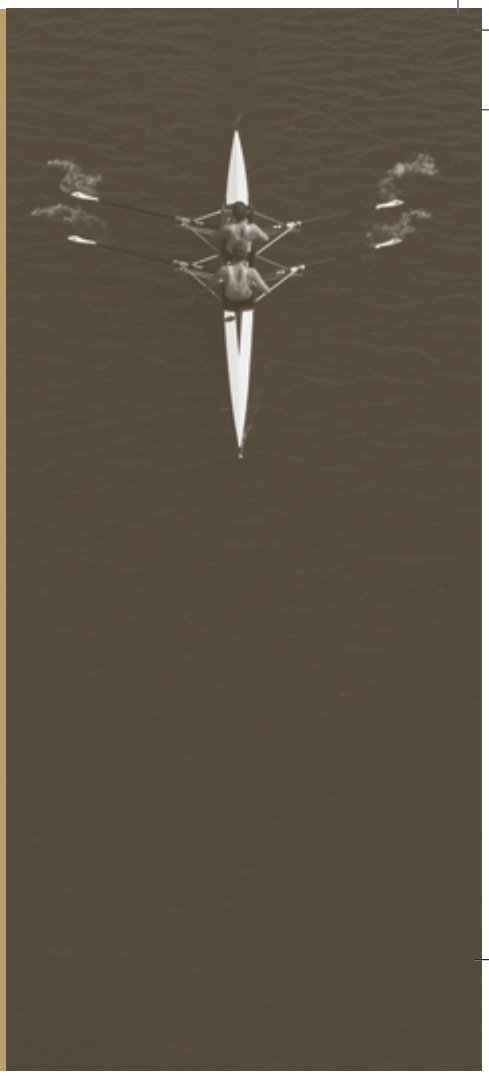
IV

BUSINESS STRATEGIES IN DIFFERENT INDUSTRY CONTEXTS



10

Industry Evolution and Strategic Change

No company ever stops changing . . . Each new generation must meet changes – in the automotive market, in the general administration of the enterprise, and in the involvement of the corporation in a changing world. The work of creating goes on.

—ALFRED P. SLOAN JR., PRESIDENT OF GENERAL MOTORS 1923–37, CHAIRMAN 1937–56

OUTLINE

Introduction and Objectives

Everything is in a state of constant change – the business environment especially. The greatest challenge of management is to ensure that adaptation of the enterprise matches the changes occurring within the business environment.

The industry environment is continually evolving, driven by the forces of technology, consumer preferences, economic growth, and a host of other influences. In some cases these forces for change may combine to create massive, unpredictable changes. For example, in telecommunications new digital and wireless technologies combined with regulatory changes have resulted in the telecom industry of 2007 being almost unrecognizable from that which existed 20 years previously. In other industries – food processing, aircraft production, and funeral services – change is more gradual and more predictable. Change is the result both of external forces and the competitive strategies of the firms within the industry. As we have seen, competition is a dynamic process in which firms vie for competitive advantage, only to see it eroded through imitation and innovation by rivals. The outcome of this process is an industry environment that is continually being reshaped by the forces of competition.

The purpose of this chapter is to help us to understand, predict, and manage change. To do this we shall explore the forces that drive change and look for patterns of change that can help us to predict how industries are likely to evolve over time. While recognizing that every industry follows a unique development path, we shall examine the extent to which there are commonalities to the life cycles of industry evolution that are the result of common driving forces. Understanding these patterns can help us to identify and exploit emerging opportunities for competitive advantage.

However, understanding and predicting changes in the industry environemt is only one aspect of the management challenge. By far the greater challenge is ensuring the adaptation of the firm to these changes. Change is disruptive, costly, and uncomfortable for individuals and for organizations the forces of inertia are even stronger. As a result, the life cycles of firms tend to be much shorter than the life cycles of industries. This implies that changes at the industry level tend to occur through the death of existing firms and birth of new firms rather than through continuous adaptation by a constant population of firms.

Our starting point is the *industry life cycle*. We shall consider the extent to which industries follow a common development pattern, examine the changes in industry structre over the cycle, and explore the implications for business strategy. We will then study the challenges of managing organizational change, including threats posed by technological change. While our main emphasis will be on the problems of adaptation to changing external circumstances, we shall also investigate the potential for firms to become agents of change – using strategy as a means of transforming their business environments.

By the time you have completed this chapter, you will be able to:

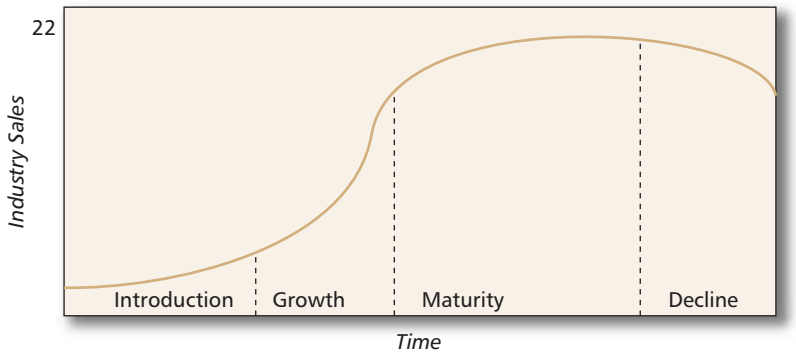
- Recognize the different stages of industry development and understand the factors that drive the process of industry evolution.
- Identify the key success factors associated with industries at different stages of their development.
- Identify the strategies, organizational structures, and management systems appropriate to different stages of industry development.
- Use scenarios to explore industry futures.
- Appreciate the challenges of managing organizational change and be familiar with alternative approaches to strategic change.

The Industry Life Cycle

One of the best-known and most enduring marketing concepts is the *product life cycle*.[1] Products are born, their sales grow, they reach maturity, they go into decline, and they ultimately die. If products have life cycles, so too do the industries that produce them. The *industry life cycle* is the supply-side equivalent of the product life cycle. To the extent that an industry produces a range and sequence of products, the industry life cycle is likely to be of longer duration than that of a single product. Sony's PS3 video game console has a probable life cycle of six or seven years; the life cycle of the electronic games industry extends back to the release of the Atari 2600 in 1977.

The life cycle comprises four phases: *introduction* (or *emergence*), *growth*, *maturity*, and *decline* (see Figure 10.1). Before we examine the features of each of these

FIGURE 10.1 The industry life cycle



stages, let us examine the forces that are driving industry evolution. Two factors are fundamental: demand growth and the production and diffusion of knowledge.

Demand Growth

The life cycle and the stages within it are defined primarily by changes in an industry's growth rate over time. The characteristic profile is an S-shaped growth curve.

