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THE INNOVATOR'S DILEMMA

WHEN NEW TECHNOLOGIES CAUSE GREAT FIRMS TO FAIL //

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Contents

In Gratitude

Although this book lists only one author, in reality the ideas it molds together were contributed and refined by many extraordinarily insightful and selfless colleagues. The work began when Professors Kim Clark, Joseph Bower, Jay Light, and John McArthur took the risk of admitting and financing a middle-aged man's way into and through the Harvard Business School's doctoral program in 1989. In addition to these mentors, Professors Richard Rosenbloom, Howard Stevenson, Dorothy Leonard, Richard Walton, Bob Hayes, Steve Wheelwright, and Kent Bowen helped throughout my doctoral research to keep my thinking sharp and my standards for evidence high, and to embed what I was learning within the streams of strong scholarship that had preceded what I was attempting to research. None of these professors needed to spend so much of their busy lives guiding me as they did, and I will be forever grateful for what they taught me about the substance and process of scholarship.

I am similarly indebted to the many executives and employees of companies in the disk drive industry who opened their memories and records to me as I tried to understand what had driven them in the particular courses they had taken. In particular, James Porter, editor of *Disk/Trend Report*, opened his extraordinary archives of data, enabling me to measure what has happened in the disk drive industry with a level of completeness and accuracy that could be done in few other settings. The model of the industry's evolution and revolution that these men and women helped me construct has formed the theoretical backbone for this book. I hope they find it to be a useful tool for making sense of their past, and a helpful guide for some of their decisions in the future.

During my tenure on the Harvard Business School faculty, other colleagues have helped refine this book's ideas even more. Professors Rebecca Henderson and James Utterback of MIT, Robert Burgelman of Stanford, and David Garvin,

Gary Pisano, and Marco Iansiti of the Harvard Business School have been particularly helpful. Research associates Rebecca Voorheis, Greg Rogers, Bret Baird, Jeremy Dann, Tara Donovan, and Michael Overdorf; editors Marjorie Williams, Steve Prokesch, and Barbara Feinberg; and assistants Cheryl Druckenmiller, Meredith Anderson, and Marguerite Dole, have likewise contributed untold amounts of data, advice, insight, and work.

I am grateful to my students, with whom I have discussed and refined the ideas put forward in this book. On most days I leave class wondering why I get paid and why my students pay tuition, given that it is I who have learned the most from our interactions. Every year they leave our school with their degrees and scatter around the world, without understanding how much they have taught their teachers. I love them and hope that those who come across this book will be able to recognize in it the fruits of their puzzled looks, questions, comments, and criticisms.

My deepest gratitude is to my family—my wife Christine and our children Matthew, Ann, Michael, Spencer, and Catherine. With unhesitating faith and support they encouraged me to pursue my lifelong dream to be a teacher, amidst all of the demands of family life. Doing this research on disruptive technologies has indeed been disruptive to them in terms of time and absence from home, and I am forever grateful for their love and support. Christine, in particular, is the smartest and most patient person I have known. Most of the ideas in this book went home on some night over the past five years in half-baked condition and returned to Harvard the next morning having been clarified, shaped, and edited through my conversations with her. She is a great colleague, supporter, and friend. I dedicate this book to her and our children.

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Introduction

This book is about the failure of companies to stay atop their industries when they confront certain types of market and technological change. It's not about the failure of simply any company, but of *good* companies—the kinds that many managers have admired and tried to emulate, the companies known for their abilities to innovate and execute. Companies stumble for many reasons, of course, among them bureaucracy, arrogance, tired executive blood, poor planning, short-term investment horizons, inadequate skills and resources, and just plain bad luck. But this book is not about companies with such weaknesses: It is about well-managed companies that have their competitive antennae up, listen astutely to their customers, invest aggressively in new technologies, and yet still lose market dominance.

Such seemingly unaccountable failures happen in industries that move fast and in those that move slow; in those built on electronics technology and those built on chemical and mechanical technology; in manufacturing and in service industries. Sears Roebuck, for example, was regarded for decades as one of the most astutely managed retailers in the world. At its zenith Sears accounted for more than 2 percent of all retail sales in the United States. It pioneered several innovations critical to the success of today's most admired retailers: for example, supply chain management, store brands, catalogue retailing, and credit card sales. The esteem in which Sears' management was held shows in this 1964 excerpt from *Fortune:* "How did Sears do it? In a way, the most arresting aspect of its story is that there was no gimmick. Sears opened no big bag of tricks, shot off no skyrockets. Instead, it looked as though everybody in its organization simply did the right thing, easily and naturally. And their cumulative effect was to create an extraordinary powerhouse of a company." [1]

Yet no one speaks about Sears that way today. Somehow, it completely missed the advent of discount retailing and home centers. In the midst of today's catalogue retailing boom, Sears has been driven from that business. Indeed, the very viability of its retailing operations has been questioned. One commentator has noted that "Sears' Merchandise Group lost $1.3 billion (in 1992) even before a $1.7 billion restructuring charge. Sears let arrogance blind it to basic changes taking place in the American marketplace." [2] Another writer has complained,

> Sears has been a disappointment for investors who have watched its stock sink dismally in the face of unkept promises of a turnaround. Sears' old merchandising approach—a vast, middle-of-the-road array of mid-priced goods and services—is no longer competitive. No question, the constant disappointments, the repeated predictions of a turnaround that never seems to come, have reduced the credibility of Sears' management in both the financial and merchandising communities. [3]

It is striking to note that Sears received its accolades at exactly the time—in the mid-1960s—when it was ignoring the rise of discount retailing and home centers, the lower-cost formats for marketing name-brand hard goods that ultimately stripped Sears of its core franchise. Sears was praised as one of the best-managed companies in the world at the very time it let Visa and MasterCard usurp the enormous lead it had established in the use of credit cards in retailing.

