



## The Innovator's Dilemma

Book Summary by Frumi Rachel Barr, MBA, PhD

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**Author bio and credits:** Clayton M Christensen is an associate professor of business administration at the Harvard Business School. His research and writing focus on the management of technological innovation, the problems in finding new markets for new technologies, and the identification and development of organizational capabilities. Prior to joining HBS faculty professor Christensen served as Chairman and President of Ceramics Process Systems Corporation, a firm he co-founded in 1984 with several MIT professors. He also served as a White House fellow and as a member of the staff of the Boston Consulting group.

### Author's Big Thought:

The author asks the question: Why do well-managed companies fail? He concludes that they often fail because the very management practices that have allowed them to become industry leaders also make it extremely difficult for them to develop *disruptive technologies* that ultimately steal their markets.

Well-managed companies are excellent at developing the *sustaining technologies* that improve the performance of their products in the ways that matter to their customers.

This book describes both the processes through which disruptive technologies supplant older technologies and the powerful forces within well-managed companies that make them unlikely to develop these technologies themselves. Christensen suggests ways that managers can harness the four Principles of Disruptive Technology so that their companies can become more effective at developing for themselves the new technologies that are going to capture their markets in the future.

### Chapter notes:

#### The Dilemma:

The innovator's Dilemma is that the logical, competent decisions of management that are critical to the success of their companies are also the reasons why they lose their positions of leadership.

This book is about the failure of companies to stay atop their industries when they confront certain types of market and technological change. It is about well-managed companies with their competitive antennae up, listen astutely to their customers, invest heavily in new technologies, and yet still lose market dominance. Sears, for example, was praised as one of the best-managed companies in the world at the very same time it let MasterCard and Visa usurp the enormous lead it had established in the use of credit cards in retailing.

The list of leading companies that failed when confronted with disruptive changes in technology and market structure is a long one. In some cases the new technologies swept through quickly; in others, the transition took decades. In some, new technologies were complex and expensive to develop. In others, the deadly technologies were simple extensions of what 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.

This book derives a set of rules, from carefully designed research and analysis of innovative successes and failures in the disk drive 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, called the *principles of disruptive innovation*, show that when good companies fail, it often has been because their management either ignored these principles or chose to fight them.

The term *technology*, as used in this book, means the processes by which an organization transforms labor, capital, materials, and information into products and services of greater value. This concept of technology extends beyond engineering and manufacturing to encompass a range of marketing, investment, and managerial processes. *Innovation* refers to a change in one of these technologies.

The *failure framework* is built upon three findings from this study.

1. There is a strategically important distinction between sustaining technologies and those that are disruptive.
2. The pace of technological progress can, and often does, outstrip the markets needs. This means that the relevance and competitiveness of different technological approaches can change with respect to different markets over time.
3. Customers and financial structures of successful companies color heavily the sorts of investments that appear to be attractive to them, relative to certain types of entering firms.

Most new technologies foster improved product performance. The author refers to these as *sustaining technologies*. Rarely have even the most difficult sustaining technologies precipitate failure of leading firms. Occasionally however, *disruptive technologies* emerge: innovations that result in worse product performance, at least in the near-term. Disruptive technologies bring to a market a very different value proposition than had been available previously. Generally, disruptive technologies under-perform established products in mainstream markets. They have other features that a few fringe customers

value. Products based on disruptive technologies are typically cheaper, simpler, smaller, and frequently, more convenient to use.

By and large, the least profitable customers in a market initially embrace disruptive technology. Hence, most companies with a practiced discipline of listening to their best customers and identifying new products that promise greater profitability and growth are rarely able to build a case for investing in disruptive technologies until it is too late.

