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Aligning corporate strategy and strategic action is a key top management responsibility. Such alignment is viewed by some as driven by the strategic intent of the CEO who sets ambitious targets within a 10 to 20 year time horizon, relentlessly develops the firm's capabilities, and transforms the basis of competition in the industry to the firm's advantage.[1] This is an inspiring view, to which many CEOs no doubt aspire. But it is a view premised on top managers having extraordinary foresight. Extraordinary foresight can, of course, always be assumed to explain successful strategies after the fact. But there is convincing evidence that it is very improbable in high-technology industries.[2]

If extraordinary foresight is unavailable, how can top management make strategic decisions in high-technology industries? Our answer to this central question is based on research concerning Intel Corporation's strategic evolution[3] as well as our analysis of more than a dozen case studies of major players in the information processing and telecommunications industries.[4]

Strategic Dissonance

Our key premise is that in extremely dynamic industries[5] alignment between a firm's strategic intent and strategic action is not likely to last. Inevitably, strategic actions will begin to lead or lag strategic intent. Such

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divergences between intent and action cause "strategic dissonance" in the organization. While new strategic intent is necessary to lead the company out of strategic dissonance, our key proposition is that new strategic intent must be based on top management's capacity to take advantage of the conflicting information generated by strategic dissonance.

Not all dissonance, of course, is strategic. Companies continuously experience some level of dissonance as a result of routine disagreements and conflicts because no division of labor is ever perfect and no project ever unfolds exactly as planned. Companies need managers precisely to mediate and resolve these sorts of frictions. Dissonance, however, is strategic when it signals impending industry or corporate transformation. Here are three examples from Intel.

> In 1970, newly-founded Intel Corporation introduced dynamic random access memory (DRAM) products in the market. DRAMs replaced magnetic core memory as the standard technology used by computers to store instructions and data as they executed programs, and Intel became the first successful semiconductor memory company in the world. Throughout the 1970s and early 1980s, DRAMs continued to be viewed as Intel's core business. While the DRAM industry grew tremendously during that period, the onslaught of Japanese entrants caused Intel's DRAM business to be hurt by the late 1970s. By the end of 1984, there was serious disagreement within the company regarding the importance of DRAMs in Intel's future. The disagreement had been latent for several years. It was resolved when, during 1984-85, Intel's top management completed the drawn out process of exiting from the DRAM business and realized that Intel had transformed itself from a memory company into a microprocessor company.
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> In 1990-91, Intel top management faced a strategic decision about what to do about the company's RISC architecture efforts. During the 1980s, a middle-level technical manager had developed the i860 RISC chip within Intel and had convinced several higher-level managers of its commercial potential. The technical development had been somewhat surreptitious because it was sold to top management as the development of a co-processor for the i486 chip but did in fact involve a stand-alone processor. The managers involved in the i860 project launched a successful marketing effort and top management had little real choice but to adopt the i860 as a new strategic product. Commercial success subsequently slowed down in the face of the competition of a plethora of other RISC chips. But large amounts of Intel's development resources had begun to flow to RISC architecture efforts and there had developed two camps within the company with different views about the future of RISC versus CISC. After a protracted debate, top management, in 1991, decided to reaffirm its commitment to the x86-CISC architecture and to scale down the RISC effort.
>
> In November 1994, a flaw in the first release of the Pentium microprocessor—a routine event associated with most first releases of new microprocessors to OEMs—triggered a discussion among technical users on the Internet which was picked up quickly by CNN and other news media. Intel's initial reluctance to replace the flawed chips, except for those highly technical users that were likely to engage in mathematical operations that could be affected by the flaw, created an uproar and escalated the event into a full blown "Pentium processor crisis."

While the national press hammered Intel for not being forthcoming enough in replacing the flawed products with no questions asked, Intel's OEM and distribution channel sales data indicated that demand for Pentium processors continued unabated. After several difficult weeks of internal debate, Intel top management decided to exchange all flawed Pentium processors for new ones simply upon request. By that time, Intel's top management had come to grips with the fact that Intel's prominence in end-user space, in part as the result of the Intel Inside campaign started in April 1991, had dramatically changed the rules of the game for Intel, and probably for all high-technology companies marketing to end-users.

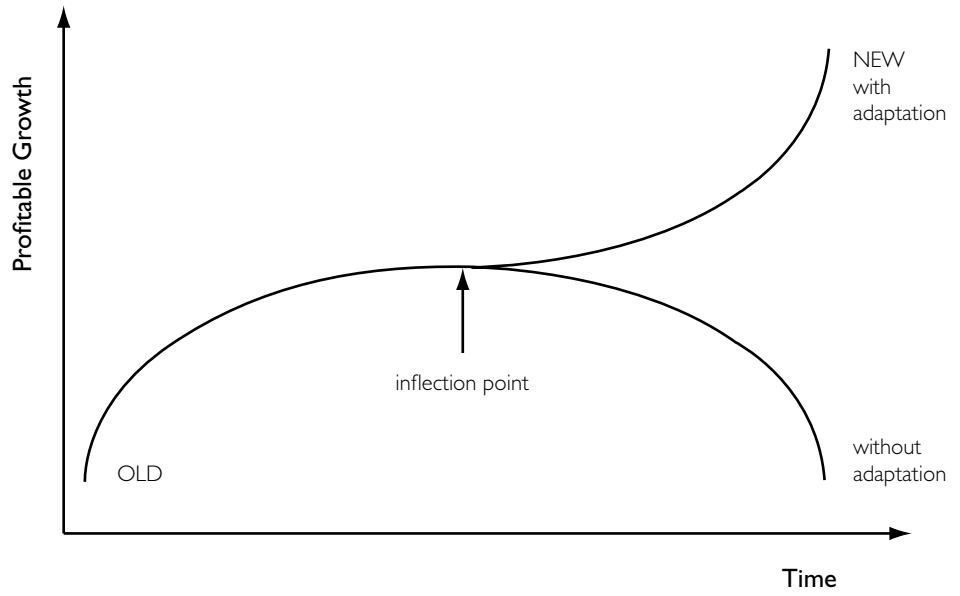
Strategic Dissonance Signals a Strategic Inflection Point

A common thread running through these vignettes of strategic dissonance is that they signaled that Intel had reached (DRAM exit, Pentium processor crisis), or was about to reach (i860 RISC chip), what we call a "strategic inflection point" (SIP) in its development. Inflection point has a rigorous mathematical meaning[6] but here we use it more loosely—metaphorically—to describe the giving way of one type of industry dynamics to another; the change of one winning strategy into another; the replacement of an existing technological regime by a new one. These changes—witness the computer industry—create a "valley of death"[7] for the incumbents because they materially affect their profitable growth trajectories. If an incumbent's top management is able to come up with new strategic intent that takes advantage of the new industry conditions, it can traverse the valley of death and enter a new era of profitable growth. Otherwise, it continues to survive with severely reduced performance prospects, or dies (see Figure 1).