- In the *introduction stage*, sales are small and the rate of market penetration is low because the industry's products are little known and customers are few. The novelty of the technology, small scale of production, and lack of experience means high costs and low quality. Customers for new products tend to be affluent, innovation-oriented, and risk-tolerant.
- The *growth stage* is characterized by accelerating market penetration as product technology becomes more standardized and prices fall. Ownership spreads from higher income customers to the mass market.
- Increasing market saturation causes the onset of the *maturity stage* and slowing growth as new demand gives way to replacement demand. Once saturation is reached, demand is wholly for replacement, either direct replacement (customers replacing old products with new products) or indirect replacement (new customers replacing old customers).
- Finally, as the industry becomes challenged by new industries that produce technologically superior substitute products, the industry enters its *decline stage*.

Creation and Diffusion of Knowledge

The second driving force of the industry life cycle is knowledge. New knowledge in the form of product innovation is responsible for an industry's birth, and the dual processes of knowledge creation and knowledge diffusion exert a major influence on industry evolution.

In the introduction stage, product technology advances rapidly. There is no dominant product technology, and rival technologies compete for attention. Competition is primarily between alternative technologies and design configurations:

- The first 30 years of steam ships featured competition between paddles and propellers, wooden hulls and iron hulls, and, eventually, between coal and oil.
- The beginnings of the home computer industry during 1978–82 saw competition between different data storage systems (audio tapes vs. floppy disks), visual displays (TV receivers vs. dedicated monitors), operating systems (CPM vs. DOS vs. Apple II), and microprocessors.

Dominant Designs and Technical Standards The outcome of competition between rival designs and technologies is usually convergence by the industry around a *dominant design* – a product architecture that defines the look, functionality, and production method for the product and becomes accepted by the industry as a whole. Dominant designs have included the following:

- The IBM PC launched in 1981 established the basic design parameters of the personal computer as well as the key technical standard that was eventually to dominate the industry (the so-called "Wintel" standard).
- Leica's Ur-Leica 35mm camera developed by Oskar Barnack and launched in Germany in 1924 established what would become the dominant design for cameras, though it was not until Canon began mass-producing cameras based on the Leica design that the 35mm camera came to dominate still photography.[2]
- When Ray Kroc opened his first McDonald's hamburger restaurant in Illinois in 1955, he established what would soon become a dominant design for the fast-food restaurant industry: a limited menu, no waiter service, eat-in and take-out options, roadside locations for motorized customers, and a franchise system of ownership and control.

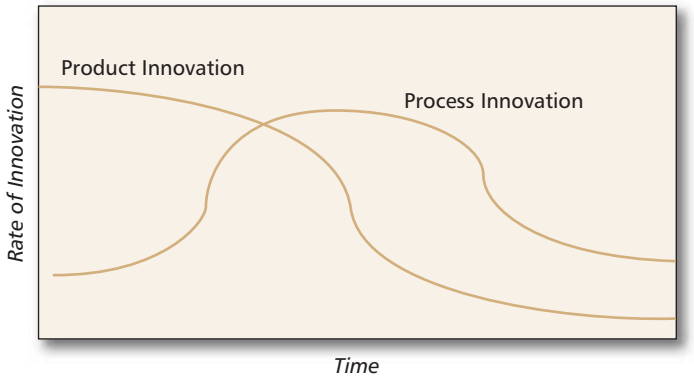
A dominant design may or may not embody a technical standard. IBM's PC established the MS-DOS operating system and Intel x86 series of microprocessor as technical standards for personal computing. Conversely, the Boeing 707 was a dominant design for large passenger jets, but did not set industry standards in aerospace technology that would dominate subsequent generations of airplanes. Technical standards emerge where there are *network effects* – the need for users to connect in some way with one another. Network effects cause each customer to choose the same technology as everyone else to avoid being stranded. Unlike a proprietary technical standard, which is typically embodied in patents or copyrights, a firm that sets a dominant design does not normally own intellectual property in that design. Hence, except for some early-mover advantage, there is not necessarily any profit advantage from setting a dominant design.

Dominant designs are present in business models as well as products. In many new markets, competition is between rival *business models*. In home grocery delivery, dot.com start-ups such as Webvan and Peapod soon succumbed to competition from "bricks 'n' clicks" retailers such as Albertson's and Giant. In the retailing of air travel, conventional travel agents such as American Express compete with the airlines' direct sales and online travel agents such as Expedia and Travelocity.

From Product to Process Innovation The emergence of a dominant design marks a critical juncture in an industry's evolution. Once the industry coalesces around a leading technology and design, there's a shift from radical to incremental product innovation. This transition may be necessary to inaugurate the industry's growth phase: greater standardization reduces risks to customers and encourages firms to invest in manufacturing. The shift in emphasis from design to manufacture typically involves increased attention to process innovation as firms seek to reduce costs and increase product reliability through large-scale production methods (see Figure 10.2). The combination of process improvements, design modifications, and scale economies results in falling costs and greater availability that drives rapidly increasing market penetration. Strategy Capsule 10.1 uses the history of the automobile industry to illustrate these patterns of development.

Knowledge diffusion is also important on the customer side. Over the course of the life cycle, customers become increasingly informed. As they become more knowledgeable about the performance attributes of rival manufacturers' products, so they are better able to judge value for money and become more price sensitive.

FIGURE 10.2 Product and process innovation over time



STRATEGY CAPSULE 10.1
Evolution of the Automobile Industry

The period 1890–1912 was one of rapid product innovation in the auto industry. After 1886, when Karl Benz received a patent on his three-wheel motor carriage, a flurry of technical advances occurred in Germany, France, the US, and Britain. Developments included:

- The first four-cylinder four-stroke engine (by Karl Benz in 1890).
- The honeycomb radiator (by Daimler in 1890).
- The speedometer (by Oldsmobile in 1901).
- Automatic transmission (by Packard in 1904).
- Electric headlamps (by General Motors in 1908).
- The all-steel body (adopted by General Motors in 1912).

Ford's Model T, introduced in 1908, with its front-mounted, water-cooled engine and transmission with a gearbox, wet clutch, and rear-wheel drive, acted as a dominant design for the industry. During the remainder of the 20th century, automotive technology and design converged. A key indicator of this was the gradual elimination of alternative technologies and designs. Volkswagen's Beetle was the last mass-produced car with a rear-mounted, air-cooled engine. Citroën abandoned its distinctive suspension and braking systems. Four-stroke engines with four or six inline cylinders became dominant. Distinctive national differences eroded as American cars became smaller and Japanese and Italian cars became bigger. The fall of the Iron Curtain extinguished the last outposts of nonconformity: by the mid-1990s, East German two-stroke Wartburgs and Trabants were collectors' items.

