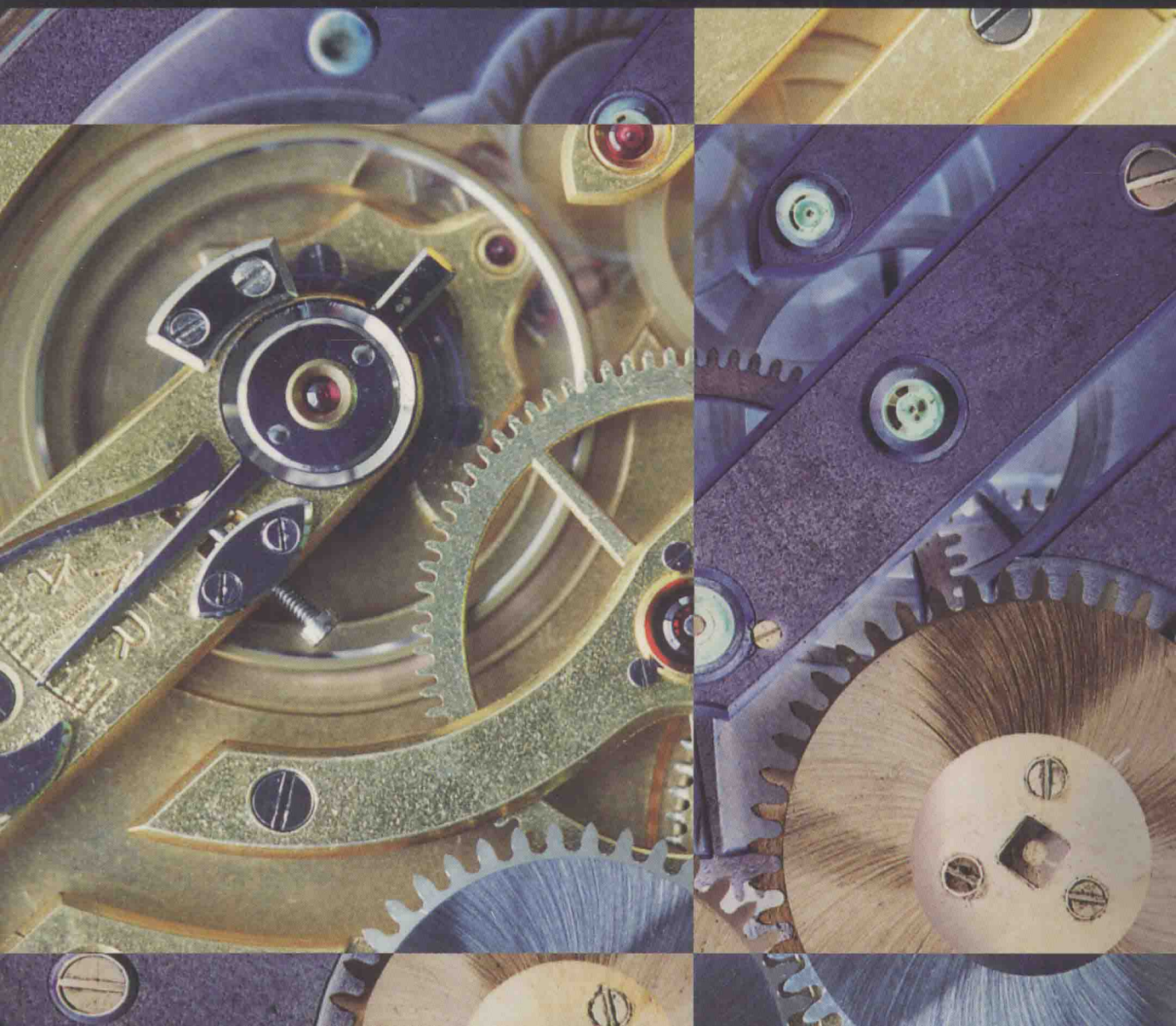
Managing Strategic Innovation and Change

A COLLECTION OF READINGS

Michael L. Tushman
and Philip Anderson



MANAGING STRATEGIC INNOVATION AND CHANGE

A Collection of Readings

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Managing Strategic Innovation and Change

PREFACE

Why are we economically better off than our parents were? The economist Josef Schumpeter asked this question more than fifty years ago, and arrived at a powerful insight: the prime driver of economic progress is technological innovation. The economics of his day held perfect competition to the end of policy. Schumpeter pointed out, however, that people were better off in the 1940s than they had been at the turn of the century because of technical advances, not because more industries had come to approach the perfectly competitive ideal. Modern life is a triumph of innovation, not antitrust policy; the refrigerator, the air conditioner, the radio, the closed-body automobile, synthetic rubber, and a host of other breakthroughs created a better life and ultimately made possible a mass consumer society. As we approach the twenty-first century, Schumpeter's insight holds more firmly than ever. The goal of both societies and organizations should be fostering the fastest rate of innovation possible, since technical progress is a key factor elevating the economic well-being of a people.