Unfortunately, it is very difficult for anyone in an extremely dynamic industry, including top management, to clearly perceive the new industry equilibrium, winning strategy, or new technological regime, that loom beyond a SIP. Think about a computer-generated image being morphed from one state to another—you cannot tell when one ends and the other starts; only the beginning (old image) and the end (new image) are clear. In-between is a dizzying succession of intertwined, overlapping, blurred, fuzzy images.

So, how can top management know when dissonance is strategic—signaling a SIP—as opposed to a minor and/or transitory change in competitive dynamics, strategy, or technology? How to tell signal from noise? Sometimes the telling signs are quite obvious. For instance, in 1984, every clear-minded senior manager in the telecommunications industry had to realize that Judge Green's "Modified Final Judgement" inaugurated a period of momentous change that would transform the competitive dynamics in the industry in major ways.[8] In other instances, however, the telling signs may be subtle and intangible. For example, after the Japanese had become powerful players in DRAMs, Intel managers visiting Japan would come back with the feeling that they were viewed with newly found derision—"Something changed; it was different now," they would say upon return. It took Intel's top management several more years to

FIGURE 1. Strategic Inflection Point



realize that the competitive dynamics, the winning strategy, and the key technological competencies in the DRAM industry had fundamentally changed.

In the face of a SIP, voices sounding danger ahead will emerge. These voices usually rise form the middle-management ranks or from the sales organization: From people that know more because they spend time outdoors where the storm clouds of creative destruction gather force and—unaffected by company beliefs, dogmas, and rhetoric—start blowing into their face. Some will flag their concern to top management—and it's wise to pay heed as it would have been very wise to give serious weight to the troubled comments of the Intel travelers. Other middle managers will just quietly adjust their own work to respond to the strategic change. For instance, in the early 1980s Intel got down to 1 factory out of 8 manufacturing DRAMs because the finance and production planning people (middle-level managers) month-by-month allocated scarce capacity from where it seemed unprofitable to where it seemed to be more fruitful. Often, these words and actions don't seem strategic at first glance: they seem peripheral. But it is wise to keep in mind that when spring comes, snow melts first at the periphery: That's where it is most exposed.

The Need For Strategic Recognition

Managing strategic dissonance requires "strategic recognition"—the capacity of top managers to appreciate the strategic importance of managerial initiatives *after* they have come about but *before* unequivocal environmental

feedback is available. Top management's strategic recognition that the set of changing circumstances is a SIP happens in three key stages:

- recognizing the growing divergence between what the company currently puts forth as its strategy and the actions taken by its managers—what we call here strategic dissonance,
- asking the (anxiety provoking) question "is it one—a SIP?" and
- trying to discern the newly emerging strategic picture and providing a framework in which the divergence can be combated and new strategic intent formulated.

The method of resolution is broad debate, involving different technical, marketing, and strategic points of view, and representatives of different levels in the organization. This takes time. Dealing with the strategic dissonance associated with a SIP is a fundamental test of the resilience of a company's culture and its leadership.

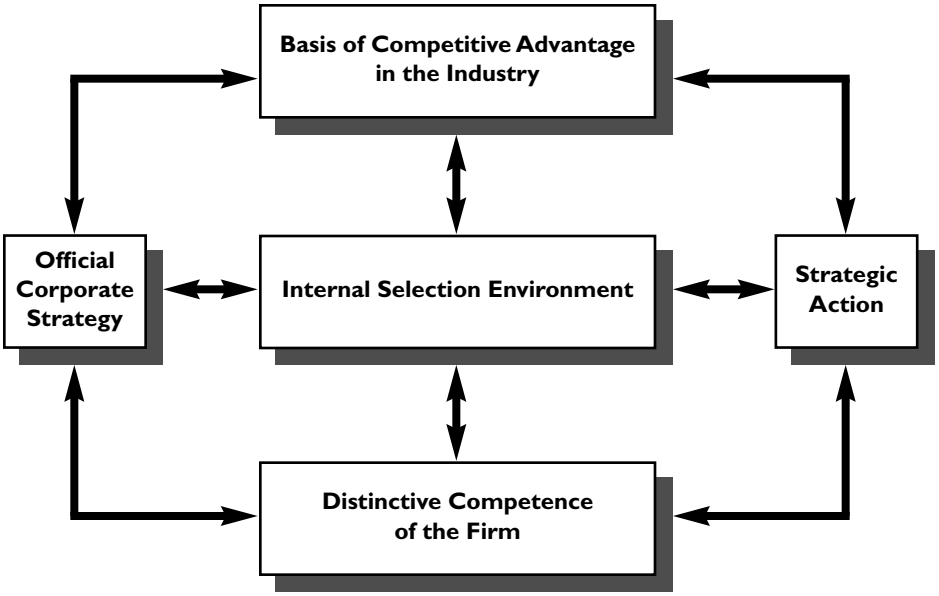
Strategic dissonance, strategic inflection point, and strategic recognition are the three interrelated key concepts that answer the question of how top management can decide on strategic intent in high-technology industries.

A Framework for Analysis

We propose a theoretical framework of five dynamic forces[9] that shape a company's evolution and the emergence of strategic dissonance (see Figure 2). This framework can help top managers determine whether manifestations of dissonance are strategic and/or ask questions that help surface latent signs of strategic dissonance.

The first of these forces—the *basis of competitive advantage* in the industry—is determined by the industry factors identified by Michael Porter[10] as key determinants of the attractiveness of an industry: bargaining power of customers and suppliers, the nature of the rivalry among incumbents, and the threat of new entrants and of substitution. Technological change, legislation, or government regulation can affect each of these elements and their relative importance. The second force concerns the company's *distinctive competence*: the competencies that have made it possible to develop a competitive advantage and to survive.[11] The third force is the company's *official corporate strategy* which reflects top management's beliefs about the basis of the firm's current success and anticipated changes in the familiar environment.[12] The fourth force—*strategic action*—is what the company actually does. Finally, the fifth force concerns the company's *internal selection environment* which mediates the link between corporate strategy and strategic action and the link between distinctive competence and the basis of competitive advantage. The internal selection environment comprises administrative elements (e.g., resource allocation rules) and cultural elements (e.g., norms governing internal communication).[13]

FIGURE 2. Dynamic Forces in Firm Evolution



Source: R.A. Burgelman, "Fading Memories: A Process Theory of Strategic Business Exit in Dynamic Environments," *Administrative Science Quarterly,* 39, 1994

During some periods in a company's history, these five forces are in harmony: The company's distinctive competence is consistent with the basis of competition in the industry; its official strategy and the strategic actions of its managers are co-aligned; and its internal selection environment is relatively peaceful with no signs of strategic dissonance.

