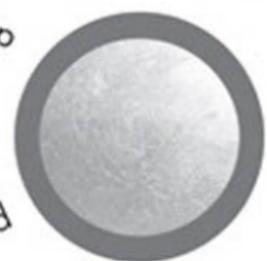


Your Roadmap
for Innovating
Faster and Smarter in
a Networked World

THE

GLOBAL

BRAIN



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SATISH
NAMBISAN

MOHANBIR
SAWHNEY

Foreword by **NICK DONOFRIO**
(Executive VP, Innovation
& Technology, IBM)

Praise for *The Global Brain*

“*The Global Brain* provokes innovation practitioners with fresh conceptual and practical insights as it explores the rapidly evolving landscape of network-centric innovation that promises to achieve higher innovation productivity. A must read for global corporations seeking to differentiate themselves through innovation in a highly competitive marketplace.”

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“You can not get comfortable in today’s world. You continually need to think of what is next and how you can improve upon where you are today. *The Global Brain* will not give you the answers—no book will. What this book does, backed by thorough research, is help you to open up the broad range of options and opportunities available to successfully innovate within your specific environment—this is where I see *The Global Brain* as a competitive advantage.”

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“The world in which we develop products and services has forever changed and *The Global Brain* is a great aid in understanding how. This book has the right combination of theory, practical examples and frameworks to help advance the way companies think about innovation. It should be required reading for managers in both large and small enterprises.”

—Rod Nelson, Vice President, Innovation and Collaboration, Schlumberger

THE
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Your Roadmap for Innovating
Faster and Smarter
in a Networked World

SATISH NAMBISAN
MOHANBIR SAWHNEY

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To Priya and Parminder

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Foreword

When Satish and Mohan asked me to write the foreword to this book, I could hardly contain my enthusiasm. Not only was I already immersed in the subject matter by virtue of my job, but I saw an opportunity to summarize some four years of acute observation and learning on a topic that is driving a new level of global, socio-economic transformation. We are in the midst of one of those rare inflection points that will forever change the way work is conducted, the way new opportunity is created, and how value is extracted from our endeavors. Of course, we are talking about the uniquely 21st century phenomena of collaborative innovation.

Certainly it is on everyone's minds. CEOs, government officials, academic and community leaders around the world are all counting on "innovation" to be the fundamental driver of economic opportunity, job creation, business competitiveness and advances in education, health care, and a vast range of other disciplines. Investing in innovation, they say, is the surest way to survive and thrive in today's complex, connected world.

But what do they really mean when they talk about innovation? Inside the information technology industry, innovation has been defined historically by the process of invention and discovery, and driven by investments in Research and Development. Bell Labs, Xerox PARC and IBM Research, along with basic research programs at the world's leading universities, epitomized the innovation engines of the 20th century.

They also operated in classic "ivory tower" mode—highly secretive and proprietary in their approaches, sharing little with others and, as a result, sometimes suffering from pain-stakingly slow paths to market for their best ideas.

But the world has changed dramatically over the past decade—and even more so, the basic nature of innovation itself. This shift first became evident earlier this decade.

Early in 2004, I had the great privilege of participating in two major initiatives to study how and why the nature of innovation is changing and the impact on business, governments, and our global society. The first was the National Innovation Initiative (NII), a special study group sponsored by the Council on Competitiveness. The NII comprised some 200 CEOs, university presidents and labor leaders whose collective mission was to help restart America's innovation engine.

Around the same time, IBM launched a unique project called the Global Innovation Outlook (GIO)—a vastly different way of identifying and acting on emerging trends, policy matters, and market opportunities, driven by input from hundreds of big thinkers in a diverse range of disciplines around the world.

We all learned a great deal from those exercises. It seems obvious now, but perhaps the most valuable finding was deep new insight into the sweeping shift in the way innovation is created, managed and delivered.

So why has the nature of innovation changed so dramatically? There are many factors, including: the dynamics of a flattening world, the march of commoditization, the rapid and global adoption of new technologies, and particularly, the open movement.

Innovation happens much faster today, and it diffuses much more rapidly into our everyday lives. It no longer is the domain of a solitary genius seeking to take the world by storm. Instead, innovation is increasingly:

Global. The widespread adoptions of networked technologies and open standards have removed barriers of geography and accessibility. Billions of people, even in the most remote regions of the world, have ready, affordable access to advanced wireless technologies and the Internet. Hitching high-speed rides on these platforms, ideas now circumnavigate the globe in a matter of minutes, if not seconds. As a result, almost anyone with a good idea can now participate in the innovation economy.

Multidisciplinary. Because the global challenges we face today are far more complex, innovation now requires a diverse mix of talent and expertise.

Consider the mapping of the human genome. Until recently, that type of research could only be conducted in wet labs, in the physical realm.

But now, incredible advances in information technology make it practical to model and process genetic information in ways never before possible.

Life Sciences just may very well be the defining science of the 21st century. At its core is the application of silicon chips, database software and powerful, lightning quick computers. To be a leader in this emerging field, you need to be as knowledgeable and facile in these domains as you are in biology and related sciences. That's a daunting and unprecedented challenge, but also a fruitful approach to unlocking new ideas and approaches to discovery that might not have otherwise emerged.

Collaborative and Open. Just about every study on innovation identifies the power of collaboration and communities as one of the major forces driving innovation in today's environment. Our first GIO exercise, for example, identified the "power of networks" as one of its top findings. Participants told us that, increasingly, their power comes largely from their ability to tap into—and sometimes transform—a larger network of people and ideas.

Similarly, more and more businesses recognize that there are a lot more capabilities for innovation in the marketplace than they could try to create on their own, no matter how big and powerful the company.

One of the key themes that emerged from a 2006 CEO study we conducted was that external collaboration is indispensable for innovation. We interviewed nearly 800 CEOs, representing a wide swath of geographic areas, a range of annual revenues, and everything from small and medium businesses to large, global enterprises. When asked which sources their companies relied on for their innovative ideas, "business partners" were right near the top of the list, just behind the general employee population.

"Customers" rounded out the top of the list, meaning that the top three significant sources of innovative ideas are predicated on open, collaborative approaches, including reaching outside the organization. In fact, CEOs said they are getting about twice as many innovation insights from customers as they are from their own sales and service organizations.

Perhaps most surprising was that "Internal R&D" was second-to-last on the list. As a career engineer and scientist-turned businessman, I would

argue that those who do not see value returning from their R&D investments are not managing their portfolios to reflect the changes underway in the marketplace. In other words, they still are not collaborating externally and working directly with their customers. IBM Research is in the midst of a renaissance as a result of embracing market input. But that's probably fodder for another book entirely.

The CEOs also told us that partnering—whether crossing internal or external boundaries—is easy in principle, but very difficult in practice. This is not at all surprising. Working with different groups to achieve common objectives usually requires a change in the culture of most organizations, and cultural transformations may be the hardest of all. I am convinced that to truly embrace a culture of collaboration you must accept limitations in your ability to get things done without help.

