"Let a thousand flowers bloom." This slogan, designed to awaken an entire nation to new ideas, offers an apt metaphor for innovation. Innovations, like flowers, start from tiny seeds and have to be nurtured carefully until they blossom; then their essence has to be carried elsewhere for the flowers to spread. And some conditions—soil, climate, fertilizer, the layout of the garden—produce larger and more abundant flowers.

Innovations can grow wild, springing up weed-like despite unfavorable circumstances, but they can also be cultivated, blossoming in greater abundance under favorable conditions. If we understand what makes innovations grow—the microprocess by which they unfold—we can see why some macro-conditions are better for their cultivation.

It is increasingly common among writers to emphasize the nonlinear, slightly chaotic, usually sloppy, sometimes random, and often up-and-down nature of innovation (Quinn, 1985). Taken to an extreme though, as some popular writers have done, it might be tempting to conclude that it is impossible to plan for innovation, manage it, or design an organization structure to support it. This extreme viewpoint holds individual variables like creativity and leadership to be more important than structural variables and, indeed, tends to see organizations in general as negative forces, with innovations generally occurring despite the organization, through accidents, lucky breaks, and bootlegged funds.

My own conclusion, after systematic comparative research (Kanter, 1983), in depth fieldwork, and literature review, is more moderate. Organizational con-
ditions—structure and social arrangements—can actively stimulate and produce innovation, as long as those conditions take into account the "organic," "natural," and even the "wild" side of innovation. Innovation is the creation and exploitation of new ideas. At its very root, the entrepreneurial process of innovation and change is at odds with the administrative process of ensuring repetitions of the past. The development of innovation requires a different set of practices and different modes of organization than the management of ongoing, established operations where the desire for or expectation of change is minimal. Stevenson and Gumpert (1985) have cast this management difference in terms of the contrast between the "promoter" type stance of the entrepreneur, driven by perception of opportunity, and the "trustee"-like stance of the administrator, driven to conserve resources already controlled (see also Hanan, 1976). Structures and practices that may work well for the perpetuation of the known tend to be at odds with innovation.

Innovation—whether technological or administrative, whether in products or processes or systems—tends to have four distinctive characteristics (Kanter, 1985).

1. **The innovation process is uncertain.** The source of innovation or the occurrence of opportunity to innovate may be unpredictable. The innovation goal may involve little or no precedent or experience base to use to make forecasts about results. Hoped-for timetables may prove unrealistic, and schedules may not match the true pace of progress. "Progress on a new innovation," Quinn (1979) wrote, "comes in spurts among unforeseen delays and setbacks... in the essential chaos of development." Furthermore, anticipated costs may be overrun and ultimate results are highly uncertain. Indeed, analysts have variously estimated that it takes an average of 10 to 12 years before the return on investment of new ventures equals that of mature businesses (Biggadike, 1979); 7 to 15 years from invention to financial success (Quinn, 1979); and 3 to 25 years between invention and commercial production (Quinn, 1985).

2. **The innovation process is knowledge-intensive.** The innovation process generates new knowledge intensively, relying on individual human intelligence and creativity and involving "interactive learning" (Quinn, 1985). New experiences are accumulated at a fast pace; the learning curve is steep. The knowledge that resides in the participants in the innovation effort is not yet codified or codifiable for transfer to others. Efforts are very vulnerable to turnover because of the loss of this knowledge and experience. There need to be close linkages and fast communication between all those involved, at every point in the process, or the knowledge erodes.

3. **The innovation process is controversial.** Innovations always involve competition with alternative course of action. The pursuit of the air-cooled engine at Honda Motor, for example, drew time and resources away from improving the water-cooled engine. Furthermore, sometimes the very existence of a potential innovation poses a threat to vested interests—whether the interest is that of a salesperson receiving high commis-
sions on current products, or of the advocates of a competing direction. (Fast, 1979, for example, argues that “political” problems are the primary cause for the failure of corporate New Venture Departments.)

4. **The innovation process crosses boundaries.** An innovation process is rarely if ever contained solely within one unit. First, there is evidence that many of the best ideas are interdisciplinary or interfunctional in origin—as connoted by the root meaning of entrepreneurship as the development of “new combinations”—or they benefit from broader perspective and information from outside of the area primarily responsible for the innovation. Second, regardless of the origin of innovations, they inevitably send out ripples and reverberations to other organization units, whose behavior may be required to change in light of the needs of innovations, or whose cooperation is necessary if an innovation is to be fully developed or exploited. Or there may be the need to generate unexpected innovations in another domain in order to support the primary product, like the need to design a new motor to make the first Apple computer viable.

If innovation is uncertain, fragile, political, and imperialistic (reaching out to embrace other territories), then it is most likely to flourish where conditions allow flexibility, quick action and intensive care, coalition formation, and connectedness. It is most likely to grow in organizations that have integrative structures and cultures emphasizing diversity, multiple structural linkages both inside and outside the organization, intersecting territories, collective pride and faith in people's talents, collaboration, and teamwork. The organizations producing more innovation have more complex structures that link people in multiple ways and encourage them to “do what needs to be done” within strategically guided limits, rather than confining themselves to the letter of their job. Such organizations are also better connected with key external resources and operate in a favorable institutional environment.

Not all kinds of innovation appear everywhere in equal proportions of course. Product innovations are more likely in new entrant organizations and process innovations in established ones. Product innovations are more common in earlier stages of a product's history; process innovations in later stages (Abernathy & Utterback, 1978). Technological innovations are more frequent when resources are abundant; administrative innovations when resources are scarce (Kimberly, 1981). Evolutionary innovations (modest, incremental changes) are more likely in organizations that are more formalized and “centralized”; more revolutionary innovations in organizations that are more complex and “decentralized” (Cohn & Turyn, 1984). But in general, the overall rate of innovation across types should be associated with the circumstances I have outlined.

Some of these structural and social conditions are more important at some points in the innovation process than at others. Like the flowers whose cultivation requires knowledge of its growth pattern, so does the understanding of innovation benefit from examining structural and social facilitators as they wax and wane with the innovation development process. This requires a dynamic model, a com-
bination of a "variance" model of the factors influencing innovation and a "process" model showing how innovation unfolds (Mohr, 1978).

Recent research examining sets of innovations as they unfold over time (Schroeder, Van de Ven, Scudder, & Polley 1986; Van de Ven, 1986) has discredited the usual process models of innovation that posit discrete stages through which an innovation idea progresses. I agree that stage models do not always adequately capture the give-and-take of innovation, and they risk artificially segmenting the process. But I propose that the structural and social conditions for innovation can be understood best if the innovation process is divided into its major tasks.

There are four major innovation tasks, which correspond roughly (but nowhere near exactly) to the logic of the innovation process as it unfolds over time and to empirical data about the history of specific innovations. These tasks are: (a) idea generation and activation of the drivers of the innovation (the "entrepreneurs" or "innovators"); (b) coalition building and acquisition of the power necessary to move the idea into reality; (c) idea realization and innovation production, turning the idea into a model—a product or plan or prototype that can be used; (d) transfer or diffusion, the spreading of the model—the commercialization of the product, the adoption of the idea.

While sometimes occurring in sequence, these tasks also overlap. But by understanding the nature of each task, we can see more easily why certain properties of organizations are related to the success of innovation. This, in turn, contributes to our knowledge of the relationship between structure and behavior, between macro-context and micro-process.

IDEA GENERATION AND INNOVATION ACTIVATION

Innovation begins with the activation of some person or persons to sense or seize a new opportunity. Variously called "corporate entrepreneurs" (Kanter, 1983), "intrapreneurs," "idea generators," or "idea champions" (Galbraith, 1982), such individuals are able to initiate a process of departing from the organization's established routines or systems.

Innovation is triggered by recognition of a new opportunity. Once the opportunity is "appreciated," as Van de Ven (1986) put it, someone needs to supply the energy necessary to raise the idea over the threshold of consciousness, much as Schon (1971) described the emergence of new public policies as a result of being pushed into awareness. The first key problem in the management of innovation, then, is how to get people to pay attention—how to trigger the action thresholds of individuals to appreciate and pay attention to new ideas, needs, and opportunities.

Drucker (1985) has argued that the opportunities that give rise to innovation lie in incongruities and discontinuities—things that do not fit expected patterns or that provide indications that trends may be changing. But unless we are to
assume these are purely individual cognitive abilities, it is important to look at the structural conditions that facilitate the ability to see new opportunities.

**Close Connection with Need Sources**

Opportunity exists because need exists, so it is not surprising that close customer or user contact is an important innovation activator. An often cited national study found that over three-fourths of a set of 500 important industrial innovations owed their origins to user suggestions and even user invention; only one-fifth originated in technical ideas looking for a home (Marquis & Myers, 1969). Users had originated 81% of the innovations in scientific instruments in another study, and 60% of those in process machinery (von Hippel, 1981).