This was the case at Intel in the early 1970s. Intel had established itself as a leader in semiconductor memories by pioneering a new semiconductor process called metal-oxide-silicon (MOS) technology. This process technology allowed Intel to increase the number of transistors on a chip while simultaneously reducing its production cost. This, in turn, allowed Intel to successfully introduce the world's first DRAM into the market in 1970. While other companies, notably Advanced Memory Systems, had been able to design a working DRAM, they had failed to develop a process technology to manufacture the new device successfully in volume. Process technology became Intel's distinctive competence. During the next half a dozen years these competencies served Intel to remain the dominant competitor in the DRAM business. During that period, Intel's corporate strategy was to offer semiconductor memory chips as alternatives for mainframe computer memories, and this strategy guided Intel's strategic actions. The

internal selection environment routinely allocated resources to semiconductor memories.

Over time, however, the dynamic forces shown in Figure 1 tend to diverge and their harmonious relationships are broken, thereby creating strategic dissonance in the organization.

Sources of Strategic Dissonance

Divergence of the Basis of Competition and Distinctive Competence

The most fundamental and often least readily visible source of strategic dissonance derives from a divergence between the changing basis of competition in the industry and the firm's distinctive competencies; the latter becoming less relevant for competitive advantage. This happened in Intel's DRAM business. In the late 1970s, Japanese entrants used their large-scale precision manufacturing skills to obtain high yields early on in new DRAM generations, thereby outcompeting Intel, which had much weaker manufacturing skills. High yields had great impact on unit cost, and this was a crucial advantage as DRAMs became a commodity product.

Companies often experience an inertial aftermath of success: They have become sharply aware of the competencies that made them successful against the initial competition and they continue to rely on these distinctive competencies even when the competition changes. Also, companies usually organize themselves in such a way that the employees representing these competencies are likely to have the greatest influence in the strategic decision-making process. Changes in the basis of competition thus often evoke inertial responses by incumbents.[14] Intel's DRAM business, again, provides an example. Falling behind the Japanese, Intel tried to compete by creating advanced products based on the company's strong process technology skills. Process technology had been the technological competency that had given Intel its initial competitive advantage. Process technologists continued to play the dominant role in Intel's DRAM product development for the 16K (kilobit), 64K, 256K, and 1 Meg (megabit) generations, in spite of the industry-wide shift in the basis of competition toward manufacturing competence.

On the other hand, strong technological competencies may also evolve in new, sometimes unanticipated, directions and provide the basis for generating new business opportunities. Important examples at Intel are the invention of erasable programmable read only memories (EPROMs) and, even more so, the invention of the microprocessor. These developments have strategic repercussions for the company's existing core business and require difficult top management decisions. The successful EPROM and microprocessor businesses soon began to compete with Intel's relatively weak core DRAM business for scarce manufacturing resources. Later on, the increasingly strong microprocessor business also competed with the weakening EPROM business. This internal

competition turned out to be advantageous for the company, transforming Intel gradually from a lagging "memory company" into a leading "microprocessor company." Evolving technological competence, however, may also create fundamental strategic dilemmas. The development of the i860 RISC processor at Intel, for instance, threatened to undermine the company's strong core microprocessor business based on the x86 architecture.

In sum, firm-level competencies and the basis of competition in the industry often evolve along independent paths. Our framework suggests that dynamically matching firm-level distinctive competencies and the basis of competition in the industry is a tough top management challenge. It requires top management to closely watch the evolution of the industry structure as well as to be alert to the strategic implications of unanticipated new developments in the company's competencies.

Divergence between Stated Strategy and Strategic Action

A second major source of strategic dissonance, one that is usually more readily visible, originates in the divergence between corporate strategy and strategic action. One driver of this divergence is inertia in corporate strategy.[15] Corporate strategy reflects top management's beliefs about the basis of success of the firm. Top managers usually rise through the ranks and are deeply influenced by their perception of what made the company successful. Intel's exit from the DRAM business, for instance, was delayed by the fact that top management was still holding on to Intel's identity as a memory company, even though the company had become a non-factor in DRAMs with 2-3 percent market share by 1985. IBM's slowness in taking advantage of the RISC microprocessor architecture (which it had invented in the mid-1970s)[16] was, no doubt, attributable, at least in part, to top management's perception of IBM as the leading "mainframe computer" company in the world. Similarly, Microsoft's relatively weak past strategy in networking operating systems probably was, in part, due to their corporate identity throughout the 1980s as the "desktop operating system" company. Intertwined with these inertial self-perceptions is emotional attachment on the part of top management to the business that made the company successful. As one middle-level manager put it in relation to Intel's exit from the DRAM business: "It was kind of like Ford getting out of cars."[17] Last, but not least, top management often hesitates to change the strategy because the consequences are not completely clear. For instance, Intel's slowness in moving away from defining itself as a memory company were, in part, due to the fact that DRAMs were viewed as the company's technology driver having been the largest volume product (in units) historically.

If inertia in corporate strategy leads to change that is too slow, top managers can also change the corporate strategy too fast—in ways that stretch beyond what the company is capable of doing and the market is ready to accept. In the early 1990s, Apple Computer's CEO John Sculley was clearly in front of his organization when he pushed the strategy of developing personal digital

assistants (PDA) and personally championed the Newton operating system. Sculley's strategic intent stretched beyond Apple's available innovative capabilities and the market's readiness. At the same time, Apple was facing a major battle in its core personal computer business after the barriers that separated the Macintosh's niche from the rest of the PC industry weakened in the face of the success of Windows 3.0. Sculley's ambitious strategy for PDAs required the development of new innovative capabilities while at the same time the demands of the PC business required major cultural change to achieve greater cost consciousness and discipline in product development. Apple could not do both, and Sculley's strategic goals thus created enormous, top-driven dissonance within the organization.[18]

The other driver of this divergence are the independent strategic actions taken by middle-level managers. During the late 1970s and into the early 1980s, Intel's new EPROM and microprocessor businesses began to compete with the DRAM business for scarce manufacturing capacity. As noted earlier, middle-level managers in manufacturing planning allocated scarce manufacturing to the new, higher margin EPROM and microprocessor businesses, thereby gradually diminishing the role of DRAMs as Intel's core business. In 1984, another middle-level manager responsible for process technology development for static random access memory (SRAM) and microprocessors made the crucial choice to support a new process technology that favored microprocessors and specialty memory products over commodity memories.[19] This decision effectively decoupled the commodity memory business from the rest of Intel's business. Ironically, this move turned out to be beneficial after the new strategic intent (Intel the "microprocessor company") was formulated.

