



Industry Structural Change

An earlier note developed the elements of industry structure which influence competitive relationships in an industry.¹ Industry structures change, however, both because of companies' strategic choices and for reasons largely outside companies' control. The purpose of this note is to examine the process of industry structural change with three objectives in mind: (1) to identify the important underlying forces causing industry structural change, (2) to understand the key relationships in the process of structural change, and (3) to develop some implications of structural change for overall company strategy. While short run fluctuations affecting an industry such as the business cycle can be important to strategy formulation, the focus here will be on long run changes.

Industry structural change creates risks for the firm, because it may redefine the competences required to compete successfully in the industry, may change the industry's competitive balance, and may require strategic adjustments by companies. Structural change can be a great equalizer. But industry structural change is also a major source of strategic opportunity for a company. If it can predict industry structural change and understanding the manner in which it will proceed, a company can both prepare to capitalize on change and even influence the way it occurs.

I. Forces Driving Industry Structural Change

While a variety of symptoms are associated with changes in industries, it is possible to identify a series of critical underlying forces which drive important industry structural change. From a strategy formulation viewpoint, understanding these forces is central to predicting change and dealing with it in a particular industry.

A. Long Run Change in the Growth Rate of Demand

Perhaps the most ubiquitous force causing structural change is change in the industry growth rate. There are five important reasons why long run growth rates change:

Demographic or Customer Position Trends:

In consumer goods, demographic changes affect the size of the buyer pool for the industry's product, and thereby the rate of growth in demand. A product satisfies a need for a particular customer group, which may be as broad as every household, but generally is differentiated by such

¹ Note on the Structural Analysis of Industries, 4-376-054.

This note was written by Assistant Professor Michael E. Porter as a basis for class discussion.

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factors as the age group of buyers, their income levels, education levels or geographic location. As the total growth rate of the population, its distribution by age group and income levels, etc. change, this translates directly into changes in the demand for particular products. A particularly vivid current example of this is the adverse effect of the declining U.S. birthrate on demand for baby products of all varieties, though products catering to the 25–35 age group are currently enjoying the effects of the post World War II baby boom.

A subcategory of demographic changes worth highlighting is the effect of so-called “income elasticity.” Income elasticity refers to the change in a buyer’s demand for a product as his/her income rises. For some products (mink club covers for golf clubs), demand tends to rise disproportionately with buyer income. For others it rises less than proportionally, or even falls! It is important from a strategic point of view to identify where an industry’s product lies in this spectrum, because this is critical to long run growth as general buyer income levels increase. Sometimes industries can shift their products up the scale of income elasticity through product innovation, so the effects of income elasticity are not a foregone conclusion for the perceptive firm.

For industrial products, the effect of demographic changes on demand is merely one step removed. Demographics affect consumer’s demand for end products, which filters back to affect the industries supplying inputs to the end product. The same analysis suggested in this section can be applied to the end product industries where an industrial products company’s output is sold to determine its long-run growth potential.

“Psychographic” Trends:

Demand for an industry’s product is affected by changes in the lifestyle and tastes of the buyer population, and any country tends to experience long run swings in such factors. For example, the late 1960’s and early 70’s in the U.S. saw shifts in such directions as: “back to nature,” more casual dress and lifestyle, nostalgia, and so on. Shifts like these not only increase demand for some consumer products and reduce it for others directly, but they affect the demand for industrial products through their affect on the industrial product’s customer industries. Long run shifts in style or taste not only affect total industry demand, but also the demand for particular types of products in the industry. The surge of demand for imported cars in the U.S. provides a well-known example.

Penetration of the Customer Group:

Most very high growth rates in the industry demand are associated with increasing penetration, or selling to new customers rather than to repeat customers. Eventually, it is a fact of life that an industry will have largely penetrated its potential customer group, and its growth rate then become determined by replacement demand. Sometimes renewed periods of adding new customers can be stimulated by major product or marketing changes, but all very high growth eventually comes to an end.

Once penetration is reached, the industry is selling primarily to buyers who have purchased the product before. There may well be major differences in selling to repeat rather than first time buyers which have important consequences for industry structure. The key to growth when selling to repeat buyers is stimulating their rapid replacement of the product or increasing their per capita consumption of the product. Since replacement is caused by physical, technological or design obsolescence as perceived by the buyer, strategies to maintain growth once penetration occurs will hinge on affecting these factors. For example, replacement demand for clothing is stimulated by annual and seasonal style changes. And the classic story of General Motors’ ascendancy over Ford was an example where model changes stimulated demand after market saturation for automobiles occurred.