Effective innovation thus derives from active awareness of changing user needs and sometime from direct user demands or solutions. Therefore, structural arrangements and social patterns that facilitate contact across boundaries, between potential innovators and their “market,” help produce more innovation. Potential innovators benefit from being linked directly to the market, to gain a fuller personal appreciation for what users need, as well as from being connected with those functions inside the organization that manage the interface with the outside. Quinn (1985) found that high innovation companies in the United States, Japan, and Europe were characterized by a strong market orientation at the top of the company and mechanisms to ensure interaction between technical and marketing people at lower levels. At Sony, for example, new technical hires were assigned to weeks of retail selling as part of their orientation. In the prosperous years for People Express Airlines, the incentive system was designed to ensure that all executives spend at least some time each year flying as crew on their planes.

Van de Ven (1986) hypothesized that direct personal confrontations with problem sources are needed to reach the threshold of concern and appreciation required to motivate people to act. Perhaps this is why it has been observed that well-managed companies search out and focus on their most demanding customers, not the ones who are easily satisfied. Similarly, successful examples of innovations offered by managers in high technology firms tended to involve radical redefinition of the product or service as a result of encounters with the “real world” of customers or users—direct, first-hand experience of their need (Delbecq & Mills, 1985).

Raytheon’s New Products Center demonstrates this principle in action. The center services a series of consumer products divisions, and also it has two levels of “users” and need sources: its internal divisional customers and the ultimate external consumer. Center practices involve frequent visits and tours to all of these need sources. Technical staff routinely attend trade shows, tour manufacturing facilities, and browse at retail outlets, striking up conversations with consumers.

Extra-organizational ties with users can be formalized, to ensure continuing close connection. Many computer and software companies have formed user groups, which allow them to gather ideas for new products and product improve-
ments. Some manufacturing application laboratories solicit proposals from their customers for things they might work on (von Hippel, 1981).

These principles apply to internal administrative or organizational innovations as well as technological or product innovations. I propose, based on field observations, that those staff groups successful at creating innovations are the ones with the closest connections with the needs in the field; Honeywell's corporate human resources staff, for example, has created "councils" of key executives to ensure the continuing relevance of its offerings to the changing needs of users.

In general, then, innovation activation benefits from structural or social connections between those with the technical base (potential innovators) and those with the need (potential users). Indeed, one research group found that a higher proportion of new products failed for "commercial" reasons (misreading the need) rather than technical ones, indicating a poor interface between developers and users (Mansfield, Rapoport, Schnee, Wagner, & Hamburger, 1981).

"Kaleidoscopic Thinking": Cross Fertilization

Awareness of need is one element; ability to construct new ways to address the need is a second. I have come to refer to the creativity involved in activating innovation as "kaleidoscopic thinking" (Kanter, 1986).

The kaleidoscope is an apt metaphor for the creative process, because the kaleidoscope allows people to shake reality into a new pattern. In a kaleidoscope a set of fragments form a pattern. But the pattern is not locked into place. If the kaleidoscope is shaken or twisted, or the angle of perspective is changed, the same fragments form an entirely new pattern. Often, creativity consists of rearranging already existing pieces to create a new possibility. For example, Malcolm McLean did this about 30 years ago when he developed the concept for Sea-Land, the first company to offer containerized shipping. Before Sea-Land, shipping was a tedious matter of packing and unpacking crates in order to move objects from one form of transportation to another. McLean's innovation was simple: move the whole container.

Contact with those who see the world differently is a logical prerequisite to seeing it differently ourselves. "Cosmopolitan" rather than "local" orientations—seeing more of the world—has been identified by many researchers as a factor in high rates of innovation (Rogers & Shoemaker, 1971). So the more innovative organizational units who face outward, as well as inward, taking in more of the world around them, and taking better advantage of "boundary spanners" to bring them intelligence about the world beyond (Robertson & Wind, 1983; Tushman, 1977). High-performing research and development (R&D) project groups have far greater communication with organizational colleagues outside the group than low-performing teams (Allen, 1984); sometimes this communication occurs in two steps, mediated by certain communication "stars" who then transmit it to the rest of the group (Tushman, 1979).

One classic set of studies of research scientists found that the most productive and creative ones were those who had more contacts outside their fields, who
spent more time with others who did not share their values or beliefs (Pelz & Andrews, 1966). At the same time, the dangers of closing off were also clear. It took only 3 years for a heterogeneous group of interdisciplinary scientists who worked together every day to become homogeneous in perspective and approach to problems. Sociologists have used the terms “occupational psychosis” and “trained incapacity” to describe the tendency for those who concentrate on only one area and interact only with those who are similar in outlook to become less able over time to learn new things.

The “twists” on reality causing creativity may derive from uncomfortable situations where basic beliefs are challenged and alternatives suggested. It is not surprising, then, that the patterns in most large, established bureaucracies inhibit rather than activate innovation. Once people enter a field, they spend most of their time (especially their discretionary time) with other people just like them who share their beliefs and assumptions. At the top, leaders are increasingly insulated from jarring experiences or unpleasant occurrences that cause them to confront their assumptions about the world, and they spend an increasing portion of their time with people exactly like themselves. And if corporate culture encourages an orthodoxy of beliefs and a nonconfrontational stance, then idea generation is further discouraged.

Cross-fertilization of ideas instead comes from cross-disciplinary contact. Creativity often springs up at the boundaries of specialties and disciplines, rather than squarely in the middle. It is often a matter of combining two formerly separate ideas—wafers and ice cream making the world’s first ice cream cone. A large oil company considers one of its greatest innovations the development of a new, highly useful chemical compound that was created because researchers from two distinct fields collaborated. Ocean Spray staged a comeback for cranberry juice because a marketing executive spent time learning about packaging; the company was the first in its industry to put juice in paper bottles. Some organizations actively facilitate cross-disciplinary exchange through product fairs or cross-division “show and tell” meetings or cross-functional teams that visit customers together (Tushman & Nadler, 1986).

But when departments of specialties are segmented and prevented from contact, when career paths confine people to one function or discipline for long periods of time, and when communication between fields is difficult or excessively formal, creativity is stifled. Huge buildings consisting of all those in one field, physically separated from people in another field, make contact impossible.

Under that kind of circumstance, outsiders may be better able to see the big picture and take a new angle on the pattern, because they are not yet aware of all the details the “experts” see that inevitably confirm the view that no change is possible. People too close to a situation often become hopeless about change, blind to the possibilities.

Thus, a great deal of important industrial innovation comes from what Schon (1967) called “innovation by invasion”: a new player enters the game, bringing a new method or technique. For example, half of all major innovations in pharmaceuticals from 1935 to 1962 were based on discoveries made outside the firm that later exploited them (Mansfield et al., 1981). It was Apple that first
successfully commercialized the personal computer; IBM was a latecomer—and it is hard to imagine more outsiderlike amateurs than Steve Jobs and Steve Wozniak. Similarly, in my study of leading companies, newly appointed managers who came from a different field by an unusual career route—in a word, outsiders—were somewhat more likely to innovate than those who rose by orthodox means (Kanter, 1983).

In general, then, contact with those who take new angles on problems facilitates innovation.

**Structural Integration: Intersecting Territories**

Activation of innovation is encouraged by structural integration across fields—by intersecting territories. Researchers have long observed that “communication integration” (closer interpersonal contact or connectedness via interpersonal communication channels in an organization) is positively related to the innovation rate (Rogers & Shoemaker, 1971; Tushman & Nadler, 1986). Isolation of individuals and units tends to reduce innovation at the idea generation stage by limiting awareness of opportunity, alternative approaches, and the perspective of those functions who need to contribute other “parts” to make the innovation add up to a “whole.” (Van de Ven, 1986, considered the management of part-whole relationships one of the four critical innovation tasks.) These who are isolated, in short, are less attuned to alternatives than those who are well-connected.

“Matrix” organization structures (Davis & Lawrence, 1977) are highly integrative, and it is not accidental that they were first developed to aid technological innovation—the large-scale development projects in the aerospace industry—and are found more frequently in rapidly changing, highly innovating organizations (Kanter, 1983). Matrix organizations, in which mid-level employees report to both a project boss and a functional boss, force integration and cross-area communication by requiring managers from two or more functions to collaborate in reaching a decision or taking some action. This is frequently characterized as a “dotted line” relationship for those in one department to another department, signifying a working relationship but not always direct authority.

By requiring extensive cross-functional consultation, the matrix diffuses authority among a group of managers. In many instances, this opportunity can be used in a positive manner by particularly entrepreneurial managers who are able to envision alternatives and assume responsibility for pursuing them—alternatives that cut across territories.

In general, measures of complexity and diversity in an organization are positively related to initial development of innovations (though they are sometimes negatively related to eventual acceptance of the same innovation by the rest of the organization). Diversity gives the individual more latitude for discovery, but may make it difficult later to get agreement on which many proposals or demonstration projects should be implemented on a wider scale. Similarly, innovation is aided by low formalization at the initiation stage, when freedom to pursue untried possibilities is required.
Therefore, to produce innovation, more complexity is essential: more relationships, more sources of information, more angles on the problem, more ways to pull in human and material resources, more freedom to walk around and across the organization (also see Burns & Stalker, 1968; Mintzberg, 1981). One does not need a formal matrix structure to do this. Indeed, it is the general characteristics of an integrative structure that make a difference in terms of encouraging innovation: looser boundaries, crosscutting access, flexible assignments, open communication, and use of multidisciplinary project teams. So specifying multiple links between managers in a formal sense (through showing more than one solid-line or dotted-line reporting relationship on an organization chart) is merely a way of acknowledging the interdependencies that complex products and innovative projects require.

