

Chapter 2

Review of the Literature on Strategy Cascading, Context, and Leadership

Abstract This chapter explores the literature on realizing improvement activities via different approaches of strategy making and cascading. The review proceeds in five sections that describe, in turn, the topics that are relevant to this research project. Section 2.1 summarizes the literature streams that describe the basics of operations strategy, and Sect. 2.2 focuses on the company context. Section 2.3 addresses strategy cascading quality, and Sect. 2.4 discusses research findings in the area of improvement performance. Finally, Sect. 2.5 concentrates on the literature that deals with leadership style. Each section progresses from the most theoretical approaches to those that are most likely to be of practical relevance.

2.1 Operations Strategy

The aim of this section is to describe the research on the foundations of operations strategy. The first part provides details about the content and process of operations strategy; the second part covers the resource-based view, including the notion of dynamic capabilities.

2.1.1 Strategy Content and Strategy Process

Skinner (1969, p. 139) defines strategy as follows: “Strategy is a set of plans and policies by which a company aims to gain advantages over its competitors.” Other authors describe strategy more pragmatically in terms of answering the questions “where to go” and “how to get there” (Eisenhardt 1999). Schneider and De Meyer (1991, p. 308) define strategic as “environmental events that may have an important impact on organizational performance.”

The topic of operations strategy is typically viewed as involving two main aspects: the *content* of strategy (Porter 1979, 1985, 1998) and the *process* of

strategy (Mintzberg 1978, 1993, 1994; Mintzberg et al. 1998). The content literature stream is mostly concerned with the so-called nucleus of strategy (Porter 1996)—“operational effectiveness is not strategy”—or, in other words, the intention of a firm’s strategic direction (Hamel and Prahalad 1989). Much of this research has concentrated on the development of typologies and taxonomies of operations strategies; see, for example, Martín-Peña and Diaz-Garrido (2008). In short, this work has identified three generic operations strategies: those that concentrate on cost savings, those geared to creating high-quality products, and those that seek to implement the latest technologies and processes. The literature describes strategy as the “pattern of matching the different elements—some within the organizational boundaries (competences and resources) and others dealing with the environment (opportunities and threats)” (Venkatraman and Camillus 1984, p. 513). Strategy has also been defined as “a pattern in a stream of decisions” (Mintzberg 1978). In an empirical study, Swamidass et al. (2001, p. 1289) present “alternative forms of manufacturing strategy processes” that demonstrate new approaches (e.g., core manufacturing competences) as distinguished from the conventional top-down planning approach. Although there appears to be a link between a firm’s manufacturing strategy and its strategic priorities, Mintzberg (1978, p. 945) acknowledges that “a company’s strategy may not be always completely planned but may consist of [both] planned and emergent components.”

In their review of the literature on operations strategy, Anderson et al. (1989, p. 133) address four issues: (1) a strategic versus a tactical view of operations; (2) the synergies between integrating business and operations strategic issues; (3) how operations decisions demonstrate strategic opportunities; and (4) how conceptual structures define operations strategy. The authors agree to a large extent with Skinner (1969) that operations strategy should be an integrated and vital part of business strategy yet often is “the missing link”. It is worth mentioning that Anderson et al. do not find a widely accepted definition of operations strategy, although most definitions agree that operations strategy is part of a firm’s overall strategy and should involve both planning and organizing operations. These authors find little research on the process of operations strategy, which they argue is in need of further empirical exploration. According to Venkatraman and Camillus (1984, p. 513), strategy research must consider the “concept of fit”—that is, aligning organizational resources with external opportunities in order to implement the chosen organizational strategy effectively.

Gavetti and Levinthal (2004, p. 1312) analyze the past 50 years of strategy research published in *Management Science* while developing their “strategy map”. Their study concludes that the organizational aspects of strategy making are not well developed. Burgelman (1983a) is an example of seminal work in this field. The research reviewed by Gavetti reveals that strategy often emerges ex post from behavioral patterns within the researched units of analysis. The topic of *alignment* is a central issue in the research of Schroeder et al. (1986), who report—after surveying 39 manufacturing companies—that only a third of these firms have an explicit manufacturing strategy. Those that do have sought to align it with their business strategy, from which the operations strategy is typically derived.

These authors describe operations strategy as consisting of four principal elements: “mission, objectives, policies, and distinctive competence” (p. 409). They find that, for most firms, business strategies are “growth oriented, market directed, and emphasize quality and service” (p. 408). With respect to business strategies, Schroeder et al. offer their own perspective on Porter’s (1998) “generic” strategies (i.e., focus, low cost, and segmentation) but argue that this trio is not jointly exhaustive. Similarly, Schroeder et al. expand the generally accepted list of manufacturing objectives (cost, quality, delivery, and flexibility). Another finding of their research is that the term “manufacturing strategy” does not seem to be well understood. Surveyed managers often mention manufacturing conditions when responding to questions about manufacturing strategy. This result is in line with the findings of Hayes and Pisano (1994), who address basic questions about operations strategy—for example, how they are defined in practice and how business strategy differs from operations strategy.

In their literature review of operations strategy research, Boyer et al. (2005, p. 442) show that “this body of work is dominated by papers that draw upon theoretical perspectives enabling a more holistic scope of inquiry.” Hence the research that they review focuses on both the content and process of operations strategy. This paper thereby reveals the need for more empirical case study research that specifically addresses operations strategy. One example of strategy process research is the study of Bates et al. (1995), who posit a link between organizational culture and operations strategy. They describe organizational culture in terms of two constructs—“hierarchically-oriented cultures depending primarily on authority relationships for control of behavior and clan-oriented cultures relying mainly on shared values and beliefs” (p. 1568)—that are based on Hofstede (2002). As a result of their survey on operations strategy process, Bates et al. postulate that a well-defined operations strategy leads to a “group-oriented organizational culture with coordinated decision making, decentralized authority, and loyal work force” (p. 1565). Following Hayes and Wheelwright (1984), Bates et al. stress the firm’s need to align its operations and business strategies, pointing out that an operations strategy consists of criteria (e.g., formal strategic planning, communication, a long-term orientation) that are linked to business strategy.

Another example of strategy process implementation is described by Sberman et al. (1997). They present the case of Analog Devices, Inc., a company that successfully implemented a “total quality management” program (Deming 2000) that yielded outstanding achievements in quality and productivity. At the same time, however, the company’s financial performance declined; it underperformed the market and was forced to lay off personnel. The authors use case evidence to devise a system dynamics model that might explain this seeming paradox. They find that one cause was the unbalanced impact of the improvement initiatives on different parts of the organization: it was not enough to make operational improvements on simple product lines alone. In particular, improvements that address indirect costs (e.g., for product development) must receive the same attention as does process improvement. The reason is that different types of improvement processes—for example, product development and scrap reduction—are characterized by different

rates of improvement. Therefore, improvement must reflect an approach that is attuned to the different individual processes. Sterman et al. (1997, p. 518) conclude that “the more successfully an organization improves its manufacturing operations, the more intense the trade-off [with business strategy] will be.”

Wheelwright and Hayes (1985) elaborate a framework in which the contributions of manufacturing are matched to a firm’s overall goals. This framework for aligning operations and business strategies incorporates a specific four-stage process. The first, “internally neutral” stage involves elimination of internal weaknesses, and the second, “externally neutral” stage is devoted to catching up with external competitors. The third, “internally supportive” stage is characterized by operations contributing significantly to the firm’s business strategy. Finally, in the fourth stage, the firm’s operations are “externally supportive” in the sense of positioning in its sector and setting standards for the industry; companies at this stage typically have a main focus on manufacturing alone or on all business functions, including operations. The authors claim that transitioning to stage four is the most difficult step. Top management needs to be involved at each stage because the transitions require not only a new set of instructions but also a changed mind-set. Senior managers play an important role in the transition to stage four, but Wheelwright and Hayes find that they avoid involvement with operations in the preceding stages—during which top management may fail to realize that operations are an integral part of business strategy. The authors consider the company to be the unit of analysis for operations strategy. Thus, operations strategy is determined by operations; backup from headquarters is helpful but should not be viewed as a prerequisite.

Skinner pioneered the research field of manufacturing strategy, beginning with the “advanced production problems” program (later to become the “manufacturing policy” program) at Harvard Business School. In one of his early papers, Skinner (1969) describes the tensions between manufacturing strategy and organizational strategy. Manufacturing objectives should consist of more than low costs and/or high efficiency; a viable manufacturing strategy also involves *trade-offs* (cf. Porter 1996), a fact that is underappreciated. The relevant trade-offs involve such generic capabilities as cost, quality, dependability, and flexibility. For example, it is difficult (if not impossible) for a company to compete in terms of cost, quality, *and* delivery. Top executives are often not involved in production—either because they delegate extensively or do not feel comfortable handling such matters. The result can be trouble for their companies. Hence Skinner’s framework is a top-down approach to derive a manufacturing strategy from the corporate strategy.

In a later paper, Skinner (1974) finds that experienced production executives had begun to apply their wisdom along with the conventional premises of manufacturing strategy, but still this did not amount to a true organizational strategy. All-purpose plants could no longer succeed, so it became necessary to design plants for a single purpose. It is the task of senior management to see that manufacturing decisions reflect appropriate trade-offs and be properly aligned with organizational decisions. Skinner (2007, p. 332) defines the essence of good strategy as follows: “a manufacturing strategy is a set of manufacturing policies designed to maximize performance among trade-offs among success criteria to meet the manufacturing task determined

by a corporate strategy. Top management's job is to ensure that there is a coherent manufacturing strategy in which all manufacturing policies are designed as a whole to support or lead the corporate strategy." Skinner postulated that only focused factories can be consistently successful. Such manufacturing processes are rare, however, because firms usually have too much complexity in their product portfolio or too many immature process technologies. It is therefore difficult for them to compete solely in terms of cost, so trade-offs are inevitable. Skinner (1974, p. 119) states: "One way to compete is to focus the entire manufacturing system on a limited task precisely defined by the company's competitive strategy and the realities of its technology and economics." Toward this end, he supplied a four-step procedure by which a firm's manufacturing and corporate strategies can be aligned.

The research of Ferdows and Meyer (1990) explores whether such trade-offs can be avoided. These authors view manufacturing capabilities as being cumulative rather than circumscribing, and they elaborate (but do not prove the validity of) a potentially useful model based on survey data. Ferdows and Meyer argue that successful companies seem to follow a sequence of improvement programs whereby new capabilities are built upon previous ones. This sequence (described by their "sand cone" model) is: quality, dependability, speed, and cost efficiency. The authors argue that trade-offs are not entirely irrelevant but that the theory of trade-offs is not valid under all circumstances. They also propose that "slack" may be an option for companies that seek simultaneous improvements in more than one capability.

2.1.2 Resource-Based Approaches

The extant literature suggests that the resource-based view is a practical one for managers and scholars to adopt (Lado et al. 2006). According to this approach, the firm's goal should be to find an asset or capability that is valuable, rare, inimitable, and *organizationally appropriate* (VRIO; Barney 1997) or valuable, rare, inimitable, and *nonsubstitutable* (VRIN; Eisenhardt and Martin 2000). By leveraging those characteristics, an organization can generate long-term competitive advantage (Arend and Lévesque 2010). In other words: resources are turned into capabilities, which in turn lead to competitive advantage. An early presentation of this resource-based view of the firm is that of Wernerfelt (1984), who analyzes firms from the resource side instead of from the product side; in this work he introduces the resource position barrier and the resource-product matrix. Teece et al. (1997) describe the resource-based approach as a strategy model that emphasizes efficiency. As Schroeder et al. (2002, p. 106) summarizes: "The resource-based view of the firm [...] argues that organizations incorporate privately held knowledge, which can be employed to create idiosyncratic modes of technology at any point in time [...]. The [resource-based view] distinguishes between resources that can be acquired in factor markets and those developed inside the firm." Often those resources are difficult to imitate, and they are *tacit* as a result of causal ambiguity.