This is particularly important for those companies, like IBM, who are addressing problems in business, government, health care, technology, and science that are very sophisticated in nature and pushing the limits of what is possible. We have learned that we cannot work on problems such as information-based medicine, integrated supply chains or advanced engineering design unless we have established a very close relationship with clients, business partners, and even other vendors who might very well be competitors.

In such an environment, to boast about being “the best” would frankly be considered crass, a sign of corporate insecurity rather than the strength of a confident leader. Instead, you want to be known as a company that helps all the various members of the team succeed in whatever problems are being addressed. Rather than claiming that you are the most innovative of companies, you want to be known as a company that helps those with whom you work become more innovative themselves.

The open movement makes all of that possible. It holds the potential to spark remarkable innovation—and also turn historical cost structures and investment models on their ears. The Linux operating system, for example, is owned by no one, yet owned by everyone at the same time.

Thousands upon thousands of programmers around the world contribute to it and make it better, creating a checks and balances system that would be impossible with proprietary, closed systems.

Historically, we know it takes about \$1 billion to bring an enterprise-ready operating system to the marketplace for one computing platform. By working with the open community, we at IBM were able to get Linux across our entire product line with about one-fifth the investment we would normally make for just one platform. We did it through a combination of Linux code developed by the community, Linux code we contributed to the open community, and Linux code we developed uniquely to better support it on our products. As a result, our offerings are better tested, more robust and are market-ready more immediately.

The open movement creates a common base for infrastructure, so that the wheel never has to be re-invented. The basics are already there and agreed-upon by the global community. That enables creators to leapfrog over the mundane, and jump right to the innovative—being assured that the infrastructure is sound and secure because it has been refined and tempered by great thinkers around the world.

When more people have access to the building blocks of innovation, rich new perspectives and diverse influences are injected into the creative process. People begin to think in an interdependent, collaborative way—across disciplines, and collaborating at the intersections between them.

True innovation, then, is driven by the ecosystem; by listening to and learning from the various constituents with whom you exchange dialog and who may add value to the discussion. By embracing your ecosystem, you tear down the boundaries of culture, geography and organization to rapidly generate ideas and act on changes.

The first step is modeling your organization's own ecosystem—all the major constituency groups that are vital to your business success. I offer one approach here (see the following Figure) simply as a framework. There really is no right or wrong model, unless you choose to go it alone.

Second, you need to commit to a two-way dialogue with each of these constituencies—and also foster interaction between them, both with you and without you. You cannot control them anymore, or simply pump one-way messages and demands out to them. They will go elsewhere and collaborate with more receptive partners.



Networks are not a new idea, of course. The business world has always comprised constellations of people working together to create value. But in the past, those relationships have generally been more limited and exclusionary in nature, bound by strictly defined legal agreements and financial understandings.

Over the past decade, however, the proliferation of communication networks has not only connected people, places and ideas in unprecedented ways, but also catalyzed the evolution of social structures. With the freedom to transcend physical and geographic borders more easily, we are more willing to partner inside and outside our traditional boundaries of organizations and countries.

Because of that shift, the 20th-century business enterprise as we know it could be history. Increasingly, the motivating force that brings people together for work is less “a business organization” and more the collective enterprise—activities driven by a common set of interests, goals or values.

The trend is accelerating, and it will have profound implications on how companies think about everything from leadership to managing and motivating global talent. It will change the way companies approach innovation itself.

As boundaries dissolve, as more fluid relationships form, as ecosystems expand, and as networks get larger, the very nature of decision-making for individuals, businesses, and the world takes on a new shape. Local actions now have global consequences, and the reverse is true as well.

To pursue open, collaborative innovation, enterprises simply must find ways to tap into the potential of the skill, talent, and creativity of people from different teams in different organizations across the globe. A company can only be as innovative as the collective capacity of the people who make up its ecosystem. And to attract and retain talented people, a company must enable those people to feel respected, as individuals, as professionals and as members of a team. The company must trust those people and encourage them to collaborate and innovate with colleagues inside and outside the business, driven as much by pride of contribution as by loyalty to the company.

These new models for collaboration offer a financial payoff as well. Studies show that companies that outperform their peer groups are much more likely to have adopted business models that focus on core expertise and collaboration with partners, rather than by strengthening their command and control posture.

Consider Bharti Tele-Ventures, the largest private telephone company in India. It recently outsourced and integrated its core functions—such as network and program management, help desk support, disaster recovery, IT, and billing—which freed it to focus exclusively on marketing and customer service strategies. As a result, Bharti tripled its subscriber base—from 6 million to 18 million subscribers—in just 20 months.

But success stories like that do not come easy. As fewer companies directly control all aspects of their operations, it becomes harder to ensure that brand experience consistently lives up to brand promise. How can a company ensure that the individuals and business partners who power its network fully understand its brand and are motivated to protect and uphold it?

During the Global Innovation Outlook sessions, several participants advanced a concept built around the term “Reputation Capital.” It describes a kind of currency for building trust in a prospective worker’s personal and professional qualifications. They cited examples such as Wikipedia and eBay, both of which built successful brands based on the contributions of hundreds of thousands of non-affiliated individuals.

In each case, there are standards in place enabling people to see and rate the integrity and credibility of contributors. The more a contributor consistently demonstrates a high level of accountability and quality, the more value the contributor garners. Even for businesses not built around the contributions of individuals, reputation capital has intriguing possibilities—especially for emerging global players who have only a virtual presence and no visible brand of their own.

I am convinced that the art of collaboration will be the most distinguishing leadership characteristic of the 21st century. Universities need to teach it. Government policies and regulations need to facilitate it.

For collaborative innovation to become part of our collective DNA, we must accept the notion that the surest way to make progress and solve problems is to tap into the collective knowledge of the team. Networked enterprises are the future. No individual enterprise, no matter how large and talented, can afford to go it alone in today's highly competitive, globally integrated marketplace.

Success in tapping into such a global marketplace of innovators and experts—the “Global Brain” as Satish and Mohan call it—requires companies to first develop a sound understanding of the collaborative landscape and then decide on an approach that suits them the best. One size does not fit all in this regard.

In this book, Satish and Mohan provide a rich description of the different models of networked innovation and offer a set of guidelines for companies to identify and prepare for the most promising collaborative innovation opportunities. As they emphasize, success also requires us to rethink the very nature of our relationships with innovation partners – what we need to control and what we need to let go.

I think we will find that the sacrifices, and the benefits, are well worth the journey.

Nick Donofrio

Executive Vice President for Innovation and Technology at IBM Corporation

Introduction

Innovation is critical for profitable growth. In their search for innovative ideas and technologies, companies are realizing the importance of reaching out to customers, partners, suppliers, amateur inventors, academic researchers, scientists, innovation brokers, and a host of other external entities that together constitute the Global Brain—the vast creative potential that lies beyond the boundaries of the firm. Terms such as communities of creation, innovation networks, open market innovation, and crowdsourcing are being used to refer to the future of innovation in a connected world. The promise of such *network-centric* innovation approaches is resonating in the executive suites of large corporations. A recent survey of CEOs found that the need to expand the innovation horizon by looking beyond the four walls of the company is at the top of the CEO agenda.¹ However, most executives feel that they don't know how to reach the Promised Land. Our conversations with senior executives charged with innovation initiatives suggest that they struggle with a question of singular importance, "How should we *really* go about harnessing the creative power of the Global Brain to enhance our growth and performance?"