While some actions may turn out to be helpful, there is also potential danger associated with strategic actions of middle-level managers that diverge from the official strategy. The technical and initial commercial success of the i860 RISC chip as an unplanned stand-alone processor created a strategic dilemma for Intel's top management and extremely strong, eventually divisive, tensions within the organization.

Role of the Internal Selection Environment

If the basis of competition in the industry, the company's distinctive competencies, the firm's official strategy, and the strategic actions of middle-level managers all start diverging from each other, how can a company possibly survive? Research suggests that in the face of a SIP, a company's internal selection environment may be more important for survival than its stated strategy.[20] The role of the internal selection environment is to regulate the allocation of the company's scarce resources—cash, competencies and capabilities, and senior management attention—to strategic action while the official strategy is in flux and new strategic intent has not yet been formulated and articulated.

A company can continue to be successful for some time if its internal selection environment selects actions that are consistent with competitive reality

even while becoming decoupled from the official (stated or implicit) corporate strategy. The continued success provides then a time cushion for bringing corporate strategy back in line with strategic action. At Intel, for instance, the capacity allocation decisions favoring EPROMs and microprocessors over DRAMs were initially not driven by official corporate strategy. Rather, they were driven by the internal resource allocation rule—maximize margin-per-wafer-start—that favored products with greater profitability and hence greater competitive advantage in the external environment. The deteriorating competitive position of DRAMs required top management to make a fundamental strategic choice in 1984: Stay in DRAMs and invest several hundred million dollars to get on a par with the market share leader in a commodity market, or exit from DRAMs and concentrate key resources to become a leading microcprocessor company. This strategic choice was facilitated by the results of the internal selection processes which had already shifted the "mainstream" away from memories toward microprocessors.

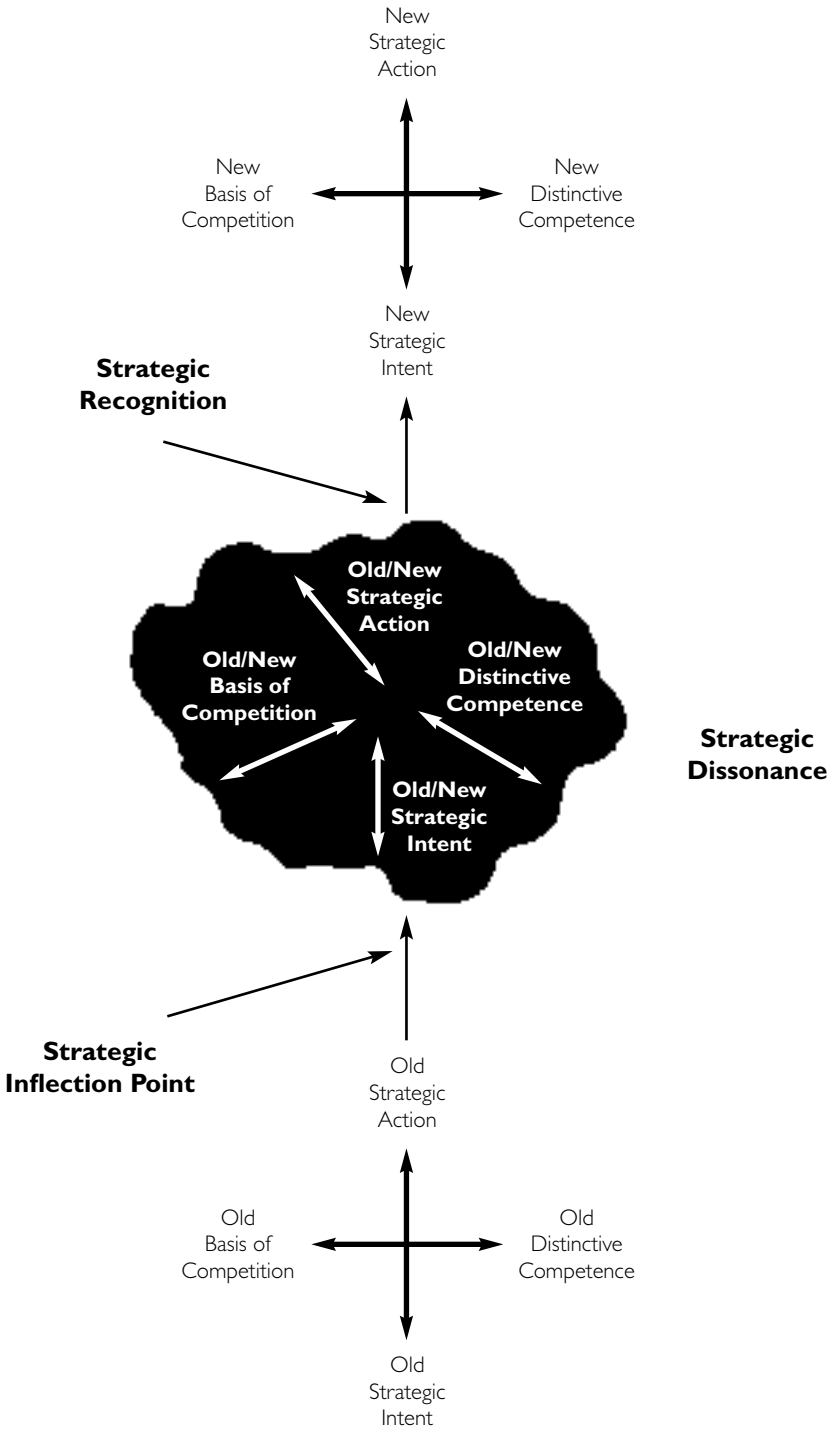
The internal selection processes leading up to the formulation of new strategic goals critically depends on top management's strategic recognition capacity. One type of strategic recognition involves top management's ability to recognize the strategic importance of actions by middle-level managers who try to tie a new business initiative to the corporate strategy—providing legitimacy for the new business. For instance, the internal and external success of microprocessors eventually made top management realize that Intel's future lay with becoming a microprocessor company. A second type of strategic recognition involves top management's ability to recognize the strategic importance of actions of middle-level managers that diminish the legitimacy of an existing business and decouple it from the corporate strategy. As an example, the allocation of manufacturing capacity away from DRAMs and the decision by a middle-level manager to give up a process technology that was important for commodity memory products eventually helped top management recognize that DRAMs were no longer a core business for Intel.[21]

Managing Strategic Dissonance

Strategic dissonance, strategic inflection points, and strategic recognition are tools for managing the major transformations that companies must bring about in the face of discontinuous change. As the company moves through the valley of death, the old and the new basis of competition, the old and the new distinctive competence, the old and the new strategy, and the old and new strategic action are all in play together. Figure 3 shows a picture of the transformation process.[22]

So, what are the characteristics of the internal selection environment and what are the top management behaviors that help a company take advantage of strategic dissonance and survive the turbulence of a SIP?