Change in the Relative Position of Substitutes:

Demand for a product is affected by the cost and quality, broadly defined, of substitute products. If the cost of a substitute is falling, or its ability to satisfy the needs of the buyer of an industry's product improves, industry growth will be adversely affected, and vice versa. For example, security guards and electronic alarm systems are often substitute goods in providing protection against fire or theft of property. Guard services are highly labor intensive. Wage rates are rising, and the inherent labor intensity of guard services means that there is little opportunity for technological innovation to bring down the cost of guards. Electronic alarm systems, on the other hand, are rapidly improving in reliability and other performance characteristics, and innovation is reducing their cost. Thus the relative position of electronic systems is rapidly improving, and demand for guard services has been adversely affected. Another historical example is the inroads television and radio made on demand for live concerts of symphony orchestras and other performing groups.

In order to predict long-run change in the growth rate of its market, a firm must explicitly identify all the substitute products that can meet the needs which its product satisfies. Then technological and other trends which will affect the cost or quality of each of these substitutes should be charted. Comparing these with the analogous trends for the base industry will yield predictions about future industry growth rates. Such an analysis will also highlight the critical areas in which substitutes are gaining in relative terms, providing leads for strategic action.

It should be noted that pressures from substitutes are likely to be reflected in profitability as well as demand, as the industry price falls to meet new position. To some extent price (and profit) declines in the industry can stem the effects of substitutes on demand.

Changes in the Position of Complementary Products:

The effective cost and quality of many industries' products depends on the cost, quality and availability of complementary products, or products used with them. Therefore, as the cost, quality or availability of complementary products changes, demand growth in an industry will change. For example, in many areas of the U.S. mobile homes are primarily sited in mobile home parks. In the last decade, there has been a chronic shortage of mobile home parks which has limited demand for mobile homes. Similarly, demand for stereophonic records was strongly affected by the penetration of stereophonic audio equipment, which in turn was affected by the cost and reliability of this equipment.

Just as it is important to identify substitutes for an industry's product, it is important to comprehensively identify complements. Complementary products should be viewed broadly. For example, credit at some cost (interest rates) is a complementary product to durable goods purchases. Specialized personnel are a complementary product to many technically oriented goods (e.g., computer programmers to computers, pilots to corporate aircraft). Raw materials are in effect a complementary product to producers of fabricating *machinery*. And so on. Charting trends in cost, availability and the technological and marketing trends affecting quality of complementary products will yield predictions about long-run growth for an industry's product, and also the key areas for strategic attention.

B. Learning

Every industry inherently is undergoing a process of learning, or accumulation of knowledge and experience, which has the potential for leading to important changes in industry structure. Learning occurs in four important areas: buyer learning, learning about technology, learning about competitors and the "learning curve."

Buyer Learning:

Through repeat purchasing and experience gathered in using a product, buyers accumulate knowledge about it. Products have a tendency to become *more like commodities* over time, as

purchasing tends to be based on better information. Thus there is a natural force reducing product differentiation over time in an industry. For example, in the 1950's aerosol packaging first came into use in consumer goods. The package is an extremely important part of marketing many consumer goods, and often represents an important cost item to the marketing company. In the early years of aerosol packaging, consumer marketers were very unfamiliar with how to design aerosol packaging applications, how aerosol containers were filled, and with how to best market aerosols. A contract aerosol filling industry sprang up to assemble and fill aerosol packages, and the contract filling industry also played a major role in assisting consumer marketing consumers find new aerosol applications, solve production problems, etc. Over time, however, consumer marketing companies learned about aerosols, and began developing their own applications, marketing programs, etc. The contract fillers found it increasingly difficult to differentiate their services, and their role became increasingly one of supplying aerosol containers which were essentially a commodity. As a result, contract fillers' profit margins were severely squeezed and many fillers left the industry.

Buyer learning tends to occur at different rates for different products, depending on how important the purchase of the product is to the buyer, the buyer's technical expertise, and so on. "Smart" or interested (because it is an important product) buyers learn faster.

Technological or marketing innovation is the primary offsetting force to buyer learning. Changes in the product or the technology by which it is used offset past buyer experience, and tend to increase the opportunities for continued product differentiation. Developing strategies for dealing with the tendency for the product to become more like a commodity is a major area for strategic attention in many industries. If offsetting strategies cannot be found, future profit potential in the industry is adversely affected.