As product innovation slowed, so process innovation took off. In October 1913, Ford opened its Highland Park Assembly Plant, with its revolutionary production methods based on interchangeable parts and a moving assembly line. In the space of one year, chassis assembly

time was cut from 12 hours and 8 minutes to 1 hour and 33 minutes. The price of the Model T fell from $628 in 1908 to $260 in 1924. Between 1908 and 1927 over 15 million Model Ts had been produced.

The second revolutionary process innovation in automobile manufacturing was Toyota's system of "lean production," involving a tightly integrated "pull" system of production embodying just-in-time scheduling, team-based production, flexible manufacturing, and total quality management. During the 1970s and 1980s, lean production diffused throughout the world vehicle industry in the same way that Ford's mass-production system had transformed the industry half a century before.

Sources: www.daimlerchrysler.com; www.ford.com.

How General Is the Life Cycle Pattern?

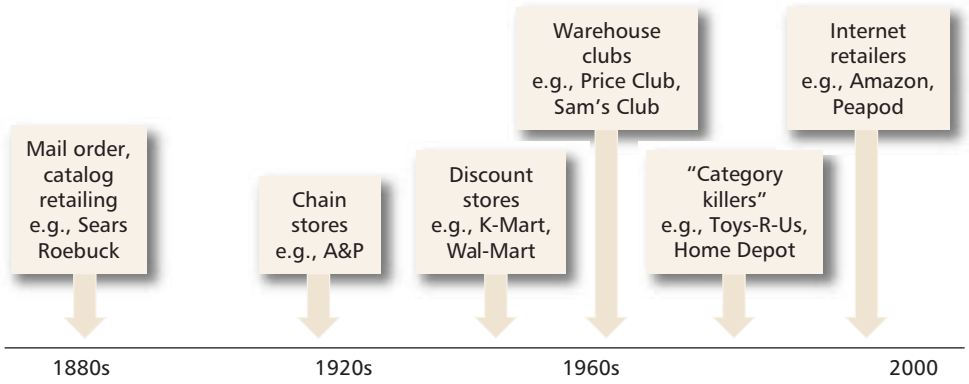
To what extent do industries conform to this life cycle pattern? To begin with, the duration of the life cycle varies greatly from industry to industry:

- The introduction phase of the US railroad industry extended from the building of the first railroad, the Baltimore and Ohio in 1827, to the growth phase of the 1870s. By the late 1950s, the industry was entering its decline phase.
- The introduction stage of the US automobile industry lasted about 25 years, from the 1890s until growth took off in 1913–15. Maturity, in terms of slackening growth, set in during the mid-1950s.
- In personal computers, the introduction phase lasted only about four years before growth took off in 1978. Between 1978 and 1983 a flood of new and established firms entered the industry. Toward the end of 1984, the first signs of maturity appeared: growth stalled, excess capacity emerged, and the industry began to consolidate around a few companies; however, it remained strong until the end of the 1990s.
- Digital audio players (MP3 players) were first introduced by Seehan Information Systems and Diamond Multimedia during 1997–8. With the launch of Apple's iPod in 2001 the industry entered its growth phase. By 2007, the industry appeared to be entering its motive phase.

The tendency over time has been for life cycles to become compressed. This is evident for all consumer electronic products, communication products, and also pharmaceuticals. In e-commerce, life cycles have become even more compressed. Businesses such as online gambling, business-to-business online auctions, and online travel services have gone from initial introduction to apparent maturity with a few years. Such time compression has required a radical rethink of strategies and management processes – "competing on internet time" is how Michael Cusumano and David Yoffie refer to the challenge.[3]

Patterns of evolution also differ. Industries supplying basic necessities such as residential construction, food processing, and clothing may never enter a decline phase because obsolescence is unlikely for such needs. Some industries may experience a rejuvenation of their life cycle. In the 1960s, the world motorcycle industry, in decline

FIGURE 10.3 Innovation and renewal in the industry life cycle: retailing



in the US and Europe, re-entered its growth phase as Japanese manufacturers pioneered the recreational use of motorcycles. Maturity of the market for black and white TVs was followed by a series of demand revivals: for color TVs, for computer monitors, and most recently for flat-screen TVs. Similar waves of innovation have revitalized retailing (see Figure 10.3). These rejuvenations of the product life cycle are not natural phenomena – they are typically the result of companies resisting the forces of maturity through breakthrough product innovations or developing new markets.

An industry is likely to be at different stages of its life cycle in different countries. Although the US auto market is in the early stages of its decline phase, markets in China, India, and Russia are in their growth phases. Multinational companies can exploit such differences: developing new products and introducing them into the advanced industrial countries, then shifting attention to other growth markets once maturity sets in.

Structure, Competition, and Success Factors over the Life Cycle

Changes in demand growth and technology over the cycle have implications for industry structure, competition, and the sources of competitive advantage (key success factors). Table 10.1 summarizes the principal features of each stage of the industry life cycle.

Product Differentiation

Emerging industries are characterized by a wide variety of product types that reflect the diversity of technologies and designs – and the lack of consensus over customer requirements. Standardization during growth and maturity phases increases product uniformity, with the result that a product may evolve toward commodity status unless producers are effective in developing new dimensions for differentiation, such as marketing variables, ancillary services (e.g., credit facilities, after-sales service),

TABLE 10.1 The Evolution of Industry Structure and Competition over the Life Cycle

	Introduction	Growth	Maturity	Decline
Demand	Limited to early adopters: high-income, avant-garde.	Rapidly increasing market penetration.	Mass market, replacement/repeat buying. Customers knowledgeable and price sensitive.	Obsolescence.
Technology	Competing technologies. Rapid product innovation.	Standardization around dominant technology. Rapid process innovation.	Well-diffused technical know-how: quest for technological improvements.	Little product or process innovation.
Products	Poor quality. Wide variety of features and technologies. Frequent design changes.	Design and quality improve. Emergence of dominant design.	Trend to commoditization. Attempts to differentiate by branding, quality, bundling.	Commodities the norm: differentiation difficult and unprofitable.
Manufacturing and distribution	Short production runs. High-skilled labor content. Specialized distribution channels.	Capacity shortages Mass production. Competition for distribution.	Emergence of overcapacity. Deskilling of production. Long production runs. Distributors carry fewer lines.	Chronic overcapacity. Re-emergence of specialty channels.
Trade	Producers and consumers in advanced countries.	Exports from advanced countries to rest of world.	Production shifts to newly industrializing then developing countries.	Exports from countries with lowest labor costs.
Competition	Few companies.	Entry, mergers, and exits.	Shakeout. Price competition increases.	Price wars, exits.
Key success factors	Product innovation. Establishing credible image of firm and product.	Design for manufacture. Access to distribution. Building strong brand. Fast product development. Process innovation.	Cost efficiency through capital intensity, scale efficiency, and low input costs. High quality.	Low overheads. Buyer selection. Signaling commitment. Rationalizing capacity.

and product options.[4] A feature of the markets for personal computers, credit cards, securities broking, and internet access is their increasing commodity status in which buyers select primarily on price.

