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The Role of innovations in development of economy of Russia

Here you can see some basic determinations and notions about innovations and its imperatives in actual business. You can found more information in the full texts of the Oslo Manual, manual on the strategy and marketing, mentioned below and the articles and books listed in the bibliography.

The main determinations of innovation are in the famous Oslo Manual[1]:

130. Technological product and process (TPP) **innovations** comprise implemented technologically new products and processes and significant technological improvements in products and processes. A TPP innovation has been implemented if it has been introduced on the market (product innovation) or used within a production process (process innovation). TPP innovations involve a series of scientific, technological, organisational, financial and commercial activities. The TPP innovating firm is one that has implemented technologically new or significantly technologically improved products or processes during the period under review.

135. Technological product innovation can take two broad forms:

· technologically new products;

· technologically improved products.

136. **A technologically new product** is a product whose technological characteristics or intended uses differ significantly from those of previously produced products. Such innovations can involve radically new technologies, can be based on combining existing technologies in new uses, or can be derived from the use of new knowledge.

138. **A technologically improved product** is an existing product whose performance has been significantly enhanced or upgraded. A simple product may be improved (in terms of better performance or lower cost) through use of higher-performance components or materials, or a complex product which consists of a number of integrated technical sub-systems may be improved by partial changes to one of the sub-systems.

139. Technologically improved products may have both major and minor effects on the firm. *The substitution of plastics for metals in kitchen equipment or furniture is an example of the use of higherperformance components. The introduction of ABS braking or other sub-system improvements in cars is an example of partial changes to one of a number of integrated technical sub-systems.*

140. The distinction between a technologically new product and a technologically improved product may pose difficulties for some industries, notably in services.

2.2 Technological process innovation

[1] Organization for Economic Co-operation and Development. THE MEASUREMENT OF SCIENTIFIC AND TECHNOLOGICAL ACTIVITIES. PROPOSED GUIDELINES FOR COLLECTING AND INTERPRETING TECHNOLOGICAL INNOVATION DATA. OSLO MANUAL. European Commission Eurostat

141. **Technological process innovation is** the adoption of technologically new or significantly improved production methods, including methods of product delivery. These methods may involve changes in equipment, or production organisation, or a combination of these changes, and may be derived from the use of new knowledge. The methods may be intended to produce or deliver technologically new or improved products, which cannot be produced or delivered using conventional production methods, or essentially to increase the production or delivery efficiency of existing products.

142. In some service industries, the distinction between process and product may be blurred. For example, a process change in telecommunications to introduce an intelligent network may allow the marketing of a set of new products, such as call waiting or call display. Examples of innovation in service industries are presented in Box 1.

The practical (marketer') view on the innovation[2].

Every company **must develop new products**. New-product development shapes the company's future. Improved or replacement products must be created to maintain or build sales. Customers want new products, and competitors will do their best to supply them. In the year 2000, consumer-product firms churned out 31,000 new products (including line extensions and new brands). Today the typical supermarket stocks 40,000 items.

A company can add new products **through acquisition or development**. The acquisition route can take three forms. The company can buy other companies, it can acquire patents from other companies, or it can buy a license or franchise from another company. The development route can take two forms. The company can develop new products in its own laboratories, or it can contract with independent researchers or new-product-development firms to develop specific new products:

Booz, Allen, and Hamilton identified six categories of new products:

1. New-to-the-world products: New products that create an entirely new market.
2. New product lines: New products that allow a company to enter an established market for the first time.
3. Additions to existing product lines: New products that supplement a company's established product lines (package sizes, flavors, and so on).
4. Improvement and revisions of existing products: New products that provide improved performance or greater perceived value and replace existing products.
5. Repositionings: Existing products that are targeted to new markets or market segments.
6. Cost reductions: New products that provide similar performance at lower cost.

Less than 10 percent of all new products are truly innovative and new to the world. These products involve the greatest cost and risk because they are new to both the company and the marketplace . Most new-product activity is devoted to improving existing products. At Sony, over 80 percent of new-product activity is undertaken to modify and improve existing Sony products.

