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MANAGEMENT SYSTEMS FOR INNOVATION

Companies are clamoring for innovation—breakthrough innovation. Every executive we've spoken with in the past ten years wants it. The trouble is they don't know how to make it happen. "We've atrophied," a senior technical leader at GE's global research center told us four years ago. "We've been so focused on responding to our business units' immediate needs and on taking cost out of our products that we've forgotten how to turn advanced technologies into breakthrough products and businesses."

Struggling to Market

There are many reasons that companies struggle with getting breakthroughs to market. A few examples from project teams that we studied in the first phase of our research in the late 1990s illustrate some of the problems companies encounter all too often. Ultimately all of these companies developed a complete breakthrough innovation capability so they could overcome the sorts of challenges presented here.

Air Products, Then and Now

The management of Air Products, a large industrial gasses and performance materials company, knew they had to get growth through new initiatives. In the early 1980s, they realized they'd missed a major technological shift in air separation processes—methods to distill air into purer levels of its component parts, such as oxygen,

nitrogen, hydrogen, and other gasses—and had been left behind. They hired a number of scientists with different backgrounds to help diversify their technological prowess in the mid-1980s. Part of that group was a small band of material scientists with expertise in ceramics materials, which Air Products' technical community believed could potentially offer new-to-the-world features in gas and air separation processes that the company was famous for. But the investment yielded little, and the group was disbanded in the early 1990s.

Several of these scientists, however, had come up with an idea for gas separation that was technically challenging but looked as if it could be a breakthrough in making high-purity, high-flux oxygen. The process would disrupt the oxygen distribution business because the oxygen would be made on site and would not need to be transported in the cylinders that are used today. These scientists labored diligently and developed Gantt charts, used stage-gate processes, and developed economic models. They began to realize that some of those project management processes could not work, since most of the markets they needed to contact were not ones in which the company currently participated, so they added a market analyst who came over from the field sales force. But then many market opportunities that they had initially explored had dried up. Still they labored on, now partnering with another development firm and securing government funding. Then the team's leadership was changed. They were questioned by the corporate executive board regarding their slow progress, but since much of their funding was external, they were not a heavy drag on the firm and so have been allowed to continue. Thirteen years later, they have working prototypes and some first customers.

Today Air Products has a functioning commercial development office (CDO) with staff who help develop such opportunities. They're connected to the company's newly formed growth board, so that the opportunities are aligned with company strategy for the future; in fact, they influence that strategic growth plan. They reach into various parts of the organization for the

help they need, be it R&D support, market connections, or manufacturing. The oxygen generation project continues, but in the meantime, the CDO has vetted and nurtured numerous other business opportunities. With the help of a staff who understands how to probe into new markets, recognize opportunities for the technological prowess the company has, and leverage networks inside and out of the company, a portfolio of breakthroughs, rather than just one, is on the horizon. Air Products is developing a breakthrough innovation capability.

IBM, Then and Now

In the early 1990s, Bernie Meyerson, an IBM research fellow, happened on a discovery, an alloy of silicon and germanium, that he believed could become the basis for high-performance new transistors with switching speeds up to four times faster than those of traditional semiconductors, with applications in the exploding wireless communications market.[1] An important benefit was their ability to operate using only a fraction of normal power requirements for competing technologies. IBM's ability to mass-produce silicon germanium would make it possible for hardware manufacturers to substitute chips made from this material for more costly, power-hungry, and exotic alternatives, such as gallium arsenide. Silicon germanium semiconductor technology offered a breakthrough price-to-performance ratio not available from these existing component technologies. Best of all, the new chip material could be manufactured with the same costly fabricating equipment used to make conventional silicon chips, potentially avoiding billions in new capital investments. The problem was that IBM was not interested. The company had made its money selling mainframes, not chips. And although it made chips, those were used only for internal customers; they were never sold to external original equipment manufacturers.

But Meyerson could see the market coming, and he knew IBM had to be there. For most of the months and years that they worked

on the development of silicon germanium chips, he and his ad hoc team of collaborators had operated as a band of mavericks—tolerated but not officially sanctioned by the IBM R&D establishment. They made progress using bootlegged time and resources when the technology was outside IBM's strategic framework. Meyerson's relationship with Paul Horn, the senior vice president of R&D, was one of mutual trust and respect. Horn allowed Meyerson to continue with his work, though without his official approval. The silicon germanium project was broadly viewed as an irritating virus within the R&D host, which used the usual organizational antibodies to neutralize it: withholding funding, general naysaying, and subtle signals that it might not be "career smart" to associate with the project. Meyerson was immune to the implication of these signals due to his status as an IBM fellow. His project continued.