The following are the four principles of disruptive technology:

1. *Companies depend on customers and investors for resources.* The implication of this principle for managers is that, when faced with a threatening disruptive technology, people and processes in a mainstream organization cannot be expected to allocate freely the critical financial and human resources needed to carve out a strong position in the small, emerging market. Creating an independent organization, with a cost structure honed to achieve profitability at the low margins characteristic of most disruptive technologies, is the only viable way for established firms to harness this principle.
2. *Small markets don't solve the growth needs of large companies.* The evidence is strong that formal and informal resource allocation processes make it very difficult for large organizations to focus adequate energy and talent on small markets, even when logic says they might be big someday.
3. *Markets that don't exist can't be analyzed.* Sound market research and good planning followed by execution according to plan are hallmarks of good management. When applied to sustaining technological innovation, these practices are invaluable. In dealing with disruptive technologies leading to new markets, market researchers and business planners have consistently dismal records. It is in disruptive innovations, where we know least about the market, that there are such strong first-mover advantages. This is the innovator's dilemma.  
Companies whose investment processes demand quantification of market sizes and financial returns before they can enter a market get paralyzed or make serious mistakes when faced with disruptive technologies. They demand market data when none exists and make judgments based upon financial projections when neither revenues nor costs can, in fact, be known.
4. *An organization's capabilities define its disabilities.* An organization's capabilities reside in two places. The first is in its processes – the methods by which people have learned to transform inputs of labor, energy, materials, information, cash, and technology into outputs of higher value. The second is in the organization's values, which are the criteria that managers and employees in the organization use when making prioritization decisions. The very processes and values that constitute an organization's capabilities in one context, define its disabilities in another context.
5. *Technology supply may not equal market demand.* Disruptive technologies, though they initially can only be used in small markets remote from the mainstream, are disruptive because they subsequently can become fully performance-competitive within the mainstream market against established products. This happens because the pace of technological progress in products frequently exceeds the rate of performance improvement that mainstream customers demand or can absorb.

## **Part 1: Why Great Companies Can Fail**

### **Chapter 1 – How Can Great Companies Fail**

#### **Insights from the hard disk drive industry**

Those who study genetics avoid studying humans as new generations occur every thirty years. Instead they study fruit flies. If you want to study why something happens in business, study the disk drive industry! Changes in technology, market structure, global scope, and vertical integration have been so pervasive, rapid and unrelenting. The value of studying this industry is that out of its complexity emerge a few stunningly simple and consistent factors that have repeatedly determined the success and failure of the industry's best firms. Simply put, when the best firms succeeded they did so because they listened responsively to their customers and invested aggressively in the technology, products, and manufacturing capabilities that satisfied their customers next-generation needs. Paradoxically, when the best firms subsequently failed it was for those very same reasons. This is one of the innovator's dilemmas: Blindly following the maxim that good managers should keep close to their customers can sometimes be a fatal mistake.

The study of technological change over the history of the disk drive industry revealed two types of technology change, each with very different effects on the industry's leaders. Technology of the first sort *sustained* the industry's rate of improvement in product performance. The industry's dominant firms always led in developing and adopting these technologies. By contrast, innovations of the second sort *disrupted* or redefined performance trajectories, and consistently resulted in the failure of the industry's leading firms.

There are several patterns in the history of innovation in the disk drive industry. The first is that the disruptive innovations were technologically straightforward. They generally packaged known technologies in a unique architecture and enabled the use of these products in applications where magnetic data storage and retrieval previously had not been technologically or economically feasible. The second pattern is that the purpose of advanced technological development in the industry was always to *sustain* established trajectories of performance improvement: to reach the higher performance, higher-margin domain of the upper right of the trajectory map. Many of these technologies were radically new and different, but they were not disruptive. The customers of the leading disk drive suppliers led them toward these achievements. Sustaining technologies, as a result, did not precipitate failure.

The third pattern shows that, despite the established firms technological prowess in sustaining innovations, from the simplest to the most radical, the firms that led the industry in every instance of developing and adopting disruptive technologies were entrants to the industry, not its incumbent leaders.

### **Chapter Two: Value Networks and the Impetus to Innovate**

One explanation for why good companies fail points to organizational impediments as the source of the problem. In assessing blame for the failure of good companies, the distinction is sometimes made

between innovations requiring very different technological capabilities, that is, so-called *radical* change, and those that build upon well-practiced technological capabilities, often called *incremental* innovations. The history of the disk drive industry, gives a very different meaning to what constitutes a radical innovation among leading, established firms.