A variation of the resource-based view incorporates *dynamic capabilities*, which are defined by Teece et al. (1997, p. 516) as “the firm’s ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments.” O’Reilly and Tushman (2008, p. 185) similarly define dynamic capabilities as “the ability of a firm to reconfigure assets and existing capabilities” with the goal of achieving a “long-term competitive advantage.” In this view, a firm’s core competences should be used to develop competitive positions capable of evolving into one or more competitive advantages in the long run. Dynamic capabilities are a source of such advantages (Teece et al. 1997) because they must be developed and cannot simply be bought. According to Makadok (2001, p. 388), two fundamental elements distinguish dynamic capabilities from other types of resources. First, they are firm-specific capabilities because they are embedded in the organization; hence, they cannot be easily transferred to or acquired by other organizations. Second, dynamic capabilities drive and enhance the productivity of other resources owned by the organization—what Makadok calls “intermediate goods” (p. 389).

In their literature review, Oliver and Holzinger (2008) analyze the effectiveness of political strategies, which they argue is a function of the firm’s dynamic *political* capabilities. The authors describe the relevance of dynamic capabilities in this way: “dynamic capabilities focus on the variation in firms’ abilities to adapt quickly to rapidly changing environments”; moreover, they “affect profitability by enhancing the productivity of the other resources that the firm possesses” (p. 497). These statements indicate that dynamic capabilities are important for a firm’s effectiveness, especially in rapidly changing environments; in that case, one naturally concludes that firms not only will gain a competitive advantage but also will earn superior returns if they can establish VRIN (or VRIO) capabilities. According to Oliver and Holzinger (2008), such dynamic capabilities are exhibited by a firm that can develop, recombine, and deploy competences that enable it to remain aligned with changing requirements. For instance, the firm’s internal assets may be aligned with environmental influences so that the latter match up well with the firm’s particular strengths. Finally, the authors argue that “firm-specific dynamic capabilities—specifically, capabilities in structural and process reconfiguration, scanning and anticipatory knowledge acquisition, social capital deployment, and institutional influence processes—are likely to serve as the key drivers of effective political management” (p. 514).

Eisenhardt and Martin (2000) conduct an extensive review of the literature dynamic capabilities, which they define as a set of processes such as product development (the authors give Toyota’s process as an example) or strategic decision making. Dynamic capabilities of this sort are often referred to as “best practices”. The authors also remark that dynamic capabilities resemble the concept of *routines* in moderately dynamic markets (“routines to learn routines”, or knowledge creation routines), where dynamic capabilities are often of a relatively complex nature. In contrast, dynamic capabilities in high-velocity markets are typically *not* complex. That being said, dynamic capabilities are widely viewed as a necessary but not sufficient condition for gaining competitive advantage. Eisenhardt and Martin

(2000, p. 1108) report that dynamic capabilities are the subject of extensive empirical research.

Along these lines, Anand et al. (2009) use a number of exploratory case studies to show that continuous improvement can serve as a dynamic capability. They argue that organizations compete in terms of the ability to improve their processes continually, but providing an appropriate infrastructure is crucial for such improvements; otherwise, continuous improvement initiatives (e.g., “lean production”) may well prove ineffective, at least in the long term. Anand et al. describe dynamic capabilities as “a learned and stable pattern of collective activity through which the organization systematically generates and modifies its operating routines in pursuit of improved effectiveness” (p. 445). The authors list two basic requirements for sustainable continuous improvement: coordination and execution. A continuous improvement initiative that lacks these features is likely to founder after the initial improvements. Thus infrastructure serves as the coordinating “glue”, and in recognition of this the authors employ the so-called purpose–process–people framework (Bartlett and Ghoshal 1994, 1995; Ghoshal and Bartlett 1995). Anand et al. (2009) emphasize two points in particular. First, continuous improvement cannot be achieved simply by training staff in new methods; that is, there must also be mechanisms for managing and maintaining improvements. Second, a holistic infrastructure is needed if continuous is to be managed properly. The authors analyze the practical impact (i.e., the actual usefulness of a resource-based view) via simulation modeling, and they find support for a watered-down version of that perspective—specifically, in cases “where a resource with relatively low levels of critical characteristics provides a firm with statistically significant sustained superior performance” (p. 914). Yet because it may be hard to identify relevant factors, the manager’s tasks are to detect a critical resource that requires more investment and to recognize noncritical resources from which any further investment should be withheld.

Lavie (2006) extends the resource-based view to examine networks of interconnected firms and concludes that “the nature of relationships may matter more than the nature of resources in networked environments” (p. 638). In this review of the literature, Lavie finds that resources can best serve interconnected firms when those resources are not the exclusive property of a single organization. He posits that the nature of the *partnership* between firms is more important than the nature of the actual resources. However, Schroeder et al. (2002) argue that proprietary processes, internal learning (i.e., intrafirm or privately held knowledge), and external (interfirm) learning are resources and capabilities leading to competitive advantages that cannot be readily duplicated by others and hence make a company both unique and competitive. In other words, no competitive advantage accrues to a company whose only skills are freely available. The survey used by Schroeder et al. measures performance as an index of several manufacturing indicators (e.g., on-time deliveries and quality control).

Paiva et al. (2008) research the related area of formulating a manufacturing strategy from the resource-based perspective. In this paper, the “know-what” and the “know-how” are key elements of organizational learning. These elements refer

to knowledge about where information can be gathered and how it can be applied in order to yield smooth-running operations. The accumulation of knowledge leads to competitive advantage, which in turn helps the firm formulate its operations strategy—described as “a process comprising both structured and unstructured strategy formulation” (p. 119). Their empirically tested model is based on the foundation of Schroeder et al.’s (2002) concepts of external and internal learning. As that earlier paper argues, “[t]he manufacturing strategy formulation process is therefore a result of resources alignment, including information, knowledge and [the] company’s functions” (p. 117). Paiva et al. conclude that manufacturing knowledge should be viewed as a necessary component of strategic decisions. That connection can be enhanced by strengthening cross-functionality (i.e., coordination).

In his own review of the literature, Pitelis (2007) compares two economic-based theories that have gained prominent in recent decades: the *behavioral* theory of the firm and the theory of the *growth* of the firm (it was on these theories that the resource-based view was founded). According to the author, elements shared by those two theories include excess resources and organizational slack, which together can foster “problemistic search” and thus innovation. In contrast to research that focuses on the paradoxes of a resource-based view, Lado et al. (2006) address the question of whether the resource-based view can help to understand and advance strategic management (as in Priem and Butler 2001) and considers the biophysical impact of a resource-based view (as in Hart 1995). Argote and Greve (2007) review literature on the behavioral theory of the firm and distill its findings into four research “commitments” as follows: “focus on a small number of key economic decisions made by the firm”, “develop process oriented models of the firm”, “link models of the firm as closely as possible to empirical observations”, and “develop a theory with generality beyond the specific firms studied” (p. 338). In this treatment, the key concepts and mechanisms include bounded rationality, problemistic search, and slack search.

According to Pitelis (2007, p. 479), bounded rationality “refers to limitations of information and calculation” and “implies the need to set targets and try to satisfy these, as opposed to optimizing the best imaginable solution.” Argote and Greve (2007, p. 343) have this to say about problemistic search: “Once organizational performance falls below the aspiration level, search for solutions will occur and organizational changes become more likely. Because problemistic search is myopic, the changes will likely occur near the apparent problem or in areas that the organization has recently changed.” They also remark that “[t]he theory of slack search and innovation is an account of why organizations sometimes develop new products, technologies, or practices even when they are not solving specific problems, which complements the theory of problemistic search” (p. 339).

In the behavioral of the firm, routines are a crucial factor in organizational learning and adaption (Argote and Greve 2007, p. 342). In Ketchen et al. (2007) the authors point out that, despite its simplistic terminology, the resource-based view is not a merely tautological perspective. They also argue that market orientation and customer orientation are not mutually exclusive but are instead “part of a two-by-two matrix created by two dimensions: the propensity to satisfy current customer

needs and the propensity to develop products and services for potential future needs” (p. 961). Ketchen et al. thus believe that the resource-based view is a contingency-driven theory that offers considerable potential for further research.

Finally, the literature review of Gagnon (1999) analyzes studies of operations management that address the resource-based view. He identifies three fundamental issues for research based on this perspective: the active role of manufacturing, the necessity of trade-offs, and the implementation of best practices. With regard to manufacturing’s active role, Gagnon states: “Consequently, the process of operations strategy may become much more emergent, where the continuous ‘crafting’ of innovative strategies would make the firm both strategically and operationally stronger in the face of uncertainty [. . .]. The strength of this emergent process should [be reflected in a] strong managerial commitment to operating priorities” (p. 128). As for trade-offs, “[o]perations managers become the guardians, ensuring that key sources of competitive advantage (e.g., new product development processes) are continuously upgraded so that competitors are unable to copy them. Operations strategy could then focus on making trade-offs in ‘resource’ (or advantage, or asset) management, determining the sustainability of the firm’s competitive strengths” (p. 130). Finally, Gagnon argues that “the implementation of best practices would help build up ‘strategic options’ on a continuous basis” (p. 133).

Of course, the field of operations strategy involves much more than content, process, and the resource-based view. Yet all three topics are relevant and, indeed, vital if one seeks to understand operations strategy in general or to devise a particular strategy. It is therefore reasonable to conclude that trade-offs among different resources are an important factor in nurturing the long-term capabilities needed to craft an operations strategy that aligns with the firm’s overall business strategy. As long as trade-offs are required and resources are scarce, there are countless ways to deploy such strategies. Hence there remains considerable room for new empirical research that analyzes the strategy cascading process.

2.2 Company Context

This section addresses the backgrounds of company contexts, which are assumed to explain firm behavior in the sense that they lead the firm to specific actions that might not have been taken under other circumstances. These contexts may have originated internally—for example, from the firm’s self-perceived role or strategic priorities. They may also arise from external circumstances, as when the complexity of a firm’s products entails the involvement of outside parties and thereby leads to restrictions over which it does not have complete control. The discussion is therefore divided into two parts; the first focuses on strategic priorities and the second on complexity theory.

2.2.1 *Strategic Priorities*

As mentioned previously, Porter (1996) emphasizes that “operational effectiveness is not strategy”. In other words, it is necessary for organizations to have strategic priorities. One approach to realize strategic priorities are core competences. Prahalad and Hamel (1990) illustrate the notion of core competences by describing the cases of NEC and GTE, where it was the development of such competences that enabled the former to excel over the latter. These authors define core competences as “the collective learning in the organization, especially how to coordinate diverse productions skills and integrate multiple streams of technologies” (p. 82). Continued application leads core competences to increase over time, yet the business organization of some firms is still in need of radical change. In the words of Prahalad and Hamel: “The critical task for management is to create an organization capable of infusing products with irresistible functionality” (p. 80). The authors elaborate three requirements for nurturing core competences: provide potential access to a variety of markets, make a contribution that benefits the customer, and make it difficult for competitors to imitate. Top management must also establish a business architecture that enables the firm to build such competences, a task that is commonly facilitated either by learning from alliances or focusing on internal development. Often the necessary investment and continuous improvement actions to build core competences require a decade (or longer) to take effect. Once developed, core competences are “physically embodied” by *core products*.