Meyerson went to great lengths in preparing his presentations, showing his experimental data and contrasting them to performance data for pure silicon and for the leading contender for higher-performing, next-generation chips: gallium arsenide. Although the project was essentially a low-priority project among senior leaders within his own company at the time, Meyerson presented his data at a number of professional conferences and published articles in scholarly journals. Conference attendees representing Northern Telecom, Analog Devices, Hughes Electronics, and other leading companies recognized the potential of silicon germanium research and approached him to express their enthusiasm. These fellow scientists could see important applications of silicon germanium technology in their businesses, particularly in telecommunications. These potential uses were a revelation to the IBM researcher and helped him to fill in the details of what had initially been a fuzzy vision.

When CEO Lou Gerstner dramatically shifted corporate strategy to include the sale of chips to external customers, Meyerson's project quickly gained legitimacy. Now it was legitimized, but he envisioned a different sort of business model than IBM was used to. The company had a long history as a volume producer of memory

chips, an arrangement in which other firms provided the higher-value application design functions. Meyerson was aware of that history and knew that acceptance and funding of his project would probably lead to a similar outcome: IBM would get the high-volume chip-fabricating part of the value chain, while someone else would handle the smaller but higher-profit business of design. Meyerson believed that IBM should go after more of the value chain associated with the silicon germanium chip and expand IBM's chip-making activities beyond its traditional foundry operations. He and the project's first business manager pushed for broader involvement in the value chain and resolved to work only with companies that were willing to let IBM in on the chip design issues relevant to the application. Meyerson hoped to learn these skills and eventually co-opt that part of the business for his company. He wanted IBM to use the development of the new chips as an opportunity to expand its design capabilities. In the end, his goal was partially accomplished when IBM's CommQuest subsidiary was slated to design silicon germanium–enhanced chip sets for next-generation cellular phones. Other efforts were ongoing, like hiring a workforce trained in the specialty design coding work that was needed.

The silicon germanium chip was announced in October 1998 and eventually became an industry standard, but it had to be rescued many times. Its success can be attributed to Myerson's technical brilliance, rebellious personality, and tight connection to the senior vice president of research, Paul Horn. Meyerson is a one-man show. He refused to give up on his idea even though it contradicted the accepted technical wisdom, fell outside the strategic boundaries of the firm at the time, and met with substantial organizational resistance. His battles to get his idea heard ended up with—in his words—"lots of blood on the walls," but his passion and perseverance eventually won out due to his personality and position. However, it could not be duplicated and could not be a model for a system design for repeated innovation.

Beginning in 1999, a systematic approach to innovation was initiated, and today, IBM has a system in place to provide support

for people like Meyerson: the emerging business opportunity management system. Entrepreneurial scientists or novel ideas that crop up anywhere in the company now have a place to go to get management attention, resources, and help. Scientists make great discoveries, but few of them indeed are also willing and able to pursue customers, negotiate alliance deals, develop a business model, and consider plant location decisions, as Meyerson did, all the while working to convince the company to adopt the initiative as part of their strategy for future growth.

The emerging business opportunity system is not dependent on a single senior leader. It encompasses a team with the responsibility for breakthrough innovation (BI) within IBM. This team also has a staff group of consultants who can help guide teams like Meyerson's, so that they are not left to handle all aspects of innovation on their own.

IBM and other large companies have always had characters like Meyerson. They're finally realizing through the school of missed opportunities that they need a more systemic approach to enable breakthrough innovation.

Building a Capability for Breakthrough Innovation

Large, established companies have never excelled at breakthrough innovation. Their management systems are designed to ensure highly reliable, repeatable processes. Everyone sticks to a plan based on market research and competitive trend analyses that tell them what to do. Their strategies are driven by financial objectives that they promise Wall Street. For the most part, the objectives are short term in nature because much of executive compensation is tied to quarterly performance.

Breakthroughs crop up once in awhile in big companies, but they occur because impassioned champions don't quit. They break the rules and find protection from one or two powerful senior leaders who believe in them. Why must this be the case? Large, established companies have access to the money, brains, and market

power that they can draw on to make things happen. It's a waste to allow BI to happen by chance alone. And senior leadership knows it. They also know they can't save their way to the future or acquire companies as their only growth strategy. Research shows that firms that successfully commercialize breakthrough innovation reap above-normal returns and higher-than-average market value over the long term, but they must have adequate systems for managing high uncertainty in place to help leverage their investments.[2]

Since we wrote our first book, we have been amazed at the extent to which companies are investing in developing systems for breakthrough innovation.[3] They are experimenting with building innovation functions, departments, and disciplines that serve the objectives of breakthrough innovation; beginning to think of portfolios of breakthroughs; worrying about how to professionalize the career path for those involved in breakthrough innovation; and concerned with governance models. In short, they're developing management systems for innovation that parallel the finely tuned management systems for operational excellence.

