The
SPIDER'S
STRATEGY

Creating Networks to Avert Crisis,
Create Change,
and Really Get Ahead

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Published by Pearson Education, Inc.
Publishing as FT Press
Upper Saddle River, New Jersey 07458

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Printed in the United States of America

First Printing: August 2008

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The Fire That Changed an Industry

About 8 p.m. on March 17, 2000, a lightning bolt struck a high-voltage electricity line in New Mexico. As power fluctuated across the state, a fire broke out in a fabrication line of the Royal Philips Electronics radio frequency chip manufacturing plant in Albuquerque.[1] Plant personnel reacted quickly and extinguished the fire within ten minutes. At first blush, it was clear that eight trays of silicon wafers on that line were destroyed. When fully processed, these would have produced chips for several thousand cell phones. A setback, no doubt, but definitely not a calamity.

At a chip factory, production takes place in "clean-room" conditions. The cleanest of such facilities have no more than one speck of dust per cubic foot. Stated differently, these facilities are ten thousand times cleaner than hospital operating rooms.[2] And therein lay the problem. Fire produces smoke and triggers sprinklers. Fire and smoke take lives, and sprinklers save them, but all—fire, smoke, and water—wreak havoc on property. As they dug deeper, plant personnel found that smoke and water had contaminated millions of chips that had been stored for shipment. Damage this extensive was definitely a calamity.

Four thousand miles away, at a Nokia plant outside Helsinki, a production planner who was following a well articulated process for managing chip inflows from Philips failed to get a routine input he needed from Philips. The failure could well have been an anomaly. Even so-called Six Sigma facilities (of which, despite the hype about

the term, there are very few anywhere) produce 3.4 defects per million. Nevertheless, he informed the plant's purchasing manager, and again following an established process, they passed on word of a possible problem to Tapio Markki, the top component purchasing manager.

In Albuquerque, Philips engineers and managers grappled with the aftermath of the fire. They realized that cleanup would take at least a week, which meant that customers would be affected, at least temporarily. Nokia and its archrival, Ericsson, accounted for 40% of the plant's shipments. Philips management decided that their orders would be filled first when the plant returned to normal.

On March 20, Philips called its customers, including Mr. Markki. He recalls that Philips said that the disruption would last about a week. The *Wall Street Journal* article (cited earlier and published months later) implied that Philips had underestimated the extent of the problem.

Mr. Markki had, early in his career, worked for five years at a small semiconductor company that supplied Nokia. He told me, "I knew the cleanup would take more than one week (but) for me it wasn't special." Nevertheless, in a culture that encouraged discussing possible problems openly, he informed his bosses, including Pertti Korhonen, then Senior Vice President of Operations, Logistics, and Sourcing for Nokia Mobile Phones. Nokia's production planner began checking the status of the five parts made in New Mexico once a day instead of the customary once a week. Nokia had developed this enhanced monitoring process over the prior five years. Several components—almost all from normally functioning plants—received the same treatment each year if Nokia became concerned with their maker's performance for any reason.

A few hundred miles away, executives at Ericsson also got a call from Philips. Until this call, Ericsson's planners and managers had not sensed any discrepancy in Philips' performance. As such, its

management had no reason to disbelieve Philips' explanations. They certainly did not perceive a need for concern or stepped-up action.

Nokia's intensified tracking and communications with Philips did not raise Nokia's confidence that its partner had the problem under control. Its executives began regularly urging their counterparts at Philips to take stronger action. They also moved toward adopting the response routines they had developed for such eventualities. On March 31, exactly two weeks after the fire, Philips admitted it would need more time to fix the problem; ultimately, the plant remained out of action for six weeks.

Recognizing that Philips' problem could affect the production of several million mobile phones, Nokia took three key steps:

- One team of executives and engineers focused on Philips, seeking a major role in developing alternative plans. Guided by Mr. Korhonen and assisted by CEO Jorma Ollila, it pressed Nokia's case with Philips executives, including its CEO, Cor Boonstra. Philips responded by rearranging its plans in factories as far away as Eindhoven and Shanghai.
- A second cross-continental team redesigned some chips so that they could be produced in other Philips and non-Philips plants. Where appropriate, it consulted with Philips to assess the possible impact of its actions.
- A third group worked to find alternative manufacturers to reduce pressure on Philips. Two current suppliers responded within five days.