Prahalad and Hamel (1990, p. 80) also explain that core competences are difficult to cultivate within an architecture of strategic business units, “which by nature underinvest in core competences, imprison resources, and bind innovation.” The typical outcomes of such units are not aligned with the concepts of core competences. Such misalignment was evident in an earlier study (Hamel and Prahalad 1989), where the authors argued that strategy should involve more than catching up to the cost and quality advantages of global competitors. As explained in that paper, “the application of concepts such as ‘strategic fit’ (between resources and opportunities), ‘generic strategies’ (low cost versus differentiation versus focus), and the ‘strategy hierarchy’ (goals, strategies, and tactics) have often abetted the process of competitive decline” (Hamel and Prahalad 1989, p. 63). The authors describe *strategic intent* as the capacity to envision a desired leadership position, a dedication to winning on all levels, and the willingness to sustain that dedication over decades in the quest for global leadership. Thus, world-class competitors make strategy in a different way: on the basis of strategic intent. They begin with a goal that exceeds the company’s present grasp and existing resources. Such intentions involve focusing, motivating, sustaining, providing degrees of freedom, and guiding the use of resources. Toward these ends, three criteria are distinguished: strategic intent “captures the essence of winning”, “is stable over time”, and “sets a target that deserves personal effort and commitment” (p. 64). That is, strategic intent consists of more than simply “better” strategic planning. Generating a competitive advantage requires several steps: (1) create a sense of urgency; (2) develop a competitor focus; (3) provide workers the skills they need to achieve desired

goals; and (4) give the organization time to digest one challenge before launching another. It is also necessary to establish clear milestones and review mechanisms. The result is a global leadership position and an approach that avoids playing by the market leader's rules.

Research has shown that the alignment of strategic priorities between managerial domains (e.g., general management and manufacturing management) enhances performance. Joshi et al. (2003, p. 353) summarize these findings as follows: "Alignment of [strategic] priorities is presumed to contribute to enhanced organizational performance, just as misalignment is expected to undermine performance." In short, their study demonstrates that firms must identify strategic priorities. Along the same lines, Hayes and Pisano (1994) find that such initiatives as total quality management, just-in-time supply chains, and business process reengineering yield no competitive advantage; their effects are limited to improving the manufacturing process. These authors argue that "superior organizational capabilities provide a competitive advantage" (p. 78) and posit that, in turbulent environments, the best competitive advantage is strategic *flexibility*. That viewpoint would seem to confirm the claim of Ferdows and Meyer (1990) that companies can excel in more than one dimension even without making trade-offs. These authors consider competitive advantage to be the ability to outperform the competition in certain areas, an ability that is required of a market leader. In contrast, Boyer and Lewis (2002) analyze the extent to which manufacturing plants see competitive priorities as trade-offs (cf. Skinner 1969). Their findings suggest that trade-offs remain, although perceived differences in competitive priorities are subtle and may vary across levels of the plant hierarchy. Moreover, strategy is perceived differently by manufacturing managers and operators, which underscores the necessity of a well-defined strategy that is clearly communicated to all plant employees. Even though it is difficult to transform "competitive priorities into operational capabilities" (Boyer and Lewis 2002, p. 18), that transformation is critical. So once a company's goals are defined, management must craft their decisions so as to nurture operational capabilities.

However, strategic priority involves more than the proper alignment of manufacturing operations within the firm. It also involves (and can be nurtured by) the company's role in a network—that is, the firm's behavior within a "web" of firms. In this regard, De Meyer and Vereecke (2009) analyze how to optimize knowledge exchange in the network of independent companies in a multisite firm. These authors base their study on a framework (developed previously in Vereecke et al. 2006) that defines four types of networking companies: receiving, isolated, hosting network, and active network. De Meyer and Vereecke find that "factories whose main advantages were market proximity and the availability of skills and know-how have survived at a higher rate than factories whose main advantage was labor costs" (p. 5). Furthermore, "it is clear that skills, know-how, and market proximity are relatively stable location advantages. Low labor costs is a less stable one, and of course the absence of any major advantage is a source of instability" (p. 6). Vereecke et al. (2006, p. 1746) characterize the four network types as follows. *Receiving* firms are "relatively young, market focused, have little inflow and outflow of components and semi-finished goods, have a relatively low level of strategic autonomy in plant

design, and have relatively high level of managerial investment.” *Isolated* firms are “relatively young, have little outflow of components and semi-finished goods, have a relatively low level of managerial investment, and show a relatively low level of capabilities.” The *hosting network* firms “are relatively old, have a broad market, have a high inflow of components and semi-finished goods, and have a relatively low level of managerial investment.” Finally, *active network* firms have “high inflow and outflow of components and semi-finished goods, have a relatively high level of strategic autonomy in plant design, and have a relatively high level of process investment.” The results of this study indicate that “flows of knowledge between plants seem to be reciprocal, and [...] there is a clear correlation between tangible and intangible flows in the network” (p. 1748). The authors emphasize, however, that building networks takes time.

Devaraj et al. (2001) discuss typologies based on plant configurations: the product–process matrix and the generic manufacturing strategies model. They find that “the generic manufacturing strategies model is a useful augmentation to the product–process matrix” (p. 427). In a later work, Devaraj et al. (2004, p. 313) examine “the effects of the fit between generic manufacturing strategies and manufacturing objectives upon strategically relevant plant level performance outcomes (e.g. cost-efficiency, quality, delivery, flexibility, and innovation).” Their main finding is that better manufacturing performance is strongly related to the fit between manufacturing objectives and manufacturing design choices.

In this line of research, it is worth mentioning the study of Verbeeten and Boons (2009). They investigate the question of whether an organization’s strategic priorities are associated with the use and effectiveness of dedicated key performance indicators and find that “aligning the performance measurement system to the strategic goals of the firm does not necessarily increase performance. [...] [M]anagers have to strike a delicate balance in the selection and use of performance measures” (p. 114). Although the authors are unable to verify all their tested hypotheses, they do conclude that tracking both financial and nonfinancial key performance indicators yields a useful indicator of a company’s (improvement) performance status.

Frazier and Spriggs (1996) argue that the concepts and techniques of “group technology” can be a source of competitive advantage by helping to improve product quality, profitability, and/or customer service levels. They define group technology as “grouping parts and products with similar characteristics into families and forming production cells with a group of dissimilar machines and processes” (p. 83). Lavie (2006, p. 643) defines a firm’s competitive advantage as “a function of the combined value and rarity of all firm resources and resource interactions.”

2.2.2 Complexity Theory

The literature has documented that complexity theory is closely linked to search theory. Authors in both areas often adopt NK models, which were introduced by

Kauffman and Weinberger (1989), in order to address their research questions. Search and complexity influence each other in the sense that search is easy in a simple environment; that is, the optimal solution is easy to find. Search theory becomes more interesting in complex settings, where the task is more demanding and the results are usually piecewise unpredictable. In discussing complexity, Rivkin (2000, p. 825) adopts the definition of Simon (1962): “the sheer complexity of a strategy can raise a barrier to imitation. [...] [T]wo factors make a strategy complex: the number of decisions that [constitute] the strategy and the degree of interaction among those decisions.” Rivkin develops an NK model that addresses these two aspects. Within NK models, complexity is determined by the parameters N and K : the N parameter corresponds to the number of decisions to be made, while the K parameter captures “the marginal benefit or cost associated with another decision” (Rivkin 2000, p. 827). Such NK models are the preferred method for addressing (and calculating the level of) complexity. The basic takeaway from Rivkin’s work is that successfully dealing with complexity requires firms to move beyond heuristics and learning: “firms that follow simple hill-climbing heuristics are quickly snared on low local peaks, and firms that try to learn and mimic a high performer’s entire strategy suffer large penalties from small errors” (p. 824). Complexity thus makes it less likely that competitors can succeed by mere imitation, but the focal firm must still be able to cope with that complexity in some fashion. In particular, it must establish search mechanisms that do not become prematurely locked in to suboptimal solutions.

According to Sorenson et al. (2006, p. 998), “complexity refers to the degree to which the components in a recipe interact sensitively in producing the desired outcome.” One component of complex designs and architectures is *modularity*, whereby a system may be decomposed into loosely coupled subsystems (MacCormack et al. 2010). On the one hand, decomposition can lead to higher complexity owing to the increased number of participating subsystems; on the other hand, decomposition can make the overall system more manageable if each subunit makes its own decisions. But then firms face the problem of aligning the decisions, whose diversity must be considered from the organization’s overall perspective. A widely held tenet of complexity theory is that increased system size is linked to deteriorating performance within “rugged landscapes” (Mihm et al. 2003). Levinthal (1997) uses an NK model to simulate an organization’s adaptability to landscapes that are rugged; such adaptation is affected by changing environments and the interaction of participants. Levinthal finds that “[t]ightly coupled organizations are subject to high rates of failure in changing environments” (p. 934). Although such organizations are more likely to survive in the face of “reorientations”, a loosely coupled organization performs better in terms of local adaptation.

In their agent-based simulation model, Gavetti et al. (2005) postulate that the approaches characterized by rational deduction or local search do not work well in novel and complex settings. The authors claim that, in contrast, “analogical reasoning is especially powerful when managers pay attention to characteristics that truly distinguish similar industries from different ones. A well-informed analogy is particularly powerful when interactions among decisions cross policy boundaries

so that the underlying decision problem is not easily decomposed” (p. 691). They find that a “wide” range of experience is more useful for strategy making than is a “deep” experience in a single (or limited number of) field(s). The implication is that abstracting and transferring experience is a major component of the strategy-making process. Rivkin and Siggelkow (2007) employ NK modeling to research patterned interactions in complex systems. Much of the related literature concerns establishing how much exploration is needed to assure that decisions are informed by sufficient knowledge. It is commonly believed that, “as interactions across decisions intensify and local optima proliferate, broader exploration is required” (p. 1068). Empirical research has demonstrated that interactions occur in patterns, and this applies to “centralization, small-world connections, power-law distributions, hierarchy, and preferential [relations]” (p. 1068). Rivkin and Siggelkow’s conclusions are summarized as follows: “Holding fixed the total number of interactions among decisions, a shift in the pattern of interaction can alter the number of local optima by more than an order of magnitude” (p. 1068). Hence broader exploration is successful for only a limited number of interaction patterns, and these must first be identified.

Of course, research on complexity is not limited to theoretical NK modeling (Anderson 1999). Complexity is evident throughout all stages of operations: manufacturing, supply chains, products, and communication involving organizational members. In their multinational empirical study, Bozarth et al. (2009) study the impact of supply chain complexity on plant performance. They define supply chain complexity as “the level of detail complexity and dynamic complexity exhibited by the products, processes and relationships that make up a supply chain” (p. 80) and find that “[u]pstream complexity, internal manufacturing complexity, and downstream complexity all have a negative impact on manufacturing plant performance” (p. 78). The reason is that “long supplier lead times, instability in the master production schedule, and variability in demand” reduce plant performance (p. 89). The authors conclude that “supply chain characteristics that drive dynamic complexity are shown to have a greater impact on performance than those that drive only detail complexity” (p. 78). One component of supply chain complexity is internal manufacturing complexity, which Bozarth et al. define as “the level of detail and dynamic complexity found within the manufacturing facility’s products, processes, and planning and control systems” (p. 80). In this view, internal manufacturing complexity is a function of “the number of supported parts and products, the types of manufacturing processes, and the stability of manufacturing schedules from one period to the next” (p. 80).

In an earlier empirical paper, Flynn and Flynn (1999) examine the effects of manufacturing environment complexity on manufacturing performance and report that “[e]nvironmental complexity was found to be related to manufacturing performance for each of the five dependent variables”—namely, inventory turnover, lead time, cycle time, on-time delivery, and customer service (p. 1021). The authors allude to the benefits of informational processing abilities as follows:

They simplify the manufacturing environment in three ways. First, the use of multi-functional employees and cellular layout (self-contained tasks) reduces information-processing needs by focusing the efforts of each work group on a limited set of goals. [...] Second, manufacturing information processing complexity can be reduced through the use of environmental management strategies that directly attack the sources of complexity. [...] Third, coordinating decision making and communicating manufacturing strategy throughout all levels and functions of an organization (lateral relations) increases the information-processing capacity of the organization. (p. 1043)

These remarks are related to this thesis in the sense that coordination is instrumental to the increased information processing required in order to cope with manufacturing environmental complexity. Coordination will therefore play a significant role in this research project.