Organizational Demographics and Industry Structure

Industry evolution is associated with high rates of entry and exit and considerable changes in firm population. The field of *organizational ecology*, founded by Michael Hannan, John Freeman, and Glen Carroll, has examined the evolution of industries as a Darwinian process in which the size and composition of the population of firms in an industry are determined by the process through which firms are founded and the process of selection through which they compete for survival.[5] Some of the main findings of the organizational ecologists in relation to industry evolution are:

- The number of firms in an industry increases rapidly during the early stages of an industry's life. Initially an industry may be pioneered by a few firms. However, as these firms gain legitimacy, failure rates decline and the rate of new-firm foundings increases. New entrants have very different origins. Some are startup companies ("*de novo*" entrants); others are established firms diversifying from related industries ("*de alio*" entrants). The US automobile industry featured many hundreds of producers in the early years of the 20th century,[6] while in TV receivers there were 92 companies in 1951.[7]
- With the onset of maturity, the number of firms begins to fall. Very often, industries go through one or more "shakeout" phases during which the rate of firm failure increases sharply. After this point, rates of entry and exit decline and the survival rate for incumbents increases substantially.[8] The shakeout phase of intensive acquisition, merger, and exit occurs, on average, 29 years into the life cycle and results in the number of producers being halved.[9] In the US tire industry, the number of players increased during the first 25 years, before waves of consolidation, typically triggered by technological and strategic changes within the industry.[10]
- As industries become increasingly concentrated and the leading firms focus on the mass market, so a new phase of entry may take place as new firms take advantage of opportunities in peripheral regions of the market. An example of this "resource partitioning" is the US brewing industry: as the mass market became dominated by a handful of national brewers, so opportunities arose for new types of brewing companies – microbreweries and brew pubs – to establish themselves in specialist niches.[11]

However, different industries follow very different evolutionary paths. While in most industries, maturity is associated with increasing concentration, in industries where scale economies are unimportant and entry barriers are low, maturity and commoditization may cause concentration to decline (as in credit cards, television broadcasting, and frozen foods). Some industries, especially where the first-mover achieves substantial patent protection, may start out as near-monopolies, then become increasingly competitive. Plain-paper copiers were initially monopolized by Xerox Corporation and it was not until the early 1980s that the industry was transformed by a wave of new entry. Seemingly stable mature industries can be transformed within a few years by a wave of mergers. The world petroleum industry consolidated considerably during 1998–2001, as did the world steel industry during 2001–6.

Location and International Trade

The industry life cycle involves the international migration of production.[12] The life cycle theory of trade and direct investment is based on two assumptions. First, that demand for new products emerges first in the advanced industrialized countries of North America, western Europe, and Japan and then diffuses internationally. Second, that with maturity, products require fewer inputs of technology and sophisticated skills. The result is the following development pattern:

1. New industries begin in high-income countries (United States, Japan, and western Europe) because of the presence of a market and the availability of technical and scientific resources.
2. As demand grows in other countries, they are serviced initially by exports.
3. Continued growth of overseas markets and reduced need for inputs of technology and sophisticated labor skills make production attractive in newly industrialized countries. The advanced industrialized countries begin to import.
4. With maturity, commoditization, and de-skilling of production processes, production shifts to developing countries where labor costs are lowest.

For example, consumer electronics were initially dominated by the United States and Germany. During the early 1960s, production shifted towards Japan. The 1980s saw the rise of Korea, Hong Kong, and Taiwan as leading exporters. By the mid-1990s, assembly had moved to lower-wage countries such as China, the Philippines, Thailand, Mexico, and Brazil. We return to these issues of national-level competitiveness in Chapter 14.

The Nature and Intensity of Competition

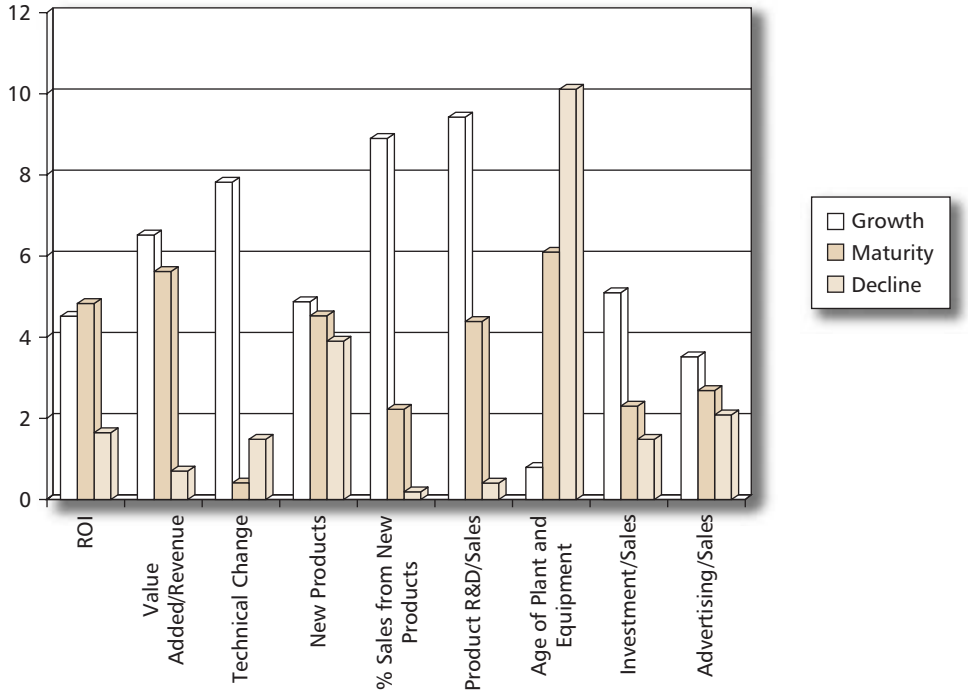
Competition changes in two ways over the course of the industry life cycle. First, there is a shift from nonprice to price competition. Second, the intensity of competition grows, causing margins to narrow. During the introduction stage, competitors battle for technological leadership and competition focuses on technology and design. Gross margins can be high, but heavy investments in innovation and market development tend to depress return on capital. The growth phase is more conducive to profitability as market demand outstrips industry capacity – especially if incumbents are protected by barriers to entry. With the onset of maturity, increased product standardization and excess capacity stimulates price competition. How intense this is depends a great deal on the capacity/demand balance and the extent of international competition. In food retailing, airlines, motor vehicles, metals, oil refining, and insurance, maturity was associated with strong price competition and slender profitability. In household detergents, breakfast cereals, cosmetics, and investment banking, high levels of seller concentration and successful maintenance of product differentiation resulted in positive economic profits. The decline phase is almost always associated with strong price competition (often degenerating into destructive price wars) and dismal profit performance.