Dividing the organization into smaller units based on a common end use goal but not around function or specialty also aids activation of innovation by producing structural integration at micro-level. When it comes to innovation, “small is beautiful,” and flexible is even better (see Quinn, 1985). Or at least small is beautiful as long as the small unit includes all functions or disciplines and forces contact across them. Cross-fertilization across disciplines and a focus on users is built into the structure.

The idea of dividing into smaller but complete business units has been appealing to organizations seeking continual innovation. In smaller business units it is possible to maintain much closer working relationships across functions than in larger ones—one of the reasons for Hewlett-Packard’s classic growth strategy of dividing divisions into 2 when they reached more than 2,000 people or $100,000,000 in sales. Even where economies of scale push for larger units, the cross-functional project or product team within a single facility (captured in such ideas as the factory-within-a-factory) helps keep the communication and the connection alive.

**Broad Jobs**

Idea generation is also aided when jobs are defined broadly rather than narrowly, when people have a range of skills to use and tasks to perform to give them a view of the whole organization, and when assignments focus on results to be achieved rather than rules or procedures to be followed. This, in turn, gives people the mandate to solve problems, to respond creatively to new conditions, to note changed requirements around them, or to improve practices, rather than mindlessly following procedures derived from the past.

Furthermore, when broader definitions of jobs permit task domains to overlap rather than divide cleanly, people are encouraged to gain the perspective of others with whom they must now interact and therefore to take more responsibility for the total task rather than simply their own small piece of it. This leads to the broader perspectives that help stimulate innovation.

In areas that benefit from more enterprise and problem solving on the part of job holders, broader jobs seem to work better. This is the principle behind work
systems that give employees responsibility for a major piece of a production process and allow them to make decisions about how and when to divide up the tasks. Pay-for-skill systems similarly encourage broader perspectives by rewarding people for learning more jobs (Tosi & Tosi, 1986).

Does this argument conflict with the numerous findings that adoption of innovation is more likely in organizations with more specialists and professionals? (E.g., Hage and Aiken's [1967] conclusion that the rate of innovation is higher when there are occupational specialties, each with a greater degree of professionalism.) No, because while specialized knowledge is an asset, confinement to a limited area and minimal contact with other professionals inhibits the ability for experts to use their knowledge in the service of change.

Potential innovators can become interested in a particular issue that develops into an innovation for several reasons. The initial impetus for innovation activation can stem from (a) an obligation of his or her position (March & Olsen, 1979); (b) a direct order; (c) a stimulus from the environment or "galvanizing event" (Child, 1972; Kanter, 1983); (d) self-motivated, entrepreneurial behavior; (e) organizational rewards and payoffs; or (f) accidental conditions (Perrow, 1981).

While much of the literature emphasizes the random, spontaneous, or deviant aspects of idea generating, some research has found that the nature of job assignments can be an activating force—either directly, because the assignment requires a new solution, or indirectly by allowing a scanning process to occur beyond what is programmed into the position. Job assignments (new ones or simply those understood as part of the job) stimulated a high proportion (51%) of the innovations in one study (Kanter, 1983). Managers did not necessarily have to think up projects by themselves to begin acting as organizational entrepreneurs; their enterprise came from accepting the responsibility and finding a way to build something new while carrying out an assigned task.

What is important is not whether there is an assignment, but its nature: broad in scope, involving change, and leaving the means unspecified, up to the doer. In my study, a manager's formal job description often bore only a vague or general relationship to the kinds of innovative things the manager accomplished (Kanter, 1983). Indeed, the more jobs are "formalized," with duties finely specified and "codified," the less innovation is produced in the organization. An emphasis on the "numbers" (a quantitative versus a qualitative thrust in jobs) and on efficiency also depresses the amount of innovation. "Low formalization," on the other hand, is associated with more innovativeness (Hage & Aiken, 1967).

Broad assignments are generally characteristics of staff managers in problem solving or bridging positions who have a general change mandate to "invent something" or "improve something." The innovation-producing companies are often marked by a large proportion of problem solvers in operating departments who float freely without a "home" in the hierarchy and thus must argue for a budget of find a constituency to please. The incentive to enterprise is the lack of defined tasks (Kanter, 1983). Thus, organizational slack (Galbraith, 1982) and stack in assignments enables the activation of innovation.
The more routinized and rules-bound a job is, the more it is likely to focus its performers on a few already-known variables and to inhibit attention to new factors. Starbuck (1983) argued that highly programmed jobs are like superstitious learning, recreating actions that may have little to do with previous success or future success. Overly elaborate and finely detailed structures and systems make organizational participants unable to notice shifts in their environment and the need for innovation, especially if they are required to send “exceptions” somewhere else for processing.

Where jobs are narrowly and rigidly defined, people have little incentive to engage in either “spontaneous” innovation (self-generated, problem-solving attempts with those in neighboring tasks) or to join together across job categories for larger top-directed innovation efforts—especially if differences in job classification also confer differential status or privilege. Companies even lose basic efficiency as some tasks remain undone while waiting for the person with the “right” job classification to become available—even though others in another classification may have the skills and the time. And people tend to actively avoid doing any more work than the minimum, falling back on the familiar excuse. “That’s not my job”—a refrain whose frequent repetition is a good sign of a troubled company.

Organizational Expectations for Innovation

Even if people are able to generate new ideas in the innovation activation stage, they must also feel confident that their attempts at innovation will be well received. The signals they receive about the expectations for innovation play a role in activating or inhibiting innovation.

One way organizations signal an expectation for innovation is by allocating funds specifically for it. In one study comparing innovation successes with failures, it was found that the failures were handicapped by a lack of resources anywhere other than in already committed operating budgets, while the successes benefitted from the existence of special innovation funds (Delbecq & Mills, 1985). Despite all the heroic glamour of associating innovation with “bootlegging” funds spent on the sly, it is clearly easier to innovate when funds exist for this purpose.

Since innovations generally require resources beyond those identified in operating budgets (Kanter, 1983) for reasons that are logical—the exact nature and timing of innovation is often unpredictable—the existence of multiple sources of loosely committed funds at local levels makes it easier for potential innovators to find the money, the staff, the materials, or the space to proceed with an entrepreneurial idea. Because no one area has a monopoly on resources, there is little incentive to hoard them as a weapon; instead, a resource holder can have more influence by being one of those to fund an innovative accomplishment than by being a nay sayer. Thus, managers at one computer company could go “tin-cupping” to the heads of the various product lines in their facility who had big budgets, collecting a promise of a little bit of funding from many people (Kanter, 1983). This
process reduced the risk on the part of all “donors” at the same time that it helped maintain the “donee’s” independence.

Sheer availability of resources helps, of course. Research shows that richer and more successful organizations innovate more than poorer and less successful ones, especially in technology areas (Kimberly & Evanisko, 1979; Kimberly, 1981; Zaltman, Duncan, & Holbek, 1973).

There are a variety of ways that high innovation companies make resources accessible locally or give middle-level people alternatives to tap when seeking money or materials for projects. One is to have formal mechanisms for distributing funds outside the hierarchy. 3M has put in place “innovation banks” to make “venture capital” available internally for development projects. Honeywell divisions have top-management steering committees guiding their organizational-change activities. The original steering committee solicited proposals quarterly from any employee for the formation of a problem-solving task team; the teams may receive a small working budget as needed. Also, “decentralization” keeps operating units small and ensures that they have the resources with which to act, and thus makes it more likely that managers can find the extra they need for an innovation locally.

Of course, some innovations, particularly organization ones, can be handled without money at all. Instead, the most common resource requirement in one study was staff time (Kanter, 1983). This was also decentralized in the form of “slack” and local control: people locally available with uncommitted time, or with time that they could decide to withdraw from other endeavors to be attached to an appealing project. Because mid-level personnel, professionals, and staff experts had more control over the use of their time in the more frequently innovating companies, it was easier to find people to assist in a project, or to mobilize subordinates for a particular activity without needing constant clearances from higher-level, nonlocal bosses.

A second general source of expectations for innovation lies in whether the organization’s culture pushes “tradition” or “change.” Innovators and innovative organizations generally come from the most modern, “up-to-date” areas rather than traditional ones with preservationist tendencies, and they are generally the higher-prestige “opinion leaders” that others seek to emulate (Rogers & Shoemaker, 1971; Hage & Dewar, 1973). But opinion leaders are innovative only if their organizations’ norms favor change; this is why the values of the leaders are so important. Most people seek to be culturally appropriate, even the people leading the pack. There is thus more impetus to seek change when this is considered desirable by the company.