Those innovations that shape our lives are created in organizations. Yet, managing innovation over time seems to be quite difficult. Suppose ten years ago you had made a list of the most successful companies in the world with the highest growth prospects. Your list today would look quite different; many stars have fallen, while many others have risen with astonishing speed. The common denominator in most cases is this: the most successful firms are those that have been able to systematically exploit innovation. In a few cases, historically successful firms have forged the future and reshaped their competitive environments. In most cases, however, those historically successful firms have not taken advantage of technological opportunities they themselves often invent. Rather, fundamentally new products and services are often commercialized by new firms—firms that are able to capture the value that technological breakthroughs create.

Managing innovation to create value is a complex, cross-functional, historically dependent endeavor. It is not the same as managing research and development (R&D), or "high-tech management," or new-product development, or implementing change. It certainly involves more than enhancing creativity; managers very often tell us that there already exist within their companies more great ideas than they know how to implement. The key themes of managing innovation are reflected in the way we have organized this book:

1. The kinds of innovation critical to success vary over time in a recurring cycle. Again and again, we find that industries go through long periods of incremental technological change, punctuated by occasional technological discontinuities, major breakthroughs that push forward the state of the art in an industry's core technologies by an order of magnitude. Each discontinuity inaugurates an era of ferment, a period of rapid technological change in which different designs often clash as a new technology supplants its predecessor. This culminates in a dominant design that evolves into the standard architecture expressing the original, crude breakthrough idea.

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With the appearance of a standard, incremental change reigns again until the next discontinuity. The technical and competitive challenges that firms encounter differ greatly over this cycle, so there is no "one best way" to manage innovation at all times. Furthermore, history matters to the firm, not just to the industry. Faced with technological change, organizations often find that their previous successes are the very things that hinder adaptation. An innovative firm must evolve, but evolution takes place through a process of branching, where the new must spring from, yet ultimately break free of the old.

2. Management of innovation is an organizational problem. The architecture of an organization—its formal structure, its competencies, its job and career structure, its culture, and its power—determines its capacity to nurture, sustain, and exploit innovation. There is no one best way to organize, but absent an effective organizational weapon, brilliant ideas, good timing, and incisive strategies very seldom lead to successful innovation.
3. Technology is central to competitive strategy, although strategic management encompasses much more than just innovation. It is difficult to capture profits from innovation without an explicit strategy for exploiting the competitive openings that new technologies provide. Research and development create valuable options and opportunities, but these are converted to survival, growth, and profits only through strategic leadership and organization execution capabilities.
4. Research and development is often the heart of a firm's capacity for technological innovation. However, management of innovation is a cross-functional challenge. Firms only capture the full value of their technological advances when each of their functional areas brings its strength to bear in support of an innovation. Coordinating highly capable functional areas is difficult, but disciplinary strength both within and outside R&D is an essential element of successful innovation.
5. Successful innovators must excel at managing linkages and interfaces between organizations. Within the firm, effective cross-linking of strong functional areas must occur within the context of teams and overlapping organizing structures. The global enterprise must also effect strong internal linkages between country-based subunits. Vertical linkages up and down a hierarchy should allow innovation to bubble up from many sources, glued together by a strategic vision and coherence that only top management can provide. Managing the firm's intellectual capital is an exercise in linking the various sources of a firm's knowledge to the problems posed by the changing markets it serves.
6. Innovation is managed by leaders and teams with multiple competencies. Effective managers of innovation are able to develop organizational architectures that produce innovations, manage the organizational changes that always accompany innovation, and manage the dual requirements of operating in both the short and long terms simultaneously. Organizational architectures, strategies, cross-functional competencies, and linking systems are tools in the hands of executives. Innovation requires enterprises to manage the dual challenge of efficiency and adaptiveness, to create change without a debilitating degree of chaos. Visionary leaders and strong executive teams surmount these problems; structures and systems alone do not.

How can managers master this set of core issues? Experience alone is insufficient. It must be set against (and used to challenge) a conceptual took kit drawn from research that speaks to pragmatic problems while transcending individual cases. This book is a multidisciplinary approach to helping you build your inventory of useful mental models. We have drawn on a variety of disciplines and research programs worldwide. Such research-anchored models accelerate your learning, and enhance your ability to penetrate below the surface of things, to distinguish symptoms from problems and incidents from principles.

A strength of this book is that it draws from

a range of disciplines that contribute different, if converging insights. Your conceptual took kit must be broad, because innovation poses different demands at different points in an historical cycle. You cannot focus only on generating breakthrough innovations, lest you falter when the competitive environment shifts toward a focus on incremental, evolutionary advances. You cannot focus solely on "high technology," because many of the challenges you face require solutions that do not draw on leading-edge technical capabilities. Although innovation and entrepreneurship are often closely linked, innovation management is a key issue for small and large organizations, venture start-ups and firms with decades of tradition, services, and manufacturing enterprises.