Corning, for example, now has a vice president for strategic growth and new business development, a newly created position, who reports to the chief technology officer and operates out of the research and development division. His initial mandate was to find and articulate opportunities for breakthrough innovation. He has a team of people, organized as the Exploratory Marketing and Technologies Group, whose charge mirrors that of those in Exploratory Research: find new opportunities. Over the past three years, Mark, the vice president, and his team recognized that finding opportunities wasn't enough, so he built a business development team whose members work with the breakthrough project teams to nurture them through the development process. Why? Why can't R&D do that? Because there are business questions that arise:

- How do we build this as a new business?
- What applications might there be?
- Who should we partner with?
- How do we go about building a new customer base?

- What are the economics?
- Where should this reside within Corning?
- What path should the technology development take?

These questions aren't new; other writers have described these in previous books.[4] What is new is that Corning is doing something about this in a systematic way. It has a dedicated team of people who are developing this expertise, working with a portfolio of projects to help develop the business part of the innovations. So is IBM. The senior vice president of strategy, Bruce Harreld, has been leading a charge since 2000 to develop and run a management system for horizon 3 (H3) businesses, IBM's label for far future opportunities, that is, breakthrough opportunities. Everything about an H3 is different from a horizon 1 (H1) business, which is a mainstream business. Performance is measured differently, and people are recruited and then reviewed differently. Everyone in general management at IBM has had to undergo training to understand these differences.

At Sealed Air, CEO Bill Hickey and the vice president of engineering are building their infrastructure, which they know they need. Who's in charge of finding new ideas? Who builds them out into new businesses? What kind of oversight has to happen to make sure the new ideas do not get squelched once they move to the operating units? Sealed Air recently installed a corporate business development function that nurtures these opportunities. They're learning how as they go along, but they're dedicated to making it happen. Sealed Air's Business Innovation Board oversees the BI portfolio. They link the portfolio to the strategic intent of the company—not their current strategy, but their vision of the company's future businesses.

At Kodak, a company that has been faced with profound technological change in its core businesses, the Systems Concept Center (SCC) was the BI hub for more than ten years (1994–2004). Those in the SCC found that business ideas that were generated and tested could not survive when they moved into operating

units, so they built an accelerator: an identified group with its own performance metrics, people, and oversight board who nurtured projects in a high-growth phase. The reason this group came about is that nothing else had worked for Kodak. Mainstream businesses could not find the talent, the interest, the understanding, or the resources to invest in small, high-potential breakthrough businesses that weren't to the level of predictable sales and cost levels. It wasn't their mandate and wasn't part of their performance requirements, so it didn't work.

The interesting thing about all of these companies is that none of them is following a skunk-works model. They're not relying solely on placing venture capital bets in external companies. They're not relying on champions to get it done against all odds. All of them are experimenting with making BI happen as part of the heart and soul of their company rather than as an offshoot, afterthought, or secret. They are expecting to simultaneously deliver on today's pressures and the future's uncertainties. "Senior leadership realized that while our responsibility is the long-run health of the organization, we spent most of our time on immediate problems," Bruce Harreld at IBM told us. "We had to change that."

Companies are experimenting and are trying to figure this all out. We have been studying twelve of them in depth for four years and another nine who check in with us regularly because they too want to learn. All of these companies qualified for participation in our study because they have a declared strategic intent to develop a breakthrough innovation capability (BIC)—not the capability to allow a maverick to sneak through the system but a management system whose objective is to enable breakthroughs over and over. Not one of these companies, in our estimation or their own, has a complete high-functioning system yet.

Our opportunity has been to observe them, see their struggles and their victories, and identify pieces of systems in each of these companies that, taken together, can create a BIC. From these insights we've developed a model that we have been using and testing successfully. It provides the building blocks and modus operandi for developing

innovations that will change the game, shake up industries, and shake up companies' existing businesses by bringing dramatic levels of new value to the marketplace. These are the risky, uncertain investments that make company executives who need to respond to shareholders and Wall Street analysts very nervous. It takes courage, but also discipline and persistence stemming from an innovation management system. To become an integral part of any company on an equal footing with operations, marketing, finance, human resources, quality and other core functions, innovation, we believe, needs to become its own discipline, its own function in companies today. And we see the signs. It's early yet, but the cues are apparent.