Novak and Eppinger (2001) offer an empirical analysis of the connection between product complexity and vertical integration. According to these authors, product complexity is a function of three factors: (1) the number of product components that must be specified and produced, (2) the extent of interactions between components (parts coupling) that must be managed, and (3) the degree of product novelty. Thus a product's complexity depends not only on the complexity of its individual components but also on how those components are interrelated within the system. Novak and Eppinger establish the following relationship between product complexity and vertical integration. "[C]omplexity in product design and vertical integration of production are complements: [...] in-house production is more attractive when product complexity is high, as firms seek to capture the benefits of their investment in the skills needed to coordinate development of complex designs" (p. 189). In terms of the research project described in this thesis, a firm may be willing to accept the disadvantages of manufacturing complex products if only to reduce the likelihood of imitation by competitors. Thus, complex products prevent knowledge drain but increase internal manufacturing complexity. Along similar lines, Ethiraj et al. (2008) analyze the effect of modularity on imitation. They analyze the trade-off between "innovation benefits and imitation deterrence" and find that "modularization enables performance gains through innovation but, at the same time, sets the stage for those gains to be eroded through imitation. In contrast, performance differences between the leaders and imitators persist in the nearly modular and the non-modular structures. Overall, we find that design complexity poses a significant trade-off between innovation benefits (i.e., generating superior strategies that create performance differences) and imitation deterrence (i.e., preserving the performance differences)" (p. 939).

In their study of communication within complex systems, Gokpinar et al. (2010, p. 468) carry out a network analysis and show that communication helps firms to cope with such complex environments as new product development. They report that "centrality in a product architecture network is related to quality according to an inverted-U relationship, which suggests that vehicle subsystems of intermediate complexity exhibit abnormally high levels of quality problems" (p. 468). From this it follows that centralization is associated with an increase in complexity.

Overall, then, the company context is determined by many different factors. Yet within this multitude, two factors seem to be of particular relevance for the present research project: complexity and strategic priorities. These factors have the most influence on an organization's decision of "where to go", and they are relevant both internally and externally. Strategic priorities are needed to establish the niche wherein a company is best positioned, and complexity determines the firm's ability to address the internally and externally generated problems that must be solved in order to exploit the opportunities that arise.

2.3 Quality of Strategy Cascading

This segment of the literature review offers a brief summary of the literature that concentrates on strategy cascading. The field is a relatively broad one, so the presentation is divided into three parts: strategic decision making, strategy cascading, and coordination. This section is integral to the research project, a primary goal of which is to enable a clear understanding of strategy cascading fundamentals.

2.3.1 *Strategic Decision Making*

Boyer and McDermott (1999) document that the strategy-making processes of companies are often highly detailed, poorly communicated, and inflexible in the face of environmental changes; by contrast, a clearly defined and understood strategy gives the firm "flexibility to adapt to changes in the environment" (p. 289). In other words, a strategy must be well fitted to the competitive environment and must also be communicated and widely understood throughout the organization. Their study exposes inconsistencies between operators and managers with respect to manufacturing priorities, a phenomenon described as a lack of "strategic consensus".

According to Eisenhardt (1999), companies in rapidly evolving markets must be able to change direction if they are to generate competitive advantages; this capacity is referred to as a *dynamic* capability. Eisenhardt postulates that effective strategic decision makers are able to rapidly generate high-quality and well-supported choices via four main techniques. First, they create collective intuition by sharing real-time information throughout the management team in "must attend" meetings. Second, they accelerate conflicts because conflicts stimulate innovativeness, create a better understanding of the options, and can improve decision effectiveness. Conflicts can be "steered" by setting up diverse management teams and generating multiple alternatives. Third, effective decision makers maintain a disciplined pace but do not push the decision speed; this means that they launch decisions promptly, maintain positive energy during the process, and cut off debates at appropriate times. Finally, they defuse political behavior because politicking is viewed as a waste of valuable time. Politicking can be avoided by creating common goals and

shared visions, by using humor, and/or by establishing clear areas of responsibility. In earlier work, Eisenhardt and Bourgeois (1988) find that the centralization of power leads to politics—that is, to “the observable, but often covert, actions by which executives enhance their power to influence decisions” (p. 737). When the CEO, who serves as a role model, engages in politicking, then it is only natural for subordinates to imitate that behavior. These authors document that politicking is associated with poor firm performance, especially when top management is involved.

Bourgeois and Eisenhardt (1988) examine strategic decision making in high-velocity environments and find “an imperative to make major decisions carefully, but to decide quickly” (p. 816). That study also finds that the companies most successful in high-velocity environments are those with both a powerful CEO and a strong top management team. Such companies are seldom risk averse and are typically innovative, but at the same time they also continue to make incremental and “safe” changes. In the same research field, Eisenhardt (1989b, p. 543) finds that “[f]ast decision makers use more information and [develop] more alternatives than do slow decision makers”; in short, “fast decisions based on this pattern of behaviors lead to superior performance” (p. 543). Thus it is fair to say that a demanding, high-velocity environment may contribute to performance improvements.

Yet communicating a strategy need not entail a successful implementation. Beer and Eisenstat (2000) identify six factors that work against a viable implementation: “a top-down or laissez-faire senior management style, an unclear strategy and conflicting priorities, an ineffective senior management team, poor vertical communication, poor coordination across functions, businesses or borders, or an inadequate down-the-line leadership skills and development” (p. 31). The authors explain how these traps can be avoided by emphasizing teamwork, especially throughout the management team. If all strategic decisions are made at the top, then not enough team members may be aware of what is going on.

Mosakowski (1997, p. 414) finds that the process of strategy making itself shifts over time. If a decision maker cannot determine which decision will lead the company to success (or to trouble)—a situation that the author refers to as “causal ambiguity”—then the actors involved will tend to concentrate on the *process* of strategy making. Over time, their knowledge and experience increases and thus so does decision makers’ ability to discern causalities. One implication of this dynamic is that, in immature environments, management of the strategy-making process itself is critical in yielding appropriate decisions. In the same line of research, Ketokivi and Castaner (2004) seek to establish how the personal involvement of organizational participants affects the decision-making process. These authors find that, as soon as organizational members must make decisions, they revert to local rather than global optimization; this effect is termed “position bias” (p. 337). Ketokivi and Castaner investigate whether strategic planning can reduce this bias, which they argue occurs automatically (i.e., on a subconscious level). Note that position bias is evident among workers and management both. Given that planning and budgeting processes identify priorities and allocate resources, it falls on strategic planning to manage the resulting vertical and horizontal interdependences. As an

integrative mechanism, then, strategic planning creates goal convergence; active employee participation and clear communication of goals can reduce position bias (Ketokivi and Castaner 2004, p. 337).

Other aspects of strategic decision making include exit (Burgelman 1996) and the introduction of multiple products (Brown and Eisenhardt 1997). Exit is a critical but underresearched component of strategy. With respect to his own process model of strategic business exit, Burgelman (1996, p. 193) nonetheless concludes that it “contributes to the development of an evolutionary process theory of strategy making by conceptualizing the pattern of managerial activities through which resources and corporate competencies are internally redirected toward more viable business opportunities, and the strategic context of a core business dissolves.” This study finds that such activities as shifting inputs and technical decoupling can add value by releasing scarce resources to more productive uses, and replacing old and unprofitable business components helps prolong a firm’s existence. However, Hart (1992, p. 327) argues that existing typologies of strategy making have “tended to be incomplete or overlapping. None has captured the full range of content associated with the phenomenon.” In his review of the literature on the strategy-making process, Hart describes “an integrative framework consisting of five modes: command, symbolic, rational, transactive, and generative” (p. 327). The author views organization members as playing different roles in the process, so strategy-making becomes an organization-wide phenomenon. The author expands on this research to find, in Hart and Banbury (1994), empirical evidence that firms have different capacities to devise strategy and that “firms with high process capability—the simultaneous use of multiple strategy-making process modes—outperform single-mode or less process-capable organizations” (p. 251).

2.3.2 Strategy Cascading

In this thesis, strategy cascading is defined as the process of vertical and horizontal deployment and alignment of an organizational strategy; it also incorporates the process of “bringing the strategy to life”. In this regard, strategy cascading is not a solely R&D task (Loch 2008) and is not limited to operations; it is a holistic issue. In their empirical research, Sting and Loch (2011) describe how “vertical delegation interacts with horizontal coordination in operations strategy implementation.” They observe that the balance between top-down and bottom-up problem solving varies within a given organization in accordance with the area being addressed. Although the final decision on important strategic initiatives is one made by top management, strategic initiatives are distributed across many actors and may originate at various hierarchical levels as a function of where expertise is concentrated. These authors emphasize the importance of interactions between the vertical and horizontal dimension of strategy implementation (i.e., coordination) and of consistency in implementation. They also point out that the field of strategy implementation has been little researched. Similar findings are presented by Slack et al. (2010), who detail four perspectives on operations strategy. Two of these

perspectives focus on the interplay within a firm between top-down and bottom-up approaches. Two complementary perspectives evaluate the horizontal aspects of strategy—namely, operations resources and market requirements. The dynamics of these four perspectives constitute a generic description of operations strategy.

In their empirical case studies, Wooldridge and Floyd (1990) analyze the influence of middle manager involvement in the strategy process and its effect on the organization's performance. These authors find that such involvement "is associated with improved organizational performance. Consensus among middle-level managers, defined as strategic understanding and commitment, is related to involvement in the strategic process but not to organizational performance" (p. 231). Yet middle manager involvement is not a given. In order to realize its benefits, top management must define and clearly communicate the strategic context; only then can middle managers become involved and thereby generate benefits for the firm. Shaw and Edwards (2006) study the management of a manufacturing knowledge strategy, a task that should not be limited to a single domain. One of their key findings is that involvement across all hierarchies is crucial for successful knowledge management. Implementing such a strategy requires both top-down and bottom-up action and communication, even as the information exchange process is itself relatively informal. For a company that seeks to become a knowledge-led enterprise, it is vital that "all categories of knowledge are managed: within, across, and between functions" (p. 1924). Therefore, relevant training is needed to achieve the goals of sharing and retaining knowledge.

One practical approach to strategy cascading is known as *hoshin kanri* (policy deployment), which was first applied at Toyota (GOAL/QPC Research Committee 1989; Akao 2004). The basic principle underlying *hoshin kanri* is the "catchball" process (Witcher and Butterworth 1999; Tennant and Roberts 2001b), a combined bottom-up/top-down planning style featuring decision loops that iterate until all participants buy in to the formulated goals and implementation schemes (Tennant and Roberts 2001a; Witcher and Butterworth 2001). This approach relies heavily on the sharing of information and knowledge. Lapré and Van Wassenhove (2001, 2002) report empirical research on the effects of knowledge generation and transfer in the context of an already established production line; this work analyzes the differences between "formal learning" and "learning by doing". The authors find that, on an established production line, formal learning significantly outperforms learning by doing; however, they could not replicate this comparative result on new production lines. Lapré and Van Wassenhove (2001, p. 1311) remark that management buy-in and knowledge diversity—that is, breadth of knowledge and experience (Gavetti et al. 2005)—are instrumental to achieving knowledge transfer. In addition, Lapré and Van Wassenhove (2002) posit that meaningful front-line involvement and improvements require both *conceptual* and *operational* learning. Conceptual learning leads to "know-why" (an understanding of cause-and-effect relationships derived from statistics and other scientific methods), whereas operational learning leads to "know-how" (as when implementing a theory and observing results). If both learning approaches are applied, then the global improvement rate will probably increase.