FIGURE 3. The Transformation Process



Help Internal Selection Reflect External Reality; Allow Dissent

Top management must help ensure that the firm's internal selection environment continues to reflect the real competitive pressures in the external environment. A necessary condition is that the company has a management information system that reflects how its businesses are really doing in the competitive environment. This allows top management to ask sharp questions, on a regular basis, about why the company's businesses are performing the way they are. Intel's rule to allocate scarce manufacturing capacity based on margin-per-wafer-start, for instance, forced the DRAM middle-level managers to come up with their best strategic arguments for why the company should forego profits by allocating scarce capacity to DRAMs. Constantly watching competitors—old and new—is mandatory behavior for top management. Why are they strong competitors? What do they do that we cannot do better? This is one set of questions senior managers should ask. In the DRAM case, for instance, Intel top management should have asked why the Japanese new entrants into the DRAM industry seemed to be getting much higher yields in manufacturing from the start .

It is also important that the firm's internal selection environment values dissent and controversy surrounding the interpretation of the data. This is difficult, because organizations are uncomfortable with internal dissent. Debating tough issues is only possible where people will speak their minds without fear of punishment. The debate between CISC and RISC at Intel during 1990-91 strained this ideal at Intel. The debate became acrimonious at times; different factions were beginning to engage in a civil war. People were voicing concerns: "How will I work for so and so when this is all over?" The DRAM crisis did likewise. A key role of top management is to provide an umbrella against such fears. Top management may not be competent to personally judge the issues but it is up to them to create a fear-free internal selection environment. So, our advice to top managers is: First, don't shut people up; and, second, if they disagreed and were right, congratulate them!

Don't Dismiss Strategic Dissonance

A company's capacity for getting through a SIP depends predominantly on a very human issue: How the top management reacts, emotionally, to strategic dissonance. This is no surprise. Business people, like all people, have emotions, and a lot of emotions are tied up in the status and well-being of their business. In spite of the best attempts at business and engineering schools to inculcate rational analysis, when the business gets into serious difficulties or key managerial assumptions are challenged, objective analysis takes second seat to personal/emotional reactions.

In fact, the top managers in charge are likely to go through some variation of the stages of dealing with a catastrophe:

DENIAL → ESCAPE or DIVERSION → ACCEPTANCE → PERTINENT ACTION

Denial is prevalent in the early stages of almost every instance. To appreciate this, read the annual report management letters of companies that, in retrospect, we know were facing a SIP. *Escape* refers to the personal actions of top managers. For instance, frequent public speeches on vague subjects given by CEOs of companies facing difficult times or the move of corporate headquarters away from the center of business action are signs of attempted escape. *Diversion*, by contrast, refers to the worst kind of escape, often involving major acquisitions unrelated to the core business that faces a SIP.

Effective top managers go through these first two stages as well, but they are able to move on to the *acceptance* and *pertinent action* stages before it is too late. Ineffective top managers are unable to do so and have to be removed. Those that replace them are not necessarily more capable, but usually do not have the emotional investment in the current strategy. In our view, replacement of corporate leaders in the face of a SIP is far more motivated by the need to put distance between the present and the past than by getting someone "better." Intel's DRAM crisis became resolved when Grove went to see CEO Gordon Moore and asked him what a new top management would do if he and Moore were replaced. The answer was clear: Get out of DRAMs. Grove then suggested that Moore and he go through the revolving door, come back in, and do it themselves—a forced way to put distance between present and past.

Formulate New Strategic Intent Based on Strategic Recognition

Top management must try to surmise how the new equilibrium of forces in the industry will look like and what the new winning strategy will be, knowing that they cannot get it completely right. Getting out of the valley of death associated with a SIP requires top management to develop a mental image of what the industry will look like and the company should look like when it climbs out on the other side. Top management must use the information that is generated by strategic dissonance when trying to discern the true new shape of the company on the other side of the valley. It must be a realistic picture grounded in the company's distinctive competencies—existing ones or new ones that are already being developed. For instance, when Intel finally got out of the DRAM business it had also become clear that the company had to be reconceptualized as a microprocessor rather than a memory company. By that time, Intel had moved from a silicon-based distinctive competence in memory products to a distinctive competence in implementing computer architectures in silicon chips.

Coming out of a difficult period, top management is more likely to have a sense of what they *don't* want the company to become before they know what they *do* want it to become. For instance, as middle-level managers in the DRAM business experienced difficulties in obtaining capacity allocations, they proposed, several times, that Intel restructure itself and give DRAMs their own manufacturing capability instead of sharing with other products. These requests helped top management decide that they did not want Intel principally to become a supplier of commodity type products. This decision was made before it was clear

to top management that Intel would become a leading microprocessor company. Management writers use the word "vision" for this. But that is too lofty for our purpose. Leadership here implies changing with the environment and the organization. Reality must lead top management rather than the other way around. This is difficult because top management is expected to have vision.

Getting through the period of immense change requires reinventing—or perhaps rediscovering—the company's identity. Since companies and their leaders are shaped by their past, this is truly hard. If top management got its experience running a hardware company, how can they and their key staff imagine what it is to run a software company? Steve Jobs, for instance, must have struggled with that at NeXT. It is not surprising that it took many years before he was able to redefine NeXT as a software company and got rid of the desire to produce esthetically pleasing, well-designed "computers." Today, Intel is outgrowing its identity as a leading microprocessor company and faces the challenge of redefining itself as a company that wants to be a supplier of building blocks for the computing and communications industries.