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[2] Kotler Philip. Marketing Management. Prentice Hall. Pearson Education International 2003. ISBN 0-13-0497150. Chapter 12. Developing new market offerings.

Most companies rarely innovate, some innovate occasionally, and a few innovate continuously. In the last category, Sony, 3M, Charles Schwab, Dell Computer, Sun Microsystems, Oracle, Southwest Airlines, Maytag, Costco, and Microsoft are the stock price gain leaders in their respective industries. These companies have decided that they must build innovation into the very fiber of their businesses. They have created a positive attitude toward innovation and risk taking; they have routinized the innovation process; they practice teamwork; and they allow their people to experiment and even fail. They know that in an economy of rapid change, continuous innovation is necessary.

Challenges in new-product development

Companies that fail to develop new products are putting themselves at great risk. Their existing products are vulnerable to changing customer needs and tastes, new technologies, shortened product life cycles, and increased domestic and foreign competition. New technologies are especially threatening. Most established companies focus on incremental innovation. Newer companies create disruptive technologies that are cheaper and more likely to alter the competitive space. Established companies are slow to react or invest in these disruptive technologies because they threaten their investment. Then they suddenly find themselves facing formidable new competitors, and many fail.

At the same time, new-product development is risky Texas Instruments lost $660 million before withdrawing from the home computer business; RCA lost $500 million on its videodisc players; FedEx lost $340 million on its Zap mail; Ford lost $250 million on its Edsel; DuPont lost an estimated $100 million on a synthetic leather called Corfam; and the British-French Concorde aircraft will never recover its investment. Even these amounts are paltry compared to the $5 billion Iridium fiasco.

New products continue to fail at a disturbing rate. Recent studies put the failure rate of new consumer products at 95 percent in the United States and 90 percent in Europe.

Why do new products fail?

- A high-level executive pushes a favorite idea through in spite of negative market research findings.
- The idea is good, but the market size is overestimated.
- The product is not well designed.
- The product is incorrectly positioned in the market, not advertised effectively, or overpriced.
- The product fails to gain sufficient distribution coverage or support.
- Development costs are higher than expected.
- Competitors fight back harder than expected.

Several factors tend to hinder new-product development:

- **Shortage of important ideas in certain areas**: There may be few ways left to improve some basic products (such as steel, detergents).
- **Fragmented markets:** Companies have to aim their new products at smaller market segments, and this can mean lower sales and profits for each product.
- **Social and governmental constraints:** New products have to satisfy consumer safety and environmental concerns.
- **Cost of development:** A company typically has to generate many ideas to find just one worthy of development, and often faces high R&D, manufacturing, and marketing costs.

- **Capital shortages:** Some companies with good ideas cannot raise the funds needed to research and launch them.
- **Faster required development time:** Companies must learn how to compress development time by using new techniques, strategic partners, early concept tests, and advanced marketing planning. Alert companies use concurrent new-product development, in which cross-functional teams collaborate to push new products through development to market. Concurrent product development resembles a rugby match rather than a relay race; with learn members passing the new product back and forth as they head toward the goal. The Allen-Bradley Corporation (a maker of industrial controls) was able to develop a new electrical control device in just two years, as opposed to six years under its old system.
- **Shorter product life cycles:** When a new product is successful, rivals are quick to copy it. Sony used to enjoy a three-year lead on its new products. Now Matsushita will copy the product within six months, leaving hardly enough time for Sony to recoup its investment.

