intendedly or inadvertently) internal knowledge. Thus, Appleyard (1996, chap.

30 this vol.) and Matusik (chap. 34 this vol.) examine the costs and benefits of interfirm knowledge sharing. Costs are incurred as a result of potential knowledge losses, protecting intellectual property, partner selection, decline in profitability, and transaction costs of the knowledge transfer. We may generalize that there are two categories of costs associated with interfirm knowledge transfer: those due to the loss of knowledge by the focal firm, and those due to managing the process of knowledge transfer.

Decision Making

Completely rational decision making involves identifying alternatives, projecting the probabilities and outcomes of alternatives, and evaluating the outcomes according to known preferences. These information gathering and information processing requirements are beyond the capabilities of any organization. In practice, organizational decision making departs from the rational ideal in important ways depending on the contingencies of the decision context. At least two features of the environment of decision making will be significant: (1) the structure and clarity of organizational goals that impinge on preferences and choices, and (2) the uncertainty or amount of information about the methods and processes by which the goals are to be attained. In a specific decision situation, goals may be fuzzy, and organizational groups may disagree about their relative importance. There is then *goal ambiguity or conflict* about which organizational goals to pursue. Moreover, uncertainty may arise because the specific problem is complex and there is not enough information about cause-effect relationships or appropriate approaches to be considered. Methods available to accomplish a task are not immediately evident, and the search space for solutions is ill-defined. There is therefore *technical or procedural uncertainty* about how goals are to be achieved.

Figure 5.3 positions four modes of decision making along the two dimensions of goal ambiguity/conflict and technical/procedural uncertainty that characterize a decision situation. In the *boundedly rational mode*, when goal and procedural clarity are both high, choice is guided by performance programs (March and Simon 1958). Thus, people in organizations adopt a number of reductionist strategies that allow them to simplify their representation of the problem situation by selectively including the

	Low goal ambiguity/conflict	High goal ambiguity/conflict
Low procedural uncertainty	Boundedly rational mode	Political mode
High procedural uncertainty	Process mode	Anarchic mode

Figure 5.3 Four modes of organizational decision making.

most salient features rather than attempting to model the objective reality in all its complexity (March and Simon 1993). During search, they “satisfice” rather than maximize; that is, they choose an alternative that exceeds some criteria rather than the best alternative. They also follow “action programs” or routines that simplify the decision-making process by reducing the need for search, problem solving, or choice.

In the *process mode* (Mintzberg et al. 1976), when strategic goals are clear but the methods to attain them are not, decision making becomes a process divided into three phases. The identification phase recognizes the need for decision and develops an understanding of the decision issues. The development phase activates search and design routines to develop one or more solutions to address a problem, crisis, or opportunity. The selection phase evaluates the alternatives and chooses a solution for commitment to action. The entire process is highly dynamic, with many factors changing the tempo and direction of the decision process: “They delay it, stop it, restart it. They cause it to speed up, to branch to a new phase, to cycle within one or between two phases, and to recycle back to an earlier point in the process. . . . [T]he process is dynamic, operating in an open system where it is subjected to interferences, feedback loops, dead ends, and other factors” (Mintzberg et al. 1976, p. 263).

In the *political mode* (Allison 1971, Allison and Zelikow 1999), goals are contested by interest groups but procedural certainty is high

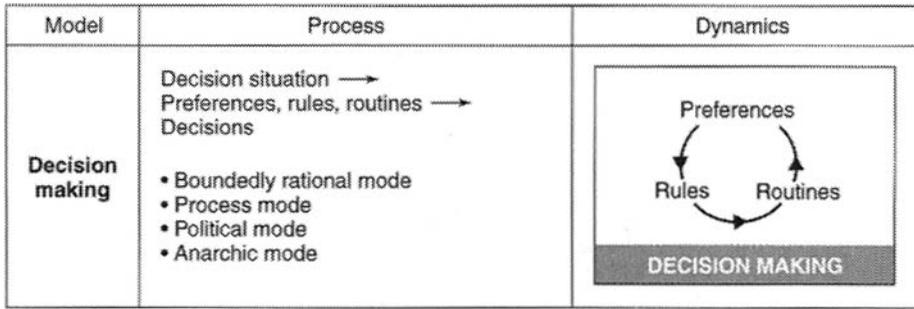


Figure 5.4 Decision making.

within the groups: each group believes that its preferred alternative is best for the organization. Decisions and actions are the results of the bargaining among players pursuing their own interests and manipulating their available instruments of influence. Political decision making may then be likened to game playing. Players take up positions, stands, and influence and make their moves according to rules and their bargaining strengths. In the political model, actions and decisions are produced as political resultants—political because decisions and actions emerge from the bargaining by individual members along regularized action channels; and resultants because decisions and actions are outcomes of the compromise, conflict, and confusion of the players with diverse interests and unequal influence (Allison 1971, Allison and Zelikow 1999).