Move from Strategic Intent to Strategic Action

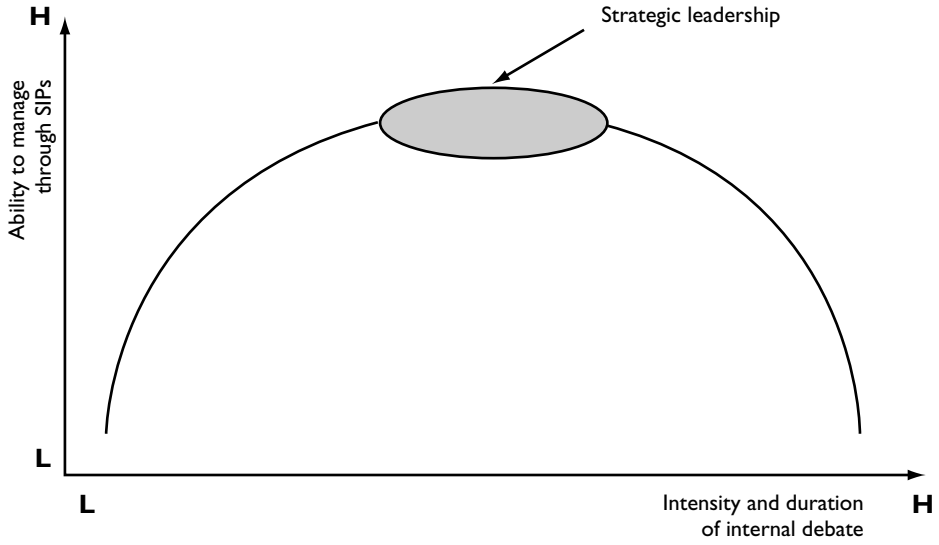
Seeing, imagining, sensing the new shape of the company is only one step. Getting there requires more wrenching actions. These moves we have called strategic actions and they involve (re)assigning resources in order to pursue the new strategic intent. The fact is, corporate strategy is realized by performing a series of such strategic actions, and not via strategic planning. Strategic plans are abstract, far away, and give managers a lot of chances to reconsider as they go along—so, they don't command the true attention their action-oriented counterparts do.

Clearly, the wisdom necessary to guide a company through transformational changes cannot, as a practical matter, reside only in the head of the CEO. If it did, he or she would have guided the company through those changes in the first place. If, on the other hand, the CEO comes from the outside, chances are he or she does not really understand the evolving subtleties in such situations. Middle managers have the hands-on exposure, but, by necessity their experience is specialized, not company-wide.

What is needed is real-time mining of the middle managers' insights, exposing all that information to searing intellectual debate, and letting this ferment take place until the shape of the other side of the valley is sufficiently clear that a dedicated march in its direction is feasible. Once that starts, the ferment needs to stop, and all hands need to be committed to this new direction. We think, therefore, that there is an inverted-U type of relationship between the intensity and duration of constructive intellectual debate in a company and its long-term ability to manage through SIPs (see Figure 4).

At one extreme, too little intellectual debate means that middle managers do not challenge one another as long as the favor is reciprocated. The result: A

FIGURE 4. Relationship between Adaptability and Internal Debate



lack of strategic dissonance and a hard fall off the curve. At the other extreme, too much intellectual debate paralyzes the company because most energy is used up seeking to win the debate for the sake of winning rather than for the sake of the company. Strategic action is delayed indefinitely and, again, a hard fall off the curve. So, during strategic dissonance, top management must let go some while they are not sure. (This is not easy: top management is paid for being sure!) But then they must pull strategic action and strategy back in line and direct the march. Strategic leadership means encouraging debate *and* bringing debate to a conclusion.[23]

Take Advantage of the "Bubble"

Top management must deliberately use the company's uncommitted resources that accumulate in good times—what we call the "bubble"—by responding to early signs of strategic dissonance and by supporting new initiatives before strategic dissonance emerges. This too is difficult, particularly so when the prospects of the mainstream business in the foreseeable future continue to be favorable (abundant profits and growth expected) and everybody is very busy exploiting the existing opportunities. Senior and top management, under such circumstances, are likely to pay only lip service to supporting new initiatives; it is easy to delay action to "tomorrow." When the prospects are not so good, it is easier to take action. In the early 1990s, Apple Computer had about $1 billion in free cash, but the prospects of the mainstream PC business looked less good because Apple's niche was not growing and was threatened by

Microsoft's Windows 3.0.[24] While the choice of strategic intent can be questioned, John Sculley deserves credit for anticipating the need for change in Apple's strategy and starting the change process.

Manage Unanticipated Invention

While senior management should constantly look for ways to harvest the benefits of unanticipated invention generated by the company's technological competencies, the first, and foremost, question should be: is this invention useful to our core business? If not, where could we use it? Is the new area suggested by this invention of interest to us? Does it make use of other competencies we have? Implicit in these actions of senior management is the will to terminate investment in areas that, after careful examination, do not fit the firm. This may sound cold, but the willingness to terminate experiments has to be viewed as an integral part of the process of creating such experiments. If such will is lacking, eventually the weight of accumulated and undisposed of experimentation will dissipate the bubble and inhibit the start of new ones.[25]

Culture is the Key

The internal selection environment that we are describing is one in which there are both strong bottom-up and top-down forces. If the company is dominated by the top-down force, chances are that it will efficiently march in lockstep toward an important strategic intent, but the strategic intent better continue to be the right one. If the bottom-up force dominates, chances are that the company will drift aimlessly from one limited strategic intent to another and dissipate its resources. Obviously, if there is neither top-down nor bottom-up force, the company will experience something like "Brownian motion."

But how can these forces both be strong at the same time? They can, if the company has the rugged, confrontational/collegial culture that is desirable in high-technology industries. Such a culture has two attributes: First, it tolerates—even encourages—debate (at Intel, the name for it is "constructive confrontation"). These debates are vigorous, devoted to exploring issues, and indifferent of rank.[26] They are focused on finding what is best for the company (as opposed to the individual or group). Second, it is capable of making—and accepting—clear decisions; with the entire organization capable of supporting the decision.

An organization that has a culture that approximates these two requirements is a powerful adaptive (learning) organization. This is the culture that works best when top management has to navigate between letting chaos reign and reining in chaos. For instance, there was enormous contention in the CISC versus RISC debate. There was rebellion within the Microprocessor Group against its management. After a period of exhausting debate, everybody was ready for a clear new direction. While a few people decided to leave, the adoption and execution of the new direction unified everyone.