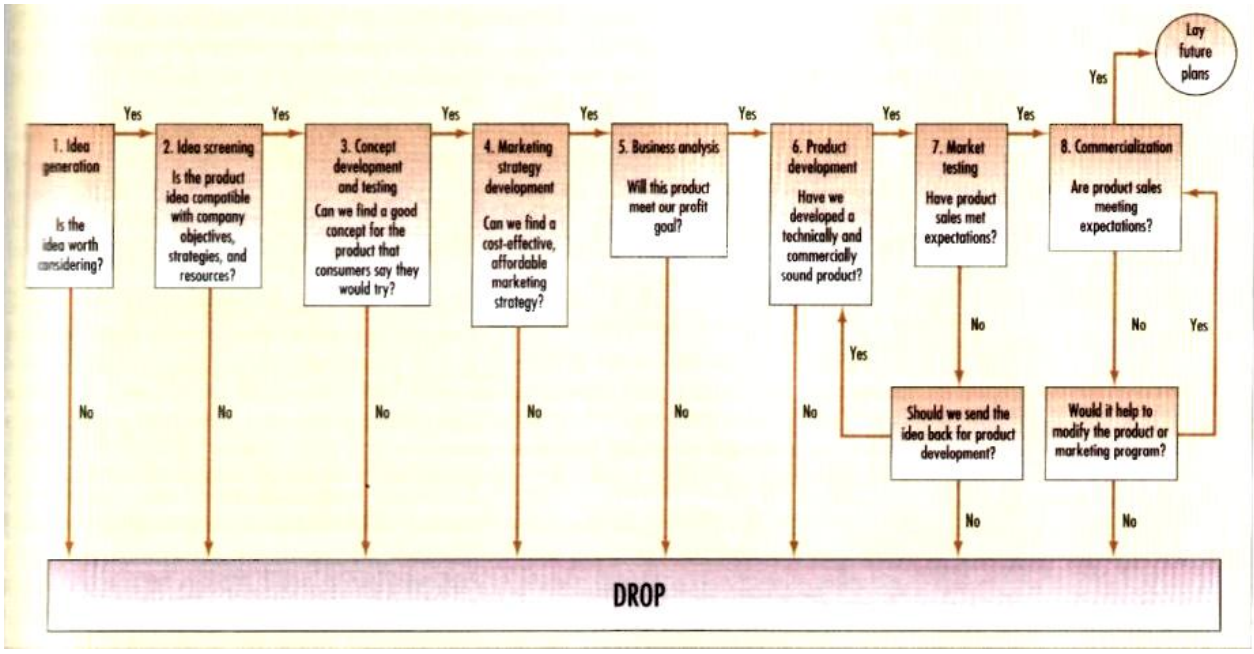
What can a company do to develop successful new products? Cooper and Kleinsch found that the number-one success factor is **unique, superior product.**

Such products succeed 98 percent of the time, compared to products with a moderate advantage (58 percent success) or minimal advantage (18 percent success). Another key success factor is a well-defined product concept prior to development. The company carefully defines and assesses the target market, product requirements, and benefits before proceeding. Other success factors are technological and marketing synergy, quality of execution in all stages, and market attractiveness.

We will now look at the marketing challenges arising at each of the eight stages of the new-product development process shown in Figure 12.1.

It is important; the product development process is the only number 6 here. The five point before are the profound researches of the market! (S.V.)

Figure 12.1 The New-Product Development Decision Process



Madique and Zirger, in a study of successful product launches in the electronic industry, found eight factors accounting for new-product success. New-product success is greater and deeper the company's understanding of customer needs, the higher the performance-to-cost ratio, the earlier the product is introduced ahead of competition, the greater the expected contribution margin, the more spent on announcing and launching product, the greater the top management support, and the greater the cross-functional teamwork.

The new products and the new industries

There are some problems for the very new products. At first, the new products demand the new industries[3].