In the *anarchic mode* (Cohen et al. 1972), when goal and procedural uncertainty are both high, decision situations consist of relatively independent streams of problems, solutions, participants, and choice opportunities arriving and leaving. A decision then happens when problems, solutions, participants, and choices coincide. When they do, solutions are attached to problems and problems to choices by participants who happen to have the time and energy to do it. Which solutions are attached to which problems is a matter of chance and timing, depending on which participants with which goals happen to be on the scene, when the solutions and problems are entered, and “the mix of choices available at any one time, the mix of problems that have access to the organization, the mix of solutions looking for problems, and outside demands on the decision makers” (Cohen et al. 1972, p. 16).

To be effective, organizations need to learn the

full repertoire of decision-making modes (figure 5.4). Different choice situations call for different decision approaches. The (boundedly) rational mode would economize time and effort by invoking stored rules and routines for familiar, well structured situations. The dynamism and iterativeness of the process mode would help searches or designs for new solutions in unfamiliar but consequential situations. The political mode allows alternative points of view to be heard and may prevent complacency or parochialism. The anarchic mode is not dysfunctional, but rather is a way for organizations to discover goals and find solutions in unfamiliar, unclear situations.

The Organizational Knowing Cycle

Information flows continuously between sensemaking, knowledge creating, and decision making, so that the outcome of information use in one mode provides the elaborated context and the expanded resources for information use in the other modes, as shown in figure 5.5. Through sensemaking, organizational members enact and negotiate beliefs and interpretations to construct shared meanings and common goals. *Shared meanings and purpose* (fig. 5.5) are the outcome of sensemaking, and they set the framework for explaining observed reality and for determining saliency and appropriateness. Shared meanings and purpose help to articulate a shared organizational agenda, a set of issues that people in the organization agree on as being important to the well-being of the organization. While they may not agree about the content of a particular issue, and they may adopt diverse positions on how it should be resolved; nevertheless, there is collective recognition that these issues are salient to

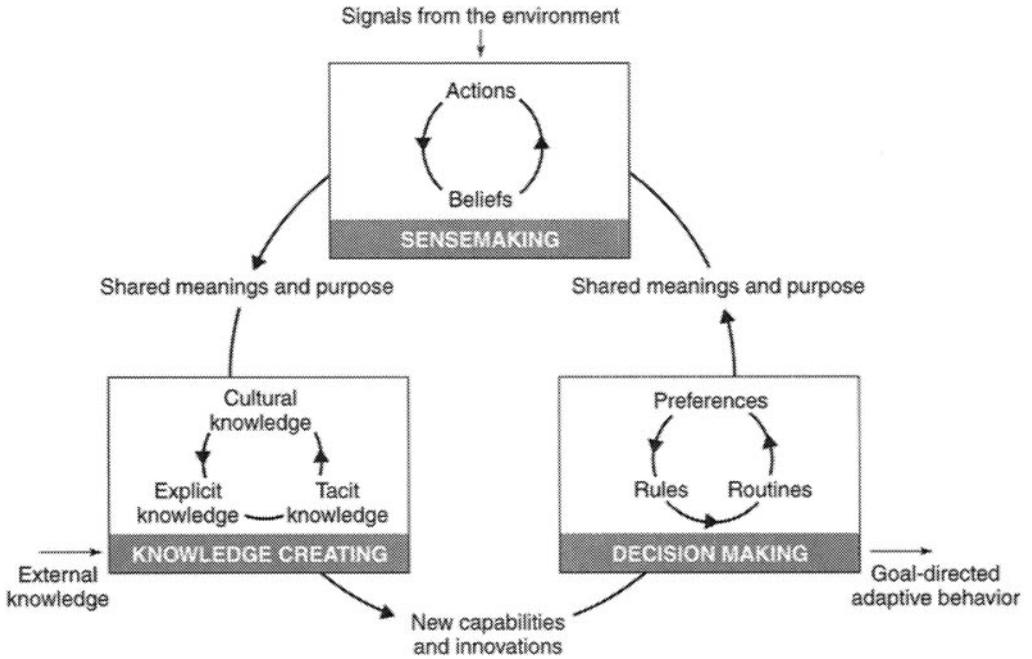


Figure 5.5 The organizational knowing cycle.

the organization. Shared meanings and purpose also help to define a collective organizational identity. Defining an organizational identity establishes norms and expectations about the propriety, accountability, and legitimacy of the organization's choices and behaviors. A framework of shared meanings and purpose is therefore used by organizational members to assess consequentiality and appropriateness and to reduce information ambiguity and uncertainty to a level that enables dialogue, choice, and action making. Where messages from the external environment are highly equivocal, shared meanings reduce ambiguity by helping members to select plausible interpretations. Where messages from the external environment are highly incomplete, shared meanings reduce uncertainty by supplying assumptions and expectations to fill in the voids. Shared meanings need to be continuously updated against new events and conditions. By allowing ambiguity and diversity in interpretations, an organization can constantly monitor its shared meanings against the environment to ensure that they are still valid.