The magnitude of the cooperation between Nokia and Philips cannot be fully appreciated without a few words on Philips. Once considered a leading-edge technology company, by the mid-1990s Philips was being criticized by many an analyst. Mr. Boonstra ignored their calls to dismember the company and instead spent three years reshaping it and rebuilding its reputation. In 2000, Philips' Semiconductor Division was functioning very well.[3] It had acquired several plants from IBM and boosted its production capacity 40% over 1999 levels.

Its seventeen plants were churning out eighty million chips a day; these chips were used in 80% of the mobile phones sold worldwide. That year, chip volume grew 33% and revenues 55%. Despite the fire—which did not merit a single sentence in Philips' 2000 annual report—divisional operating income rose 119%.[4] This superb performance meant that Philips simply had no surplus capacity. Helping Nokia required managerial and technical effort equivalent to pulling a rabbit out of a hat.

Philips' predicament was not unique. In 2000, the mobile phone market was growing at over 40% per annum, but so were the markets for laptops and other electronics. Component makers, ranging from chip to liquid crystal display producers, were working at capacity.[5] Some consumer electronics companies were ready to pay virtually any price for key components. By midyear, Sony, Micron Technology, Dell, Sun, and even Philips itself had announced that component shortages would rein in their (very strong) financial performances. Shortages were expected to continue unabated till year-end.

At the end of March, in this market environment, Ericsson finally came to appreciate the gravity of its problem. However, for reasons about which one can only speculate, it still did not act speedily. Jan Warby, the executive who headed the mobile phone division, did not get involved till early April. By then Ericsson had very few options left.

Nokia's initial sensing of the problem and its rapid and effective response carried the day. In the third quarter of 2000, its profits rose 42% as it expanded its share of the global market to 30%. *Its quarterly statements and annual report for 2000 did not even mention the fire*.

On July 20, 2000, Ericsson reported that the fire and component shortages had caused a second-quarter operating loss of $200 million in its mobile phone division. As such, annual earnings would be lower by between $333 million and $445 million.[6] Six months later, it reported divisional annual losses of $1.68 billion, a 3% loss of market share, and corporate operating losses of $167 million. It also announced the outsourcing of cell phone manufacturing to Flextronics

and the elimination of several thousand jobs; Flextronics took over Ericsson's plants in Brazil, Malaysia, Sweden, the U.K., and the U.S. In April 2001, it signed a Memorandum of Understanding to create Sony Ericsson; the informal negotiations that led to this step had started at the height of the crisis in July 2000, though Ericsson had denied it in public. The deal was finalized in October 2001.

Ericsson's woes spread beyond mobile phones and continued into subsequent years. It finally returned to health in 2004, but as a much smaller company. Compared to 2000, its revenues had fallen 52%, total assets about 30%, and number of employees 52%; net income and operating income were almost, but not quite, the same.

The face of the mobile phone industry had changed forever, all because of a fire that had been contained in ten minutes.

That was an exciting story, but so what?

Since early 2001, stories about the fire have appeared in many publications and forums. Some—but only a fraction—of the articles that have appeared are listed in the endnotes of this and subsequent chapters. Collectively, these stories perpetuated several myths:

- **Myth #1: Nokia succeeded because it relied on individual effort, while Ericsson relied on teams.** No individual—or even a group of individuals acting independently—could have pulled off the cross-continental, cross-organizational response that Nokia took. When I interviewed him at the Nokia headquarters at Espoo, Finland, in the spring of 2006, Mr. Korhonen made it clear that Nokia's culture did not tolerate individualistic cowboys.