From the beginning of his research career, Burgelman has examined the effects of *induced* and *autonomous* strategies. In an early process study, Burgelman (1983a) finds that both strategy types require not only order but also diversity to keep the firm viable. Middle managers play a critical role in managing diversity, which leads the author to suggest the “experimentation and selection” approach (p. 1349). He also indicates that strategy content is produced by middle management; this view implies that top management must recognize and guide the resulting “entrepreneurial” activities rather than planning or micromanaging the strategy. Burgelman thus concludes that the strategic management activities of top management should be limited to maintaining a balance, over time, between diversity and order while facilitating an environment conducive to collaboration and entrepreneurial activities among organizational participants. In the spirit of that earlier work, Burgelman (1991, p. 240) examines induced versus autonomous processes of strategy making by answering the research question: “[W]hich sorts of strategy-making processes lead to major strategic change that is survival-enhancing?” For this, the author uses the variation–selection–retention framework, and his findings are threefold. First, top managers of “consistently successful organizations” concern themselves with the content of strategy and employ both induced and autonomous strategic processes. Second, such organizations carry out those processes simultaneously. Third, any successful restructuring of an organization is likely a result of internal experimentation and selection (i.e., autonomous) processes. In a subsequent paper, Burgelman (2002) describes the case of Intel, investigating the “coevolutionary lock-in” of decisions made by the firm’s CEO. Burgelman finds that ensuring the simultaneity of induced (variation-reducing) and autonomous (variation-increasing) strategy processes involves difficulties similar to maintaining a balance between exploitation and exploration processes in organizational learning. In each case the processes are competing for limited resources, so company leaders are forced to make trade-offs between them.

In his early work on internal corporate venturing, Burgelman (1983b, p. 223) establishes that successful efforts “depend on the availability of autonomous entrepreneurial activity on the part of operational level participants, on the ability of middle-level managers to conceptualize the strategic implications of these initiatives in more general system terms, and on the capacity of top management to allow viable entrepreneurial initiatives to change the corporate strategy.” In their own research on strategy, Neilson et al. (2008, p. 62) state that “execution is the result of thousands of decisions made every day by employees acting according to the information they have and their own self-interest.” Managers often contemplate restructuring when their company fails to execute its strategy, but restructuring alone is seldom sufficient to turn the tide. Far more effective would be initiatives to clarify decision rights and improve the flow of information both up the chain of command and across the organization. Executives should incorporate all four of the building blocks essential to effective strategy execution: clarifying decision rights, designing information flows, aligning motivators, and making changes to structure (Neilson et al. 2008).

2.3.3 *Coordination Theory*

In their literature review, Okhuysen and Bechky (2009) define coordination as “the process of interaction that integrates a collective set of interdependent tasks, [which] is a central purpose of organizations.” In essence, these authors identify coordination mechanisms that are in line with those proposed in previous studies (e.g., routines, meetings, plans, schedules). They also identify three integrating conditions—accountability, predictability, and common understanding—that are needed for coordination and that constitute “the means by which people collectively accomplish their interdependent tasks in the workplace” (p. 483). In an earlier paper, Malone (1987) analyzes information processing across different sets of coordination structures: product hierarchies, functional hierarchies, centralized markets, and decentralized markets. He then defines coordination as “as a pattern of decision-making and communication among a set of actors who perform tasks in order to achieve goals” (p. 1319). There are many and varied approaches to achieving coordination among participants. According to Mihm et al. (2010, p. 833), vertical hierarchies are one of the “most common ways of coordinating specialized groups and their separate decisions.” These authors note that, despite the wide variety of other available coordination mechanisms (e.g., liaisons, cross-unit groups, informal networks), the vertical hierarchies that exist in almost every organization are typically employed for this purpose.

In her empirical research on coordination mechanisms in care provider groups, Gittell (2002, p. 1408) defines coordination as “the management of interdependencies among tasks.” She analyzes three forms of coordination practices—namely, routines, boundary spanners (cross-functional liaisons), and team meetings—and finds that *relational coordination* (“a communication and relation intensive form of coordination”) mediates the effect of coordination mechanisms on performance. The author also finds that well-coordinated work processes yield higher-quality outcomes and tend to do so more efficiently. In a subsequent case study, Gittell et al. (2010) analyze the influence of high-performance work systems on company outcomes. This research confirms that such systems “can improve organizational performance by strengthening relationships among employees who perform distinct functions, a pathway that is expected to be particularly important in settings characterized by highly interdependent work. [...] Relational coordination mediates the association between these high-performance work practices and outcomes, suggesting a relational pathway through which high-performance work systems work” (p. 490). These authors also find that enabling of workers has a positive effect on the firm’s performance. Their results indicate that coordination and enabling are two fruitful approaches to improving performance.

Faraj and Xiao (2006, p. 1157) analyze coordination in a fast-response environment (a medical trauma center) and define coordination as a “temporally unfolding and contextualized process of input regulation and interaction articulation to realize a collective performance.” This research leads them to develop two coordination practices: *expertise* coordination (protocols, structuring, plug-and-play teaming,

knowledge sharing) and *dialogic* coordination (epistemic contestation, joint sense making, cross-boundary intervention, protocol breaking). Faraj and Xiao find that “[e]xpertise coordination practices are needed to manage evolving skill and knowledge interdependencies during treatment of a single patient and between treatment of different patients. Dialogic coordination practices are necessary, because much of the coordination occurs at the boundary of epistemological communities and involves cross-boundary interventions, leading to contention and contestation” (p. 1168). Summarized, coordination practices are difficult to prespecify in high-velocity environments and are therefore characterized as “emergent”.

Terwiesch et al. (2002) study alternative coordination mechanisms in concurrent engineering processes and report that “[p]revious studies have either described coordination as a complex social process, or have focused on the frequency, but not the content, of information exchanges” (p. 409). These authors develop two alternatives to managing interdependent tasks. The first, *iterative* coordination, “should be emphasized if the downstream task faces ambiguity, or if starvation costs are high and iteration (rework) costs are low” (p. 409). The second, *set-based* coordination, “requires an absence of ambiguity, and should be emphasized if either starvation costs or the cost of pursuing multiple design alternatives in parallel are low” (p. 409). Combining the two coordination types enables Terwiesch et al. to align the accuracy of exchanged information with the probability that this information does not change in later development phases. Hence this approach is likely to be viable in other uncertain and high-velocity environments as well.

In their empirical research on manager *ambidexterity*, Mom et al. (2009, p. 812) establish that, “[r]egarding the personal coordination mechanisms, findings indicate that both the participation of a manager in cross-functional interfaces and the connectedness of a manager to other organization members positively relate to this manager’s ambidexterity. [...] Furthermore, results show positive interaction effects between the formal structural and personal coordination mechanisms on managers’ ambidexterity.” Mom et al. also find that coordination can benefit from mixing formal and personal structures to support manager ambidexterity. The authors conclude that appropriate coordination strengthens ambidexterity and thereby improves performance.

The qualitative case study of Adler (1995) examines, in the setting of new product development, mechanisms that foster interdepartmental coordination between design and manufacturing; it focuses in particular on the integration of computer-aided design (CAD) and manufacturing (CAM). The author presents 12 coordination mechanisms—that is, four modes of interdepartmental coordination (standards, schedules and plans, mutual adjustments, teams) and, within each mode, three temporal phases (preproject, product and process design, and manufacturing). Adler concludes that “the most efficient interdepartmental coordination mechanism is that which is able to deal with the uncertainty of this product/process fit at least cost to the organization” (p. 147). He conceptualizes the product–process fit along two dimensions, fit of novelty and fit of analyzability. This research establishes that increasing novelty requires more use of interactive coordination mechanisms and that decreasing analyzability requires more coordination in a project’s later phases.

Coordination in complex environments is often simulated via NK models. Levinthal and Warglien (1999, p. 342) employ an NK model to explore “how alternative organizational designs influence actors’ fitness landscapes and, in turn, the behavior that these alternative designs engender” and they report two principal findings. First, design robustness can be increased by reducing interdependences, and robust designs are more stable and predictable. Second, if a design has many interdependences—as may occur, for instance, in the case of cross-functional teams—then the resulting “rugged landscape” renders coordination more difficult. One advantage in this case, however, is that the firm is forced to explore (and choose among) the possible “core” configurations.

The research discussed in this section can be summarized by saying that the quality of a strategic cascading process is determined by several factors—most predominantly, coordination and whether the firm deploys its strategies in a top-down or a bottom-up manner. Strategy cascading is seldom addressed in any of the literature streams, and much remains to be discovered about its interaction with such factors as coordination, enabling, and management consistency. The topic may seem trivial, but practitioners need to know more about how management style affects strategy cascading and vice versa. In this thesis it is assumed that management style does indeed have a significant effect on the quality of the firm’s strategy cascading process.

2.4 Improvement Performance

The measurement of performance has been a focus of production and operations management from the very beginning of these disciplines. Performance has been linked to areas as diverse as politics (Eisenhardt and Bourgeois 1988), national culture (Naor et al. 2010), the involvement of manufacturing executives (Papke-Shields and Malhotra 2001), and leadership style (Ogbonna and Harris 2000). These citations are a good indication of just how wide the field of performance measurement (and its applications) is. In most cases, “performance” is reduced to *economic* metrics—for example, sales, market share, cash flow, and growth (Hendricks and Singhal 1997; Ittner and Larcker 1997; Anderson 1999; Kotha and Swamidass 2000; Hendricks and Singhal 2008; Fugate et al. 2009). However, a number of studies address performance from the perspective of such *operational* metrics as warranty costs, productivity, and the cost of quality (Samson and Terziovski 1999; Terziovski and Samson 1999). There are even studies that consider performance strictly in terms of *manufacturing* criteria: lead time, cycle time, and the firm’s inventory turnover ratio (Sakakibara et al. 1997). This thesis adopts an approach of evaluating performance as a manufacturing metric: measuring performance as a function of the firm’s ability to generate process improvements. Hence this section reviews improvement performance from two different perspectives: as an application of exploration and exploitation and as an application of search.

2.4.1 *Exploration and Exploitation*

In the *Academy of Management Journal*'s special issue on exploration and exploitation, Gupta et al. (2006) address several questions about the nature of these approaches (e.g., are they mutually exclusive?), about the need to balance them, and how best to maintain that balance (ambidexterity versus punctuated equilibrium). The authors define *exploitation* as the "refinement and extension of existing competencies, technologies, and paradigms" and define *exploration* as "experimentation with new alternatives" (p. 693). The difference between ambidexterity and punctuated equilibrium is explained as follows: "Ambidexterity refers to the synchronous pursuit of both exploration and exploitation via loosely coupled and differentiated subunits or individuals, each of which specializes in either exploration or exploitation. In contrast, punctuated equilibrium refers to temporal rather than organizational differentiation and suggests that cycling through periods of exploration and exploitation is a more viable approach than a simultaneous pursuit of the two" (p. 693). Gupta et al. report four major findings. First, exploration and exploitation both compete for the same resources, and if resources become scarce then exploration and exploitation are likely to become mutually exclusive. Second, within a given domain, exploration and exploitation are the extreme ends of the same continuum; hence, in the case of a single domain, punctuated equilibrium is the most effective way to balance them. Third, exploration and exploitation "are conceptualized as orthogonal" in the case of multiple domains; in that case, a balance is best achieved via ambidexterity. Fourth, the organization's top-level management should be responsible for balancing exploration and exploitation; the actual pursuit of these modes is the task of lower levels, which can apply both methods under ambidexterity or punctuated equilibrium as a function of the individual context.