Key Success Factors and Industry Evolution

These changes in structure, demand, and technology over the industry life cycle have important implications for the primary sources of competitive advantage at each stage of industry evolution:

- During the introductory stage, product innovation is the basis for initial entry and for subsequent success. Soon, however, knowledge alone is not enough. As the industry begins its evolution and technological competition intensifies, other requirements for success emerge. In moving from the first generation of products to subsequent generations, investment requirements tend to grow, and financial resources become increasingly important. Capabilities in product development soon need to be matched by capabilities in manufacturing, marketing, and distribution. Hence, in an emerging industry, firms need to support their innovation with a broad array of vertically integrated capabilities.
- Once the growth stage is reached, the key challenge is scaling up. As the market expands, the firm needs to adapt its product design and its manufacturing capability to large-scale production. As Figure 10.4 shows, investment in R&D, plant and equipment, and sales tends to be high during the growth phase. To utilize increased manufacturing capability, access to distribution becomes critical. At the same time, the tensions that organizational growth impose create the need for internal administrative and strategic skills. We consider these issues in Chapter 11.

FIGURE 10.4 Differences in strategy and performance between businesses at different stages of the industry life cycle



Note: The figure shows standardized means for each variable for businesses at each stage of the life cycle.

SOURCE: C. ANDERSON AND C. ZEITHAML, "STAGE OF THE PRODUCT LIFE CYCLE, BUSINESS STRATEGY AND BUSINESS PERFORMANCE," *ACADEMY OF MANAGEMENT JOURNAL* 27 (1984): 5–24.

- With the maturity stage, competitive advantage is increasingly a quest for cost efficiency – particularly in those mature industries that tend toward commoditization. Cost efficiency through scale economies, low wages, and low overheads become the key success factors. Figure 10.4 shows that R&D, capital investment, and marketing are lower in maturity than during the growth phase.
- The transformation to the decline phase raises the potential for destructive price competition. While cost advantage is essential, it is also important to maintain a stable industry environment. Hence, company strategies focus on encouraging the orderly exit of industry capacity and building a strong position in relation to residual market demand. We consider the strategic issues presented by mature and declining industries more fully in Chapter 12.

Organizational Adaptation and Change

In Chapter 1, I emphasized the importance of *fit*. For companies to be successful, their strategies and organizational structures need to be aligned with their industry environments. This concept of fit has its origin in *contingency* approaches to organization theory.[13] Industry evolution poses a huge challenge to managers: strategy and structure must adapt to keep pace with the rate of change in the external environment. The faster the pace of industry evolution, the more daunting is the challenge of organizational change.

Evolutionary Theory and Organizational Change

Theories of organizational evolution draw heavily upon biological theories of evolution. Organizations – like biological organisms – adapt to external change through *variation*, *selection*, and *retention*. The critical issue that divides organizational theorists is the level at which these evolutionary processes occur:

- *Organizational ecologists* emphasize evolution at the industry level. Individual organizations are subject to *inertia* – the resistance to change that accompanies the processes of institutionalization.[14] Hence, evolutionary processes work at the level of the industry. The competitive process is a *selection mechanism*, in which organizations whose characteristics match the requirements of their environment survive, and organizations whose characteristics do not are eliminated through acquisition or liquidation. The implication is that industry evolution involves a changing population of companies. As we shall see, a number of empirical studies support this contention that industry evolution is achieved more by the changes in the composition of firms than by adaptation by companies in response to external change.[15]
- *Evolutionary theorists* (such as Nelson and Winter) view evolution as occurring within individual organizations where the process of variation, selection, and retention takes place at the level of the *organizational routine*.[16] As we discussed in Chapter 5, these patterns of coordinated activity are the basis for organizational capability. While evolutionary theorists view firms as adapting to external change through the search for new routines, replication

of successful routines, and abandonment of unsuccessful routines, such adaptation is neither fast nor costless. The search for new routines is triggered by declining performance; when companies are performing well there is little impetus for change.

The Sources of Organizational Inertia

Common to all the different analyses of organizational change is the recognition that for organizations – as for individuals – change is difficult and painful. Indeed, it is more difficult for organizations than for individuals because change upsets patterns of social interaction and requires coordinated action among multiple individuals. Different theories emphasize different barriers to change:

- *Organizational capabilities and routines*. Evolutionary economists emphasize the fact that capabilities are based on organizational routines – patterns of interaction among organizational members that develop through continual repetition. The more highly developed are an organization's routines, the more difficult it is to develop new routines. Hence, organizations get caught in *competency traps*[17] where "core capabilities become core rigidities."[18]
- *Social and political structures*. Organizations develop social patterns of interaction that make organizational change stressful and disruptive.[19] Similarly, organizations create stable systems of political power. To the extent that change disrupts social patterns and threatens the power of those in positions of authority, organizations tend to resist change.
- *Conformity*. Institutional sociologists emphasize the propensity of firms to imitate one another to gain legitimacy.[20] The process of *institutional isomorphism* locks organizations into common structures and strategies that make it difficult for them to adapt to change. External pressures for conformity arise from governments, investment analysts, banks, and other sources of resources and legitimacy, but also through voluntarily imitation – risk aversion encourages companies to adopt similar strategies and structures as their peers.[21]
- *Complementarities between strategy, structure, and systems*. Both organizational economists[22] and sociotechnical systems scholars[23] emphasize the importance of *fit* between an organization's strategy, structure, management systems, culture, employee skills – indeed, all the characteristics of an organization. Organizations establish complex, idiosyncratic combinations of multiple characteristics during their early phases of development in order to match the conditions of their business environment. However, once established, this complex configuration becomes a barrier to change because of the need to change all the elements of the organization. The implication is that organizations tend to evolve through a process of *punctuated equilibrium* involving long periods of stability during which the widening misalignment between the organization and its environment ultimately forces radical and comprehensive change on the company.[24]
- *Limited search and blinkered perceptions*. Organizations' capacity for large-scale change is also limited by their propensity to limit search to areas close to their existing activities and operations. According to the Carnegie School of

organizational theory, most organizations are limited to incremental changes because of *bounded rationality* (limited information processing capacity constrains human beings in their search activities), *satisficing* (the quest for satisfactory rather than optimal performance), and the preference for *exploitation* of existing knowledge over *exploration* for new opportunities.[25]

Empirical Evidence on Organizational Adaptation

The ability of some companies to adapt is indicated by the fact that many have been leaders in their industries for a century or more – Siemens has been a leading player in communications equipment since the founding of Telegraphen-Bau-Anstalt von Siemens & Halske in 1847, Exxon (now Exxon Mobil) and Royal Dutch Shell have dominated the petroleum industry for the whole of the 20th century, General Motors has been the world's biggest automobile maker since the mid-1920s. Yet these companies are exceptions. Among the companies forming the original Dow Jones Industrial Average in 1896, only General Electric remains in the index today. Of the world's 12 biggest companies in 1912, just three were in the top 12 in 2006 (see Table 10.2).