This book describes an integrated management system for breakthrough innovation, details how it must function and how it interacts with the mainstream organization. It also highlights challenges that firms face as they develop these systems, which, in many ways, require managing in counterintuitive ways and helps set companies on the path toward developing that capability.

A Primer on Breakthrough Innovation Management Systems

In this next section we offer some definitions and frameworks to guide the discussion throughout the rest of the book. We start by defining breakthrough innovation and then go on to the elements of a management system for innovation. Finally we define what a breakthrough innovation capability is. Once we have those concepts in place, we can develop them more completely in the chapters that follow.

What We Mean by Breakthrough Innovation

There are many definitions of *breakthrough innovation*. Some believe breakthroughs disrupt currently functioning markets,[5] while others define a breakthrough as anything that earns the firm a standing in a new market domain. Some say breakthroughs are predicated on new scientific discoveries,[6] while others suggest

that many breakthroughs are the result of clever business model innovations.[7] Indeed, there are any number of ways to achieve breakthrough innovation.

Working with our set of twenty-one companies as well as the Research on Research subcommittee of the IRI devoted to this project, we defined a breakthrough innovation as the creation of a new platform or business domain that has high impact on current or new markets in terms of offering wholly new benefits *and* high impact on the firm through expansion into new market and technology domains, increased revenues, and ultimately increased profits.[8] These high-impact levels, though, come with a set of challenges and dilemmas. As the long development periods unfold, risk and uncertainty associated with breakthrough opportunities abound. Companies find themselves in the situation of having to develop new technological competencies, create new market spaces, acquire different resources, and adapt their organizational structure to house the resulting new business, because breakthroughs may not easily fit into the current structure of the company.

The firms in our study use different terminology for breakthrough innovation. We've heard terms like *scope change innovations*, *game changers*, *moonshots*, *radical innovations*, and *rockets* to communicate the idea of breakthroughs. In fact, most of them told us they consider several different levels of innovativeness. We list some of their classifications in Table 1.1. Your company probably has one as well.

Some of these categorization schemes are organized by time horizon, some by fit with the current organization, some by degree of technological advance, some by impact on the market. But all of our company participants agreed that the categories in the far right column, no matter what they were called, were riskier and more uncertain than the ones listed on the left or in the center.

So, no matter what definition we use for *breakthrough innovation*, we are dealing with innovation opportunities that offer the promise of new growth platforms. They also may take the company into technology domains, business arenas, and domains of expertise that are unfamiliar and, in fact, may not yet even exist.

Table 1.1 Innovation Categories

	Degree of Uncertainty and Ambiguity		
	Relatively Low	*Moderate*	*High*
Company 1	Horizon 1	Horizon 2	Horizon 3
Company 2	Making the most of what we have	Getting new business	Breaking new ground
Company 3	Incremental	Platform	Breakthrough
Company 4	Today	Tomorrow	Beyond
Company 5	Incremental	Major Improvements	Step-outs
Company 6	Incremental	Substantial	Transformational
Company 7	Business unit projects	CEO projects	Advanced technology programs
Company 8	Incremental	Longer term	"We don't have a clue"
Company 9	Aligned	White space projects	Gray space (multialigned)
Your Company			

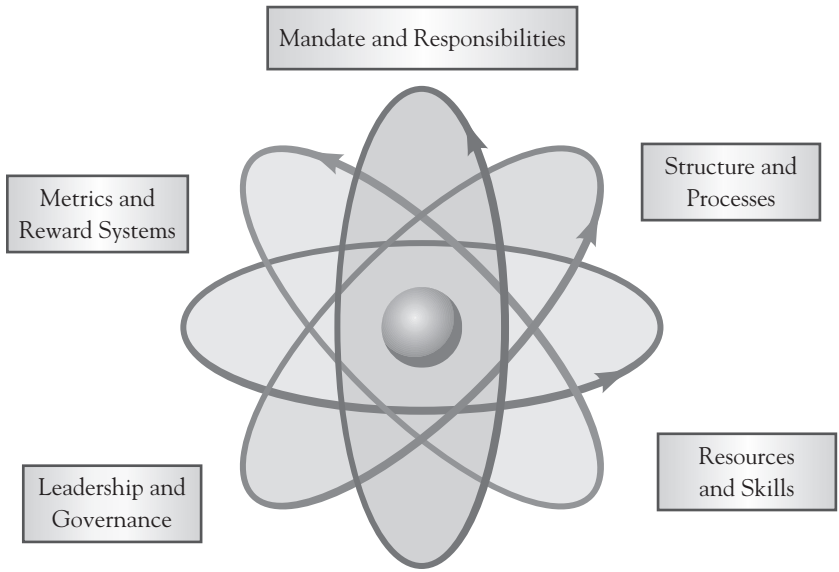
Up to this point we've discussed breakthrough innovation and its various incarnations. But this book is about how to build a breakthrough innovation capability. A *breakthrough innovation capability* is the ability for a firm to commercialize breakthroughs repeatedly. It provides the foundation for a company's ongoing renewal and growth. A firm with this capability has more operating than reliance on hero scientists, strong champions, or mavericks for breakthroughs every once in awhile. There is a system built into the company's infrastructure that addresses uncertainty and risk. It is different from the mainstream management system that's focused on the relatively low-uncertainty world of operational excellence and maintaining customer loyalty. It is, in essence, a management system for innovation.