Benner and Tushman (2003) analyze the effect of process management activities (e.g., total quality management) on the firm's exploration and exploitation activities. These authors argue that "process management activities are beneficial for organizations in stable contexts, [and] they are fundamentally inconsistent with all but incremental innovation and change" (p. 238). They also find that "process management activities must be buffered from exploratory activities and that ambidextrous organizational forms provide the complex contexts for these inconsistent activities to coexist" (p. 238). Benner and Tushman do insist that exploitative and exploratory activities are both mandatory for dynamic capabilities. March (1991) argues that there is a general trade-off between exploration and exploitation. His research models two scenarios involving the organization's development and use of knowledge. The first scenario involves mutual learning between organization members; the second, learning and competitive advantage in competition for market primacy. March finds that "[a]daptive processes, by refining exploitation more rapidly than exploration, are likely to become effective in the short run but self-destructive in the long run" (p. 71). The essence of exploitation is the refinement and extension of existing competences, technologies,

and paradigms, whereas the essence of exploration is experimentation with new alternatives. Therefore—and because both exploitation and exploration compete for scarce resources—maintaining an appropriate balance between them is a primary factor in system survival and prosperity.

In their literature overview of organizational ambidexterity, Raisch et al. (2009) emphasize its importance for long-term firm performance. These authors describe four fundamental tensions related to organizational ambidexterity: differentiation versus integration, individual versus organizational, static versus dynamic, and internal versus external. In a later, longitudinal study, Raisch and Tushman (2011) analyze new business initiatives and find that “firms engage in a dynamic process of managing contradictory boundary activities. Boundaries between differentiated units are reinforced to enable exploitation and exploration, while corporate boundary spanners integrate these processes. The locus of integration shifts from the corporate team to lower organizational levels when the new business initiative reaches economic and cognitive legitimacy” (p. 1). The authors develop a new process model in which boundary spanning and structural differentiation improve the firm’s use of exploration and exploitation.

In their empirical research on manager ambidexterity, Mom et al. (2009, p. 812) define it as “a manager’s behavioral orientation toward combining exploration and exploitation related activities within a certain period of time.” This definition echoes that of O’Reilly and Tushman (2008, p. 185), who view ambidexterity as “the ability of a firm to simultaneously explore and exploit, [which] enables a firm to adapt over time.” Mom et al. observe that ambidextrous managers “host contradictions”, multi-task, and renew their knowledge regularly; they find that “[a] manager’s decision-making authority positively relates to this manager’s ambidexterity, whereas formalization of a manager’s tasks has no significant relationship with this manager’s ambidexterity” (p. 812). The authors emphasize that this effect is stronger for operation-level than for business-level managers. In their study of the relationship between dynamic capabilities and ambidexterity, O’Reilly and Tushman identify a set of options that mark ambidexterity as a dynamic capability. These authors claim that there need not be a trade-off between exploration and exploitation, but avoiding one depends on the ability of senior leadership teams that implement both.

Exploration is often associated with the implementation of new ideas. A variant of exploration is “absorptive capacity”, which was introduced by Jansen et al. (2005a); their empirical research sheds light on the effects of organizational antecedents on potential and realized capacities of this type. Their results indicate that “organizational mechanisms associated with coordination capabilities (cross-functional interfaces, participation in decision making, and job rotation) primarily enhance a unit’s potential absorptive capacity. Organizational mechanisms associated with socialization capabilities (connectedness and socialization tactics) primarily increase a unit’s realized absorptive capacity” (p. 999). According to these authors, high absorptive capacity leads to superior organizational performance. In a related study, Jansen et al. (2005b) analyze how firms develop organizational units that are ambidextrous—that is, able to pursue exploratory and exploitative

innovation simultaneously—in order to compete in dynamically competitive and high-velocity environments. Such ambidexterity is more likely to be evidenced by organizational units that feature decentralized and densely connected social relations. In their later empirical work, Jansen et al. (2006) research the effects of formal (“centralization and formalization”) and informal (“connectedness”) coordination mechanisms and explain how they are moderated by environmental effects. The authors define *exploratory* innovation as “radical innovations” adopted to “pursue new knowledge and develop new products and services for emerging customers or markets” and define *exploitative* innovation as “incremental innovations” intended to “build on existing knowledge and extend existing products and services for existing customers” (p. 1661). This research also demonstrates that “centralization negatively affects exploratory innovation, whereas formalization positively influences exploitative innovation” and that “connectedness within units appears to be an important antecedent of both exploratory and exploitative innovation” (p. 1661). Jansen et al. (2006) conclude that “pursuing exploratory innovation is more effective in dynamic environments, whereas pursuing exploitative innovation is more beneficial to a unit’s financial performance in more competitive environments” (p. 1661). These findings are relevant for the research project described in this thesis because they yield information on the levers of exploration and exploitation.

Brown and Eisenhardt (1997) study the elements of continuous change by linking complexity theory with the notion of punctuated equilibrium”. They analyze multiple-product innovation in six different firms. These authors find that, first, “successful multiple-product innovation blends limited structure around responsibilities and priorities with extensive communication and design freedom to create improvisation within current projects. This combination is neither so structured that change cannot occur nor so unstructured that chaos ensues. Second, successful firms rely on a wide variety of low-cost probes into the future, including experimental products, futurists, and strategic alliances. Neither planning nor reacting is as effective. Third, successful firms link the present and future together through rhythmic, time-paced transition processes” (p. 1). Finally, Brown and Eisenhardt argue that, by adopting these practices, companies can develop the core capability of making frequent changes in turbulent environments.

2.4.2 Search Theory

What is the best way to search for new ideas? This question has often been addressed by researchers, but there is no universally accepted answer. Siggelkow and Rivkin (2005, p. 104) mention that the goal of organizational search is “to find and occupy a high spot on this landscape, i.e., to select a combination of choices that, together, are highly successful. Interactions among decisions [...] cause the landscape to become rugged and multi-peaked, making the search for a high peak profoundly more difficult.” Sting and Loch (2011) remark that search theory posits coordination as an important part of strategy making because coordination

ensures consistency among multiple parallel initiatives. They also report evidence of simultaneous top-down and bottom-up search patterns. In their overview, Adler et al. (2009) review the consolidated findings on productivity and the so-called productivity dilemma, explaining that mature processes provide few opportunities to learn because they unfold “according to plan”. One approach to overcoming that limitation is *deliberate perturbation*, whereby a mature process is altered in order to encourage more innovation. Another approach involves *meta-routines* (routines for changing routines), which are proposed as a way to avoid the exploitation trap. These variations of the continuous improvement process allow firms to bridge the gap between short-term efficiency and long-term adaptability. In this context, “routine” is defined by Gavetti and Levinthal (2004, p. 1313) as a “bundle of coordinated activities that evolves slowly through local learning and typically involves substantial elements of tacit knowledge and context dependence.”

In the organizational context, the aim of search is to generate new ideas. Girotra et al. (2010) use a laboratory experiment to test their theory of idea generation by examining two different approaches. The first is a *team structure* approach in which the entire process of idea generation (e.g., brainstorming) and evaluation transpires as a team process; the team works together at the same time and place. In the second, *hybrid structure* approach, team members first work individually on generating ideas and later meet to exchange information and results. The authors conclude that “groups organized in the hybrid structure are able to generate more ideas, to generate better ideas, and to better discern the quality of the ideas they generate. Moreover, we find that the frequently recommended brainstorming technique of building on others’ ideas is counterproductive; teams exhibiting such buildup neither create more ideas, nor are the ideas that build on previous ideas better” (p. 591). So the downside of generating ideas entirely within teams is that the ideas will tend toward self-similarity and cause pressure to conform; if group consensus is the goal, then the resulting ideas are seldom new ones. The advantage of a hybrid structure therefore stems from its individualistic component. Because the individual team members generate ideas on their own before presenting them to the team, there is more variance and diversity in those ideas. Girotra et al. establish that the brainstorming conducted by teams does not yield the superior ideas that firms seek.

Van den Ende and Deichmann (2010) investigate the experience of idea generation by analyzing continuous improvement activities throughout a company. Using a database of 1,792 “radical ideas”, these authors analyze “how success and failure experiences of people who take initiative [affect] (a) the inclination to take new personal initiatives, and (b) the performance of those initiatives” (p. 1). They find that “failure rather than an initiator’s success experience stimulates future initiation of ideas. While failure in initiating an idea stimulates people to take the initiative again, prior success in initiating an idea is related to better performance of a subsequent idea” (p. 25). Thus, both failure and success at generating ideas can lead to future success in continuous improvement activities.

Gavetti and Rivkin’s (2007) case study of Lycos shows that a firm’s capacity for action and cognition changes over time. Gavetti and Rivkin (2007) find that, “[o]ver time, the cognitive and physical elements that make up a strategy become

less plastic, while mechanisms to search rationally for a strategy become more available” (p. 420)—a result that is in line with previous findings (Gavetti 2005). Gavetti and Rivkin find that one problem faced by managers in a novel domain is that they do not understand the environment well enough to engage in rational search for a strategy. As firms lose their plasticity, they become less able to exploit their know-how in new settings. These authors define *plasticity* as the ability “to change elements of their strategies, but only within limits” (p. 421) and find evidence of “plasticity depending largely on the age of the firm and rationality depending largely on the maturity of its industry. [...] By the time a firm can shift to more-rational, less-experiential search mechanisms, it may lack the plasticity necessary to harvest the fruits of its rationality” (p. 435). Young companies tend to have more plasticity and so find local search to be more fruitful; as a company becomes more mature (and less plastic), rational search is preferred.

In the literature on search theory, the dominant approach is computerized NK modeling. After theoretical models are elaborated and tested by computerized applications, hypotheses are generated from the evaluated findings. For instance, Rivkin and Siggelkow (2003) use an agent-based simulation model to explore the balance between search and stability in the context of organizational design. This research yields three principal findings. First, certain sets of design elements encourage firms to search and evaluate a broad array of options, whereas others lead firms to stabilize and cease their search. Second, firms that perform well usually exhibit a balance of search and stability. Third, an organizational design that promotes search is especially effective when the decisions involved are characterized by many interactions. In a later study (Siggelkow and Rivkin 2005), these same authors research the effects of turbulence and complexity on the formal design of organizations. They define an environment as *turbulent* if “the mapping from firm actions to performance outcomes changes frequently, profoundly, and in ways that are difficult to predict” (p. 103); with respect to environmental *complexity*, they make the following distinction: “A firm making decisions whose performance effects are independent from each other is said to operate in a simple environment, while a firm whose decisions are highly interdependent is said to operate in a complex environment” (p. 103). Siggelkow and Rivkin generate a 2×2 contingency table for comparing complex and noncomplex as well as turbulent and nonturbulent environments, postulating that the main goal in turbulent (resp., complex) environments is rapid improvement (resp., diverse search). In settings that are both turbulent and complex, organizations must balance speed and search; success in that endeavor is likely to depend on the thoroughness of—and latitude granted to—middle managers. The authors conclude that “[a]mple processing power at the bottom of a firm, for instance, can slow down the improvement and narrow the search of the firm as a whole” (p. 101). Finally, an NK simulation model is used also by Levinthal and Posen (2007), who analyze the effectiveness of selection processes. These authors find that “[s]election may be systematically prone to errors and that these selection errors are endogenous to, and differ markedly across, firms’ search strategies. Search strategies that generate systematically different performance trajectories, even if they share a common long-run outcome, will generate differing

survival rates” (p. 586). This result indicates that stable organizational traits are no guarantee of long-term organizational search success.

Another take on search in organizations is offered by Winter et al. (2007), whose propositions are also based on a simulation model. However, instead of the widely used NK modeling approach, these authors employ fractal geometry to search within a rugged landscape. Winter et al. use their model to analyze the “interplay of local payoff and cognitive considerations (preferred direction) in search” (p. 403) and conclude that “[a]n intermediate search strategy, combining the guidance of local search with a moderate level of nonlocal obsession, is distinctly advantageous in searching a rugged landscape” (p. 403). Their findings demonstrate that pure search approaches, which represent “polar extremes”, are not likely to result in extraordinary success; rather, they are helpful in only a limited number of settings. In most cases, then, organizations are better served by using a mixed approach—in other words, one that incorporates aspects of both local payoff and nonlocal “obsession”.