A common thread is that most of the readings take a dynamic approach to thinking about processes that play out over time. We begin the book by putting forward a view of innovation that is sensitive to history, timing, cycles, and the constant tension between environmental pressures for stability and change. The introduction and overview section begins with our own view of how firms manage innovations over time, focusing on the notion of managing streams of innovations that play out across different eras in a technology cycle. The introduction continues with a look at the rise and fall of the Swiss watch industry, a rich case study that illustrates the impact of technology shifts on entire production networks cutting across individual firms.

Section II introduces you to a way of thinking about innovation as an historical, cyclical process. We introduce the notion of "punctuated equilibrium," a pattern of change in which long periods of routine evolution alternate with short bursts of rapid transformation. We then focus on how standards and dominant designs emerge, and explore when and how patient, incremental advance is the key to competitive success. This section concludes with a look at how new technologies substitute for old, against a backdrop of institutional resistance to change.

In Section III, we view managing innovation as a problem in creating organizational architectures to facilitate the development and implementation of innovations. Innovations are the products of organizational action, so it is necessary to understand how adaptive organizations are built and managed. We introduce a congruence model that lies at the root of our approach to managing innovation. This methodology has been used in helping managers around the world in diagnosing innovation problems and, in turn, managing innovation and change. Then, we examine how core competencies, career patterns, culture, power, and organizational structure all interact, jointly determining whether the organization can achieve and maintain a high degree of fit with a fast-changing environment. In keeping with our theme of processes that play out over time, we conclude by examining how congruence itself not only creates success, but creates a set of rigidities that can inhibit future innovation.

Section IV deals with the interface between technological innovation and strategy at the business unit level. The readings examine how technical capabilities and strategic advantages evolve over time, and how firms capture value from the innovations they pioneer. Technology strategy is operationalized by a firm's choice of innovation projects to pursue. The last reading in this section introduces the notion that we should value and rank these projects by treating them as "call options" on the future.

Section V shifts the spotlight to several roles three key functional areas—R&D, marketing, and operations—play in the innovation process. How do effective R&D organizations operate, and how should R&D be linked to strategy? How do market-driven organizations ensure that innovation efforts address customer needs while transcending the customer's own short-term vision of what he wants? How can organizations balance the need for efficiency and quality with the demands placed on operations by streams of innovation?

Section VI looks at the problem of weaving together organizational components to create an innovation engine that is more effective than the sum of its parts. We examine this problem at three different levels. First, we focus on effecting cross-functional linkages through managing teams and

working the boundaries between functions. Second, we explore the connections between organizational units, as opposed to functional disciplines. These may be geographically separated divisions, levels in a hierarchy, or "network" forms of organization. Third, we investigate how successful firms form and administer ties with other organizations, either strategic partners or quasi-independent ventures spun out of the parent.

In Section VII, we investigate how top executives manage innovation and change. We look at the way effective leaders steer the organization through cycles of stability and reorientation, asking how top teams implement genuinely new organizational designs. We conclude by examining how chief executive officers at Xerox and Alcoa have communicated new visions and values, and how they have adapted their organizations' architectures to fast-changing environments. Both organizations have been informed by ideas and methods discussed in our book.

This book is designed to meet the needs of managers and future managers. We have built on the ideas in these readings to design MBA courses and executive programs on managing innovation at Columbia University, Dartmouth's Tuck School of Business, MIT, Cornell University, California Institute of Technology, INSEAD, and Chalmers University. We have also employed them in consulting engagements for a variety of firms around the globe, both large and small. We are particularly grateful for input and support from managers at Ciba-Geigy, Bristol Myers Squibb, BOC, Ericsson, Pfizer, Thompson, Grand Met, and the American Electronics Association. Managers and students looking for a broad, yet integrated approach should find that this book opens a window to a diverse set of ideas that are seldom brought together in one place. By combining both classic articles and recent, cutting-edge works, we have endeavored to provide a view of the subject that is at once timely, yet of enduring value.

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CHAPTER ONE

INTRODUCTION AND OVERVIEW

Managing innovation would be relatively easy if it were the executive's only concern. It is difficult because managers must juggle conflicting forces. On the one hand, firms that do not adapt and innovate often fail. On the other hand, being adaptive may create inefficiency, threatening survival in highly competitive environments. Usually, this dual challenge requires an organization to embrace inconsistent internal divisions, some concerned with short-term needs and others focused on long-term requirements. Furthermore, this balancing act takes place in a shifting environment, where sometimes radical innovation prevails, and at other times incremental change is the dominant theme.

This first section introduces the concept of innovation streams, patterns of innovation that respond to these conflicting pressures. Managing innovation streams allows the organization to surmount the different challenges posed at different points of an industry's passage through technology cycles. The second reading illustrates these themes of cyclical change and flexible/efficient organization through a careful study of the world's watch manufacturing industry.

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