What We Mean by a Management System

To be successful, any established organization must have a set of systems, structures, and processes that allows it to function efficiently and effectively. Typically when companies are founded, they are run by the founding entrepreneur or the founding team who makes all decisions, writes every check, draws up invoices, hires all the people, and assesses their performance. Obviously this works for only a very short period of time. An organization that does not adopt mechanisms for managing routine activities finds its opportunities for growth hampered.

A *management system* is that set of elements needed to make an organization function effectively and efficiently. It moves decision making and execution beyond the original founder and ensures that behaviors are oriented to achieving organizational objectives. The five necessary elements are shown in Figure 1.1.

Figure 1.1 Management System Elements



Mandate and Responsibilities. The system's objective or mandate, the first element, is about its purpose and what it is responsible for. The management system for ongoing operations of any established company must efficiently and effectively manage current markets and operations, so as to responsibly leverage stakeholders' investments into profits. An innovation management system has a different purpose: creating new businesses as platforms for the firm's growth and future health.

Structure and Processes. The second element is the organizational structure and processes designed for innovation. Is there a group, department, or division responsible for breakthrough innovation? To whom do they report? Where is the locus of innovation activity? Should the innovation system be organized hierarchically, or should it be flat? Is it centralized or decentralized? Formal or informal? Rigid or flexible?

What about innovation-related processes? In an ongoing operation designed to efficiently and effectively deliver goods and services in response to customers' needs, processes abound. Market research, production scheduling, purchasing, inventory management, supply chain management, capital equipment maintenance, and new product development and launch all are driven by well-hewn processes that have been refined with experience. Indeed, ISO 9000 and other manifestations of the quality movement in the 1980s and early 1990s are a testament to the importance of processes in terms of cost savings and quality improvement. But processes for breakthrough innovation defy the concept of step-by-step variance reduction that is inherent in the process improvement techniques we apply today. Every breakthrough innovation requires learning many, many new things. The familiar can, in fact, be detrimental. Innovation processes must differ from those for ongoing operations and take on a more experimental, learning-oriented nature. This does not mean to say that processes don't exist, only that they're different.

Resources and Skills. System resources fuel the management system. How does the system access the resources it needs? Ongoing operations are self-funded, generally and are expected to generate returns beyond their expenses. Innovation systems, however, are investments and must receive resources from the larger corporation. Are the system resources provided consistently or in an ad hoc manner? Are they contingent or stable? Are they considered an investment or an expense?

What about finding and developing the necessary skills for innovation? The types of skills and talent needed to accomplish the system's objectives, and the definition of roles and responsibilities, as well as the mechanisms for developing and promoting that talent, must all be in place in order for any management system to function effectively. The skills necessary for innovation differ from those required to run an ongoing operation, and so one would expect to find different roles, career paths, and recruitment and development strategies for people in an innovation system than for those rising through the ranks of the mainstream organization.

Leadership and Governance. How are decisions made? Who makes them? Leadership for ongoing operations is oriented toward execution of current plans, working to prevent any deviations. Decisions are made by those in positions of authority based on predefined sets of criteria. But leadership for new business creation and breakthrough innovation must set a culture that tolerates learning and experimentation, creativity, failure, and the parsing together of tidbits of information to chart a new course on a regular basis. Decisions may be made by a broader set of people, since gaining buy-in for these new businesses may be a strategic choice that involves a number of constituents in the company.

Metrics and Reward Systems. Metrics used to measure the system's performance and the reward systems for those operating within the system are the final element that rounds out the management system. In an ongoing operations system, individuals

are rewarded for executing according to a plan, without deviating from the budget or the schedule. They are paid bonuses for following directions.