Recent examples from companies such as P&G, IBM, Boeing, and Apple illustrate that externally focused innovation can take many forms. There are many different entities that companies can reach

out to and many different types of relationships and networks they can create to harness innovative ideas. Questions abound: What are the different approaches to harnessing external networks for innovation? Which approach is best for our firm? What kinds of innovation projects lend themselves well for these approaches? What role should our firm play in our innovation network? To answer these questions, managers need a good understanding of the emerging landscape of network-centric innovation. Only with a good view of the landscape will they be able to identify the opportunities that network-centric innovation presents.

Beyond the identification of opportunities lie additional questions managers need to ask in exploiting the opportunities. What organizational capabilities do we need? How should our innovation network be designed? What benefits can we expect and how do we measure these benefits? What are the potential risks of opening up innovation? Is there a danger that we could lose control over our innovation initiatives? How should we protect our intellectual property? How should we define success?

We wrote this book to answer these two sets of questions in a practical and direct way so that companies—both large and small—can *explore* as well as *exploit* the power of the Global Brain. We hope to take you on a journey that begins with an awareness of the nature and potential of network-centric innovation to a destination where you will be able to implement a network-centric innovation strategy for your firm.

Throughout this book we will use both these terms: Global Brain to describe the diverse set of external players that constitute the innovation network for the companies; Network-centric innovation to describe the underlying principles of collaborative innovation in such a context.

HOW THIS BOOK CAME ABOUT

Both of the authors have been students of innovation for several years. Ever since the Internet gained critical mass and firms started to realize the power of networks and communities, we have been particularly interested in understanding the nature and the implications of distributed innovation, community-based innovation, and innovation networks.

Satish had studied “Virtual Customer Environments” and the role customers play in supporting and enhancing companies’ innovation efforts.² Mohan had written about the emerging phenomenon of “Communities of Creation” in different contexts and examined their promise as a way of organizing commercial

innovation initiatives.³ Our work had also focused on new types of innovation intermediaries—or “Innomediaries” as Mohan calls them⁴—that link companies with external networks and communities.

A common theme in our research was our interest in the concept of distributed innovation—innovation initiatives that are spread across a diverse network of partners. In the summer of 2005, we participated in a research symposium on distributed innovation organized as part of the Annual Academy of Management Meeting held in Hawaii. While enjoying the sun and the beaches, we began a conversation on the growing importance of innovation networks and communities of creation. Both of us were convinced about the promise and the potential of innovation initiatives centered on such networks of individual inventors, customers, and partners. We believed, based on early evidence from the software and automotive industries, that innovation could be made far more efficient, effective, and speedy if firms could harness all the talent and ideas that lie outside their boundaries. But we suspected that, despite all the hype about the innovative power of external networks, managers had very limited guidance for implementing such network-centric innovation initiatives. We decided to explore this hunch further, to see whether we could make a contribution in this area.

Our vehicle for this exploration was the Kellogg Innovation Network (KIN)—a forum for senior innovation managers of large companies—affiliated with the Center for Research in Innovation and Technology that Mohan directs at the Kellogg School of Management. The KIN is an excellent example of the power of the Global Brain in action. It consists of senior executives from a hand-selected group of leading companies who come together in a collaborative forum to exchange ideas and best practices related to innovation. The research agenda for the KIN emerges from dialogue, discussion, and debate among the members. We initiated conversations with senior managers from KIN member companies such as Motorola, DuPont, IBM, Kraft, and Cargill. We presented our ideas on network-centric innovation in KIN seminars, and our discussions revealed that our hunch was accurate. Most managers indicated that they were very excited and enthusiastic about the opportunities posed by external innovation networks and communities, but were less convinced about their own capabilities to implement such initiatives that involve reaching out to external networks successfully. And all the media hype and buzz about open innovation, open source software, social networking, and Internet-based innovation wasn't helping. There was a lot of heat and dust, but very little enlightenment when it came to execution-related issues.

A survey of senior managers conducted by the management consulting company, Bain & Co., in 2005 supports our observation. A majority (73%) of the survey respondents agreed that companies “can dramatically boost their innovation by collaborating with outsiders,” but they simultaneously expressed “deep dissatisfaction with (their) knowledge about appropriate strategies, practices, and tools” for executing such network-centric innovation.⁵

For companies to be successful in making the shift from *firm-centric* innovation to *network-centric* innovation, managers need to progress beyond a basic awareness of the potential. They need to understand the landscape of network-centric innovation. Next, they need to know the strategies and best practices that are relevant to their business context. We felt that there was a need for a book that would help managers to take these two important steps so they could harness the unbounded creative potential that lies outside their four walls.

After we decided to embark on the book project, we began with an extensive review of the academic literature as well as practitioner-oriented articles and books in the area of innovation management and networks. This review provided the background material for developing our frameworks and concepts. Next, we identified a number of companies that were leaders in externally focused innovation. These companies ranged from consumer product companies such as Dial, P&G, Staples, and Unilever to technology companies such as IBM, DuPont, Boeing, 3M, and Cisco. We decided to learn from the leaders by conducting in-depth interviews with managers leading innovation initiatives at these firms. Over a period of one year, we talked with more than 50 managers from a wide variety of firms to develop and validate our frameworks and concepts. We also talked with and analyzed the business models of boutique firms that are playing specialist intermediary roles in network-centric innovation. These companies included innovation facilitators like IgniteIP, Eureka Ranch, Evergreen IP, and InnoCentive. We also interviewed several individuals who have played leadership roles in the Open Source Software movement and other network-centric innovation contexts such as online customer communities. The diverse experiences and perspectives that we gleaned from these interviews helped us to develop the frameworks and insights related to network-centric innovation that form the core content of this book.

WHO SHOULD READ THIS BOOK

We have written this book for two primary audiences with a deep interest in innovation management.

The first audience is a CEO or senior business executive who has the primary responsibility for growth and innovation of a business unit or a major corporation. For this audience, we provide an understanding of the nature of externally focused innovation mechanisms that you can exploit for your firm, as well as your roadmap for implementing a network-centric innovation strategy.

The second audience for the book is a manager tasked with leading the innovation initiatives at a large corporation. For you, we bring clarity to the type of innovation networks you should build; the roles that your company should play within these innovation networks, and the competencies that you will need to develop at your firm to execute these roles.

What industries or markets is this book particularly relevant for? Clearly, the frameworks and concepts that we present are applicable to a broad array of industries; our book is particularly relevant for firms in the technology sector (computers, software, telecommunications, chemicals, and so on) and the consumer packaged goods sector. In addition to these sectors, the concepts we present are also relevant to other industries or fields such as health care services, medical devices, automobiles, consumer durables, and the entertainment industry, where network-centric innovation opportunities are rapidly emerging.