In some industries this pattern of leadership failure has been repeated more than once. Consider the computer industry. IBM dominated the mainframe market but missed by years the emergence of minicomputers, which were technologically much simpler than mainframes. In fact, no other major manufacturer of mainframe computers became a significant player in the minicomputer business. Digital Equipment Corporation created the minicomputer market and was joined by a set of other aggressively managed companies: Data General, Prime, Wang, Hewlett-Packard, and Nixdorf. But each of these companies in turn missed the desktop personal computer market. It was left to Apple Computer, together with Commodore, Tandy, and IBM's stand-alone PC division, to create the personal-computing market. Apple, in particular, was uniquely innovative in establishing the standard for user-friendly computing. But Apple and IBM lagged five years behind the leaders in bringing portable computers to market. Similarly, the firms that built the engineering workstation market—Apollo, Sun, and Silicon Graphics—were all newcomers to

the industry.

As in retailing, many of these leading computer manufacturers were at one time regarded as among the best-managed companies in the world and were held up by journalists and scholars of management as examples for all to follow. Consider this assessment of Digital Equipment, made in 1986: "Taking on Digital Equipment Corp. these days is like standing in front of a moving train. The $7.6 billion computer maker has been gathering speed while most rivals are stalled in a slump in the computer industry." [4] The author proceeded to warn IBM to watch out, because it was standing on the tracks. Indeed, Digital was one of the most prominently featured companies in the McKinsey study that led to the book *In Search of Excellence*.[5]

Yet a few years later, writers characterized DEC quite differently:

> Digital Equipment Corporation is a company in need of triage. Sales are drying up in its key minicomputer line. A two-year-old restructuring plan has failed miserably. Forecasting and production planning systems have failed miserably. Cost-cutting hasn't come close to restoring profitability…. But the real misfortune may be DEC's lost opportunities. It has squandered two years trying halfway measures to respond to the low-margin personal computers and workstations that have transformed the computer industry. [6]

In Digital's case, as in Sears, the very decisions that led to its decline were made at the time it was so widely regarded as being an astutely managed firm. It was praised as a paragon of managerial excellence at the very time it was ignoring the arrival of the desktop computers that besieged it a few years later.

Sears and Digital are in noteworthy company. Xerox long dominated the market for plain paper photocopiers used in large, high-volume copying centers. Yet it missed huge growth and profit opportunities in the market for small tabletop photocopiers, where it became only a minor player. Although steel minimills have now captured 40 percent of the North American steel market, including nearly all of the region's markets for bars, rods, and structural steel, not a *single* integrated steel company— American, Asian, or European—had by 1995 built a plant using minimill technology. Of the thirty manufacturers of cable-actuated power shovels, only four survived the industry's twenty-five-year transition to hydraulic excavation technology.

As we shall see, the list of leading companies that failed when confronted with disruptive changes in technology and market structure is a long one. At first

with disruptive changes in technology and market structure is a long one. At first glance, there seems to be no pattern in the changes that overtook them. In some cases the new technologies swept through quickly; in others, the transition took decades. In some, the new technologies were complex and expensive to develop. In others, the deadly technologies were simple extensions of what the leading companies already did better than anyone else. One theme common to all of these failures, however, is that the decisions that led to failure were made when the leaders in question were widely regarded as among the best companies in the world.

There are two ways to resolve this paradox. One might be to conclude that firms such as Digital, IBM, Apple, Sears, Xerox, and Bucyrus Erie must *never* have been well managed. Maybe they were successful because of good luck and fortuitous timing, rather than good management. Maybe they finally fell on hard times because their good fortune ran out. Maybe. An alternative explanation, however, is that these failed firms were as well-run as one could expect a firm managed by mortals to be—but that there is something about the way decisions get made in successful organizations that sows the seeds of eventual failure.

The research reported in this book supports this latter view: It shows that in the cases of well-managed firms such as those cited above, *good* management was the most powerful reason they failed to stay atop their industries. Precisely *because* these firms listened to their customers, invested aggressively in new technologies that would provide their customers more and better products of the sort they wanted, and because they carefully studied market trends and systematically allocated investment capital to innovations that promised the best returns, they lost their positions of leadership.

What this implies at a deeper level is that many of what are now widely accepted principles of good management are, in fact, only situationally appropriate. There are times at which it is right *not* to listen to customers, right to invest in developing lower-performance products that promise *lower* margins, and right to aggressively pursue small, rather than substantial, markets. This book derives a set of rules, from carefully designed research and analysis of innovative successes and failures in the disk drive and other industries, that managers can use to judge when the widely accepted principles of good management should be followed and when alternative principles are appropriate.

These rules, which I call *principles of disruptive innovation*, show that when good companies fail, it often has been because their managers either ignored these principles or chose to fight them. Managers can be extraordinarily effective