Sting et al. (2011) rely on NK modeling in their study of how collaboration supports search. According to these authors, “[s]earch theory describes how organizations address problems that are too complex to be solved through optimization”, and collaboration can be described as “several actors combining their problem solving activities to develop a solution for a common problem” (p. 1). They find that collaboration does improve the quality of solutions in many settings, although it often entails a trade-off between solution quality and search time: collaboration depends on information exchange between the participants, and the resulting “back and forth” loops increase quality at the expense of more time. Sting et al. also observe that the shared and combined knowledge characteristic of collaboration accounts for the increased quality of solutions devised by teams—even when the knowledge of individual team members is limited. They conclude that “collaboration and knowledge matter for search performance and exhibit subtle interactions with each other and with organizational design” (p. 26). In sum: collaboration may well improve solution quality, but the associated information exchanges take time (and can sometimes be exhausting).

Mihm et al. (2010) use a formal model and simulations in order to analyze hierarchical structure and search in complex organizations. They postulate that “[o]rganizations engage in search whenever they perform non-routine tasks” (p. 831). Therefore, especially in large organizations, tasks must be divided into manageable portions. No individual senior manager or front-line employee is capable of comprehending the “big picture” and finding all needed solutions. Mihm et al. present three results on how hierarchy can improve search. First, a “lead function” should set up a sequential decision-making process, which is typically faster than a parallel approach. Second, local decision making should be delegated to the front-line level, where the solutions are more stable and are found more quickly. Third, search is most effective when the front-line groups are relatively small (in contrast, structure has little effect at the middle management level).

Along similar lines, Rivkin and Siggelkow (2006) use an agent-based simulation to research the effects of interactions on preventing premature lock-in: “Unnecessary

overlap, the reigning-in of managers, [and] the period of decentralization all can be seen as organizational mechanisms that help ensure the broad, early search that a firm needs when interactions among strategic decisions raise the danger of locking-in on a strategy prematurely” (p. 591). These authors argue that it is vital for a company to achieve a balance between search and stability. On the one hand, companies must search broadly to prevent premature lock-in; on the other hand, a company must lock in a good result once it is found. According to Rivkin and Siggelkow, the requisite balance can be achieved by an appropriate organizational structure.

Economic research relies on performance as a primary indicator of success, and performance is often the dependent variable in such cause-and-effect modeling as regression analysis. In much of the literature, performance is viewed in strictly econometric terms—for example, in terms of sales revenue, cash flow, or market share. However, such a perspective captures only part of a company’s performance. Especially when the focus is strategy cascading, the many factors that influence these standard metrics may render them unsuitable to function as dependent variables. In particular, the research on exploration and exploitation and on search theory clearly shows that other indicators (e.g., improvement performance) are no less important. Thus, the accuracy of measuring the effectiveness of a firm’s strategy deployment and strategy cascading can be enhanced by also assessing its improvement performance, which indicates (among other things) how well a company can preserve and expand on its ability to engage in exploration and rational search.

2.5 Leadership Style

The last section of this literature review covers the research field of leadership style. In the interest of facilitating a comprehensive grasp of that field, the section is split into two parts: “Leadership Traits” and “National Culture”. This division reflects the assumption that both aspects affect the leadership style of a company’s management.

2.5.1 Leadership Traits

There is no question that the leadership traits of a company’s top management team have an effect on strategy cascading, a fact that explains the research attention paid to this topic. The literature review authored by Yukl (1989) describes the importance of leadership in terms of influencing task objectives and strategies, influencing commitment and compliance in task behavior to achieve these objectives, influencing group maintenance and identification, and influencing the culture of an organization. Denison et al. (1995, p. 526) define effective leadership as “the ability to perform the multiple roles and behaviors that circumscribe the requisite variety implied by an organizational or environmental context”; they define eight leadership

roles in particular (cf. Kets De Vries et al. 2010). Denison et al. find that “effective leaders demonstrate more complex, contradictory, and paradoxical behaviors than ineffective leaders” (p. 535) and that effective leaders exhibit more awareness of the eight leadership roles than do ineffective leaders. Yukl (1989, 2006) argue that technical, conceptual, and interpersonal skills are necessary for most leadership roles. Yet even for a given type of organization, the optimal pattern of traits and skills may vary depending upon the firm’s prevailing business strategy. Nonetheless, Yukl (1989, p. 261) acknowledges that “some specific skills such as analytical ability, persuasiveness, speaking ability, memory for details, empathy, tact, and charm are probably useful in all leadership positions.”

Bass et al. (1987) (see also Bass 1990) introduce the *transactional* and *transformational* leadership styles. Bass (1990) defines transactional leadership as follows:

Two factors that characterize modern leadership were found in many of these behaviors. One factor—initiating and organizing work—concentrates on accomplishing the tasks at hand. The second factor—showing consideration for employees—focuses on satisfying the self-interest of those who do good work. The leader gets things done by making, and fulfilling, promises of recognition, pay increases, and advancement for employees who perform well. By contrast, employees who do not do good work are penalized. This transaction or exchange—this promise and reward for good performance, or threat and discipline for poor performance—characterizes effective leadership. (p. 20)

Transformational leadership is then defined in this way:

Superior leadership performance—transformational leadership—occurs when leaders broaden and elevate the interests of their employees, when they generate awareness and acceptance of the purposes and mission of the group, and when they stir their employees to look beyond their own self-interest for the good of the group. Transformational leaders achieve these results in one or more ways: They may be charismatic to their followers and thus inspire them; they may meet the emotional needs of each employee; and/or they may intellectually stimulate employees. [...] Further, transformational leaders are individually considerate, that is, they pay close attention to differences among their employees; they act as mentors to those who need help to grow and develop. Intellectual stimulation of employees is a third factor in transformational leadership. Intellectually stimulating leaders are willing and able to show their employees new ways of looking at old problems, to teach them to see difficulties as problems to be solved, and to emphasize rational solutions. (p. 21)

Influential fieldwork on leadership style is reported in the GLOBE study of House et al. (2005), who define leadership as “the ability of an individual to influence, motivate, and enable others to contribute toward the effectiveness and success of the organizations of which they are members” (p. 15). One outcome of that research project is the identification of six widely accepted conceptions of leadership: the *global leadership dimensions* (charismatic/value-based, team oriented, self-protective, participative, human oriented, autonomous). The GLOBE project reveals that national culture (see also Sect. 2.5.2) has an effect on organizational culture, since leaders tend to hire people who are similar to themselves. In this line of research, Ogbonna and Harris (2000) explore the interrelations among leadership, culture, and performance and find that “leadership style is not directly linked to performance, but is merely indirectly associated. In contrast, competitive and innovative cultural traits are directly linked with performance (as predicted) while,

contrary to expectations, community and bureaucratic cultural traits are not directly related” (p. 781). After analyzing different organizational cultures and different leadership styles, these authors posit that organizational culture mediates the effect of leadership style on performance.

Considerable research effort has addressed the question of what management style is most likely to yield a suitable business strategy (see, e.g., Gupta 1984; Smet et al. 2012). Anderson et al. (2010, p. 90) shows that, when managers are involved in a participative goal-setting process, the result is lower but more accurate (i.e., more realistically achievable) goals. To analyze these effects, the authors conduct empirical research that focuses on a particular US retail firm and find that “managers with a longer career horizon and whose households depend more on their income will have stronger incentives to engage in slack building” (p. 91)—that is “‘excess’ bonus payments that offset performance effects” (p. 90). Hence optimal outcomes will not be achieved via top-down management alone. Identifying appropriate leadership styles is certainly important but represents just one side of the coin; such knowledge is useful only when combined with awareness of *individual* leadership style. Toward this end, Kets De Vries et al. (2010) have developed the Leadership Assessment Questionnaire (LAQ), “an instrument designed to help organizational leaders identify their own style of leadership and formulate appropriate development objectives” (p. 2848). The LAQ, which evaluates leadership both as self-perceived and as reported by other parties, is based on eight leadership archetypes: strategist, change catalyst, transactor, builder, innovator, processor, coach, and communicator. Each archetype is described in great detail, so that those who are assessed receive enough feedback about their own leadership style (and that of others) to interact effectively.

In their qualitative case study on high-reputation plant managers, Smith et al. (2009) examine the effect of plant managers’ political skills on organizational outcomes. The authors define *political skill* as “the ability to effectively understand others at work, and to use such knowledge to influence others to act in ways that enhance one’s personal and/or organizational objectives” (p. 430). Smith et al. find that plant managers with high reputation use political skills to influence their subordinates in a way that advances organizational goals, and they establish that “effective plant managers possessed a configuration of dispositional traits (self-motivation, sense of humility, and affability), systematically employed interpersonal behaviors (creating accountability, leading by example, and developing trust), and focused on managerial processes (stretch goals, influencing and learning from below, and empowering direct reports)” (p. 428). The authors conclude that the best results are achieved when plant managers wield a combination of unobtrusive systemic power and political skill.

Along these lines, the empirical research of Papke-Shields and Malhotra (2001) employs the concept of strategic alignment to assess the impact of the manufacturing executive’s role on firm performance. Their findings indicate that “involvement and influence are indeed two different, but highly related, aspects of the manufacturing executive’s role” (p. 5). Although both factors are relevant for strategy alignment, it seems that the role of influence is a bit more substantive. In any case, the alignment

of organizational and manufacturing strategies has a significant strong effect on a firm's performance improvement, and the manager's task of establishing both involvement and influence in this context involves subtleties that often are not fully appreciated. In her empirical study of *self-managing* teams, Wageman (2001) shows that coaching is an important factor to make teams more effective. Wageman defines a self-managing team as one with authority and accountability for "executing and managing the work—but within a structure and toward purposes set by others" (p. 559). The team's design and coaching are both the responsibility of higher management. When both factors are optimized, the effect on team performance is substantial.

Bartlett and Ghoshal (1994) argue that the traditional strategy–structure–systems model is no longer sufficient and hence the role of top management must change. Indeed, the managers of successful companies have come to recognize these changing priorities and have developed a mind-set geared toward specific institutional purposes and goals. According to these authors, "[t]raining is key to transforming workers into professionals" (p. 87). They also explain how the managers of successful companies achieve these goals: "First, they [managers] place less emphasis on following a clear strategic plan than on building a rich, engaging corporate purpose. Next, they focus less on formal structural design and more on effective management processes. Finally, they are less concerned with controlling employees behavior than with developing their capabilities and broadening their perspective" (p. 80). In short, managers must develop their personnel. In related research, Bartlett and Ghoshal (1995) explain why the strategy–structure–systems doctrine should be supplanted by the purpose–process–people approach: "Top managers can reduce [...] reliance on strategic-planning systems by influencing the organization's direction through the development and deployment of key people; lighten the burden of control systems by developing personal values and interpersonal relationships that encourage self-monitoring; and replace [...] dependence on information systems by developing personal communications with those who have access to vital intelligence and expertise" (p. 135). The firm's first priority should therefore be to develop its workforce and management team, a task to which at least half of each managers' time should be dedicated. The authors refer to this process as "human engineering" (p. 136). A corollary of this principle is that, since no leader can fully grasp *all* the issues relevant to an organization, creating transparency—preferably via personal communication—is critical. Thus, Ghoshal and Bartlett (1995) predict a managerial revolution that will focus on horizontal processes rather than vertical structures. Future management must enable three processes in particular: "front-line entrepreneurship, competence building, or renewal" (p. 88). Doing so will require a mind-set that is more inclined to accept and encourage bottom-up processes, even at the expense of top-down ones. Yet because "structure is only one instrument of organizational change" (p. 87), managers may need to guide developments by proving themselves willing to disturb the firm's equilibrium. In other words, management must create an environment for employees that establishes internal discipline while challenging them to question conventional wisdom.