Pride in company, coupled with knowing that innovation is mainstream rather than countercultural, helps to stimulate innovation (and occurs as a result of innovation as well). A feeling that people inside the company are competent leaders, that the company has been successful because of its people, supports this. For instance, of the companies in one study, Polaroid Corporation knew that it is the technological leader in its field; Hewlett-Packard prided itself on its people-centered corporate philosophy, the H-P way, as well as on its reputation for quality, important in its retention of customers (Kanter, 1983).
Such cultures of pride stand out in sharp distinction to the cultures of inferiority that lead less innovating companies to rely on outsiders for all the new ideas, rather than on their own people.

Success breeds success. Where there is a "culture of pride," based on high performance in the past, people's feeling of confidence in themselves and others goes up. They are more likely to take risks and also to get positive responses when they request cooperation from others. Mutual respect makes teamwork easier. High performance may cause group cohesion and liking for workmates as well as result from it (Staw, 1975); pride in the capacity and ability of others makes teamwork possible. In an extension of the "Pygmalion Effect" to the corporation, supervisors who hold high expectations of subordinate's abilities (based on independent evaluations) may enhance that person's productivity (Wortman & Linsenmeier, 1977).

Thus, organizations with "cultures of pride" in the company's achievements and in the achievements and abilities of individuals will find themselves more innovative. This is why formal awards and public recognition make a difference—sometimes less for the person receiving them (who has, after all, finished an achievement) than for the observers in the same company, who see that the things they might contribute will be noticed, applauded, and remembered.

It is a self-reinforcing upward cycle—performance stimulating pride stimulating performance—and is especially important for innovation. Change requires a leap of faith, and faith is so much more plausible on a foundation of successful prior experiences.

Finally, feeling valued and secure helps people relax enough to be creative, as Amabile's (1983) experiments on the conditions facilitating creative problem solving indicate. Groups were asked to solve problems in one of two conditions, and the creativity of their solutions was rated. In condition I, they were paid for their participation before they began to work. In condition II, which tended to resemble the corporate norm, they were paid on a contingency basis, depending on how well their group performed. In which condition were groups more creative? The first, the one that can be called a high security/high value condition. Knowing that they were already paid, members could relax, and they could assume that they were with a set of talented people. Without the tension that worry about paycheck might have caused, they could free themselves to be much more creative. Furthermore, they "rose to the occasion": because expectations for innovation were set by advance pay, they innovated.

Integration versus Isolation

Overall, I argue that the generation of new ideas that activates innovation is facilitated by organizational complexity: diversity and breadth of experience, including experts who have a great deal of contact with experts in other fields; links to users; and outsiders, openness to the environment; and integration across fields via intersecting territories, multiple communication links, and smaller interdisci-
plinary business units. Conversely, isolation, or what can be termed "segmentalism" (Kanter, 1983), inhibits this critical first phase of innovation.

It is important to explain an apparent contradiction in the literature here. Some analysts appear to argue that innovation does indeed require isolation, a special organization separated from the rest and dedicated to innovation. For example, Galbraith (1982) argued that innovation requires an organization specifically designed for that purpose, with a structure, processes, rewards, and people combined in a special way; he also made clear that his focus was on "good ideas that do not quite fit into the organization's current mold." But note that the "good idea" already exists, and the special organization is designed to focus on developing and elaborating it without distraction once it has been identified. Thus, isolation of the innovator group appears appropriate later in the process, when project ideas have been formulated.

To generate ideas in the first place, a great deal of diverse outreach is involved. R&D units that remain isolated are less creative than those that maintain close integration in the search of exploration stage. Recall the example of the Raytheon new products department, a unit with an unusually strong track record of creative outputs. It is indeed physically isolated from the rest of the organization to allow it to work on projects undistracted. But to generate ideas and activate innovation in the first place, department members immerse themselves in the world outside the lab, wandering around the organization, seeking problems to work on from their dense network of ties in other units, attending professional conferences in scientific fields other than their own, going to trade shows to view the exhibits, etc.

COALITION BUILDING

Once a specific project idea has taken shape, it must be sold—a necessity even when the innovator was initially been handed the area as an assignment. It must be sold because the initial assignment, though bearing some legitimacy, may contain no promises about the availability of resources or support required to do something of greater magnitude than routine activities (Kanter, 1982; 1983). Thus, the second task of the innovation process involves coalition building, acquiring power by selling the project to potential allies.

Overwhelmingly, studies of innovation show the importance of backers and supporters, sponsors and friends in high places, to the success of innovation (Quinn, 1979; Maidique, 1980). Galbraith (1982) distinguished the roles of "sponsor"—those who discover and fund the increasingly disruptive and expensive development and testing efforts that shape an innovation—and "orchestrator"—managers of the politics surrounding a new idea. Observing that sponsors were usually middle managers and orchestrators were higher level executives, he argued that these informal roles could be formalized, with sponsors given resources earmarked for innovation, and orchestrators allocating time to protecting innovations-in-progress.
While most studies emphasize single roles (the "champion," the "sponsor"), detailed accounts of the history of innovations reveals the importance of a whole coalition, embryonic and informal or assembled and formal (Summers, 1986). Van de Ven (1986), in a similar vein, focuses not on a single sponsor but on the importance of transactions or "deals" in the innovation process, and he sees the management of the innovation process as managing increasing bundles of transactions over time. Indeed, he and his colleagues found, in a comparative study of seven very different large scale innovations in different sectors, that "much more than sponsorship" was involved; higher management, one or two levels removed from the innovation was directly involved in making major decisions about the project and often "ran interference" for it as well as securing necessary resources (Schroeder et al., 1986). Furthermore, a comparison of over 115 innovations found in the successful ones a set of allies, often peers from other areas as well as more senior managers, behind successful innovations, ranging from the "stakeholders" who would be affected if the project was implemented to the "power sources" who contributed the tools to ensure that implementation (Kanter, 1983).

Thus, it is more appropriate to conceptualize the second major innovation task as coalition building, a broader notion that ties in more of the organization, rather than as seeking sponsorship, a narrower concept. In general, the success of an innovation is highly dependent on the amount and kind of power behind it. In contrast, innovation failures are characterized by ambivalent support; inadequate resources during the initial fragile stages of development; constant efforts to "sell" and "justify"; and personalized infighting over resources (Delbecq & Mills, 1985).

Thus, the effectiveness of the political activity the innovation entrepreneur engages in, coupled with structural conditions conducive to power acquisition and coalition building, may largely account for whether an idea ever moves into the later phase of innovation production. Social and political factors, such as the quality of the coalition building, may account for as much or more than technical factors, such as the quality of the idea, in determining the fate of innovation.

Research shows that there are some kinds of ideas that are inherently better able to attract support. The most salable projects are likely to be trialable (can be demonstrated on a pilot basis—see especially Delbecq & Mills, 1985); reversible (allowing the organization to go back to pre-project status if they do not work); divisible (can be done in steps of phases); consistent with sunk costs (build on prior resource commitments); concrete (tangible, discrete); familiar or compatible (consistent with a successful past experience and compatible to existing practices); congruent (fit the organization's direction); and have publicity value (visibility potential if they work) (Kimberly, 1981; Zaltman et al., 1973). When these features are not present, as they are unlikely to be in more "radical" innovations, then projects are likely to move ahead if they are either marginal (appear off-to-the-side-lines so they can slip in unnoticed) or idiosyncratic (can be accepted by a few people with power without requiring much additional support) (Zaltman et al., 1973; Kanter, 1983).
The features of successful ideas have more to do with the likelihood of gathering political support than with the likelihood of the idea to produce results. In general, the relative economic advantage of a new idea, as perceived by members of an organization, is only weakly related to its rate of adoption (Rogers & Shoemaker, 1971). Instead, "political" variables may play a larger role, especially the acquisition of "power tools" to move the idea forward.

**Power Tools**

Organizational power tools consist of supplies of three "basic commodities" that can be invested in action: information (data, technical knowledge, political intelligence, expertise); resources (funds, materials, space, time); and support (endorsement, backing, approval, legitimacy) (Kanter, 1983).

To use an economic strategy, it is as though there were three kinds of "markets" in which the people initiating innovation must compete: a "knowledge market" or "marketplace of ideas" for information; an "economic market" for resources; and a "political market" for support or legitimacy. Each of the "markets" is shaped in different ways by conditions in the environment (e.g., critical contingencies, resource scarcity; Pennings & Goodman, 1977; Pfeffer & Salancik, 1977), and by organizational structure and rules (e.g., how openly information is exchanged, how freely executives render support). And each gives the person a different kind of "capital" to invest in a "new venture" (also see Pfeffer & Salancik, 1977).

We can hardly speak of "market" at all, of course, where the formal hierarchy fully defines the allocation of all three commodities, for example, when money and staff time are available only through a predetermined budget and specified assignments, when information flows only through identified communication channels, and when legitimacy is available only through the formal authority vested in specific areas with no support available for stepping beyond official mandates. In organizations where there is really no market for exchanging or rearranging resources and data, for acquiring support to do something outside the formal structure, because it is tightly controlled either by the hierarchy or by a few people with "monopoly" power, then little innovative behavior is likely. Indeed, when people feel "powerless" through structural locations that limit them access to the tools, they become more controlling and conservative (Kanter, 1977; Kanter & Stein, 1979).