- **Myth #2: Nokia succeeded because it used superior information technology.** Several software makers claimed that their software had helped Nokia, and some technology analysts wrote that IT had saved it from Ericsson's fate. Like most large companies, Nokia could not have functioned without IT. However, IT played a supporting role, and the specific benefit it gave Nokia was so prosaic that no technology partisan that I know ever wrote about it.

- **Myth #3: Nokia succeeded because Finns are less cautious than Swedes.**   An explanation rooted in unfounded national stereotypes has little to teach us and is undoubtedly wrong. In any case, *national* culture played no role; a French executive, Jean-Francois Baril, who had spent many years in the U.S., led the building of many of Nokia's capabilities.

- **Myth #4: Nokia succeeded because Mr. Korhonen was a brilliant crisis manager.**   Mr. Korhonen and Nokia replaced James Burke and Johnson & Johnson's handling of the Tylenol cyanide poisoning as the poster child for impeccable crisis management. Academics use the story to illustrate types of crises that companies must be able to withstand and to cajole them to upgrade their supply chains. Risk management professionals use it to scare potential clients into buying appropriate insurance. In reality—and despite the fact that the *Wall Street Journal* article quoted Mr. Korhonen as calling the situation a "crisis"—*Nokia successfully avoided the crisis that engulfed Ericsson*. A long way into our conversation, perhaps after he felt that I understood what Nokia had really done, Mr. Korhonen said:

  > Externally, the fire has been a much bigger thing than internally. For us, it has been business as usual. We have had to manage many such things.

Mr. Korhonen did play a key role—but mostly during the prior five years, when Nokia created the capabilities that enabled it to shrug off a challenge that has captivated the business world. These capabilities—built into its strategy, processes, and values and supported by technology—enabled it to *adapt* rapidly to huge changes in the assumptions embedded in its business plans. Even today, seven years after the fire and almost eleven years after Nokia began transforming itself, only a handful of large companies can do what Nokia did in 2000.

Such a capability is exceedingly important, because we live in a *networked* world in which each company partners with a set of other companies. A company's network extends from its customer-facing side, through its product and technology development functions, and

on to its supply network side. While such networks are critical to modern businesses, they enable shifts in market or operating conditions to rapidly propagate far beyond their origins. If a company is unable to sense such a shift and respond effectively, it can lose tremendous amounts of value, see the reputations of its senior executives tarnished, and destroy the livelihoods of thousands.

Companies—like Nokia—that can intelligently and effortlessly adjust to major shifts in market or operating conditions are Adaptive Businesses.

Design Principles for Adaptive Businesses

This book presents four Design Principles that senior executives can apply to transform their companies into businesses that will thrive in a networked world. A Design Principle is a guideline for policy, rather than a template to stamp out identical sets of tools and procedures. Indeed, I do not believe it is possible to provide replicable templates; companies must use the Principles to create their own unique solutions. The Principles are as follows:

1. ***Embed sense-and-respond capabilities within normal plan-and-execute processes.*** The ability to detect a problem (or opportunity) early and correctly and the ability to react effectively are key determinants of competitive advantage. Unless these abilities are a part of everyday work, companies will lurch from crisis to crisis, be they big or small.

2. ***Adopt strategies that promote collaborative action among network partners.*** As they globalize and as their supply-and-demand networks fracture, companies lose visibility into aspects of their competitive landscape. Unless they develop cooperative relationships with their partners, they will not get preferential assistance with either crisis or opportunity.

3. ***Value and nurture organizational learning.*** Companies must collect, analyze, and share across their networks knowledge about what works and what does not. Absent such "intelligent knowledge sharing," they will lack information to act decisively and effectively.

4. ***Deploy technologies that enable intelligent adjustment to major environmental shifts.*** To adjust to changed conditions effectively and efficiently, companies must apply information technologies that support the prior principles.

The four Principles are deceptively simple; stating them is far easier than applying them day after day. For example, despite embarking on its transformation in 1995, Nokia has only recently become comfortable with the idea that its adaptive capabilities are inextricably interwoven into the fabric of its organization. Hewlett-Packard—another company that I will profile extensively—also began changing at the same time and is still institutionalizing the capabilities it has built.