The ability of a firm to adapt to external change depends on the nature of that change. Evolutionary change over the typical industry life cycle is less threatening than radical technological change. Let us review evidence on adaptation to both types of change.

Adapting to changes over the life cycle Even though the industry life cycle involves changes that are largely predictable, the different stages of the life cycle require different capabilities that established forms may struggle to develop. Markides and Geroski show steps through the different stages of an industry's development are usually undertaken by different companies – the "innovators" that pioneer the creation of a new industry are typically different companies from the "consolidators" that develop it:

TABLE 10.2 World's Biggest Companies in terms of Market Capitalization, 1912 and 2006

1912	$ bn	2006	$ bn
US Steel	0.74	Exxon Mobil	372
Exxon	0.39	General Electric	363
J&P Coates	0.29	Microsoft	281
Pullman	0.20	Citigroup	239
Royal Dutch Shell	0.19	BP	233
Anaconda	0.18	Bank of America	212
General Electric	0.17	Royal Dutch Shell	211
Singer	0.17	Wal-Mart Stores	197
American Brands	0.17	Toyota Motor	197
Navistar	0.16	Gazprom	196
BAT	0.16	HSBC	190
De Beers	0.16	Procter & Gamble	190

SOURCES: *FINANCIAL TIMES, ECONOMIST.*

> *The fact that the firms that create new product and service markets are rarely the ones that scale them into mass markets has serious implications for the modern corporation. Our research points to a simple reason for this phenomenon: the skills, mind-sets, and competences needed for discovery and invention are not only different from those needed for commercialization; they conflict with the needed characteristics. This means that the firms good at invention are unlikely to be good at commercialization and vice versa.*[26]

In personal computers the pioneers were Apple, Commodore, and Xerox; 25 years later, the leaders were Dell, Lenova, Acer, and Hewlett-Packard. In US wireless telephony the pioneer was McCaw Communications; the current market leaders are Cingular and Verizon.

Adapting to technological change The ability of firms to adapt to technological carnage depends to a great extent on the implications of the new technology. Some new technologies may enhance a company's existing capabilities, others may be "competence destroying."[27] This depends, in part, on whether the technology's impact is at the "component" or the "architectural" level – i.e. whether it involves a single process or product feature or whether it necessitates a new configuration of the product.[28] In many sectors of e-commerce – online grocery purchases and online banking – the internet involved innovation at the component level (it provided a new channel of distribution for existing products). Hence, existing supermarket chains and established retail banks with their "clicks and bricks" business models have dominated online groceries and online financial services.

Where more radical technological change involves architectural innovation then established firms have difficulty adapting and new startups tend to be more successful. But even here, ownership of key resources (e.g. brands, customer relationships, and distribution systems) can support established firms while they overcome the disruptive effects of radical technological change. Since the late 19th century, the typesetter industry has undergone three waves wrenching technological change. Yet, although new entrants had advantages in technology and new product development, incumbent firms' customer relationships, sales and service networks, and font libraries allowed many to survive and prosper.[29]

Elsewhere, technological changes – even the apparently modest technological changes associated with new product generations – can give newcomers the ability to unseat established market leaders. In disk drives, Clayton Christensen found that with every new product generation – from 14″ to 8″ to 5.25″ to 3.5″ drives – the established companies were on average two years behind newcomers in launching new products.[30] The barriers to change were twofold: first, at the time of their introduction, new technologies are initially inferior to existing technologies; second, established companies listen to their customers, most of whom don't want the new technology – typically, it is fringe customers that are lead adopters of new technologies. The result is that new technologies tend to be disruptive to established firms even when they do not embody architectural innovations. The critical feature of these *disruptive technologies*, according to Christensen, is that they offer a very different package of attributes from the existing technology. For example:

- Sony's early transistor radios sacrificed sound fidelity but offered portability through small size and light weight.

- Nucor pioneered minimill technology, which initially was lower quality and higher cost than integrated steel production but offered flexible, small-scale production close to customers.
- In telecommunications equipment, it was newcomers Cisco Systems and Juniper Networks, rather than established leaders such as Lucent Technologies and Alcatel, that were most successful in exploiting the packet switching technologies associated with the internet.[31]

What about technological changes that create new industries? Again, we see the same phenomenon: new startup companies (*de novo* entrants) competing with established companies that have diversified from other sectors (*de alio* entrants). The issues are the same as within an industry undergoing change: are the flexibility advantages of new startups more important than the more substantial resources and capabilities of established firms? The evidence suggests that, where the resources and capabilities of one industry are closely related to those required in a new industry, then diversifying entrants from that established industry will tend to be at an advantage over new startups. Thus:

- In the US automobile industry, former bicycle, carriage, and engine manufacturers tended to be the best performers.[32]
- The US television manufacturing industry was dominated by former producers of radios.[33]

However, often some of the best performing firms in a new industry are spinoffs from existing companies within that industry – i.e. new ventures established by former employees of existing companies. This was evident in the US auto industry,[34] the Akron tire industry,[35] and the Silicon Valley semiconductor industry – where most of the leading players, including Intel, trace their origins to Shockley Semiconductor Laboratories, the initial producer of integrated circuits.[36]

Managing Organizational Change

Given the many barriers to organizational change, how can companies adapt to changes in their environment? The fundamental requirement is that managers recognize the sources of inertia – existing routines and capabilities, power structures, and entrenched perceptions regarding the nature of the business. Once the rigidities of the status quo are acknowledged, then we can embark on the challenge of initiating and guiding strategic change.

Dual Strategies and Separate Organizational Units Given the rigidities of prevailing strategies and structures, it may be easier to effect change by creating new organizational units rather than trying to change the existing organization. Thus, faced with the challenge of disruptive technologies, Christensen and Overdorf suggest that established companies develop products and businesses that embody the new technologies in organizationally separate units.[37]

Costas Markides argues that the critical issue is not so much the allocation of new strategic initiatives to separate organizational units, but the firm's capacity to simultaneously pursue multiple strategies. Despite several well-publicized failures dual strategies – notably the budget airlines initiated by British Airways, Continental, and United – he finds that a surprisingly large number of companies have successfully

pursued dual business models. Success had little to do with whether the new strategy was organizationally separated; the key was the ability of the new business model to access and deploy the company's existing resources and capabilities.[38]

To some extent all companies need to pursue dual strategies to the extent that they must maximize current performance by deploying existing resources and capabilities most effectively while at the same time developing the business to meet the challenges of competing in the business environment of the future. According to Derek Abell, pursuing such "dual strategies" requires dual planning systems: short-term planning that focuses on strategic fit and performance over a one- or two-year period, and longer term planning to develop vision, reshape the corporate portfolio, redefine and reposition individual businesses, develop new capabilities, and redesign organizational structures over periods of five years or more.[39] In companies, strategic management is biased towards the exploitation of current resources and capabilities and insufficient management time is devoted towards the exploration of new opportunities and new capabilities for the future.