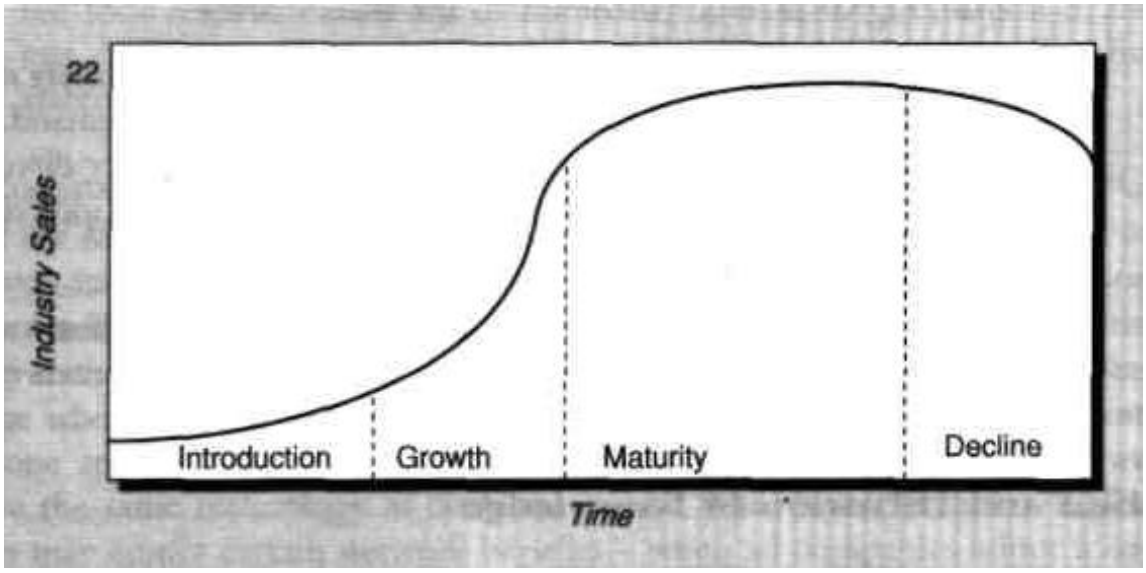


FIGURE 10.1 The industry life cycle

THE INDUSTRY LIFE CYCLE

One of the best-known and most enduring marketing concepts is the product life cycle. 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. For example, though 128-bit video game consoles such as the PlayStation2, XBox, and Gamecube have a probable life cycle of a few 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 stages, let us examine the forces that are driving industry evolution. Two factors are fundamental: demand growth and the production and diffusion of knowledge.

[3] Grant Robert M. Contemporary Strategy Analysis. Blackwell Publishing. 2005. Chapter 10. Industry Evolution.

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 early years of the automobile industry featured competition between different power sources (steam vs. gasoline-powered internal combustion), transmission systems, cooling mode (air vs. water), and radically different steering and braking systems.

The early years of the home computer industry 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).

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. Where there are network effects, then each customer wants to choose the same technology as everyone else to avoid being stranded. A dominant design may confer certain network benefits - when all companies adopt a common architecture innovation gets quicker and suppliers to the industry can exploit economies of scale. However, unlike a proprietary technical standard, a firm that sets a dominant design does not gain any ownership stake 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.* Such rivalry was especially evident in emerging e-commerce during the dot.com frenzy of 1998 to 2000. For example, the on-line grocery business was pioneered by dot.com start-ups such as Webvan and Peapod. However, they soon succumbed to competition form "bricks 'n' clicks" retailers such as Albertson's and Giant. A battle between rival business models is also developing in digital distribution of recorded music, where the record companies' own music download sites (such as Sony and Universal's Pressplay) compete with Apple's MusicStore, and with file-sharing services such as KaZaA.

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.

Patterns of evolution also differ. Industries supplying basic necessities such as residential construction, food processing, and clothing may never enter a decline phase

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.