While some portion of the power innovators need may be already attached to their positions and available for investing in an innovation, the rest must be sought through allies. Thus, the organization's structure determines the amount and availability of power via both the distribution of power tools and the ease with which coalitions can be formed. Access to external and internal sources of power increases an innovation entrepreneur's chances of successfully creating an innovation.
Coalition Structure

Which parties are potential coalition members? Principally those on whom the innovator may be dependent—where there is interdependency affecting the fate of the idea. The concept of organizational interdependency has both a technological (Thompson, 1967) and a political (Pfeffer, 1981) component.

First, people often form interdependent relationships because of mutual task dependence. For example, a manager in a finance department may require financial information on operations costs from a production manager, who in turn receives back the financial information in some evaluated or analyzed form and uses it to assess production efficiency. The timeliness and quality of the information provided by each manager affects the other's work.

Second, interdependencies may be political in nature, since organizations are tools for "multiple stakeholders" (Kanter, 1980); managers identify and seek out others with complementary and sometimes competing interests for the purpose of trading resources, demands, etc. (March, 1962; Cyert & March, 1963). Networks of interdependent members also form where people are joined by a variety of links through which goods, services, information, affect and influence flow (Tichy & Fombrun, 1979; also see Kaplan & Mazique, 1983).

In short, there are many types of interdependent relationships: hierarchical (Weber, 1978; Schilit & Locke, 1982); lateral (Thompson, 1967; Burns & Stalker, 1968); oblique (Kaplan & Maidique, 1983). In addition, people also work in the midst of multiple constituencies that are defined by common political or organizational interests and include persons outside the formal boundaries of the organization (Pennings & Goodman, 1977; Connolly, Conlon, & Deutsch, 1980). Constituencies may form around task, issues, attempts to create change or block change, or salient values.

The size of the coalition is affected by how many territories the innovation crosses. The broader the ramifications of the issues involved in the proposed innovation and the greater the attendant uncertainties, the larger the coalition of supporters needs to be if the idea for innovation is to result in product action (Thompson, 1967).

Mobilizing a few potential members into an active, visible coalition also mirrors a classic dilemma in organization theory, that of finding the appropriate mix of inducements to obtain the desired contributions and work behavior from employees (Barnard, 1938). The inducements an innovator can offer to participate in a coalition include a variety of payments, such as financial incentives, resources, information, policy promises, learning experience, personal development, or emotional satisfaction (March, 1962; Riker, 1962; Gamson, 1968). The exchange of inducements for coalition participation can also extend across both vertical and lateral levels of an organization (e.g., Dalton, 1959; Blau, 1963).

Mobilizing coalition members through exchange assumes that "commodities" are available for trade, and that the organizer had some control over their distribution (managers we interviewed often referred to this process as one of
"horse trading"). Such commodities used to mobilize coalition members can also serve as the basis of organizational power; e.g., resources, slack, information, and political support (Mechanic, 1962; Kanter, 1977).

Access to these commodities depends to a large degree on their distribution within the firm; their munificence increases the ability to draw people into coalition that can work on an innovation.

Because corporate entrepreneurs often have to pull in what they need for their innovation from other departments or areas, from peers over whom they have no authority and who have the choice about whether or not to ante up their knowledge, support, or resources, to invest in and help the innovator, their work is facilitated by integrative devices that aid network formation and collaboration across areas; open communication; frequent mobility, including lateral career moves; extensive use of formal team mechanisms; and complex ties permitting crosscutting access.

Communication Density

Innovation flourishes where "communication integration" is high (Rogers & Shoemaker, 1971). Open communication patterns make it easier to identify and contact potential coalition members and to tap their expertise.

Examples of "open communication" systems from innovating companies stress access across segments. "Open door" policies mean that all levels can, theoretically, have access to anyone to ask questions, even to criticize. At several high innovation companies examined in one study, there were policies barring closed meetings. In others, the emphasis was on immediate face-to-face verbal (not written) communications (Kanter, 1983), unlike "mechanistic," low innovation organizations where written communications prevail (Burns & Stalker, 1968). Such open communication norms acknowledge the extent of interdependence—that people in all areas need information from each other.

"Openness" at such organizations is reflected in physical arrangements as well. There may be a few "private" offices, and those that do exist are not very private. One manager had a "real" office enclosed by chest-high panels with opaque glass, but people dropped by casually, hung over the walls, talked about anything, and looked over his desk when he was not there. In general, people walk around freely and talk to each other; meetings and other work are easily interrupted, and it is hard to define "private" space. They often go to the library or conference room to "hide" to get things done, especially on "sensitive" matters like budgets (Kanter, 1983).

Open communication serves a very important function for the potential innovator. Information and ideas flow freely and were accessible; technical data and alternative points of view can be gathered with greater ease than in companies without these norms and systems. And thus both the "creative" and the "political" sides of innovation are facilitated.
Network Density

Coalition formation in the interest of innovation is also aided by conditions that facilitate dense ties through networks. Circulation of people is a first network-facilitating condition. Mobility across jobs means that people rather than formal mechanisms are the principle carriers of information, the principal integrative links between parts of the system. Communication networks are facilitated (see Thurman, 1979-1980), and people can draw on first-hand knowledge of each other in seeking support. Knowledge about the operations of neighboring functions is often conveyed through the movements of people into and out of the jobs in those functions. As a set of managers or professionals disperse, they take with them to different parts of the organization their "intelligence," as well as the potential for the members to draw on each other for support in a variety of new roles. In just a few moves, a group that has worked together is spread around, and each member now has a close colleague in any part of the organization to call on for information or backing.

A second network-forming device is more explicit: the frequent use of integrative team mechanisms at middle and upper levels. These both encourage the immediate exchange of support and information and create contacts to be drawn on in the future. The organizational chart with its hierarchy of reporting relationships and accountabilities reflects only one reality in innovating organizations; the "other structure," not generally shown on the charts, is an overlay of flexible, ad hoc problem-solving teams, task forces, joint planning groups, and information-spreading councils.

It is common at innovating, entrepreneurial companies to make the assignments with the most critical change implications to teams across areas rather than to individuals or segmented units for example, at one company a team of mixed functional managers created a five-year production and marketing plan for a new product. This was a model of the method that top management endorsed for carrying out major tasks and projects. At a computer company, the establishment of formal interdepartmental or cross-functional committees was a common way managers sought to improve the performance of their own unit (Kanter, 1983).

The legitimacy of crosscutting access promotes the circulation of all three of the power tools: resources, information, and support. This allows innovators to go across formal lines and levels in the organization to find what they needed—vertically, horizontally, or diagonally—without feeling that they are violating protocol. They can skip a level or two without penalty. This is essential if there is to be hands-on involvement of managers up several levels, as Schroeder et al. (1986) found characteristic of large-scale innovations.

Matrix designs, though not essential for crosscutting access, can be helpful in legitimizing it, for the organization chart shows a number of links from each position to others. There is no "one boss" to be angered if a subordinate manager goes over his head or around to another area; it is taken for granted that people move across the organization in many directions; and there are alternative sources
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of power. Similarly, formal cross-area and cross-hierarchy teams may provide the occasion and the legitimacy for reaching across the organization chart for direct access (Kanter, 1983).

IDEA REALIZATION AND INNOVATION PRODUCTION

The third task of the innovation process involves assembling a working team to “complete” the idea by turning it into a concrete and tangible object (physical or intellectual) that can be transferred to others. The idea becomes a reality; a prototype or model of the innovation is produced that can be touched or experienced, that can now be diffused, mass-produced, turned to productive use, or institutionalized.

There are a number of critical organizational issues related to the ability to move a innovation through this phase. These issues join with social psychological (intragroup) variables to account for the performance of the group responsible for producing the innovation model.

Physical Separation

While structural isolation is a liability for idea generation or innovation activation, it is an asset for idea completion or innovative production.

Differentiated innovation units, separated from ongoing operations in both a physical and an organizational sense, are not necessary to stimulate or activate innovation (a task for which isolation is counter-productive), but they do appear helpful for ensuring that the working out of the innovation, the production of the initial model, actually occurs. Lockheed’s term, “skunkworks,” (taken from a Peanuts cartoon) has been used to refer to the special setting where innovation teams can create new things without distractions.

Galbraith (1982) has argued for the importance of “reservations”—organizational units, such as R&D groups, totally devoted to creating new ideas for future businesses—havens for “safe learning” managed by a full-time sponsor. Reservations can be internal or external, permanent or temporary. Galbraith found that some innovations, including the new electronics product he studied, were perfected at a remote site before being discovered by management; thus “the odds [for innovation] are better if early efforts to perfect and test new ‘crazy’ ideas are differentiated—that is, separated—from the function of the operating organization” (Galbraith, 1982).