Bottom–up Processes of Decentralized Organizational Change In Chapter 6, we noted that the appeal of modular, loosely coupled organizational structures was the potential for decentralized adaptation that avoided disrupting the whole organization. Yet, typically, simply decentralizing decision making is not enough to speed the processes of organizational adaptation. The strategy literature points to the need for top management to manage the conditions that foster and extend the processes of change. For example:

- If search for new strategies and new opportunities is limited by satisficing behavior, then top management needs to stimulate performance by raising performance expectations – establishing "stretch targets" for example.
- Corporate top management can challenge divisional and business unit managers to seek new opportunities by issuing specific company-wide initiatives. General Electric's former CEO, Jack Welch, would periodically issue such challenges: "Be number 1 or number 2 in your industry," "six-sigma quality," "destroy-your-business.com."
- Andy Grove of Intel has pointed to the necessity for top management to be alert to the emergence of "strategic dissonance" created by divergent strategic directions within the company. Such dissonance is likely to signal a "strategic inflection point" – a fundamental change in industry dynamics – at which point the company must be willing to make a radical strategic shift. For Intel, such an inflection point occurred when it recognized that its future lay in microprocessors rather than its initial business of DRAM chips.[40]
- By periodically changing organizational structure, a company can stimulate decentralized search and local initiatives while encouraging more effective exploitation of the outcomes of such search.[41] A typical pattern is to oscillate from periods of decentralization to periods of centralization.[42]

Imposing Top–down Organizational Change If organizational change occurs periodically through a punctuated equilibrium process, the implication is that these instances of concentrated organizational change must be orchestrated from the top. Most large companies exhibit periodic restructuring involving simultaneous changes in strategy, structure, management systems, and top management personnel. Such

restructuring typically follows declining performance. For example, the oil and gas majors all experienced far-reaching restructuring during 1986–92 following depressed profitability that accompanied the oil price decline of 1986.[43] The challenge for top management is to undertake large-scale change before the company is pressured by declining performance. This may require that the CEO manufactures a perception of impending crisis within the company.

Using Scenarios to Prepare for the Future A company's ability to adapt to changes in its environment depends on its capacity to anticipate such changes. Yet predicting the future is hazardous, if not impossible. "Only a fool would make predictions – especially about the future," remarked movie mogul Samuel Goldwyn. But the inability to predict does not mean that it is not useful to think about what might happen in the future. *Scenario analysis* is a systematic way of thinking about how the future might unfold that builds on what we know about current trends and signals. Scenario analysis is not a forecasting technique, but a process for thinking and communicating about the future.

Herman Kahn, who pioneered their use first at the Rand Corporation and subsequently at the Hudson Institute, defined scenarios as "hypothetical sequences of events constructed for the purpose of focusing attention on causal process and decision points."[44] The multiple scenario approach constructs several distinct, internally consistent views of how the future may look five to 25 years ahead (shorter in the case of fast-moving sectors). Its key value is in combining the interrelated impacts of a wide range of economic, technological, demographic, and political factors into a few distinct alternative stories of how the future might unfold. Scenario analysis can be either qualitative or quantitative, or involve some combination of the two. Quantitative scenario analysis models events and runs simulations to identify likely outcomes. Qualitative scenarios typically take the form of narratives and can be particularly useful in engaging the insight and imagination of decision makers.

For the purposes of strategy making, scenario analysis is used to explore likely paths of industry evolution, to examine developments in particular country markets, to think about the impact of new technologies, and to analyze prospects for specific investment projects. Applied to industry evolution, scenarios can clarify and develop alternative views of how changing customer requirements, emerging technologies, government policies, and competitor strategies might have an impact on industry structure, and what the implications for competition and competitive advantage might be.

However, as with most strategy techniques, the value of scenario analysis is not in the results, but in the process. Scenario analysis is a powerful tool for bringing together different ideas and insights, for surfacing deeply held beliefs and assumptions, for identifying possible threats and opportunities, for generating and evaluating alternative strategies, for generating more flexible thinking by managers, and for building consensus. Evaluating the likely performance of different strategies under different scenarios can help identify which strategies are most robust and can assist in contingency planning by forcing managers to address "what if?" questions. Strategy Capsule 10.2 outlines the use of scenarios at Shell.

Shaping the Future

A succession of management gurus from Tom Peters to Gary Hamel have argued that the key to organizational change is not to adapt to external change but to create the

STRATEGY CAPSULE 10.2

Multiple Scenario Development at Shell

Royal Dutch Shell has pioneered the use of scenarios as a basis for long-term strategic planning in an industry where the life of investment projects (up to 50 years) far exceeds the time horizon for forecasting (two or three years). In 1967, a "Year 2000" study was inaugurated and scenario development soon became fundamental to Shell's planning process. Mike Pocock, Shell's former chairman, observed: "We believe in basing planning not on single forecasts, but on deep thought that identifies a coherent pattern of economic, political, and social development."

Shell views its scenarios as critical to its transition from planning toward strategic management, in which the role of the planning function is not so much to produce a plan, but to manage a process, the outcome of which is improved decision making by managers. This involves continually challenging current thinking within the group, encouraging a wider look at external influences on the business, promoting learning, and forging coordination among Shell's 200-odd subsidiaries.

Shell's global scenarios are prepared about every four years by a team comprising corporate planning staff, executives and outside experts. Economic, political, technological, and demographic trends are analyzed 20 years into the future. Shell's 2005–25 scenarios were based on three sets of forces – market incentives, community, and coercion and regulation – and three objectives – efficiency, social cohesion, and security. Their interactions produced three scenarios each embodying different social, political, and economic conditions:

- *Low Trust Globalization*. A legalistic world where emphasis is on security and efficiency at the expense of social cohesion.
- *Open Doors*. A pragmatic world emphasizing social cohesion and efficiency with the market providing built-in solutions to crises of security and trust.
- *Flags*. A dogmatic world where community and security values are emphasized at the expense of efficiency.

Once approved by top management, the scenarios are disseminated by reports, presentations, and workshops, where they form the basis for long-term strategy discussion by business sectors and operating companies.

Shell is adamant that its scenarios are not forecasts. They represent carefully thought-out stories of how the various forces shaping the global energy environment of the future might play out. Their value is in stimulating the social and cognitive processes through which managers think about the future. CEO Van Der Veer commented: ". . . the imperative is to use this tool to gain deeper in sights into our global business environment and to achieve the cultural change that is at the heart of our group strategy . . . I know that they broaden one's mindset and stimulate discussions."