The concept of the value network, the context within which a firm identifies and responds to customers' needs, solves problems, procures input, reacts to competitors, and strives for profit, is central to this synthesis. Within a value network, each firm's competitive strategy, and particularly its past choices of markets, determines its perceptions of the economic value of a new technology. These perceptions, in turn, shape the rewards different firms expect to obtain through pursuit of sustaining and disruptive innovations. In established firms, expected rewards, in their turn, drive the allocation of resources toward sustaining innovations and away from disruptive ones. This pattern of resource allocation accounts for established firms' consistent leadership in the former and their dismal performance in the latter.

The attractiveness of a technological opportunity and the degree of difficulty a producer will encounter in exploiting it, are determined by, among other factors, the firm's position in the relevant value network. The manifest strength of established firms in sustaining innovation and their weakness in disruptive innovation, and the opposite manifest strengths and weaknesses of entrant firms, are consequences not of differences in technological or organizational capabilities between incumbent and entrant firms, but of their positions in the industry's different value networks.

The author's findings consistently showed that established firms confronted with disruptive technology change did not have trouble developing the requisite technology. Rather, disruptive projects stalled when it came to allocating scarce resources between competing product and technology proposals. Sustaining projects addressing the needs of the firms' most powerful customers almost always preempted resources from disruptive technologies with small markets and poorly defined customer needs.

The following is the decision making pattern, outlined in six steps which emerged from interviews:  
Step 1: Disruptive technologies were first developed within established firms. Although entrants led in commercializing disruptive technologies, their development was often the work of engineers at established firms, using bootlegged resources.

Step 2: Marketing personnel then sought reactions from their lead customers. In the day-to-day decisions about how time and money would be allocated, engineers and marketers, acting in the best interests of the company, consciously and unconsciously starved the disruptive project of resources necessary for a timely launch.

Step 3: Established firms step up the pace of sustaining technological development. They gave customers what they wanted and could be targeted at large markets to generate the necessary sales and profits for maintaining growth. Although often involving greater development expense, such sustaining investments appeared far less risky than investments in the disruptive technology: The customers existed, and their needs were known.

Step 4: New companies were formed, and markets for the disruptive technologies were found by trial and error. From this trial and error approach to the market, the ultimately dominant applications for their products emerged.

Step 5: The entrants moved up-market. Once the startups had discovered an operating base in new markets, they realized that, by adopting sustaining improvements in new component technologies, they could increase the capacity of their drives at a faster rate than their new market required.

Step 6: Established firms belatedly jumped on the bandwagon to defend their customer base. Many found that the entrant firms had developed insurmountable advantages in manufacturing cost and design experience, and they eventually withdrew from the market. The firms attacking from value networks below brought with them cost structures set to achieve profitability at lower gross margins. The attackers therefore were able to price their products profitably, while the defending, established firms experienced a price war. For established manufacturers that did succeed in introducing new architectures, survival was the only reward. None ever won a significant share of the new market; the new drives simply cannibalized sales of older products to existing customers.

Implications of the value network framework for innovation:

1. The context, or value network, in which a firm competes, has a profound influence on its ability to marshal and focus the necessary resources and capabilities to overcome the technological and organizational hurdles that impede innovation.
2. A key determinant of the probability of an innovative effort's commercial success is the degree to which it addresses the well understood needs of known actors within the value network.
3. Established firms decisions to ignore technologies that do not address their customers' needs become fatal when two distinct trajectories interact. The first defines the performance demanded over time within a given value network, and the second traces the performance that technologists are able to provide within a given technological paradigm.
4. Entrant firms have an attacker's advantage over established firms in those innovations, generally new product architectures involving new technology per se, that disrupt or redefine the level, rate, and direction of progress in an established technological trajectory.
5. In these instances, although this "attacker's advantage" is associated with a disruptive technology change, the essence of the attacker's advantage is the relative flexibility of successful established firms versus entrant firms to change strategies and cost structures, not technologies.