High innovation companies in the United States, Europe, and Japan have flatter organizations, smaller operating divisions, and smaller project teams (Quinn, 1985). Small teams of engineers, technicians, designers, and model makers are placed together in “skunkworks,” with no intervening organizational or physical barriers to developing the idea to prototype stage. Even in Japanese organizations supposedly known for elaborate (and slow) consensus-building proc-
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esses, innovation projects are given autonomy, and top managers often work directly on projects with young engineers, including the founder of Honda himself. This approach eliminates bureaucracy, allows fast and unfettered communication, enables rapid turnaround time for experiments, and instills a high level of group loyalty and identity by maximizing communication and commitment among team members.

Boundary Management

If small, separate units aid idea model production, then boundary management is a particular problem. The team must continue to procure information and resources and return output to the rest the organization (Gladstein & Caldwell, 1984), but without becoming so outwardly focused that ability to do the job is jeopardized.

Success in building the innovation may be a function of how well external relations are handled as much as the technical feasibility of the idea. On the one hand, those who are prone to interfere must be kept from distracting the focus of the working team; on the other hand, the stakeholders, coalition members, and others whose support will be required at the transfer phase must be communicated with and involved, to ensure their support. The group must both buffer itself against too much input from its environment (Thompson, 1967) as well as manage the demand for what it is producing so that it has an appropriate level-of exchange with the world around it—not too much, and not too little.

While many analysts have argued that "gatekeeping" is an important function in the management of innovation. Gladstein and Caldwell (1984) have gone further by identifying four boundary management roles in the new product teams they studied, roles that can all be played by one person or distributed throughout the group:

- Scouts, bringing in information or resources needed by the groups;
- Ambassadors, carrying out items that the group wants to transmit to others;
- Sentries, controlling the transactions that occur at the boundaries, deciding how much can come in;
- Guards, controlling how much goes out of the group.

Whereas scouts and ambassadors keep extra group relationships smooth and get the group its needed supplies, sentries and guards buffer the group from outside interference. But note that all of these roles may be played by one person or just a few people, allowing the rest of the group to work on tasks without paying any attention to the world outside the project team. In the much publicized case of the building of a new computer at Data General, the project manager and his two aides handled all of the boundary tasks, allowing the team members to focus on completing the project in what proved to be record time (Kidder, 1981).
Boundary management is important not merely to get the working group what it needs and save it from unnecessary interference but also to handle any subtle threats to the continued existence of the innovation project. In one study, it was striking how little overt opposition is encountered by entrepreneurial managers—perhaps because their success at coalition building determines whether a project starts at all. Opposition or resistance seemed to take a more passive form instead: criticism of specific details of the plan, foot-dragging, low response to requests, unavailability, or arguments for preferential allocation of scarce time and resources to other pet projects. Early opposition was likely to take the form of skepticism and therefore reluctance to commit time or resources. Later opposition was likely to take the form of direct challenge to specific details of the plan that is unfolding (Kanter, 1983).

The nature of the opposition becomes clearer at the idea production points in the innovation process for several reasons. First, the very act of contacting others in the course of realizing an idea may mobilize what would otherwise have been latent or unorganized opposition. Most people will not spend their fund of political capital by overtly opposing a new idea right away, especially if it has the support of someone who is powerful, because it may never “get off the ground.” Political capital would have been depleted unnecessarily. It is when it looks as though the project might actually happen that the critics begin to surface, generally arguing at the project’s most vulnerable point that it has had enough time to prove itself; time to move on to something else (usually the critic’s own pet project) (Kanter, 1983).

At the same time, many new ventures or innovation projects tend to be relatively invisible in the beginning, occurring in hidden corners of the organization or not significant enough to warrant their rivals’ or competitors’ attention. But as the effort gets closer and closer to results, it becomes more of a threat, and rivals begin to take action to crush it. At Apple, for example, a start up company by an employee was passively tolerated by chairman Jobs, but when it looked like that group might actually have a rival technology, he threatened suit, saying that it had been developed on Apple time and Apple owned it (Moritz, 1984).

My research identified a number of tactics that innovators used to disarm opponents: waiting it out (when the entrepreneur has no tools with which to directly counter the opposition); wearing them down (continuing to repeat the same arguments and not giving ground); appealing to larger principles (tying the innovation to an unassailable value or person); inviting them in (finding a way that opponents could share the “spoils” of the innovation); sending emissaries to smooth the way and plead the case (picking diplomats on the project team to periodically visit critics and present them with information); displaying support (asking sponsors for a visible demonstration of backing); reducing the stakes (deescalating the number of losses or changes implied by the innovation); and warning the critics (letting them know they would be challenged at an important meeting—with top management, for example). Note that many of these are more likely to succeed when the innovation group has a strong coalition backing it. The effectiveness of interpersonal processes depends on structural conditions.
Because of the controversy that surrounds many innovations, it is important for the working team to continue to send information outward. For example, when the project nears completion and there are things to see, they may begin to bring important people in to view the activities. Successful innovators have been observed to “manage the press,” working to create favorable and up-to-date impressions in the minds of peers and key supporters (Kanter, 1983). Similarly, Friedlander and Scott (1981) found that activities of change teams were given more legitimation and were more likely to be implemented when there was a great deal of communication with top management, including two-way dialogue about particular project ideas.

Continuity

Structural and social conditions within the innovation team also make a difference in success. Because “interactive learning” (Quinn, 1985) is so critical to innovation, innovation projects are particularly vulnerable to turnover. Continuity of personnel, up to some limits (Katz, 1982), is an innovation-supporting condition.

There are sometimes good reasons, from the project’s standpoint, for people to leave: inadequate performance, interpersonal tensions, the wrong skills. But every loss-and-replacement can jeopardize the success of the innovation process, in three different ways:

1. Each person leaving removes knowledge from the pool, that has not yet been routinized or systematized. In a sense, everyone leaving an innovation project does indeed take “secrets” with them—private knowledge they may have gained that has not yet been shared with the rest of the team because of the intensity with which everyone is gathering knowledge.

2. Each person entering deflects the energies and attention of the others from knowledge development to education—to try to duplicate the experience base of current staff and avoid reinventing the wheel. But telling about it is not only time consuming; it is indeed no substitute for having been there.

3. Each person entering in a key position may wish to change course in order to exercise his or her own power, thereby failing to take advantage of accumulated knowledge. So every new boss is indeed a new beginning.

Turnover in key positions outside the project team can also create problems, though not necessarily as severe: The division is reorganized, for example, and the new management does not “understand” the venture. The coalition is disrupted and needs to be rebuilt. An organization can easily undermine an innovation without “officially” stopping it simply by reorganizing and changing its reporting relationships.
In one case, the problems of turnover are illustrated. A senior executive of a major instruments manufacturing company was recalling one of the company's venture failures—a new product start-up in one of the divisions. He knew this project well, because he had been the venture manager for the first 6 months. "I think about this often," he said, "because if I had stayed I think I could have made it work." Six months into the project, he was offered a promotion up several levels, from managing 15 people in the start-up to managing 6,000 in an established division. The career implications were clear: take it now or lose his place in line. The rewards were also clear: "The corporation was set up to reward the person running a stable $200 million business more than someone growing a business from zero to $10 million to $200 million, which is much, much harder." Even so, he remembered, "I wanted a week to think about it; I felt torn." Eventually he took the promotion. The start-up team understood the corporate career message, but they still felt abandoned. And the new manager sent in to replace him simply did not have "the feel" for what it would take to get his business going. Even more than loss of leadership, it was loss of experience that hurt this project.

Ironically, creating change requires stability—continuity of people especially during the information-rich, knowledge-intensive development stage. But established corporations often exacerbate the vulnerabilities of their new ventures and innovation efforts by the instability they encourage in and around them. Lock-step career systems that tie rewards to promotions, thus requiring job changes in order to "advance," or that put more value on the "safer" jobs in already-established businesses, encourage people to abandon development efforts before their knowledge has been "captured." Thus, organizational structures and cultures that allow continuity on innovation teams by facilitating unusual or "off-line" career paths, allocating human resources on a project basis rather than a time basis, and rewarding completion are helpful ingredients for successful innovation production.

Continuity is also supported where strong commitment is generated, so that people want to stay and want to contribute. Three kinds of commitment mechanisms are relevant to innovation efforts:

- Conditions encouraging a rational calculation of the benefits of continuing participation;
- Those encouraging strong social and emotional ties with the group;
- And those encouraging a strong belief in the fundamental values or purposes of the efforts (Kanter, 1972).

Structural and social facilitators of commitment to innovation teams would thus include these kinds of things, among others: A sense of "investment" might be produced by a financial stake in outcomes which grows with time spent, as AT&T's new venture teams have. A sense of "communion" might come from clear group identity and sense of specialness through team names, rituals, and celebrations like those in Data General's new computer development group (Kiddder, 1981). A sense of strong values might come from reminders of the connection
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Flexibility

Flexibility is another requirement for idea realization. It is quite common for innovations to fail to proceed as planned but instead to encounter unexpected roadblocks or obstacles that require replanning and redirection if the innovation is ever to be produced. Cost overruns and missed deadlines are common, due to the inherent high uncertainty of the development process. For example, in one pharmaceutical company the ratio of actual to expected cost of new products was 2.11; the ratio of actual to expected time was 2.95 (Mansfield et al., 1981).