The difficulty of implementing the Principles is what gives them their great power; *collectively they change how work is performed on a day-to-day basis*. For example, to sense and respond, one might need the preferential help of a partner company. This presumes that the companies look after each other's interests. Technology aids the ability to sense and respond, but unless people can make sense of what they are sensing, all the effort will be for naught.

Companies also must consider major organizational changes in order to marshal and deploy people with the skills needed to design, create, and manage their networks. Many may decide to centralize these people in a coherent group, while others may decide to keep them dispersed but well linked. In either case, they must consider appointing a senior executive to give them a voice in top management deliberations. Whether or not he or she actually holds the title formally, this executive, the Chief Network Officer, will bear primary responsibility

for the four Design Principles. No company that I know of, including Nokia, currently uses this title; nevertheless, a couple of key people at Nokia have played the Chief Network Officer's *role* well.

Seen through the lenses of Adaptive Businesses and network management, Nokia and Philips treated each other as *preferential* partners and won. Ericsson, which had no one to "watch its back" when the chips were down (literally and figuratively!), lost. Ironically, the lesson Ericsson took away was not one of codependence; instead, it resolved never again to become dependent on a single supplier.

Organization of the Book

In the rest of Part I, "Why Change?," I build the case for transforming the modern enterprise by addressing its key limitations and the impact they have on performance.

Chapter 2, "Shadows of the Past," first summarizes a fascinating piece of historical research that tracks how and why companies have changed over the last two-hundred-odd years. In response to periodic "epochal" shifts, companies have modified how work is performed, how their organizations are structured, and even their corporate ethos. Distributed computer networks are driving the present epochal change by fragmenting work across time and space, engendering extreme product customization, and blurring industrial boundaries. In this environment, companies will fall into *the execution trap* if they believe that reliance on traditional "good management"—plan well and execute brilliantly—*alone* will help them succeed.

Chapter 3, "Visions from the Present," advances the case for corporate transformation. In order to succeed in a world of corporate networks, companies must develop three capabilities to augment their traditional plan-and-execute skills. They must be able to sense changes in their environments, respond to these seamlessly, and learn from their experiences and apply the lessons in other situations.

Senior executives should take responsibility for guiding this transformation, because research shows that financial markets are penalizing companies and executives for perceived failures more severely than ever before.

Part II, "Design Principles for Adaptive Capabilities," lays out the four Design Principles that can transform a company.

Chapter 4, "Transform Everyday Work," introduces the first Design Principle: ***Embed sense-and-respond capabilities within normal plan-and-execute processes.*** Without embedding, a company cannot be adaptive; at best, it can be great at managing crises. Embedding requires changing work practices, just as becoming truly quality-focused requires making quality the responsibility of individual employees.

Chapter 5, "Succeed in a Dog-Eat-Dog World," explains the second Design Principle: ***Adopt strategies that promote collaborative action among network partners.*** The fragmentation of work will require companies to create win-win partnerships with their partners, because no company can succeed while its network is ailing. Research shows that executives recognize the need for collaboration, but this does not always lead to action. Understanding why companies act against their best interests can help executives change such behavior.

Chapter 6, "Ensure That Work Teaches," discusses the third Design Principle: ***Value and nurture organizational learning.*** The failure to learn keeps companies from intelligent and effortless adaptation. It impedes both the effective use of the prior Principles and the interpretation of environmental signals to take action. Executives must understand how they can manage culture, systems, and organizational structure to improve their companies' ability to learn.

Chapter 7, "Make Technology Matter," provides focused guidance on the fourth Design Principle: ***Deploy technologies that enable intelligent adjustment to major environmental shifts.*** It asserts that companies must invest in technologies that *provide visibility, support analysis, facilitate collaboration,* or *enable mobility.* Technologies

that do not build these capabilities may be essential for security or legal reasons, but they will not provide competitive advantage. This discussion focuses on technology strategy (what, why) and not technical details (how).