HOW THE BOOK IS ORGANIZED

We have organized this book, consisting of 12 chapters, into five parts. Each part addresses a set of fundamental questions related to network-centric innovation:

Part I: From *Firm-Centric* to *Network-Centric* Innovation (Chapters 1 and 2)

Part II: The Landscape of Network-Centric Innovation (Chapters 3 and 4)

Part III: The Four Models of Network-Centric Innovation (Chapters 5 to 8)

Part IV: Executing Network-Centric Innovation (Chapters 9 and 10)

Part V: Globalization and Network-Centric Innovation (Chapters 11 and 12)

We begin Part I by answering some basic questions, such as, “Why should firms ‘innovate beyond boundaries’?” And, “What do you mean by adopting a ‘network-centric innovation’ approach?” Put more simply, “Why should I care about this?” We describe the need for companies to look outside for innovation and make the shift from firm-centric to network-centric innovation. Then, we define the concept of “network-centricity” and describe the principles of network-centric innovation. Using a number of examples, we emphasize that different

“flavors” of network-centric innovation exist, and companies need to carefully map their industry and organizational context to identify the appropriate innovation approach.

In Part II, Chapters 3 and 4, we address the question, “What does the network-centric innovation landscape look like?” We present a conceptual framework to structure the emerging landscape of network-centric innovation. Our framework is based on two central dimensions of network-centric innovation—the nature of the innovation space and the structure of the network leadership. Based on these dimensions, we outline four basic models of network-centric innovation. We also identify other key elements of our conceptual framework—the different types of players in network-centric innovation (that is, a taxonomy of innovation roles) and the different types of innovation management activities and network infrastructure (for example, governance systems, IP rights management systems, and so on).

In Part III, Chapters 5 to 8, we describe in detail the four models of network-centric innovation. In each chapter, we apply the conceptual framework that we develop in Section II to analyze the nature of the innovation roles, innovation management activities, and network infrastructure that apply to that particular model. We use one “anchor” case study to ground our discussion of the important issues.

In Part IV, we address execution-related issues. We start with the question, “Where does my company fit in this landscape?” In Chapter 9, we develop a contingent framework that maps the context for innovation—industry and business environment conditions, technology and market factors, a company’s innovation goals and internal resources—to alternate network-centric opportunities. This contingent framework provides guidelines for managers to evaluate the different types of opportunities and to identify the opportunities that will best align with the firm’s resources, capabilities, and strategy.

In Chapter 10, we address questions such as, “Now that I know the opportunities for my firm, how exactly should I prepare my company to exploit these opportunities?” “What types of capabilities are required?” And, “What types of metrics should be used to evaluate my company’s performance in these initiatives?” We describe different aspects related to preparing the organization for network-centric innovation—cultural readiness, strategic readiness, operational readiness, and so on.

In Part V, Chapters 11 and 12, we broaden our horizon and consider the implications of network-centric innovation for the emerging economies. We ask,

“What opportunities do the different types of network-centric innovation initiatives present to companies in countries such as India, China, Russia, and Brazil?” We identify some of the common trends in the emerging economies and analyze the potential for companies in these countries to plug into the global brain. We offer our final thoughts in the last chapter and leave the reader with a set of best practices and “next practices” that we have identified from our study of leaders in network-centric innovation initiatives.

Join us as we begin this journey by focusing on a question that is on the lips of every CEO: “How can we sustain profitable growth, and why is innovation so important for organic growth?”

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The Power of Network-Centricity

“The key is to be able to collaborate—across town, across countries, even to the next cube. ... Global innovation networks help make this happen.”

—Tony Affuso, UGS Chairman, CEO, and President.¹

Innovation used to be something companies did within their four walls. Storied organizations like AT&T’s Bell Laboratories, IBM’s Watson Research Center and Xerox’s Palo Alto Research Center were the temples of innovation.² Thousands of researchers and scientists toiled deep within the bowels of large corporations to create the next big thing. Corporations viewed their innovation initiatives as proprietary and secret. And they attempted to hire the best and the brightest researchers and managers to drive basic research and new product development. In fact, any self-respecting organization was afflicted with the “Not Invented Here” (NIH) syndrome—believing that it had the best ideas and the best people, so if it did not invent a certain something, that thing wasn’t worth looking at.

Then the Internet happened. With it came phenomena like the Open Source Software movement, electronic R&D marketplaces, online communities, and a whole new set of possibilities to reach out and connect with innovative ideas and talent beyond the boundaries of the corporation. Even the lexicon associated with innovation is changing, with new adjectives that describe a very different view of innovation—open, democratic, distributed, outside, external, community-led. The changes in vocabulary and metaphors suggest that the shift in the nature and the process of innovation is broad and

deep. Consultants, academicians, and mainstream business media have all joined the chorus to liberate innovation from organizational boundaries. Special issues and articles in business magazines with titles such as “The Power of Us,” “Open Source Innovation,” and “The Innovation Economy” implore managers to reorient and amplify their innovation initiatives by tapping external networks and communities.

But, in the words of the miners in the California Gold Rush in the nineteenth century, is there real “gold in them thar hills”? Or, what exactly can such externally focused innovation deliver? To answer this question, we first need to look at the problems companies are facing in continuing to grow their revenues and profits.

THE QUEST FOR PROFITABLE GROWTH

How the mighty can stumble. Consider Dell Inc., the leading seller of personal computers and accessories. From 1995 to 2005, Dell was a paragon of profitable growth, fueled by its innovative build-to-order manufacturing and direct-to-customer sales business model. During the five-year period from 2000 to 2005, Dell’s revenues grew at 16% per year and its earnings increased 21% per year. The company was widely admired for its ability to drive growth and increase its market share by executing flawlessly on its business model, and staying focused on process innovation. When other companies started imitating its business model, Dell maintained its edge by further refining its business processes to become even more efficient in its operations. However, Dell’s growth engine stalled badly in 2005. In 2006, it missed investor expectations for several quarters in a row, and its stock lost almost half of its value from July 2005 to June 2006. One reason behind the downfall of Dell is that it became too much of a one-trick pony—using the same direct business model for more than two decades, and not innovating enough in terms of new products and new markets. Meanwhile, Dell’s competitors, including Apple Computer and Hewlett-Packard, who placed more emphasis on innovative products and new business models, grew faster and increased their market share at the expense of Dell. Dell’s growth woes are likely to persist for the foreseeable future, and its senior management will be under intense pressure to reignite the growth engine.

Dell is not the only large company facing such growth challenges. Companies such as Kraft, 3M, Sony, Ford, and IBM are all finding it difficult to drive growth. Investors closely monitor the CEOs and senior management of large public companies on their ability to grow the firms they lead. No wonder then that a

majority of the CEOs consider growth to be their highest priority—even more than profits. Although growth has always been on the CEO agenda, the perennial quest for growth has become more challenging in the era of global competition and shrinking product life cycles.