Learning About Technology:

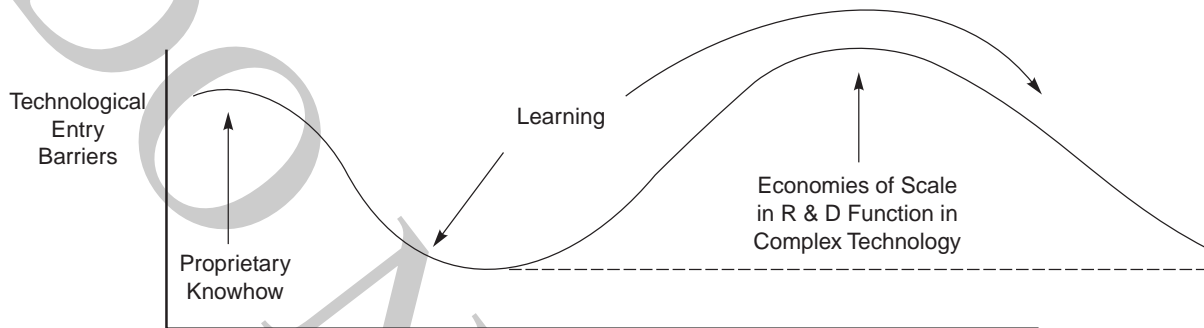
Technologies tend to get less propriety. Over time, a technology becomes more established and knowledge about it more widespread. Similarly, specialized personnel who are expert in the technology invariably become more numerous. While some firms in an industry may have a headstart in the technological dimension, there is a tendency to think no one else will learn—this is rarely true in practice.

Technological learning has a number of important implications for industry structure. First, any entry barriers built on knowledge of propriety or specialized technology tend to decrease over time. Second, any entry barriers due to shortages of qualified specialized personnel fall as well. These factors make it easier for new competitors to spring up, and they make it easier for established competitors to invade heretofore safe territory, and they make it easier for suppliers or customers to vertically integrate into the industry. (There are some offsetting tendencies for increasing industry and firm size to increase entry barriers that will be described below.)

Returning to the aerosol example discussed above, over time the new aerosol technology became better and better known. Since the production volume to achieve efficient scale in aerosol packaging was relatively low, many large consumer marketing companies could support their own captive filling operations. As knowledge about the technology and specialized personnel became more common, many large consumer marketing companies vertically integrated into aerosol filling or could threaten to do so. This left the contract filler in either the role of meeting emergency demand, or in a very adverse bargaining situation. The response of many contract fillers to this development was to invest in improving filling technology, and to invent new aerosol applications to once again establish their technological advantage. This proved to be difficult to do, and the contract fillers' position weakened.

Depending on the industry there may be some offsetting factors to technological change. While technological entry barriers will initially fall, if the industry is one where the technology is complex (e.g., electronics) the research and development function tends to get increasingly

specialized, focusing on small improvements to the product or process and expanding of an ever increasing body of specialized knowledge. If technological development continues, over time it may get harder and harder for small firms and new entrants to play the game. Economies of scale in the research function and the investment a new firm has to make to do catch-up learning get larger leading to higher R&D barriers to entry.² Once technological advancement possibilities are exhausted in the industry, these barriers will rapidly fall. Thus entry barriers due to technology exhibit the following pattern:



In the aerosol example discussed above, the nature of the technology did not allow the secondary increase in entry barriers.

From a strategic point of view, the diffusion of knowledge about technology means that maintaining position requires either that (1) existing knowhow and specialized personnel must be protected, which is very difficult to do in practice,³(2) technological development must occur to maintain the lead or, (3) strategic position must be shored up in other areas. In industries with complex technology, the economies of scale and catch-up barriers erected by specialized in-house research can sometimes be turned into an advantage for industry leaders. Planning for the defense of strategic position against technological learning takes on high priority where the firm's existing position is heavily dependent on technological barriers.

Learning About Competitors:

As an industry matures, it usually becomes easier to understand and predict competitors' strategic moves and their responses to disturbances from outside the industry. For example, after several business cycles it is generally possible to discern how a rival will react to a downturn of demand. On average, data on market share patterns in a wide variety of industries show that the instability of market shares declines with the age of the industry, reflecting companies greater understanding of each other which reduces the likelihood of competitive warfare.⁴ Thus as an industry develops over time, the patterns of rivalry among competitors may generally change.