Within the framework of its constructed meaning, agenda, and identity, the organization exploits current specializations or develops new capabilities in order to move toward its vision and goals. Movement may be blocked by gaps in

the knowledge needed to bridge meaning and action. When the organization experiences gaps in its existing knowledge or limitations in its current capabilities, it initiates knowledge seeking and creating, set within parameters derived from an interpretation of the organization's goals, agendas, and priorities. Organizational members individually and collectively fabricate new knowledge by converting, sharing, and synthesizing their tacit and explicit knowledge, as well as by cross-linking knowledge from external individuals, groups, and institutions. The outcome of knowledge creating are *new capabilities and innovations* (fig. 5.5) that enhance existing competencies or build new ones; generate new products, services, or processes; or expand the repertory of viable organizational responses. The value of new knowledge is assessed locally by its ability to solve the problem at hand, as well as generally by its ability to enhance the organization's capabilities in the long run. New knowledge enables new forms of action but also introduces new forms of uncertainty. The risks and benefits of untested innovations and unpracticed capabilities are compared and evaluated by invoking rules and preferences in the process of organizational decision making.

Shared meanings and purposes, as well as new knowledge and capabilities, converge on decision

making as the activity leading to the selection and initiation of action. Shared meanings, agendas, and identities select the premises, rules, and routines that structure decision making. New knowledge and capabilities make possible new alternatives and outcomes, expanding the range of available organizational responses. By structuring choice behavior through roles and scripts, rules and routines, the organization simplifies decision making, codifies and transmits past learning, and proclaims competence and accountability. Rules and routines specify “rational” criteria for the evaluation of alternatives, “legitimate” methods for the allocation of resources, and “objective” conditions for distinguishing between normal states and novel situations that may necessitate the search for new rules.

Over time, the organization has learned and codified a large number of rules and routines, so choosing which rules to activate for a specific decision situation is itself problematic. Shared meanings and understandings about the nature and needs of a particular situation are used to guide rule activation. Shared interpretations help select which rules to apply by answering the questions, What kind of situation is this? What rules do we have for dealing with this type of situation? Shared interpretations may also select rules according to the criterion of appropriateness—What kind of organization are we? What would be appropriate behavior for an organization like ours in a situation like this one? (March et al. 2000). Sometimes shared interpretations indicate that the situation is novel, where none of the learned rules seems to apply. When rules break down, the organization attempts to make new meaning in time to initiate action, effectively prototyping new rules to prompt choice making. The end result of this interaction between shared meaning (in interpretations and understandings) and shared learning (in rules and routines) is the execution of a pattern of actions that allows the organization to move toward current goals while at the same time adapting to changed conditions in the environment. In this sense, the outcome of decision making is behavior that is both goal directed and adaptive.

While each organization adjusts its behavior to perceived changes in the environment, its responses are deflected and diffracted by the concurrent actions of other actors that participate in the same arena. Thus each organization is reacting to the actions of other organizations that are also reacting to it. The resultant meshwork of in-

teractions configures new patterns and new conditions that pose fresh ambiguities and uncertainties. A continuous stream of new events and equivocal cues necessitates iterative cycles of information processing. Where meanings or purpose change as a result of reinterpreting the environment, or where rules or routines are altered as a result of acquiring knowledge and understanding, the organization is adapting to variation and feedback in its environment.

Organizational Knowing as Strategy Finding

Cycles of organizational knowing lead to the iterative development of organizational strategy. Strategies are patterns of actions that often appear to be rational or goal directed after the fact, with the benefit of hindsight. An organizational-knowing view of strategy suggests that an organizational “strategy” does not emerge fully formed. Rather, it is traced out through cumulative cycles of sensemaking, knowledge creation, and decision making. As described in the preceding section, the organization’s initial beliefs prime it to notice and bracket certain events and signals. They also predispose the organization to be drawn to and consider certain actions. The pursuance of patterns of action involve creating knowledge to fill knowledge and capability gaps, as well as making operational and strategic decisions to commit resources and effort. The outcomes of organizational action generate new cycles of sensemaking, knowledge creating, and decision making.