In their attempt to jumpstart growth, companies often turn to inorganic growth through mergers and acquisitions (M&A). M&A deals are very appealing to senior managers—they generate an immediate boost in revenues; the hard synergies (mostly financial) are very apparent; and the internal stakeholders (that is, senior managers) have a lot to gain from making the deals. As a result, M&A activity has increased to a fever pitch. In 2005, there were 10,511 mergers and acquisitions involving U.S. companies alone, with an aggregate value of more than \$1 trillion—a 28% increase over 2004's \$781 billion.³

However, there is trouble in “M&A land.” Simply put, mergers and acquisitions don't work as advertised. Most studies and surveys paint a gloomy picture of the after-deal scenario. Between 70% and 80% of the M&A initiatives end up in failures—most of them within the first 18 months.⁴ Companies generally do well at realizing the hard synergies; for example, consolidating the borrowing, restructuring the taxation, pooling the working capital, purchasing at higher volumes, and so on. The soft synergies—operational consolidation, process improvement, channel merging, technology sharing, staff layoffs, extension of customer base, and so on—are what rarely materialize. Although most M&A failures are blamed on “people” and “cultural” issues, the end result is that such initiatives fail to enhance (and, often contribute to decline in) shareholder value. After the failure, the CEO often exits and a new CEO arrives who starts divesting those previously acquired divisions—and then promptly start acquiring new ones! Like a gerbil in a treadmill, the cycle of acquisitions and divestitures goes on, with the only sure winners being the consultants, lawyers, and investment bankers.

Given the high visibility of many recent M&A failures (remember Time Warner and AOL or Chrysler and Daimler-Benz), many CEOs have changed their tune and now proclaim innovation as the preferred pathway to growth. In a recent CEO survey, 86% of respondents indicated that innovation is definitely more important than M&As and cost-cutting strategies for long-term growth. In fact, many CEOs and senior managers have come to view innovation as their only alternative to achieve sustained growth.⁵

As Howard Stringer, Chairman and CEO of Sony, recently noted, “We will fight our battles not on the low road to commoditization, but on the high road of innovation.”⁶

However, despite such public statements about the importance of innovation, when it comes to actual decisions and actions, many companies still take the easy way out—focusing either on cost-reduction initiatives that promise short-term profit increases or on mergers and acquisitions that create an illusion of rapid revenue growth, even if the former is often not sustainable and the latter mostly turn out to be failures. In short, a significant gulf seems to exist between the desire to innovate and the ability to innovate.

AN INNOVATION CRISIS?

The ability of firms to innovate is stymied by two factors—the pace of innovation required to maintain and grow profits is increasing, and the productivity of internally driven innovation efforts is decreasing. These two factors are conspiring to create an innovation crisis in large firms.

THE “RED QUEEN” EFFECT IN INNOVATION

“Well, in our country,” said Alice, still panting a little, “you’d generally get to somewhere else—if you run very fast for a long time, as we’ve been doing.” “A slow sort of country!” said the Queen. “Now, here, you see, it takes all the running you can do, to keep in the same place. If you want to get somewhere else, you must run at least twice as fast as that!”⁷

Despite having hundreds of in-house scientists and engineers working tirelessly on innovation projects, managers are discovering that their innovation pipelines are not delivering the results they need to sustain growth. Innovation productivity is declining while the cost of new product development is increasing day by day. Investing more dollars into internal R&D efforts does not seem to produce the desired payoffs. For example, Kraft invests close to \$400 million annually and has 2,100 employees in its internal R&D unit. Despite such large investments, the company has been discovering its R&D pipeline to be less and less effective in fueling firm growth.⁸ The story is not much different in many other large firms in both the technology and the consumer product sectors.

On the other hand, the industry cycle times continue to shrink rapidly across the board. For example, in the automobile industry, 48-month development cycles and six-year model life cycles were the norm. But today, concept-to-production times are down to less than 24 months, and industry leaders like

Toyota are talking about 12-month development cycles. In consumer electronics markets (for example, cell phone, digital audio player, and so on), product life cycles are often measured in weeks, not months.

Added to this acceleration is the impact of globalization—global markets breed global competitors. Companies such as Samsung from Korea (in mobile phones and televisions), Tata from India (in automotive), and Lenovo from China (in computers) have upped the ante by producing innovative products at significantly lower costs, driving the rapid commoditization in many product categories.

These forces—rapidly decreasing product life cycles, decreasing internal innovation productivity, and global competition—together are creating a Red Queen effect⁹ in innovation: Companies have to invest more and more just to maintain their market position.

Consider a simple simulation done by Dave Bayless, an entrepreneur and our friend, to understand the crippling effect of shrinking product life cycles on growth. Assuming a company has base revenues of \$500 million per year, the simulation illustrates how a 10% annual increase in industry clock speed would necessitate an immediate and sustained increase in the rate of new product introductions of 50% just to maintain that average level of revenue over ten years.¹⁰ And this simulation did not even consider the potential negative impact of reduced innovation productivity or the increasing market risk of new products and services—both clearly evident in many industries. Thus, just one factor alone, shrinking product life cycle, poses a critical innovation challenge. On top of that, if the company wants to grow even at a modest 4% or 5% annual rate, the innovation challenge becomes almost insurmountable.

THE LIMITS OF INTERNALLY FOCUSED INNOVATION

It is not just the Red Queen effect that defines the limits of internally focused innovation initiatives. There is also the potentially debilitating effect of a myopic “world-view” that companies often come to possess—particularly when their “successful” innovation and growth strategies have been around for a while.

Dell’s direct-to-consumer business model is a good example in this context. As market pressures continue to climb in the personal computer market, Dell’s inability to come up with new business models is what continues to drag down its growth. Dell, to its credit, has started considering new ways of doing business and entering into new product categories and markets—but these efforts haven’t been met with much success. Granted, business model innovation is

not easy. But it is Dell's ingrained perspectives derived from operating its current business model for a long time that makes such business model innovation doubly difficult. Over time, organizations become prisoners of what they know, especially when they have met with sustained success. They fail to see beyond their limited view of the world.

This limited world-view is becoming more dangerous in the turbulent and dynamic business environment that we find ourselves in. In many industries such as consumer electronics, automobiles and software, products have become more complex in terms of their features, their underlying technologies, and their design. Therefore, the knowledge and skills required to design and develop new products and services have become much more diverse and more demanding. Innovating such new products and services thus calls for not only a command of diverse sets of knowledge and expertise but also the ability to make non-obvious connections between such diverse knowledge bases. This feat is very difficult to pull off inside the four walls of any firm, no matter how large.

Clearly, throwing more and more money at the internal innovation engine is not the most efficient way to address the innovation crisis. Doing more of the same can only result in incremental improvement in innovative output. What is really needed to overcome this crisis is a significant increase in the company's innovation reach and productivity—only such an increase will translate into a dramatic shift in innovation output of one or more orders of magnitude. And to gain such increases in reach and range of innovative ideas, companies need to broaden their innovation horizons by looking outside for innovative ideas and technologies.