The significance of this learning for strategy is in reducing some of the uncertainty of strategic moves. It is less likely, over time, that competitors will make "irrational" responses to strategic moves and behave in ways that make the entire industry worse off. Often one hears managers refer to this learning in terms like: "Our competitors have matured," "the industry used to make its own problems." It should be pointed out that this learning is a two way street, since competitors have

² For a discussion of this tendency, see Dennis Mueller and John Tilton, "Research and Development Costs as a Barrier to Entry," *Canadian Journal of Economics*, November 1969.

³ Some firms have successfully done this through defensive innovation and patenting. If the firm can discover and patent the best alternative technologies as well as the one they use, the difficulty of the entrant is greatly increased. Such strategies have been followed by Bulova with the accutron watch, and Xerox with xerography.

⁴ R.E. Caves and Michael Porter, "Market Structure, Oligopoly and the Stability of Market Shares," Discussion Paper, Harvard University, 1976.

learned about the company's own response patterns and tendencies. It is wise to plan strategic moves *with a view towards whether* this learning is to be encouraged or discouraged. In some instances, especially when a company is attempting a major change in its strategic position, deviation from the historical pattern of response in highly visible areas may send signals to competitors earlier than would be desirable. The firm may reap benefits through carefully managing its image with competitors to facilitate its strategic plans.

The "Learning Curve":

In some industries, especially those with intricate assembly operations and those that are labor intensive, the well known learning curve tends to lower unit costs over time as more and more experience is gained in performing and managing the production process. Since the learning curve is dependent on the cumulative volume a firm has produced, the firms producing greater output tend to enjoy cost declines sooner and the relative costs of firms in the industry can spread out in a predictable way as the industry matures.⁵ Thus the strategic position of firms in the industry changes over time in predictable ways.

The significance of the learning curve for industry competition is dependent on whether or not some firms can establish significant leads over others. For this to occur, the firms that are "behind" must be unable to catch up through copying the methods of the leaders, buying the new and more efficient machinery that the leaders have pioneered, and so on. If firms that are behind can "leapfrog," and the leaders have to bear the expense and losses of introducing the new methods and equipment, the learning curve may have the reverse effect on industry structure. This is coupled with the tendency of technological advantages to diffuse as discussed above.

Companies in industries subject to significant learning curves must chart its effects on the competitive dynamics in the industry. Pricing in anticipation of learning curve cost declines may make it extremely difficult for followers to catch up, or for new firms to enter the industry. If the firm is a follower, it must prepare strategically for either rapid imitation or to build offsetting strategic advantages in other areas. One important way in which the learning curve is offset is through technological or product innovation which changes production methods and nullifies past learning, putting the industry on a new learning curve. Market segmentation and other product differentiation efforts can also hurt the leader seeking minimum costs through a standardized product.

C. Increasing Market and Firm Size

By definition, as long as an industry is growing at some rate its total size is increasing. This increase in market size is usually accompanied by increases in the absolute size of the leading firms in the industry. Increasing industry and firm size has a number of implications for industry structure. First, increasing size tends to widen the set of available strategies in ways that often increase economies of scale and capital requirements. For example, increasing size may allow substitution of labor for capital, and the adoption of production methods subject to greater economies of scale. Not only does increasing market size allow existing competitors to adopt new strategies affecting industry structure, but it also can make it feasible for an outsider to "buy into" the industry with such a strategy.

The way increasing size operates on an industry is illustrated by light aircraft. In the light aircraft industry, increasing market size and the resulting increases in the size of Cessna (the industry leader) has allowed Cessna to shift its production process from job shop to quasi-mass production. This has resulted in a cost advantage for Cessna as economies of scale in mass production became feasible, and thus Cessna enjoys at least a temporary structural advantage. Once the big 3 competitors

⁵ Technically, it depends on when the larger firms started producing. But since large firms learn faster, they will eventually catch up in any event.

in the industry reach the size to begin more capital intensive mass production, barriers to entry into the industry will increase markedly.

Another consequence of increasing market and company size is that strategies of vertical integration tend to become more feasible, and should be expected as strategic moves. As it grows, a company starting out as an assembler can begin to manufacture more and more of its component parts. Such increased vertical integration tends to elevate barriers to entry into the industry, since it usually elevates economics of scale and raises requirements for entry capital.

Increasing market size means that suppliers to the industry are selling larger volumes, and customers as a group are purchasing larger quantities. To the extent that *individual* suppliers or customers are increasing their sales or purchases, there may be important consequences for industry structure. On the supplier side, increasing volume may provide a temptation for forward integration into the industry. On the customer side, larger total purchases by individual customers may tempt them to integrate backwards, and it will surely make them harder bargainers. The firm in a growing industry needs to expect and prepare for changes in supplier and customer relationships.