### **Chapter 3: Disruptive Technological Change in the Mechanical Excavator Industry**

Excavators and their steam shovel predecessors are huge pieces of capital equipment sold to excavation contractors. While this is a far slower moving industry, there are points in common. Over its history, leading firms have successfully adopted a series of sustaining innovations, both incremental and radical, in components and architecture, but almost the entire population of mechanical shovel manufacturers was wiped out by a disruptive technology, hydraulics, that the leaders' customers and their economic structure had caused them initially to ignore. The triumph of hydraulic excavators took twenty years. Yet the disruptive invasion proved just as decisive and difficult to counter in excavators as

those in the disk drive industry. Initially hydraulics was a technology that their customers didn't need. These companies did not fail because the technology wasn't available. They did not fail because they lacked information about hydraulics or how to use it; the best of them used it as soon as it could help their customers. They did not fail because management was sleepy or arrogant. They failed because hydraulics didn't make sense, until it was too late.

### **Part Two: Managing Disruptive Change**

Part Two of this book is built upon detailed case studies of a few companies that succeeded, and many more that failed, when faced with disruptive technological change. These case studies show that those executives who succeeded tended to manage by a very different set of rules than those that failed. There were, in fact, five fundamental principles of organizational nature that managers in the successful firms consistently recognized and harnessed. The firms that lost their battles with disruptive technologies chose to ignore or fight them. These principles are:

1. Resource dependence: Customers effectively control the patterns of resource allocation in well-run companies.
2. Small markets don't solve the growth needs of large companies.
3. The ultimate uses or applications for disruptive technologies are unknown in advance. Failure is an intrinsic step toward success.
4. Organizations have capabilities that exist independently of the capabilities of the people who work within them. Organizations' capabilities reside in their processes and their values, and the very processes and values that constitute their core capabilities within the current business model also define their disabilities when confronted with their disruption.
5. Technology supply may not equal market demand. The attributes that make disruptive technologies unattractive in established markets often are the very ones that constitute their greatest value in emerging markets.

How did the successful managers harness these principles to their advantage?

1. They embedded projects to develop and commercialize disruptive technologies within an organization whose customers need them. Customer demand increased the probability that the innovation would get the resources it needed.
2. They placed projects to develop disruptive technologies in organizations small enough to get excited about small opportunities and small wins.
3. They planned to fail early and *inexpensively* in the search for the market for a disruptive technology. They found that their markets generally coalesced through an iterative process of trial, learning, and trial again.
4. They utilized some of the *resources* of the mainstream organization to address the disruption, but they were careful not to leverage its processes and values. They created different ways of working within an organization whose values and cost structure were turned to the disruptive task at hand.
5. When commercializing disruptive technologies, they found or developed new *markets* that valued the attributes of the disruptive products, rather than search for a technological

breakthrough so that the disruptive product could compete as a sustaining technology in mainstream markets.

The sum of these studies is that while disruptive technology can change the dynamics of industries with widely varying characteristics, the drivers of success or failure when confronted by such technology are consistent across industries.

The author sites many case studies. Quantum, Control Data, IBM's PC Division, and HP's desk jet initiative all succeeded because they created organizations whose survival was predicated upon successful commercialization of the disruptive technology: These firms embedded a dedicated organization squarely within the emerging value network.

The author believes that the best way to know whether a technology is disruptive, is to graph the trajectories of performance improvement demanded in the market versus the performance improvement supplied by the technology

**Reviewer's recommendation:**

This is a really significant book and a must read for all business leaders whether those involved in responsibility for growth or for emerging technologies.

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**About the reviewer: Frumi Rachel Barr, MBA, PhD**

Many CEO's find themselves asking "What now?" to sensitive situations that only an experienced former CEO can understand. Frumi is brought in to solve problems and often remains to work with you, as your confidante and secret weapon. She has an uncanny knack of getting to the heart of your corporate climate and maximizing your team's performance, profitability and sustainability.

To schedule a free ***Break From the Pack to Success*** consultation email [ceoconfidante@frumi.com](mailto:ceoconfidante@frumi.com) or call 949-729-1577