Consider the case of Kraft. Profits fell 24% in the time period from 2003 to 2005. Top-line growth stalled, and net income in 2005 was \$2.63 billion, down from \$3.48 billion in 2003. The company that came up with blockbuster products such as Oreo cookies, Miracle Whip dressing, and DiGiorno pizza is hungry for ideas. It is not lacking any internal R&D infrastructure. Kraft has an extensive internal R&D setup, with thousands of talented researchers on staff. However, internally focused innovation efforts are not delivering the goods. So Kraft has turned outwards in its quest for ideas: The company is inviting unsolicited ideas from its customers or for that matter from anybody who visits its Web site and submits ideas. Whether putting such an invitation for ideas on the company Web site is the right approach is debatable, but what is less arguable is the need to start looking outside. Indeed, the limits of internally focused innovation are well illustrated by Kraft's radical departure from past practice. As Mary Kay Haben, senior vice president at Kraft, noted, "In the past we would have said, 'Thank you, but we are not accepting ideas.'"¹¹

The imperative to look outside is not limited to the consumer product sector. Consider Merck, a giant in the pharmaceutical industry. Merck has traditionally been an internally focused innovation organization. However, after a string of failures and a very lackluster R&D pipeline, it made a strategic shift toward looking outside for innovation—specifically, to partner with smaller firms with innovative ideas. Merck’s R&D chief, Peter Kim, made it clear that the company’s own labs are insufficient to replenish its pipeline for the future, and three years or so back embarked upon a more collaborative and open innovation agenda. Although the results of this approach will likely take years to become evident, the initiative is well underway. Compared to 10 outside alliances in 1999, Merck has entered into 141 such deals between the years 2002 and 2004—an average of 47 each year. And in 2005, Merck reviewed more than 5,000 such external collaboration opportunities.¹²

OVERCOMING THE CRISIS: “LOOKING OUTSIDE”

The opportunities for companies to “look outside” for innovation are increasing day by day. As we noted previously, the Global Brain is rich and diverse—a large number of innovative firms as well as a large pool of innovative people exist in different parts of the world whose knowledge and creativity can be leveraged by companies. Moreover, new types of innovation intermediaries and new technological infrastructure (for example, the Internet) have made tapping into such global networks of inventors, scientists, and innovative firms easier than ever before. Thus, the imperative for sourcing external innovation is matched by the rapidly expanding horizon of innovation opportunities.

Former Sun Chief Scientist, Bill Joy, noted several years back that “most of the smart people in the world don’t work for your company.” True enough, but increasingly those smart people in other parts of the world represent a global innovation opportunity waiting to be tapped.

This is mirrored in companies, such as by P&G’s recent innovation initiatives. As Tom Cripe, Associate Director of P&G’s External Business Development group, recently noted:

“We want to grow efficiently. And at the size we are, it’s just not possible to do it all yourself. And even if it was it’d be lunacy to attempt it. There are just too many smart people out there. If we have to grow at the rate we want to, we have to add incremental business of billions of dollars ... It took us 100 years to get here and we now have to

do in a few years what we did in 100 years. Even if we could, it would be expensive. And so we've been able to increase our innovative output while reducing our spending as a percent of sales because we're multiplying it by all the people we're partnering with. So the reason for 'looking outside' is to grow most effectively by drawing on the very best ideas out there, rather than trying to compete with everybody."¹³

This message has come through in several other forums, too. For example, the Council of Competitiveness published the National Innovation Initiative report in 2004. This report focused on the implications of globalization for the national innovation agenda for the United States. Among other trends, the committee identified the effective pursuit of highly collaborative innovation as of utmost importance for the U.S. economy. As the report notes, "Innovation itself—where it comes from and how it creates value—is changing:

- It is diffusing at ever increasing rates.
- It is multidisciplinary and technologically complex and will arise from the intersection of different fields.
- It is collaborative, requiring active cooperation and communication among the scientists and engineering and between creators and users.
- Workers and consumers are embracing new ideas, technologies, and content, and demanding more creativity from their creators.
- It is becoming global in scope—with advances coming from centers of excellence around the world and the demands of billions of new consumers."¹⁴

The key findings of the committee also reflected how the global connectedness and the scale of collaborative innovation will demand the development of a more diverse workforce that is able to communicate and coordinate innovation activities across organizational and geographic boundaries.

Similarly, IBM has been conducting a global conversation on innovation that it calls the Global Innovation Outlook (GIO). The most important finding from IBM's GIO conducted in 2005 and 2006 was that innovation is more global (anyone and everyone can participate without geographical barriers), more multidisciplinary (innovation requires a diverse mix of expertise), and more collaborative (innovation results from entities working together in new ways).¹⁵

To enjoy the benefits of such a rapidly expanding horizon of innovation opportunities, companies would need to make a gradual shift from innovation initiatives that are centered on internal resources to those that are centered on

external networks and communities—that is, *a shift from firm-centric innovation to network-centric innovation*. However, the question remains: Will such a shift address the innovation crisis outlined earlier? In other words, will a network-centered innovation strategy deliver gains that are orders of magnitude higher in innovation reach, range, and effectiveness?

To understand the promise of network-centric innovation, we need to consider its foundational theme or premise—namely, the concept of network-centricity. The concept of network-centricity has very deep roots and very broad applicability. Before we discuss how networks can enhance innovation, let us examine how network-centric capabilities are transforming several other domains.

THE POWER OF NETWORK-CENTRICITY

The university that one of us works at has a library with close to 500,000 books on its shelves. Considering the number of students—around 7,500—it is not a large acquisition. However, the library is part of a network of 13 other university libraries in the area—a system called ConnectNY. The total number of books in the ConnectNY network is 10 million. Each member of the ConnectNY network can request books from any other member library, and if the book is available, it is delivered by a private courier (who travels between the different member libraries) within three to four business days. Thus, in effect, by becoming a member of the ConnectNY network, the library has increased its acquisition by twentyfold—from 0.5 million to 10 million.

Consider another simple example—the task of replenishing a vending machine. A service truck can visit each and every vending machine and then find out whether it needs any servicing or not. This method creates inefficiency because there is no way for the person making the rounds to know whether he needs to replenish a specific machine and what exactly the machine is short of. Imagine if the vending machine could “talk” to the service person over an information network and inform him in advance if it was running out of a specific food or beverage item. This is what Vendlink LLP, a N.J.-based vending service company, has done in Philadelphia. It created a wireless network that integrates information from all the vending machines in the area and produces a servicing plan that optimizes the logistics involved.

Even toys can be made smarter after they are connected to a network. In 1997, Fisher Price and Microsoft created the ActiMates Interactive Barney. By itself, ActiMates Interactive Barney is a cute, purple stuffed animal. But the real fun

begins when the toy is used with either of two add-on devices: a TV Pack, which adds a radio transmitter to the user's TV/VCR; and a PC Pack, which does the same to a computer. The toy enables children to improve their vocabulary or language skills. The company also created a network from which the "lessons" can be downloaded into the toy. As the child gets older, parents can connect the toy to the network, download the appropriate components, and thereby extend its use.

These simple examples reflect the essence of network-centricity: the emphasis on the network as the focal point and the associated opportunity to extend, optimize, and/or enhance the value of a stand-alone entity or activity by making it more intelligent, adaptive, and personalized. It should be no surprise, therefore, that the concept of network-centricity has permeated many aspects of our contemporary world and daily-life—ranging from warfare and military operations to social advocacy movements. Let us start with network-centric computing.

Network-Centric Computing

In the field of computer science, the shift from host-centric computing to distributed or network-centric computing has relatively old roots. The concept of distributed computing, pioneered by David Farber in the 1970s at the University of California,¹⁶ evolved into what is now called network-centric computing or grid computing.