Numerous cases in numerous fields illustrate the unpredictable nature of innovation, and therefore the need for flexibility in order to persist with a project. For example:

- GTE’s Telemessenger would not show returns fast enough because, like most innovation, the product employed technology so unknown in the marketplace that prospective customers were not receptive to it, and several rounds of replanning were necessary to get the right configuration. Even assumptions about the scope of the test market had to be changed in the light of experience. What the team had originally imagined was a local test had to be rethought when the product was reconceived (successfully) as an aid to communication across the time zones, thus necessitating a national test. This change in tactics paid off. Though only 6 units were sold after a local mailing of 60,000 letters, 200 were sold at one crack to a multi-national company immediately after the test went national (Powell, 1985).

- The historic town of Alexandria, Virginia, now has an important factory redevelopment project on its waterfront, a project that seemed simple and straightforward when it was first voted on 10 years earlier but required several changes of direction midstream. But the city-owned Alexandria Torpedo Factory and Art Center almost didn’t happen. Among a number of unexpected obstacles that nearly killed the project and required additional entrepreneurial effort to resolve was the fact that it threatened a small building used by a public school rowing program. Without the flexibility to make changes in order to persist with the project, the city
would never have seen the results: a rise in the value of its property from $4 million to $31 million.

Thus, as Quinn (1985) found across three countries, multiple approaches, flexibility, and quickness are required for innovation because of the advance of new ideas through random and often highly intuitive insights and because of the discovery of unanticipated problems. Project teams need to work unencumbered by formal plans, committees, board approvals, and other "bureaucratic delays" that might act as constraint against the change of direction.

Furthermore, innovations often engender secondary innovations, a number of other changes made in order to support the central change (Kanter, 1983). As necessary, new arrangements might be introduced in conjunction with the core tasks. Methods and structure might be reviewed and when it seems that a project is bogging down because everything possible has been done and no more results are on the horizon, then a change of structure or approach, or a subsidiary project to remove roadblocks, can result in a redoubling of efforts and a renewed attack on the problem. This is why Van de Ven (1986), among others, argued for the lack of utility of distinctions between technical and organizational innovations; in practice, one often entails the other. Indeed, restructuring of the organization often occurs during the innovation process, including joint ventures, changes in organizational responsibilities, use of new teams, and altered control systems (Schroeder et al., 1986).

Flexibility is an organizational rather than a purely individual variable. Those organizations that permit replanning, give the working team sufficient operating autonomy, and measure success or allocate rewards for results rather than adherence to plan are likely to have higher rates of innovation production. Because of the inherent uncertainty of innovation, advance forecasts about time or resource requirements are likely to be inaccurate; it is difficult to budget or to forecast when lacking an experience base by definition, in the case of a new idea. The GTE Telemessenger was almost aborted when the project manager's first market test failed, because he had not brought in the results he promised, and he went through several rounds of argument to get an original "15 days to fix it" extended to 2 months (Powell, 1985). Requiring commitment to a predetermined course of action interferes with the flexibility needed for innovation.

Balancing Autonomy and Accountability

Some analysts argue that innovation production occurs better when the working team is left completely alone, freed from all bureaucratic procedural demands and allowed total concentration, total focus on its work. But there is a middle ground between the extreme of so many reporting requirements that the team spends more of its time preparing reports than doing the work, and the other extreme of no controls or measures until the end.
If some innovation projects fail because they are overly constrained by the need to follow bureaucratic rules and seek constant approvals, others may equally fail because they are overfunded and undermanaged by top leaders, which can remove the incentive to produce results efficiently. Indeed, Bailyn (1985) learned from her studies of R&D labs that many engineers were subject to overly constraining operational controls while permitted too much "strategic autonomy" to set their own research goals—just the opposite of the combination needed for success.

This can be a particular problem in large new ventures. In one case in a leading corporation, top management generously funded a new project development effort and then left it alone, assuming that they had done the right thing by providing abundant resources. Because they were so rich, the team wasted money on dead-ends and intriguing but unnecessary flourishes and failed to replan when early results were disappointing. The team did not need to justify their actions to anyone, and the project eventually failed. This is one reason why Stevenson and Gumpert (1985) argued that successful entrepreneurship involves multi-stage commitments—smaller amounts of money at more frequent intervals.

The ideal structural context surrounding an innovation project, then, should offer procedural autonomy coupled with multiple milestones that must be reached in order for the project to continue. These milestone points represent the major interface with organizational decision makers and perhaps coalition members. They also help maintain team members' own commitment by giving them targets to shoot for and occasions to celebrate.

TRANSFER AND DIFFUSION

The culmination of innovation production is transfer to those who will exploit the innovation or embed it in ongoing organizational practice. Transfer needs to be handled effectively, if new products are to be successfully commercialized or new organizational practices or techniques to be successfully diffused. Isolated in its development, the innovation must again be connected with the actors and activities that will allow it to be actually used.

Social arrangements, from organization structures to patterns of practice, again make the principal difference, even more than the technical virtues of the innovation (Rogers & Shoemaker, 1971).

Strategic Alignment and Structural Linkages

Whereas creation and development—production of the innovation model—can occur with few resources, little visibility, modest coalitions, and the isolated activity of relatively small teams, use of the innovation is a different matter. If creation is an intensive process; diffusion is an extensive process. Use requires
many other people, activities, patterns and structures to change to incorporate the innovation.

Thus, a first condition for effective transfer is minimal new change requirements because the innovation is aligned with strategy or direction and linked to the other parts of the structure, so that adjustments and changes have already been made in anticipation of the innovation.

It is not surprising that innovations are more successfully transferred, commercialized, or diffused where the organization or market is already receptive to the idea and prepared for its use. This is almost tautological. Where there is stronger organizational commitment in the development process, signified by funding, visibility, coalition support, and so forth, there are more "side bets" placed on the idea (that is, staking of reputations in the outcome) as well as greater "sunk costs." Thus, there will be more pressures to use the innovation in more ways and make it more central to the organization's strategy. Organizational arrangements will already have begun to bend in anticipation of the successful development, often through the negotiations among departments, the "logical incrementalism" through which new strategies are adopted (Quinn, 1980).

On the other hand, those innovations that begin life as random deviance, or unofficial bootlegging in a hidden corner of the organization, or the idiosyncratic dream of a tolerated-but-marginal actor, have a harder time getting adopted regardless of their virtues. Other actors, other departments have already made their plans without taking the possible availability of an innovation into account. Therefore, structures and practices have already been established that would have to be rearranged. These structural constraints to diffusion or transfer may be matched by political constraints: controversy over the innovation or refusal to use it by those uninvolved in its development. The latter is the common NIH (not invented here) problem: this problem particularly plagues organizational innovations (Kanter, 1983; Walton, 1975).

It has long been a cliche in the innovation literature (primarily because most scholars cite the same handful of studies) that diffusion or adoption of an innovation, once developed, is aided by formalization and centralization in the organization, by a concentration of power and a set of employees accustomed to following orders. The opposite structural features, then, from those that are conducive to a free flow of many new ideas are held to be necessary for ensuring the rapid acceptance of any one.

Recent evidence, however, makes this a much more contingent proposition (Kimberly, 1980). Cohn and Turyn (1984), in a quantitative comparison of innovations in the domestic footwear industry, found that formalization and centralization were associated with adoption of evolutionary innovations but not with revolutionary ones.

A concentrated source of power is needed to impose the innovation on the organization or move it quickly through preexisting formal channels whenever the innovation has not already been appropriately linked to the units to which it will be transferred. Indeed, strong central authority can be argued to be just a functional alternative to strong direct links between an innovation project and those to whom its product is handed-off.
If an innovation development project is structurally well-integrated as it comes to completion, rather than segmented and isolated from the rest of the organization (Kanter, 1983), then it does not require the power of centralized authority to ensure its effective transfer. Other units have readied themselves to receive the innovation. Indeed, the hand-off or diffusion process is more difficult in organizations where interdepartmental rivalries and lack of integration cause friction when anything comes from a sister unit; then only “orders” from central authority are attended to. Perhaps this is why evidence indicates that successful new ventures in large corporations are more likely to be the ones sponsored by operating line executives rather than by corporate executives (Hobson & Morrison, 1983); the line-sponsored ventures are already closely connected with implementors.

Of course, effective transfer also requires a strategic decision that this innovation should get resources allocated to it, resources necessary to exploit its potential. For product and technical process innovations, and even for some organizational innovations, the greatest financial requirements begin after the model has been developed. Thus, the nature of the strategic decision process and how top management is linked to the innovation project is another critical structural element in an innovation’s success or failure (Burgelman, 1984).

At the transfer point, when resources to exploit the innovation are allocated, visible and well-connected projects already aligned with the organization’s strategic objectives are likely to fare better. In turn, the degree of investment the project gets, as it is moved into commercialization, routine production, or institutionalization affects its prospects for success as an ongoing product or practice. “Thinking small” and not providing adequate investment is often identified as a reason for new venture failures (Drucker, 1985). Research on the first 4 years of operation of 117 corporate ventures in established markets in manufacturing found that the businesses above the median in success began with capacity that could meet twice the current total market demands, whereas those below the median began with a capacity that could meet only 6% of the current total market demands. Furthermore, the “winning” ventures initially set higher market share objectives, had R&D spending levels twice those of the other ventures in the first 2 years and marketing expenditures about 1.5 those of the other ventures in the same period (Hobson & Morrison, 1983).