Other companies that have survived in extremely dynamic industries by transforming themselves probably have a similar set of characteristics, even though they shape them in their own way. Hewlett-Packard, for instance, has such a culture (judging by the results), perhaps more so than any other large company. Their history has been and continues to be a series of transformations, all achieved by "peaceful means" in the hands of internal management. To see this, compare their ability to move from instruments to computers (and their growth spurt) with that of their major competitors in instruments. When computers moved from minicomputer-based technology to microprocessor-based technology, compare their performance with that of other minicomputer manufacturers. HP made the transformation with hardly working up a sweat. In recent years, H-P has transformed itself again, becoming the world leader in desktop printing[27] and gradually working itself into a strong position in desktop computers. H-P's culture is more "SIP-ready" than any we can think of.

Conclusion

We started this article by asking: How can top management in extremely dynamic environments decide on the right strategic intent? We have offered a conceptual framework and three interrelated key concepts—strategic dissonance, strategic inflection point, and strategic recognition—for answering that central question. Our conceptual framework helps examine the evolving linkages between a company's distinctive ("core") competencies and the basis of competition in the industry, and its official corporate strategy and strategic action. The research underlying our framework has revealed that, over time, there will unavoidably emerge divergences between competence and basis of competition, and between strategy and action. We view these divergences as natural outcomes of the internal and external dynamic forces that move and shake companies and industries. We also view the strategic dissonance that these divergences create as an opportunity for top management to learn about the changing reality of the competitive world that the company faces and the new opportunities generated by its own competencies. Strategic dissonance signals a strategic inflection point in the firm's development trajectory and alerts top management to the fact that the familiar picture of the industry is being morphed into a completely new one—involving a fundamental change in the basis of competition, requiring fundamentally different competencies, or both. Strategic recognition is top management's major tool for dealing with strategic dissonance and a SIP. Strategic recognition picks out of the mass of conflicting information the elements that can form the foundation for new, viable strategic goals. Top management's capacity for strategic recognition is enabled in major ways by the ability of the company's internal selection environment to distinguish signal from noise. This, in turn, depends on the comprehensiveness, depth, and rigor of intellectual debate among middle and top managers, which

is the cultural feature most telling of a company's long-term ability to manage through SIPs.

Notes

1. Gary Hamel and C.K. Prahalad, *Competing for the Future* (Boston, MA: Harvard Business School Press, 1994). These authors introduced the idea of "strategic intent." See Gary Hamel and C.K. Prahalad, "Strategic Intent," *Harvard Business Review* (May/June 1989).
2. A current example concerns the impact of the Internet on the computer and telecommunications industries. Few of the key players in these industries foresaw the speed and force with which the Internet has evolved during the last 18 months. For a general discussion of the difficulty of foreseeing the implications of new technologies, see Nathan Rosenberg, "Uncertainty and Technological Change," paper prepared for the Conference on Growth and Development: The Economics of the 21st Century, organized by the Center for Economic Policy research of Stanford University, June 3-4, 1994.
3. This research is reported in: Robert A. Burgelman, "Intraorganizational Ecology of Strategy Making and Organizational Adaptation: Theory and Field Research," *Organization Science* (August 1991); Robert A. Burgelman, "Fading Memories: A Process Theory of Strategic Business Exit in Dynamic Environments," *Administrative Science Quarterly* (March 1994); Robert A. Burgelman, "A Process Model of Strategic Business Exit: Implications for an Evolutionary Perspective on Strategy," *Strategic Management Journal* (Special Issue, Summer 1996, forthcoming).
4. These case studies are used in our MBA elective course "Strategy and Action in the Information Processing Industry" at the Stanford Business School. Some of these cases were written at the Stanford Business School: George W. Cogan and Robert A. Burgelman, "Intel Corporation (A): The DRAM Decision," 1990; Bruce K. Graham and Robert A. Burgelman, "Intel Corporation (B): Implementing the DRAM Decision," 1991; George W. Cogan and Robert A. Burgelman, "Intel Corporation (C): Strategy for the 1990s," 1991; Dan Steere and Robert A. Burgelman, "Intel Corporation (D): Microprocessors at the Crossroads, 1993; Dan Steere and Robert A. Burgelman, "Intel Corporation (E): New Directions for the 1990s," 1993; Alva H. Taylor, Robert A. Burgelman, and Andrew S. Grove, "A Note on the Telecommunications Industry in 1993," 1994; Alva H. Taylor, Robert A. Burgelman, and Andrew S. Grove, "The Wireless Communications Industry: After AT&T-McCaw," 1994; Thomas Kurian and Robert A. Burgelman, "The Operating Systems Industry in 1994," 1994; Jeffrey Skoll, David Zinman, and Robert A. Burgelman, "The Consumer On-Line Services Industry in 1995," 1995. Other cases, written at the Harvard Business School, include: "The Global Semiconductor Industry in 1987"; "The Global Computer Industry; Note on the PC Network Software Industry, 1990"; "Microsoft's Networking Strategy; Mips Computer Systems (A)"; "Motorola and Japan (A); The Transformation of IBM"; "Apple Computer 1992, and Reshaping Apple Computer's Destiny,"1992. These are all published in David B. Yoffie, *Strategic Management in Information Technology* (Englewood Cliffs, NJ: Prentice-Hall, 1994).
5. For a discussion of different types of dynamic environments, see Jeffrey Williams, "How Sustainable is Your Competitive Advantage?" *California Management Review*, 34/3 (Spring 1992): 29-51. For a discussion of the managerial challenges of operating in "high-velocity" environments, see Kathleen Eisenhardt, "Speed and Strategic Choice: How Managers Accelerate Decision Making," *California Management Review*, 32/3 (Spring 1990): 39-54.