Grid computing relates to the ability to pursue large-scale computational problems by leveraging the power and unused resources of a large number of disparate computers (including desktop computers) belonging to different administrative domains but connected through a network infrastructure.¹⁷ The essential idea behind grid computing is to solve computing-intensive problems by breaking them down into many smaller problems and solving these smaller problems simultaneously on a set of connected computers. The parallel division of labor approach can result in very high computing throughput, often more than a supercomputer. Further, this throughput can be achieved at a cost that is significantly lower by exploiting the relatively inexpensive computing resources available at remote locations. And the network-centric computing architecture also is far more flexible, because remote users can decide moment-to-moment how much computing power they need. The promise of grid computing—high computing power combined with low cost and high operational

flexibility—is spurring many applications in commercial as well as non-commercial contexts, including financial modeling, weather modeling, protein folding, and space exploration.¹⁸

Network-Centric Warfare

Network-centric warfare (NCW) is a relatively new theory or doctrine of war developed primarily by the United States Department of Defense.¹⁹ This emerging theory indicates a radical shift from a platform-centric approach to a network-centric approach to warfare.

The basic premise of NCW is that robust networking of geographically dispersed military forces makes it possible to translate informational advantage into warfare advantage.²⁰ Higher levels of information sharing among the units enhance the extent of “shared situational awareness.” In other words, through information sharing, every unit—from infantry units to aircraft to naval vessels to command centers—“sees” the sum of what all other units “see.” This shared awareness facilitates self-synchronizing forces, virtual collaboration, and other forms of flexible operations. The value proposition for the military is a significant reduction of combat risks, higher order combat effectiveness, and low-cost operations.²¹ Although there is still significant debate about how soon and to what extent the benefits of NCW can be realized, several countries, including Australia and the UK, have embraced the basic tenets of network-centric warfare.

Network-Centric Operations

The term *network-centric operations* (NCO) was originally applied to the field of logistics and supply chain management in business enterprises. The term “value nets” or “value networks” has also been used in this context. However, more recently, NCO has gained a broader interpretation and is often used interchangeably with NCW in the defense and military areas.

In the supply chain management context, NCO signifies establishing dynamic connections between the enterprise, suppliers, customers, and other partners to deliver maximum value to all the entities concerned.²² It involves integrating enterprise information systems (for example, ERP and CRM systems) with external partners’ systems and processes to enhance the information flow and

“sense and respond” capabilities. Whereas traditional supply chains emphasize linear and often inflexible connections, network-centric operations or value nets focus on establishing varied, dynamic connections that deliver both efficiency and agility to the enterprise. Supply chain-focused software companies such as SAP, i2 Technologies, and IBM have adapted these concepts to create applications that support such network-centric supply chain operations.

Network-Centric Enterprise

The concept of network-centric enterprise (NCE) owes its origin to the concept of business ecosystems and virtual organizations. It involves establishing an “infrastructure” that connects the different partners in a company’s business ecosystem and supports the different value creation processes. As such, the concept of NCE is also closely related to NCO.

Companies such as Wal-Mart, Cisco, and Toyota have considerable experience in deploying and operating such a network-centric enterprise. For example, Cisco has evolved its organization into what it calls the “Networked Virtual Organization” (NVO) in its manufacturing operations.²³ Similarly, Toyota has used the NCE model to improve its just-in-time inventory management. The NCE (or NVO) model has three core tenets.²⁴ First, it puts the customer at the center of the value chain and emphasizes the need to respond rapidly to customers’ needs. Second, it calls for the enterprise to focus on those core operations or processes where it adds most value and to outsource or turn over all other operations to multiple partners. Finally, the model requires significant process, data, and technology standardization to enable real-time communication and synchronization across organizational boundaries. Overall, the network-centric enterprise model implies significant strategic and operational agility for an enterprise, thereby enhancing its ability to thrive in highly dynamic markets.

Network-Centric Advocacy

The concept of network-centricity is also becoming evident in the domain of social advocacy movements. Social advocacy groups have realized that the basic tenets of network-centricity can be adopted to enhance the reach, speed, and overall effectiveness of social movements.²⁵

Network-centric advocacy (NCA) signifies a critical shift from the direct engagement and the grassroots engagement models of social advocacy to a

more network-centered model wherein the individual participates as part of a coordinated network.²⁶ In NCA, individuals and groups that are part of the network rapidly share information on emerging topics and identify “ripe campaign opportunities.” The ability of the network to scale up in terms of resources, expertise, and overall level of public support brings sharpened focus and enhanced visibility to the campaign. Network-centric advocacy provides several advantages: speed of campaign, ability to pursue multiple campaigns with few resources, and ability to rapidly abandon losing efforts. All this brings an element of unpredictability that lowers the ability to counter such social campaigns effectively.

We summarize the promise of network-centric concepts in **Table 1.1**. These examples suggest that, although the concept of network-centricity has found considerable application in diverse domains, all these applications have a common thread in terms of outcomes—greater power, speed, flexibility, and operational capabilities delivered at a lower cost using diverse resources that are spread out geographically. These benefits are the very ones we seek as we examine the appeal of network-centricity in the domain of innovation.

Table 1.1 Evidence of Network-Centricity in Different Domains

Domain	From	To	Implications
Computing	Host-centric	Distributed or grid computing	More computing throughput at lower cost
Warfare	Platform-centric	Network-centric	More combat power with fewer, lower-cost units
Supply chain mgmt.	Linear chains	Value nets	Higher “sense-and-respond” capabilities
Business enterprise	Stand-alone organization	Virtual or networked organization	More strategic and operational agility
Social advocacy	Direct engagement	Network-coordinated engagement	More effective campaigns with fewer resources

NETWORK-CENTRICITY AND INNOVATION

To apply a network-centric perspective to innovation, we formally define network-centric innovation (NCI) as an externally focused approach to innovation that relies on harnessing the resources and capabilities of external networks and communities to amplify or enhance innovation reach, innovation speed, and the quality of innovation outcomes.

Network-centric innovation features principles that are analogous to the examples we mention from other domains. We define these principles in the next chapter. But first, let us look at the evidence of the power of networks to enhance innovation in a variety of industries and markets.

Perhaps the most celebrated example of networked innovation is the Open Source Software (OSS) movement, and its most famous product is Linux, the fast-growing open source operating system that was developed and is continually enhanced by a networked community of software developers. The first release of Linux Kernel, version 0.01, was in September 1991, and it consisted of 10,239 lines of code. By April 2006, version 2.6.16.11 had been released with a whopping 6,981,110 lines of code. In this 15-year period, thousands of programmers spread across the world contributed to the development and release of more than a hundred versions of the Linux Kernel. In fact, within one year—from early 1993 to early 1994—15 development versions of the Linux Kernel were released. Such a rapid release schedule is unheard of in the commercial software world, and it reflects the innovative power of the global Linux community.

A more formal comparison of the development effort between Red Hat Linux version 7.1 (a distribution version) and a similar proprietary product was done in 2001.²⁷ Red Hat Linux 7.1 contained more than 30 million source lines of code and reflects approximately 8,000 person-years of development time. If this version were developed in a proprietary manner (that is, inside an organization such as Microsoft or Oracle) in the United States, it would have cost approximately \$1.08 billion (in year 2000 U.S. dollars).