In an innovation system, where the likelihood of failure is high, it's inappropriate to reward for sticking to a plan since plans are upended regularly. What is the best way to reward those willing to take the path of uncertainty? Should breakthrough innovation teams have equity stakes in the ventures? Should the breakthrough innovation management system be measured on how much money it brings to the company? Over what time period? Adopting traditional near-term profit objectives for an innovation management system clearly would be foolish.

How a Successful Management System Works

A management system cannot be successful unless its elements reinforce one another. For example, if the decision-making criteria used to evaluate projects for funding are based on what is already known about success in familiar markets and with known technologies, but the projects being evaluated are characterized by high uncertainty and ambiguous outcomes (Will the technology work? What are the most likely applications? How might we derive value from this as a business? How will we develop the process innovations necessary to make this economically justifiable?), it's very unlikely they'll be funded. If the system's objectives are to commercialize breakthrough opportunities, the decision criteria used must align with those objectives. Similarly, if the system's objectives are operational excellence, hiring people who are highly creative but who struggle with sticking to a decision would be a disaster. Yet those very same people may thrive in an innovation system, where exploration and experimentation are highly valued.

The management system for mainstream operations must differ from that of the breakthrough innovation function. Although the components of the system are the same, the way they operate is quite different, as illustrated in Table 1.2. The process for new product development in current lines of business fits with an

Table 1.2 A Comparison of Mainstream and Innovation Management Systems

	Mainstream Management Systems	*Innovation Management Systems*
Objectives and mandate	Efficient, effective management of current markets and operations	New business creation in new and existing markets
Leadership and culture	Planning and delivery oriented	Learning and building oriented
Structures	Clear and delineated	Flexible
Processes	Stage-gate, project management oriented; avoid deviations from budget or schedule	Learning and experimentation oriented, allow redirection based on new insights
Governance and decision making	Go-or-kill criteria clear in advance, hierarchical decision making	Decisions made based on strategic intent and continued learning; criteria not clear in advance; governance rather than hierarchy
Skills and talent development	Functional expertise	Entrepreneurial expertise
System resources	Annual budget allocation	Resources acquired through many avenues
Metrics	On-time delivery, cost containment, profitability	Portfolio health and balance; connection with strategic intent of firm; new domains accessed; new resources garnered; new business starts

operational excellence management system. It efficiently leverages what the organization knows for responding quickly and effectively to customer needs or competitive threats to current product lines or markets. But for breakthrough innovation, the company

must search for and create new knowledge, as well as leverage what it knows into new domains and develop new competencies to fill gaps as it goes. That's a learning-oriented, experiment-based exploratory system, which is not traditionally rewarded in cultures of operational excellence.

The point is that most successful firms have become adept in fine-tuning their mainstream management systems. But they're telling us that they need new avenues for growth. Top-level managers are turning their attention to developing innovation systems that can be sustained, so they don't have to rely on the one-off breakthroughs that occur by happenstance and strong personalities alone. Our research program has followed these efforts, and we've learned not only about what firms are doing but how they can do it better.

Defining a Breakthrough Innovation Capability

A breakthrough innovation capability comprises three distinct building blocks, their interfaces with one another, and their interface with the rest of the organization. All of this is depicted in Figure 1.2. Let's start with the building blocks: discovery, incubation, and acceleration. These are shown in Figure 1.3.

How convenient that we can use the acronym DNA for discovery, incubation, and acceleration. (We know; we're cheating a bit on iNcubation.) DNA, the biological sort, contains the genetic instructions for the development and functioning of organisms. DNA is the blueprint for an organism and its behavior. Similarly discovery, incubation, and acceleration are the building blocks of the innovation function in companies, Together they comprise an adaptable model for innovation in an organization.

Discovery is the creation, recognition, articulation, and elaboration of opportunities. It encompasses many activities, including external scouting of technologies and hunting within the organization for good ideas and scientific research, all to find and generate ideas. But there's more. Ideas are great, but they have to be