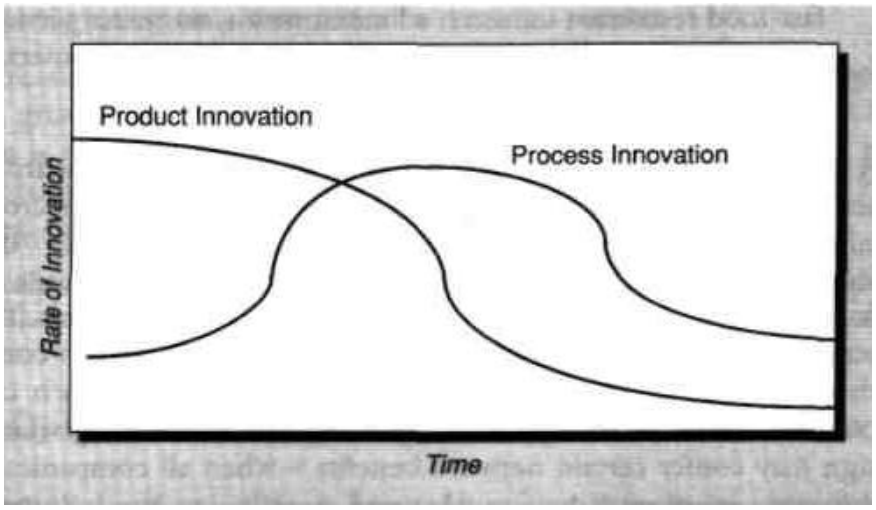


Fig. 10.2 Product and process innovation over time

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.

Managing with Dual Strategies

Adapting to change requires that companies must compete simultaneously in two time periods. Strategy is about maximizing performance under **today's** circumstances; it is also about developing resources and capabilities for competing in the **future**. Whereas strategies for the present are primarily concerned with maximizing the effective deployment of current resources and capabilities, competing in the future is concerned with extending, augmenting, and redeploying resources and capabilities. Derek Abell identifies the pursuit of "dual strategies" - optimizing present performance while adapting to the future - as a critical strategic challenge. Managing dual strategies requires dual planning systems:

- Short-term planning that focuses on strategic fit and performance over a one-or two-year period.
- 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.

However, the challenge of managing dual strategies goes beyond establishing dual strategic planning systems. We have examined the arguments that new technologies, new capabilities, and new business should be developed in separate organizational units. Markides and Charitou show that 17 out of a sample of 67 companies were successful in pursing dual business models. They found that 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.[34]

Classifying Industries According to Competitive Dynamics

The extent to which different industries are affected by intense technological competition is not entirely a result of their level of maturity. Some industries are comparatively stable right through

their life cycles, others seem to be in a state of permanent revolution. Focusing on dynamic aspects of competition - the rate of new product introduction, duration of product life cycles, the rate of decline of unit costs, geographical scope, and the stability of supplier-customer relations - Jeffrey Williams identifies three industry types:[40]

- ***Local monopoly markets*** sell specialized products to meet the specific requirements of small groups of customers. Examples include defense and other government contractors, professional service companies that rely on close client contact (corporate law firms, private bankers), and exclusive consumer product companies (designer clothes, Rolls-Royces, and Ferraris). Product differentiation tends to be high: customers are resistant to standardization and elasticity of demand is low, reflecting customers' preference for specialty products. High-quality, low-volume production with lack of competition encourages craft-based production that is vertically integrated with little emphasis on economies of scale or experience.
- ***Traditional industrial markets*** are large, not heavily segmented, and feature modest rates of product innovation. Competition is a quest for the benefits of size - economies of scale and brand leadership - but rival products are close substitutes and market domination is seldom achieved. The typical strategy is based on cost leadership, brand awareness, and product variety (e.g., Unilever, General Motors, Toyota, General Electric, Citigroup).
- ***Schumpeterian markets***, driven by a "gale of creative destruction," are "hypercompetitive" in nature (see Chapter 3). Product innovation is the dominant form of competition, with established products continually displaced by new products. Imitation means that speed in exploiting new products is essential. Product innovation must be supported by the manufacturing and marketing capabilities required to move quickly down the experience curve. Semiconductors, telecommunications, computers, consumer electronics, financial derivatives, recorded music, and some fashion goods are Schumpeterian in character. Annual reductions in real unit costs in excess of 8 percent are common for these products.

Some industries may be hybrids: thus, in the personal computer industry, components such as keyboards and power supplies are traditional industries, other components such as microprocessors are Schumpeterian industries, while some applications software and customer support are craft-based, sheltered industries. These hybrids pose considerable difficulties for strategy and organization.

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