To provide further evidence of the awesome power of such innovative communities, consider Red Hat Linux version 6.2, which was released just a year earlier in 2000—it had only 17 million lines of code and represents 4,500 person-years of development effort (\$600 million in comparative cost). Thus, version 7.1 was approximately 60% more in terms of size and development effort. In one year, the open source community's innovative contributions increased two orders of magnitude—an impossible feat in a conventional proprietary software development initiative.

The creative power of networks and communities is being felt in other domains, too. Consider the community-based encyclopedia called Wikipedia. This online encyclopedia was launched in January 2001, and through the collaborative efforts of tens of thousands of contributors, it swiftly became the largest reference site on the Internet. As of July 2007, Wikipedia had more than 75,000 active contributors working on more than 7,704,000 articles in more than

250 languages. Debate is ongoing regarding the reliability and accuracy of Wikipedia (for example, a peer-reviewed study published by the prestigious journal *Nature* found that Wikipedia is comparable to the hallowed *Encyclopedia Britannica* in terms of accuracy,²⁸ while other studies have shown just the opposite). What is undeniable, however, is the creative power of the community that feeds Wikipedia's exponential growth.

Another example is the world of open source or citizen journalism. The first open source newspaper is OhmyNews—a South Korean online newspaper established in February 2000. The majority of the articles in the newspaper are written by its readers—a community of approximately 41,000 citizen reporters. As a citizen newspaper, OhmyNews exercised considerable influence during the South Korean presidential elections in 2002.²⁹ An International edition (in English) of OhmyNews was launched in February 2004 with 1,500 citizen reporters from more than 100 countries.

Global networks are also turbo-charging scientific research in the life sciences and material science industries. A well-known example of an electronic R&D network is InnoCentive, a global community of scientists that helps large companies seek solutions to their R&D problems by sourcing solutions from scientists around the world. InnoCentive maintains a community of scientists, in fields as diverse as petrochemicals and plastics to biotechnology and agribusiness, from approximately 170 countries. To understand the power of this network, consider the case of Eli Lilly, which had an R&D problem in the area of small molecules that its internal R&D organization had spent more than 12 person-months of work and failed to solve. Eli Lilly posed the problem on the InnoCentive Web site in June 2003. In less than five months after posting it on InnoCentive, Eli Lilly had a solution in hand—a retired scientist based in Germany had found a solution that had eluded Eli Lilly's internal team of researchers.³⁰ Through InnoCentive, Eli Lilly had effectively increased its reach to approximately 30,000 scientists and researchers who were members of the InnoCentive forum. Other examples from InnoCentive and similar "Innomediaries" suggest that the innovative power of communities can translate into orders of magnitude improvements in innovation speed, cost, and quality.

Perhaps no other company illustrates the power of network-centricity as well as P&G. The company's aggressive partnership with external innovation networks has translated into highly commendable results. R&D productivity has increased by nearly 60%, innovation success rate has more than doubled, and the cost of innovation has fallen significantly.³¹

These and other scattered examples of the creative power of the Global Brain have encouraged more and more companies to reorient their innovation initiatives to a more collaborative, network-centered approach. However, as most CEOs and senior managers would readily admit, harnessing this innovative power is something that is “theoretically easy” but “practically hard to do.”³²

Let us briefly examine these broad challenges now.

CHALLENGES IN “LOOKING OUTSIDE”

Organizations embarking on a network-centered innovation strategy are likely to be faced with different types of networks and communities with different types of innovation opportunities. The three broad sets of challenges that companies will likely face are *mindset and cultural* challenges, *contextualization* challenges, and *execution* challenges.

MINDSET AND CULTURAL CHALLENGES

Most large companies have considerable experience in partnering with a relatively small set of carefully identified firms—joint ventures, technological agreements, licensing agreements, and so on. However, when it comes to innovation collaboration on a greater scale—for example, a larger number and geographically more widely dispersed set of partners—most companies have limited experience. The first critical issue that senior managers will need to address relates to the broader implications of adopting such a network-centered approach to innovation. How should the organization view such collaboration opportunities? How can senior managers ensure a coherent set of innovation strategies that capture both external opportunities and internal capabilities? What type of broad framework or mindset should be developed that reflects the organization’s intent to collaborate with outsiders and defines the broad parameters for such collaboration? And how should senior managers communicate and encourage other members of the organization to adopt such a mindset?

For companies such as 3M, DuPont, and Kodak with a history of significant internal achievements and with a vast array of resident scientists and technical specialists, the dominant threat is the feeling of “We know everything and everyone.” This “Not Invented Here” (NIH) syndrome is a serious barrier to acceptance of new ideas from outside the company. The cultural shift needed to overcome the NIH syndrome and to adopt a collaborative mindset is significant.

IBM has acknowledged the simple fact that to partner with open source communities and other such communities of creation, it needs to let go of some of the control it has traditionally exercised in all of its innovation initiatives. Indeed, a recent book by Linda Sanford, one of IBM's senior executives, succinctly captures this spirit through its title, *Let Go to Grow*.³³ Although such a cultural shift might be easy to identify, achieving it in an organization—especially a large organization with a long history of success—is very challenging.

CONTEXTUALIZATION CHALLENGES

The second set of issues involves understanding the landscape of network-centric innovation and relating it to the firm's own unique innovation context.

It is evident that companies such as IBM and P&G have succeeded to different extents in leveraging innovation networks. For example, IBM has subscribed to the open source model and has invested significant resources to align its innovation initiatives in many of its product and service areas with the open source model. Similarly, P&G has garnered significant visibility through its Connect+Develop initiative to partner with external innovation networks such as those offered by InnoCentive and Nine Sigma.

Although these examples indicate specific approaches to a network-centered innovation, they are not the only approaches. The multiplicity of approaches raises many questions: Is there a systematic way to identify and analyze the different approaches (or models) of network-centric innovation? What are these different approaches? How should an organization evaluate and select the most appropriate approach vis-à-vis its particular context? Further, should an organization assume a lead role or a non-lead role in such a collaborative arrangement? What types of internal projects would be ripe for such a collaborative approach? All these issues relate to contextualizing the opportunity offered by the external innovation network or situating the opportunity in the company's particular market and organizational context.

EXECUTION CHALLENGES

Finally, the third set of issues relates to the actual implementation of collaborative innovation projects. When an appropriate network-centric innovation opportunity has been identified, how should the organization go about executing it? How should the organization prepare itself for network-centric innovation? What are the types of capabilities and competencies that the organization

would require? How should the organization integrate its internal and external innovation processes? What types of licensing and other value appropriation systems should it employ? What is the appropriate set of metrics that it should use to evaluate its performance in such collaborative innovation projects?

The preceding three sets of issues—mindset and cultural, contextualization, and execution—represent the type of practical issues that most CEOs and senior managers need to address in order to be successful in championing and executing their external network-centered innovation initiatives. Because these challenges originate from the richness and variation that is present in the network-centric innovation landscape, we continue our discussion by examining the different “flavors” of network-centric innovation.

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