Figure 1.2 Model of Breakthrough Innovation Capability

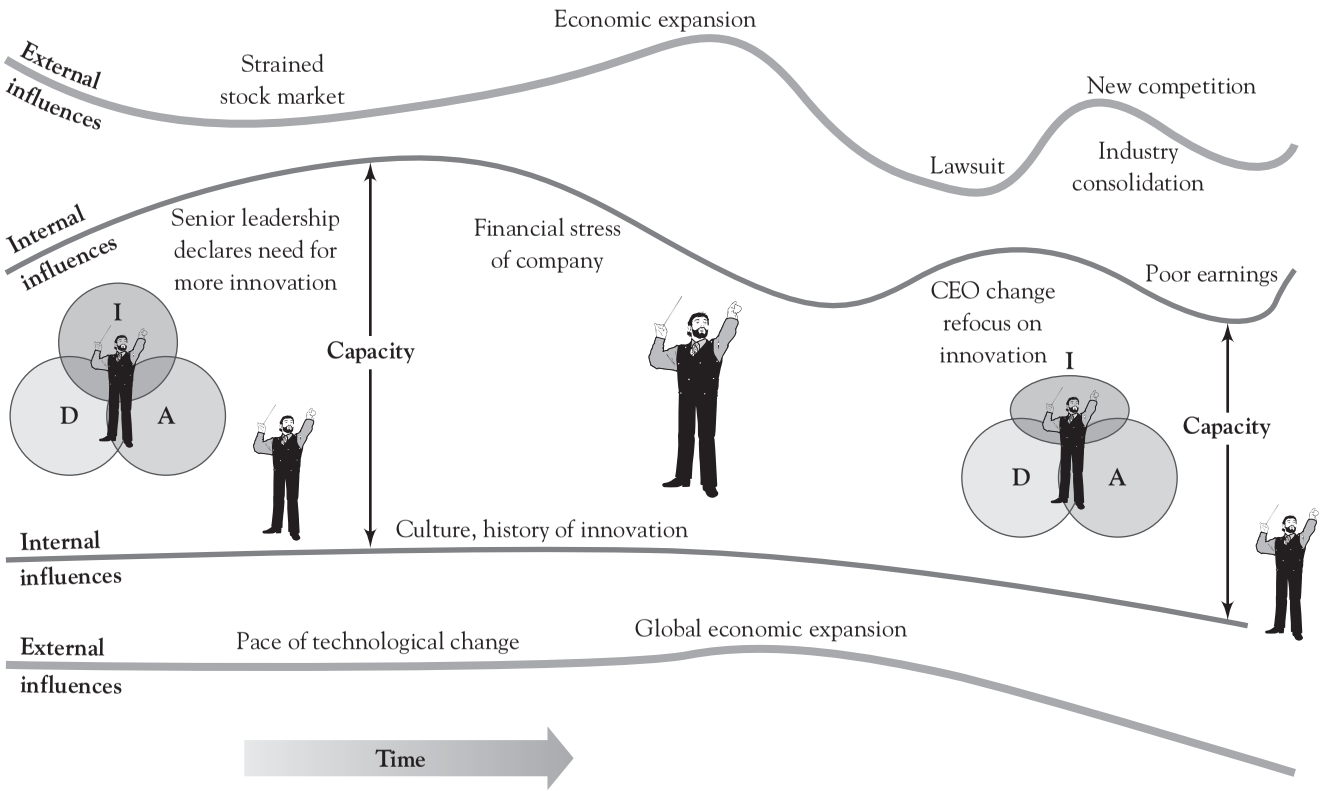
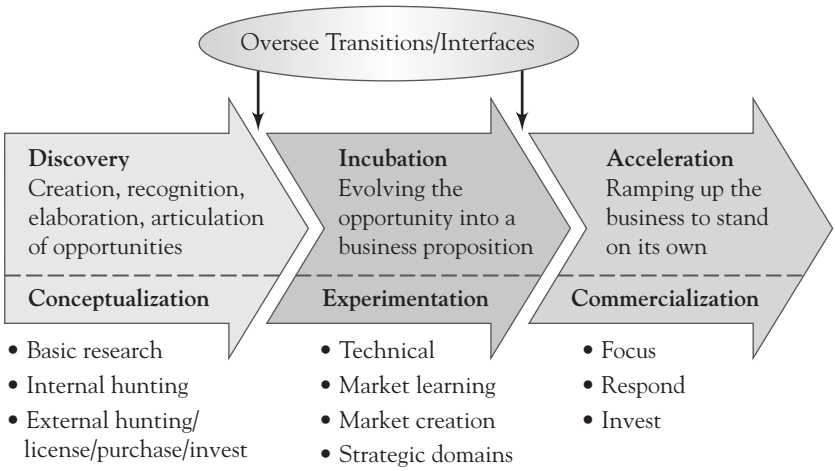


Figure 1.3 The Building Blocks of Breakthrough Innovation Capability



developed, elaborated, and envisioned as business opportunities. These may be flickers of insight or combinations of technologies that together create enormous possibilities for bringing new value to the marketplace. Discovery requires creativity and a high degree of conceptual skill.