The implication for an organization thriving in dynamic environments is that it would need to manage each of the three information processes effectively. In sensemaking, the organization would scan broadly (sensing), develop plausible interpretations quickly that enable action (sensemaking), and communicate purpose and vision to members (sense-giving). In knowledge making, tacit, explicit, and cultural knowledge are engaged simultaneously in the generation and utilization of knowledge. The more tightly integrated the three forms of knowledge, the more valuable, unique, and inimitable the organizational advantage. In decision making, rules and routines encode learning, economize effort, and add to the organization’s tradable stocks of knowledge. At the same time, the organization must be able to recognize situations when existing rules are inadequate or irrelevant and be pre-

pared to abandon them while inventing new rules.

The model also implies that the greater the interplay between the processes of sensemaking, knowledge creating, and decision making, the greater the organization's capacity to detect threats and opportunities, create valuable knowledge, and act on new knowledge. This interplay is necessarily fluid and open-ended, but it is not entirely random or without structure. The interplay is given coherence and direction through strong leadership (Crossan and Hulland, this volume), shared understandings about identity and purpose (Grant, this volume; Sole and Edmondson, this volume), and community norms and values (Adler 2001, Nahapiet and Ghoshal 1998, this volume). What drives the cycles of strategic learning is an inner logic and discipline that establishes a culture and a set of practices for revising and updating assumptions and beliefs, and for noticing, figuring, and trying things out.

References

- Adler, P. (2001) "Market, hierarchy, and trust: the knowledge economy and the future of capitalism." *Organization Science* 12(2):215–234.
- Allison, G.T. (1971) *Essence of Decision: Explaining the Cuban Missile Crisis*. Boston: Little Brown.
- Allison, G.T. and Zelikow, P. (1999) *Essence of Decision: Explaining the Cuban Missile Crisis*, 2d ed. New York: Addison-Wesley.
- Appleyard, M.M. (1996) "How does knowledge flow? Interfirm patterns in the semiconductor industry." *Strategic Management Journal* 17(Winter):137–154.
- Badaracco, J.L. (1991) *The Knowledge Link: How Firms Compete through Strategic Alliances*. Boston: Harvard Business School Press.
- Choo, C.W. (1998) *The Knowing Organization: How Organizations Use Information to Construct Meaning, Create Knowledge, and Make Decisions*. New York: Oxford University Press.
- Cohen, W.M. and Levinthal, D.A. (1990) "Absorptive capacity: a new perspective on learning and innovation." *Administrative Science Quarterly* 35(March):128–152.
- Cohen, M.D., March, J.G., and Olsen, J.P. (1972) "A garbage can model of organizational choice." *Administrative Science Quarterly* 17:1–25.
- Doz, Y. and Hamel, G. (1997) "The use of alliances in implementing technology strategies," in M. Tushman and P. Anderson, eds. *Managing Strategic Innovation and Change*, pp. 556–580. New York: Oxford University Press.
- Gioia, D.A. and Mehra, A. (1996) "Sensemaking in organizations: book review." *Academy of Management Review* 21(4):1226–1229.
- Grant, R.M. (1996) "Prospering in dynamically competitive environments: organizational capability as knowledge integration." *Organization Science* 7:375–387.
- Kogut, B. and Zander, U. (1992) "Knowledge of the firm, combinative capabilities, and the replication of technology." *Organization Science* 3(3):383–397.
- March, J.G. and Simon, H.A. (1993) *Organizations*, 2d ed. Oxford: Blackwell.
- March, J.G., Schulz, M., and Zhou, X. (2000) *The Dynamics of Rules*. Stanford, CA: Stanford University Press.
- Mintzberg, H., Raisinghani, D., and Théorét, A. (1976) "The structure of 'unstructured' decision processes." *Administrative Science Quarterly* 21(2):246–275.
- Nahapiet, J. and Ghoshal, S. (1998) "Social capital, intellectual capital, and the organizational advantage." *Academy of Management Review* 23(2):242–266.
- Nonaka, I. (1994) "A dynamic theory of organizational knowledge creation." *Organization Science* 5(1):14–37.
- Nonaka, I. and Takeuchi, H. (1995) *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation*. New York: Oxford University Press.
- Simon, H.A. (1976) *Administrative Behavior: A Study of Decision-Making Processes in Administrative Organization*, 3d ed. New York: Free Press.
- Tsoukas, H. (1996) "The firm as a distributed knowledge system: a constructionist approach." *Strategic Management Journal* 17:11–26.
- Weick, K.E. (1979) *The Social Psychology of Organizing*, 2d ed. New York: Random House.
- Weick, K.E. (1995) *Sensemaking in Organizations*. Thousand Oaks, CA: Sage.