Sources: Pierre Wack, "Scenarios: Uncharted Waters Ahead," *Harvard Business Review* (September–October 1985): 72 and "Scenarios: Shooting the Rapids," *Harvard Business Review* (November–December 1985): 139; Arie De Geus, "Planning as Learning," *Harvard Business Review* (March–April 1988): 70–4; Paul Schoemacher, "Multiple Scenario Development: Its Conceptual and Behavioral Foundation," *Strategic Management Journal* 14 (1993): 193–214; *Shell Global Scenarios to 2025* (Shell International, 2005).

FIGURE 10.5 Shaking the Foundations

OLD BRICK	NEW BRICK
Top management is responsible for setting strategy	Everyone is responsible for setting strategy
Getting better, getting faster is the way to win	Rule-busting innovation is the way to win
IT creates competitive advantage	Unconventional business concepts create competitive advantage
Being revolutionary is high risk	More of the same is high risk
We can merge our way to competitiveness	There's no correlation between size and competitiveness
Innovation equals new products and new technology	Innovation equals entirely new business concepts
Strategy is the easy part; implementation the hard part	Strategy is the easy only if you're content to be an imitator
Change starts at the top	Change starts with activists
Our real problem is execution	Our real problem is execution
Big companies can't innovate	Big companies can become gray-haired revolutionaries

ADAPTED FROM: GARY HAMEL, *LEADING THE REVOLUTION* (BOSTON: HARVARD BUSINESS SCHOOL PRESS, 2000): 280–1.

future. Companies that adapt to change are doomed to playing catch-up; competitive advantages accrue to those companies that act as leaders and initiate change. Hamel and Prahalad's "new strategy paradigm" emphasizes the role of strategy as a systematic and concerted approach to redefining both the company and its industry environment in the future.[45]

According to Gary Hamel, in an age of revolution, "the company that is evolving slowly is already on its way to extinction."[46] The only option is to give up incremental improvement and adapt to a nonlinear world – revolution must be met by revolution. Achieving internal revolution requires changing the psychological and sociological norms of an organization that restrict innovation (see Figure 10.5).

Hamel's challenge for managers to cast off their bureaucratic chains and become revolutionaries is invigorating and inspiring. But is revolution among established companies either feasible or desirable? Some established companies have achieved radical change:

- Nokia underwent a metamorphosis from a manufacturer of paper and rubber goods into the world's leading supplier of mobile phones.
- BP transformed itself from a bureaucratic state-owned oil company to one of the most flexible and innovative of the supermajors.
- Microsoft has successfully ridden a series of disruptive changes in the world's computer industry, including the transition to object-oriented computing and the networking revolution of the late 1990s, and is currently positioning itself for the conversion of computing, telecommunications, and home entertainment.

However, for most established companies, efforts at radical change have resulted in disaster:

- Enron's transformation from a utility and pipeline company to a trader and market-maker in energy futures and derivatives ended in disaster in 2001.
- Vivendi's multimedia empire built on the base of French water and waste utility fell apart in 2002.
- GEC's reincarnation as Marconi, a telecom equipment supplier, was swiftly followed by bankruptcy in 2002.
- ICI, the former British chemical giant, has yet to recover from its attempt to reinvent itself as a specialty chemical company.
- Skandia's quest to become one of the world's most innovative insurance companies ended in top management scandal and the sale of most the company's businesses outside of Sweden.

The perils of radical strategic change are not difficult to understand. We have noted that competitive advantage depends on the deployment of superior organizational capabilities and these capabilities develop slowly. Strategic changes that take a company beyond its competence domain involve massive risks.

Summary

Strategy is about establishing an identity and a direction for the development of a business into the future. How can we formulate a strategy for the future if the future is unknown and difficult to predict?

In this chapter we have learned that some regularities are evident in the evolutionary paths that industries follow. The life cycle model is a useful approach to exploring the impact of temporal processes of market saturation and technology development and dissemination and their impact on industry structure and the basis of competitive advantage. Classifying industries according to their stage of development can in itself be an insightful exercise:

- It acts as a shortcut in strategy analysis. Categorizing an industry according to its stage of development can alert us to the type of competition likely to emerge and the kinds of strategy likely to be effective.
- Classifying an industry encourages comparison with other industries. By highlighting similarities and differences with other industries, such comparisons can help us gain a deeper understanding of the strategic characteristics of an industry.
- It directs attention to the forces of change and direction of industry evolution, thereby helping us to anticipate and manage change.

Even if we can identify certain regularities in the pattern of industry evolution, adapting to change presents a huge challenge to companies. Organizational theories that emphasize inertia and conformity among organizations, suggest that industry adjustment may occur more through

the birth of new firms and death of old ones, rather than through adaptation by established firms. This analysis is supported by empirical evidence that points to the limited success of established firms in dealing with industry evolution and disruptive technologies.

While various management consultants and commentators advocate radical and continuous change among established companies, there is little evidence that most companies have the capacity to manage such change. Certain tools and techniques – scenario analysis, in particular – may help managers understand and cope with change in the external environment; nevertheless, the fundamental truth is that, so long as developing new capabilities is slow and risky, a firm's capacity to successfully undergo radical change is inherently uncertain.

In the next two chapters, we discuss strategy formulation and strategy implementation in industries at different stages of their development: emerging industries, those characterized by technology-based competition, and mature industries.

Self-Study Questions

1 Consider the changes that have occurred in a comparatively new industry (e.g. wireless communications, video game consoles, medical diagnostic imaging, PDAs, online auctions, bottled water, courier delivery services). To what extent has the evolution of the industry followed the pattern predicated by the industry life cycle model? At what stage of development is the industry today? How is the industry likely to evolve in the future?

2 Select a product that has become a *dominant design* for its industry (e.g. the IBM PC in personal computers, the Boeing 707 in passenger jets, McDonald's in fast food, Harvard in MBA education, Southwest in budget airlines). What forces caused one firm's product architecture to become dominant? Why did other firms imitate this dominant design? To what extent has the dominant design evolved or been displaced?

3 The "resource partitioning" model argues that as industries become dominated by a few major companies whose strategies and products converge, so opportunities open for new entrants to build specialist niches. Identify an opportunity for establishing a specialist new business in an industry dominated by mass market giants.

4 Consider an industry facing fundamental technology change (e.g. fixed-point telecommunications and internet protocols, the recorded music industry and digitalization, computer software and open-source, newspapers and the internet, automobiles and alternative fuels). Develop two alternative scenarios for the future evolution of your chosen industry. In relation to one leading player in the industry, identify the problems posed by the new technology and develop a strategy for how the company might adapt to and exploit the changes you envisage.

Notes

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