Interface Structures: Active Agents and Communication Channels

The transfer or diffusion issue should be conceptualized as a continuum. At one extreme there is perfect identity between the developers and the ultimate users, so that the innovators are essentially producing the innovation for themselves, to their own specifications, with foreknowledge that they will be using whatever it is that they make. Organizations can come close to replicating this condition in customized development work for specific clients already internally committed to use, in which client representatives actually sit on the development team. In this
case, transfer or diffusion is nonproblematic; it is an inevitable part of successful development.

At the other extreme, there is little or no connection between developers and those to whom the innovation could potentially be transferred, nor is there an established transfer process. There is high uncertainty (an information issue) and controversy (a political issue) about what the next step is to get anyone to use the innovation, who should take it, and whether there are identifiable customers for the idea, whether anyone does or should want the innovation.

A variety of interface or bridging structures can reduce both the uncertainty and the controversy, thus making it more likely that successful transfer will occur.

One method for diffusing new ideas is to establish a group whose formal responsibility is to move new ideas into active use (Engel, Kollate, & Blackwell, 1981). Members serve as active agents of diffusion, managing the process by which the realized idea is transferred to those who can use it. Part of their mandate is to gather the information to make systematic the process of getting the innovation to users.

Inside organizations, such bridging structures might take the form of product managers, whose job is to manage the successful entry of a new product into the marketplace, drawing on every function in the organization that might contribute, from continuing work on the design to the manufacturing process to the sales effort. Or, in the case of organizational or work innovations, the bridging structure might be a transition team or "parallel organization" (Stein & Kanter, 1980) that concentrates on the change process as a management task in and of itself.

Agents of diffusion may also exist outside the organization. Indeed, it can be argued that external agents are even more important in diffusion than champions inside the organization, for they add real or imagined legitimacy to the idea, why Rogers and Shoemaker (1971) found contact with consultants such an important part of the diffusion of innovation. What is important is not only the cloak of respectability in which the external party clothes the innovation, but also the communication service provided. Thus, Walton (1987) found that the diffusion of work innovations in shipping in eight countries was aided by formal organizations set up to study and write about those innovations. They served as a necessary communication channel to transfer innovations to other users.

How well organized the environment is for the transfer of ideas can account for how rapidly a particular innovation is diffused. By "organized" I mean the case with which those with common interests can find each other, and therefore how easily connections can be made between innovations and users. Thus, the existence of conferences, meetings, and special interest associations should all be valuable in diffusing innovations, even product innovations, which have to be brought to the attention of specific groups. Again, this can occur within as well as outside a particular organization. 3M and Honeywell both organize a large number of internal conferences and "idea fairs" to connect ideas with those who can use it or help take it the next step.

Trade associations, professionals and societies, and specialist consulting organizations are among those serving this purpose more broadly. The Food Mar-
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Marketing Institute, trade association for grocers and supermarkets, was largely responsible for facilitating the spread of universal price codes on packages from manufacturers and hence the spread of scanners in stores.

The Institutional Environment

The last issue in transfer and diffusion is a receptive and social and legal environment. The institutional environment, I propose, is so often taken for granted in the study of innovation that it tends to be visible mostly when it impedes. But the institutional environment is one of the most important factors distinguishing between eight nations in their overall record of diffusion of work innovations in shipping (Walton, 1987). Among the specific elements making a difference are patterns of labor organization and government policy and regulations. In the United States, for example, where innovation diffusion has been low, a series of fragmented labor unions bargaining independently with shipowners, with no vehicles for industry-wide collaboration by either party, accounted in part for the low diffusion rate.

The role of government in influencing innovation transfer can be a strong one. Hollomon and colleagues (1981) identified specific ways in which government policies and programs directly affect innovation adoption patterns:

- Assessment of new and existing specific technologies
- Direct regulation of the research or development of new products and processes
- Direct regulation of the production, marketing, and use of new or existing products
- Programs to encourage the development and utilization of technology in and for the private goods and services sector
- Government support of technology for public services for consumers
- Policies to affect industry structure that may affect the development and use of innovation
- Policies affecting supply and demand of human resources having an impact on technological change
- Economic policies with unintended or indirect effect on technological innovation
- Policies affecting international trade and investment
- Policies intended to create shifts in consumer demand
- Policies responding to worker demand having impact on technological change.

Whether innovations are ultimately spread and used, then, may be a matter of societal as well as industry organization. This level of analysis is not common in the innovation literature, but it demands more attention, particularly with respect to innovations that themselves have organizational consequences. Unfortu-
nately, much of the literature is shortsighted in still looking for determinants of adoption of innovations in individual attitudes or intraorganizational structures.

But as organizations themselves bump up against the institutional limits to innovation diffusion, then the issues become clearer. For example, if the use of technological innovations has implications for job security, then the institutional patterns of labor relations in the industry may be among the most important determinants of an organization's ability to use such innovations. Several major companies are now attempting to reshape the broader institutional context in order to create conditions for more rapid diffusion of innovation within their borders. General Motors, is a notable example, planning the new Saturn subsidiary jointly with the United Auto Workers Union, using a series of joint committees. Pacific Telesis is also reshaping relations with its principal unions through local common interest forums of company officers and union presidents that define many workplace policies together. But even if the unions concur, the current labor law framework may be a significant impediment; Pacific Telesis has already faced one legal challenge to institutional restructuring.

Innovation, and the spread of innovation, is also a function of industry conditions and the support an organization can draw from its larger community, as research by Ruttan and Hayami (1984) and Trist (1981) shows. The more dependent an organization is on others (Pfeffer & Salancik, 1977), the more likely that it will be shaped or constrained in its internal innovation by those portions of the environment which dominate it. But the opposite also holds. Some environments represent "fertile fields" that provide more of the surrounding conditions conducive to innovation.

"Fertile fields" include these kinds of features, associated with entrepreneurship in the form of start-ups as well as innovation in established organizations:

- Close proximity and ample communication between innovators and users
- A more highly skilled, professionalized, cosmopolitan workforce
- A flow of new technical ideas from R&D centers
- A more complex, heterogeneous environment that encourages innovation as an uncertainty-reduction strategy (Kimberly, 1981)
- Channels of communication for exchange of innovation ideas
- Competition from entrepreneurial new companies, in turn benefiting from the availability of venture capital
- More interorganization interdependence and integration (Pierce and Delbecq, 1977)
- Public encouragement of new ideas as social goods.

This brings us full circle, for many of these same conditions help activate the innovation process as well as diffuse the models later.

The ultimate set of social structural factors supporting innovation, then, comes from the nature of the environment in which an organization operates as
well as its connections to various key units in that environment. Although an innovation model may be produced in one organization independently and in isolation, it takes the actions of many for the innovation to diffuse.

It is appropriate to look beyond the borders of one organization for the determinants of innovation. Indeed, some innovations can start life as the joint product of more than one organization, through joint ventures, cooperative research efforts, and strategic alliances. The reputed Japanese "edge" in technology diffusion is said to come precisely from an institutional context allowing and encouraging such interorganizational cooperation in the same industry—a strategy still largely limited by U.S. antitrust laws. Furthermore, sometimes organizations unwittingly cooperate in innovation. For example, the failure of innovation in one organization can be the trigger for the creation of a new organization designed solely to develop that same innovation, the entrepreneurial process that has led to spinoffs from larger companies that reject innovations developed and exploited successfully by start-up companies. And the contribution of some organizations to innovation is to generate new organizations (e.g., Viewel and Hunter, 1985).

CONCLUSION

I have tried to connect the major tasks in the innovation process to those structural arrangements and social patterns that facilitate each. Innovation consists of a set of processes carried out at the micro-level, by individuals and groups of individuals; and these micro-processes are in turn stimulated, facilitated, and enhanced—or the opposite—by a set of macro-structural conditions. Overall, the common organizational threads behind innovation are breadth of reach, flexibility of action, and above all, integration between those with pieces to contribute, whether inside or outside a single organization.

Undeniably, innovation stems from individual talent and creativity. But whether or not individual skills are activated, exercised, supported, and channelled into the production of a new model that can be used, is a function of the organizational and interorganizational context. Throughout, I have marshalled evidence to show the importance of integration to the innovation process, close structural connections between potential innovators and users, between functions and departments, between the innovation project and the units or organizations that will move the model into production and use. I have also shown that the integrative organizational model helpful for innovation extends beyond the borders of a single organization. Innovation benefits from interorganizational ties and organization-environment linkages as well as from internal integration.

Making a thousand flowers bloom is not a fully random or accidental process, unless we are satisfied with spindly, fragile wildflowers. Instead, the flowers of innovation can be cultivated and encouraged to multiply in the gardens of organizations designed on the integrative model, organizations where the growth rhythm of innovation is well understood.
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