2.5.2 *National and Organizational Culture*

The research field of national culture is too large to be comprehensively surveyed within the space limitations of a thesis. Hence this section offers only a brief overview of the main findings in the cultural studies literature from the last two decades. Culture affects thinking and acting, as proved in a wide variety of longitudinal and large-scale research (Hofstede 2002; House et al. 2005; Trompenaars and Hampden-Turner 2008). Most researchers agree that national and organizational cultures are related. In general, culture is “holistic, historically determined, related to anthropological concepts, socially constructed, soft, and difficult to change” (Hofstede et al. 1990, p. 286). This definition is expanded by House et al. (2005), who add the components “[s]hared motives, values, beliefs, identities, and interpretations or significant events that result from common experiences of members of collectives that are transmitted across generations” (p. 286). These authors are led to identify nine dimensions of culture: uncertainty avoidance, power distance, collectivism I, collectivism II, gender egalitarianism, assertiveness, future orientation, performance orientation, and human orientation.

One of the first researchers to analyze the relation between national cultural and leadership style was Hofstede, who was a mentor of Trompenaars. Much of the research on cultural dimensions is based on Hofstede’s work. In his landmark study, Hofstede (2002, p. 9) states: “Culture consists in pattern ways of thinking, feeling and reacting, acquired and transmitted mainly by symbols, constituting the distinctive achievements of human groups, including their embodiments in artifacts; the essential core of culture consists of traditional (i.e. historically derived and selected) ideas and especially their attached values.” This large-scale research project addresses the cultural dimensions of leadership styles and distinguishes five dimensions of national culture: power distance, individualism versus collectivism, masculinity versus femininity, uncertainty avoidance, and short-term versus long-term orientation. These dimensions are derived from decades of research conducted by this author. An earlier milestone is his longitudinal research on organizational culture (Hofstede et al. 1990), a mixed qualitative and quantitative study of 12 cases. A key finding of that work is that “shared perceptions of daily practices” are the nucleus of an organization’s culture (p. 311). This study elaborates a model with six dimensions: process- versus result-oriented, employee- versus job-oriented, parochial versus professional, open versus closed system, loose versus tight control, and normative versus pragmatic. Hofstede reports that the “organizational culture differences found resided mainly at the level of practices as perceived by members” (p. 286). Organizational and national culture are thus interlinked, but the foundation of organizational culture is nurtured on the firm’s front line.

Trompenaars and Hampden-Turner (2008) discusses seven hypothesized dimensions of *cultural valuing* that include five dimensions of interpersonal behavior: neutral versus emotional, universalism versus particularism, individualism versus communitarianism, specific versus diffuse, and achievement versus ascription. The authors add a cultural dimension related to time (sequential versus parallel) and

one related to the environment (internal versus external control). Trompenaars and Hampden-Turner define culture as the accumulation of traditions that a group of people employs to solve problems and reconcile dilemmas. Culture is viewed as consisting of onionlike layers that progress from the most obvious to the deeply seated. Previously solved problems disappear from consciousness and become, like breathing, automatic. Individuals who participate in their parent culture can never completely understand other cultures, which means that there cannot be a universal “best way” to manage a business. Every culture experiences the concepts of authority, bureaucracy, creativity, good fellowship, verification, and accountability in (sometimes radically) different ways; different products carry different meanings to people in different cultures; and a given business organization is likely to be perceived differently by individuals from different cultures. However, by striving to understand and appreciate the cultures (including business cultures) of others, people can become “transcultural”.

An early work in the field of culture is that of Hall and Hall (1992), who describe the cultural differences between American, French, and German executives. They posit that the underlying concepts of culture are time (polychronic versus monochronic cultures), high and low context (the “right” amount of information), space (*proxemics*, or personal territory), and the appropriate speed of information exchange. A similar but smaller-scale research project is the one conducted by Schneider and De Meyer (1991), who examine the influence of national culture on strategic issues. These authors focus mainly on the differences between northern and southern European managers and find that “different cultures are likely to interpret and respond to the same strategic issue in different ways” (p. 307): southern European managers see “threads” where northern European managers see “strategic issues”. According to this study, national culture has a strong influence on organizational culture. Following in the same line of research, Reber et al. (2004) use the Vroom–Yetton model in their empirical study of the influence on national culture on leadership decisions. Their work is limited to comparing the leadership behavior of Austrian and Czech managers, but the authors find that “[n]ational culture is a dominating factor for the conception and execution of leadership styles” (Reber et al. 2004, p. 424). One may conclude that national culture shapes leadership style, but this research does not determine whether national culture also shapes organizational culture.

In an exploratory case study, Yauch and Steudel (2002) examine two cases of cellular manufacturing. This research includes analysis of the underlying effects of cultural aspects on manufacturing with reference to the previous research of Schein (1992). In a subsequent paper, Yauch and Steudel (2003) argue that the combined use of qualitative and quantitative methods leads to a greater understanding of “cultural artifacts and behavior” and of the cultural values that underlie them. In later empirical research, Naor et al. (2010) explore the effects of organizational and national culture on manufacturing performance and find that “organizational culture has more of an effect on manufacturing performance than [does] national culture” (p. 194). These authors anchor their research in the framework of the GLOBE study (House et al. 2005) and find that “organizational culture inside plants differ in

three dimensions (power distance, future orientation, and performance orientation)” (Naor et al. 2010, p. 194). The authors summarize their study by concluding that “[a]n organization culture characterized by low power distance and assertiveness and high institutional collectivism, in-group collectivism, future orientation, performance orientation, uncertainty avoidance, and human orientation leads to enhanced manufacturing performance” (p. 202). Hence their research demonstrates that organizational culture dominates national culture. That is why the aspect of national culture receives short shrift in this thesis—in other words, focusing on organizational style should yield a deeper understanding of leadership style.

That style is affected by individual leadership traits and to a lesser extent by the national culture in which the manager is embedded. This thesis assumes that the leadership traits of top managers serve as a role model for the entire staff, given the importance of those traits for a firm’s improvement performance. To the extent that national culture shapes personal values, leadership style will be affected. Although the recent literature suggests that organizational culture is of greater consequence than national culture, the latter may have indirect effects on improvement performance that remain to be discovered.

2.6 Summary

Current research distinguishes between the *content* and the *process* of operations strategy. Some authors believe that the differences between those two approaches are diminishing, whereas others continue to emphasize the special characteristics of each. The content researchers are concerned with generating and nurturing strategic content; the process researchers are concerned with the best way to implement a chosen strategy. The focus of this research project is on strategy deployment, which explains its theoretical emphasis on the process of strategy. Recent literature addresses the perceived need for trade-offs in the process of operations strategy as well as the importance of balance and alignment between manufacturing and business strategies.

The essence of the resource-based view is that companies have bundles of resources that are valuable, rare, inimitable, and nonsubstitutable. The task of firms is to transform these bundles into sustainable and long-term competitive advantages. Trade-offs also figure prominently in the resource-based approach, especially in rapidly changing environments.

It takes time to build core competences and position strategic priorities, a process that is strongly influenced by organizational boundaries. Core competences are necessary but not sufficient for establishing viable strategic priorities. Whether such priorities are relegated to the product level or the plant level, building them takes time; however, core competences also increase over time. A company is more likely to thrive when top management drives strategic intent.

Complexity can easily destroy value within organizational contexts. It should therefore be the goal of every organization to decrease complexity whenever

possible. Complexity is defined by the number of elements in a system and by the number of types of their interactions. According to search theory, complexity can be reduced by search mechanisms that prevent premature lock-in and expand upon simple hill-climbing heuristics. Search theory in the context of manufacturing and related areas is greatly facilitated by (but not limited to) NK modeling.

With respect to strategic decision making, competitiveness can be achieved only when a strategy is well fitted to the organization that adopts it. The top management teams of successful organizations exhibit specific and clearly identifiable patterns of strategic decision making. Such managers use more information and communicate information across all hierarchies. Yet communication alone is not enough; the personal involvement of each organizational member is also required. Strategic decisions must be widely understood, but they are not necessarily stable over time.

As regards strategy cascading, it is unreasonable to suppose that either top-down or bottom-up implementations are always preferable. Since the best approach depends largely on specific organizational contexts, it follows that the strategy cascading process can and should vary from firm to firm. Indeed, it is clear that often much improvement potential will be lost if a company ignores ideas originating at the front line and relies exclusively on the initiatives of top management.

Coordination theory can be summarized as communication between independent actors who interact while performing tasks in order to achieve goals. The numerous studies already conducted in this area have revealed that coordination is important in many facets of organizations in general and of manufacturing in particular. There has been extensive research—much of it focusing on complexity—that involves simulating coordination via NK models.

The fundamentals of exploration and exploitation can be summarized in two phrases: “incremental improvements” versus “the long jump”. The research in this field addresses the question of how best to manage the processes of continually introducing new improvements and profitably exploiting existing opportunities. Whether by “punctuated equilibrium” or “ambidexterity”, these processes target the same goal—namely, to balance both aspects. The firm should not concentrate entirely on exploitation, since exploration (e.g., the introduction of radical new ideas) requires considerable effort.

Search theory is often associated with NK modeling. Although this is a frequently applied research approach, it is hardly the only one. In this context, search involves finding the best ideas in an unknown territory—what some authors refer to as rugged landscapes. In general the aim of research in this field is to describe the optimal balance between search effort and premature lock-in.

Leadership amounts to influencing others to fulfill tasks so that goals can be readily achieved. Certain individual characteristics, or leadership traits, have been shown to facilitate this process. Not all such traits are equally effective across different organizational and national contexts. For instance, a strictly top-down orientation may be effective in the short term but is generally perceived to be inadequate and unsustainable in the long term.

Leadership behavior is affected to some extent by national culture but more so by organizational culture. Research indicates that national culture has a greater

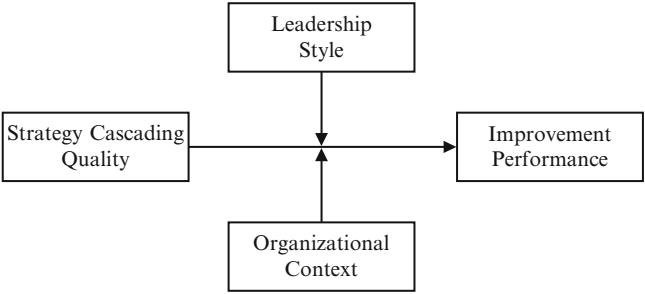


Fig. 2.1 Guiding framework

influence on the personal values and behaviors of each leader but that organizational culture has a greater impact on the leadership style of a firm’s top management team. In the end, that style is the most important driver of successful strategy cascading and hence of the company’s achieving its goals.

The guiding framework introduced in Sect. 1.2 is illustrated in the diagram reproduced here as Fig. 2.1. The literature discussed in this chapter makes it clear that the topic of this thesis is relevant and that its guiding framework is both valid and worthy of examination. In short, the aim of this research project is to discover how improvement performance varies across locations depending on the quality of a firm’s strategy cascading processes and on company contexts and leadership style. Strategy cascading quality is clearly related to improvement performance, but what roles are played by company context and leadership style? These issues are addressed in the following chapters.

Strategy Deployment in Business Units
Patterns of Operations Strategy Cascading Across
Global Sites in a Manufacturing Firm

Schlickel, M.

2013, XX, 187 p., Hardcover

ISBN: 978-3-642-33620-1

A product of Physica-Verlag Heidelberg