Part III, "Going Adaptive," discusses the challenging task of transforming a company into an Adaptive Business by systematically implementing the four Design Principles.

Chapter 8, "Create the Organization," addresses the organizational changes companies must make. Managing internal and external networks must become a focal point for key decisions. People who are superb at designing, creating, and managing human networks will undertake this task and increasingly become highly prized by their employers. A Chief Network Officer, who may or may not be formally designated as such, should lead them.

Chapter 9, "Introduce Change Holographically," deals with the general management challenge of initiating the transformation and maintaining momentum. Companies must adopt what I call *holographic change management*. This approach advocates the implementation of all four Design Principles in one business area and subsequent replication in other areas. It also advises against implementing one Design Principle at a time across the entire company.

The Epilogue brings closure by describing two perspectives on an Adaptive Business. One comes from a junior manager who works at the company, while the other comes from this person's CEO.

Given my focus on *corporate* transformation, many of the issues I discuss fall within the bailiwicks of top managers. Starting with Chapter 2, I make specific recommendations for them. However, becoming adaptive is not a spectator sport for middle managers and other professionals; indeed, Hewlett-Packard's efforts have been led by such people. Most chapters, therefore, end with a sidebar titled "So You Are Not the CEO...," which addresses the critical roles these professionals must play.

Basis of the Ideas

Historically, most "big ideas" in management arose in the manufacturing sector and then spread to the service sector. Adaptive Businesses, too, are evolving in manufacturing (and retail) companies, but will sooner or later migrate to the service businesses. (Indeed, a top strategy executive of a major British manufacturer recently argued coherently that a premier American investment bank applies all four of the Design Principles and is no less adaptive than Nokia.)

So, this book builds on a robust intellectual foundation of research on manufacturers. I also present evidence from a study of over five hundred manufacturing and retail companies that I conducted a few years ago for the software firm SAP. I supplement these with stories, some from the media, but many others from over a quarter century of personal association with companies in industries that include steel wire, food, white goods, glass, medical devices, pharmaceuticals, consumer-packaged goods, and electronics. I have advised several CEOs—and other C-level executives—of global firms, led cross-organizational product-development efforts, and worked on the graveyard shift beside line workers carping about managerial idiocies. I protect their confidentiality by not naming them, but I do provide enough contextual information to make the stories meaningful.

Most importantly, I draw on many hours of interviews (and associated secondary research) that I have conducted at Nokia and Hewlett-Packard. To the best of my knowledge, Nokia has not given anyone else similar access to the executives involved. These two stories—Nokia's in particular—present a comprehensive picture of the transformation that companies must undergo. I cannot credibly call for *multidimensional* change and then provide piecemeal examples cobbled together from different firms facing divergent challenges. For the record, neither company is—or has been—a client of mine. What they have created, they have done on their own.

Endnotes

[1] I have pieced together the description of the fire and, indeed, the broader story of what happened at Nokia, Ericsson, and Philips from interviews I conducted, numerous news reports, website descriptions of technology companies, and annual reports. Of the news reports, the best known is "Trial by Fire: A Blaze in Albuquerque Sets off Major Crisis for Cell-Phone Giants. Nokia Handles Supply Shock with Aplomb as Ericsson of Sweden Gets Burned—Was Sisu the Difference?" by Almar Latour, the *Wall Street Journal*, January 29, 2001. Other newspaper and newsmagazine citations are given here and in subsequent chapters in conjunction with specific quotes.

[2] Intel website, http://www.intel.com/education/cleanroom/index2.htm.

[3] Royal Philips Electronics annual report for 2000 (pp. 38–39 and 60–61).

[4] A single line in the 2001 report noted an insurance payoff for damages sustained due to the fire.

[5] "Companies fear no end in sight for component shortages," by Rachel Konrad, CNET News.com, July 26, 2000.

[6] "Ericsson's Mobile Worries," BBC, July 21, 2000, 21:35 GMT, 22:35 UK, http://news.bbc.co.uk/2/hi/business/845619.stm.

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