6. Mathematically, an inflection point is reached when the first derivative (the slope of the trajectory) becomes zero and the second derivative (the rate of change) changes sign (positive to negative or vice versa).
7. Andrew S. Grove, "PCs Trudge out of the Valley of Death," *The Wall Street Journal*, January 18, 1993; "Invest or Die," *Fortune*, February 22, 1993 (cover story).
8. Nevertheless, even in 1995 it is by no means obvious what the new competitive equilibrium in the telecommunications industry will look like; what the winning strategies and the dominant technologies will be. For instance, Bell Atlantic, one of the most aggressive regional Bell operating companies (RBOCs) planning to diversify into delivering video and television services, abruptly called a halt to its plans in April 1995. See "Bell Atlantic Halts Plan for Video Services," *The New York Times*, April 26, 1995. Recently, AT&T decided to split itself up into three parts—telecommunications services, telecommunications equipment, and computers—in order to be able to compete in a more focused way in each of these dynamic industries. One reason for the split-up was that AT&T experienced enormous strategic dissonance as the RBOCs, in anticipation of the deregulation of the local exchange business, were increasingly reluctant to buy telecommunications equipment from a potential major rival.
9. Burgelman (March 1994), op. cit.
10. Michael E. Porter, *Competitive Strategy* (New York, NY: Free Press, 1980).
11. The concept of distinctive competence was first proposed by Philip Selznick, *Leadership in Administration: A Sociological Interpretation* (New York, NY: Harper & Row, 1957). Distinctive competence is similar to core competence, but emphasizes the relative uniqueness of the competencies that the company initially assembles and the evolutionary processes through which they evolve. As a result of these evolutionary processes, distinctive competencies have inertia and may become "competence traps." See Barbara Levitt and James March, "Organizational Learning," in W. Richard Scott, ed., *Annual Review of Sociology*, 14 (1988): 319-340. For a discussion of core competence see C.K. Prahalad and Gary Hamel, "The Core Competence of the Corporation," *Harvard Business Review* (May/June1990).
12. See Robert A. Burgelman, "A Model of the Interaction of Strategic Behavior, Corporate Context, and the Concept of Strategy," *Academy of Management Review* (1983); Gordon Donaldson and Jay W. Lorsch, *Decision Making at the Top: The Shaping of Strategic Direction* (New York, NY: Basic Books, 1983); Karl E. Weick, "Substitutes for Corporate Strategy," in David J. Teece, ed., *The Competitive Challenge* (Boston, MA: Ballinger, 1987).
13. Burgelman (March 1994), op. cit.
14. Arnold C. Cooper and Dan E. Schendel, "Strategic Responses to Technological Threats," *Business Horizons* (1976); William J. Abernathy, Kim B. Clark, and Alan M. Kantrow, *Industrial Renaissance: Producing a Competitive Future for America* (New York, NY: Basic Books, 1983); Michael E. Tushman and Philip Anderson, "Technological Discontinuities and Organizational Environments," *Administrative Science Quarterly* (1986); Barbara Levitt and James March, "Organizational Learning," *Annual Review of Sociology*, 14 (1988); Rebecca M. Henderson and Kim B. Clark, "Architectural Innovation: The Reconfiguration of Existing Product Technologies and the Failure of Established Firms," *Administrative Science Quarterly* (1990); Dorothy Leonard-Barton, "Core Capabilities and Core Rigidities: A Paradox in Managing New Product Development," *Strategic Management Journal* (1992).
15. Michael T. Hannan and John H. Freeman, "Structural Inertia and Organizational Change," *American Sociological Review* (1984); Henry Mintzberg and James A.Waters, "Tracking Strategy in an Entrepreneurial Firm," *Academy of Management Journal* (1982); Danny Miller and Peter H. Friesen with the collaboration of Henry

Mintzberg, *Organizations: A Quantum View* (Englewood Cliffs, NJ: Prentice-Hall, 1984).

16. See for instance "Mips Computer Systems," in Yoffie (1994), op. cit.
17. Burgelman (March 1994), op. cit., p. 41.
18. See "Reshaping Apple Computer's Destiny 1992," in Yoffie(1994), op. cit.
19. See "Intel Corporation (A): The DRAM Decision," Stanford Business School case PS-BP-256, p. 10.
20. See Burgelman (August 1991) and (March 1994), op. cit.
21. Theses two processes are called "strategic context determination" and "strategic context dissolution," respectively. See Burgelman (1996, forthcoming), op. cit.
22. A vivid example from the late 19th century concerns the transition from wind to steam as the dominant means for powering ships. For a while, some ship builders produced hybrids featuring both sails and steam engines. See R. N. Foster, *Innovation: The Attacker's Advantage* (New York, NY: Summit, 1986). Today, in the face of uncertainty as to whether TDMA or CDMA will become the dominant technology in cellular telephony, some telecommunications companies are planning to bring out cellular phones that embody both technologies.
23. We think that strategic recognition and strategic leadership must meet the tests for "statesmanship," put forth by Henry A. Kissinger. Kissinger writes: "The ultimate test of statesmanship...is a combination of *insight and courage* [emphasis provided]. Insight leads to assessments that define a society's freedom of action, while courage enables the statesman to act on his convictions before they are generally understood. Great statesmen operate on the outer margin of their society's capabilities; weak statesmen tend to be overwhelmed by events." See Henry A. Kissinger, Review of "Churchill: The Unruly Giant" by Norman Rose, *The New York Times Book Review*, July 16, 1995, p. 7.
24. See "Reshaping Apple Computer's Destiny 1992," in Yoffie (1994), op. cit.
25. For an assessment framework, see Robert A. Burgelman, "Designs for Corporate Entrepreneurship in Established Firms," *California Management Review,* 26/3 (Spring 1984).
26. Andrew S. Grove, *High Output Management* (New York, NY: Random House, 1983); Andrew S. Grove, "Breaking the Chain of Command," *Newsweek,* October 3, 1983. There is some useful social science literature on the quality of decision making in teams with dissent. One line of inquiry concerns the role of minority views in increasing group performance. There is evidence that distinct minority points of view help generate novel solutions that lead to improved group performance. See, for instance, Charlan Nemeth, "Style without Status Expectations: The Special Contributions of Minorities," in Murray Webster and Martha Foschi, eds., *Status Generalization: New Theory and Research* (Stanford, CA: Stanford University Press, 1988). Another line of inquiry concerns the use of conflict as a means for improving decision effectiveness. Two techniques for introducing conflict in decision processes are "Devil's Advocate" and "Dialectical Inquiry." Devil's Advocate involves assigning an individual or group the task of criticizing a particular course of action. Dialectical Inquiry involves creating a debate between opposing views. See, for instance, Richard A. Cosier and Charles R. Schwenk, "Agreement and Thinking Alike: Ingredients for Poor Decisions," *Academy of Management Executive* (February 1990). Much of this research, however, is based on experiments involving students in contrived settings. A study of how Lyndon Johnson used George Ball as "devil's advocate" in top-level government decision making during the Vietnam war to isolate and defuse, rather than to integrate, a different point of view suggests the potential pitfalls of some of these techniques. See Irving L. Janis, *Victims of GroupThink* (Boston, MA: Houghton Mifflin, 1972) and Irving L.

Janis and Leon Mann, *Decision Making: A Psychological Analysis of Conflict, Choice, and Commitment* (New York, NY: Free Press, 1977).
27. "How H-P Used Tactics of the Japanese to Beat Them at Their Game," *The Wall Street Journal*, September 8, 1994.