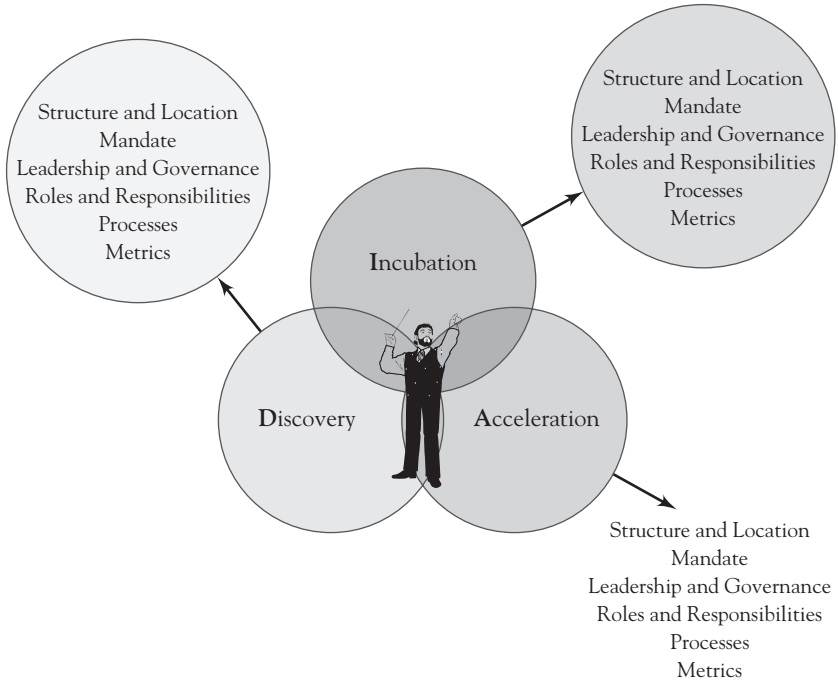
Incubation is all about experimentation—experimenting with the technical side of opportunities but also with the market, the possible economic models that a fledgling business could adopt, the business strategy, partners, value chains, and operations-related options.

Acceleration refers to the focused investment on stimulating growth. It takes the results of the experiments in incubation and leverages those to build businesses rapidly and develop the new business platform to a point of maturity where it can survive as part of the mainstream company. If a company does not have all three of these building blocks in place, its BIC is not fully evolved, and something will suffer.

Now let's return to the idea of a management system. The management system for innovation plays out differently for each of

the building blocks, as shown in Figure 1.4. The skills and metrics for discovery, for example, are different from those of incubation, and both differ from the skills and metrics needed for acceleration. So too do their objectives differ, their funding models, and their governance mechanisms. Each has its own expression of the innovation management system, but together they combine to form the company's innovation function. Also notice that Figure 1.4 shows that DNA is not simply a linear system through which a new breakthrough business opportunity progresses. We think of discovery, incubation, and acceleration as sets of activities, each with its own portfolio of opportunities ongoing within it. Resource allocation, prioritization, pacing, and other portfolio-level decisions will have to be made within and across each building block. This means that D, N, and A can't be managed separately; rather,

Figure 1.4 Management Systems for Discovery, Incubation, and Acceleration



attention has to be paid to their interfaces. How will projects be moved from discovery to incubation? From incubation to acceleration? From incubation back to discovery if necessary? And how will new opportunities that become apparent in acceleration be captured in discovery? Someone must have responsibility for the overall function.

Finally, the model in Figure 1.2 shows that the DNA system occurs in the broader context of the company, the industry, and the economy. The DNA's interface with the rest of the organization will change based on these pressures that the organization is facing. We call that the organization's *capacity* for innovation, the subject of the next chapter. As Figure 1.2 shows, capacity changes over time.

Note the person in Figure 1.2 who is running interference between the innovation management system and the mainstream organization. The interface must be orchestrated (that's why our figure shows a person with a baton) by either a single person such as a chief innovation officer or a board. Someone has to be held responsible for innovation in established companies. "If someone doesn't own it, nobody owns it," the saying goes. History shows that new business incubators, new ventures divisions, or other groups that have been founded to accomplish major innovation in companies often don't last. Nortel Networks' didn't. Lucent's didn't. Xerox's didn't. Even 3M's didn't. Their average life span has been four years in fact.[9] The idea that an orchestrator powers the innovation function up and down given the company's ability to absorb new businesses is key to ensuring that the innovation capability is not lost, but remains part and parcel of the company, just as the marketing function remains even when marketing budgets must at times be cut.

The rest of this book describes each of the pieces of this innovation function in detail. We provide examples of how firms are approaching discovery, incubation, and acceleration, knitting them together and handling the tricky aspect of orchestration. Not one of our participating companies is truly satisfied with its current systems, but many of them are making progress. They're in it for the long run.