The potential for both changes in methods and increased vertical integration to change industry structure applies not only to manufacturing but to distribution, marketing, research and development and any other aspect of the firm's business. Increasing size may allow in-house servicing of products, captive distribution channels, specialized research and development laboratories and any number of other changes in methods which increase economies of scale in the industry, or raise the capital resources required to compete effectively.

The significance of these effects of increasing industry size for strategy may be great, especially for the follower firms in the industry who may be unable to achieve the volume necessary for reaping scale economies by adopting new methods or vertical integration. Any firm must prepare for such size-motivated changes to insure that it can make an orderly and rapid transition to new methods. Industry leaders can extend their strategic advantage by designing a strategy to *reinforce* their cost advantages—push for product standardization, extend the advantages of economies of scale to other areas besides production such as marketing and distribution methods, and so on. Follower firms may have to redesign corporate strategies to develop competences to offset the industry leaders' lower costs or other advantages gained by methods substitution and vertical integration. New product development, increasing market segmentation, increasing service and other strategies to raise product differentiation are likely candidates to reduce the importance of cost to follower firms.

Market Size and Entry:

In combination with the effects noted above, there may be an offsetting tendency in some industries for increasing size to attract new entrants. New entrants can make it tougher for existing leaders particularly if the entrants are large, well qualified ones. Many large firms will enter a market only after it has reached a significant absolute size (to justify the fixed costs of entry), even though they have been very likely potential entrants right from the start as a result of skills or assets they bring from their existing operations. As an industry grows, different kinds of entrants tend to be attracted. For example, in the recreational vehicle industry the initial entrants were new firms started from scratch, and relatively small mobile home producers whose production process was very similar to that of recreational vehicles. As the industry reached large absolute size, large farm equipment and automotive companies began to enter. These larger firms, with ample resources for competing in recreational vehicles drawn from their automotive operations, left it to the smaller firms to develop the market and prove that a significant market existed before they entered.

As discussed in the Note on Structural Analysis, by examining the entry barriers into its industry the firm can identify who are the most likely entrants into it—firms with skills or resources drawn from their existing businesses allowing them to overcome some of these entry barriers. This discussion of the effect of increasing market size on the character of potential entrants adds another

dimension to that analysis by suggesting that differing groups of these potential entrants are the bigger threats at different points in the industry's development. Other things being equal, it is best to avoid industries where a lot of companies operating in other industries have experience or skills appropriate for entry.

D. Innovations Which Change Structural Elements

A major source of industry structural change is innovations from both inside and outside the industry which affect the elements of the industry's structure.⁶ New technological developments can create cost advantages due to knowhow or patents, and/or can elevate (or reduce) economies of scale and capital requirements for entry. Product or marketing innovations may enhance (or reduce) the possibilities for product differentiation, and alter the difficulty of gaining access to distribution channels. And so on. Every company in an industry must be sensitive to innovations which importantly change industry structural elements, for it is these that carry the heaviest weight in altering competitive relationships.

Some innovations are developed within the industry, and provide temporary if not lasting structural advantages for their originating firms. A frequent source of innovation that is overlooked, however, is from outside the industry. Research has shown that a large proportion of truly revolutionary innovations come from outside sources.⁷ For example, in the 1950's the invention of fiberglass construction greatly reduced the difficulty of designing and building pleasure boats. This reduction in entry barriers triggered the entry of a large number of new companies into the industry with disastrous consequences for profits, many failing between 1960 and 1962 as the industry underwent a shakeout. Fabricating machinery suppliers were a major source of innovations which expanded the use of aluminum fabrications that benefited the aluminum industry. In the metal container industry, steel companies expended substantial resources aiding in defending the steel can against the inroads of the aluminum can.

Since innovations coming from outside the industry are not inherently proprietary to a competitor, the way in which the innovations are introduced into the industry is critical, but more importantly, subject to *influence*. A forward looking competitor can sometimes turn outside innovations into proprietary advantage for it, and in any case should try to influence the way the innovation is introduced to provide maximum benefit (or minimum harm) to its position. The possibility of gaining technological assistance and innovations from outside the industry can be a major strategic variable for smaller firms at a disadvantage due to economies of scale or heavy capital requirements in in-house research and development. Industry leaders must be extremely sensitive to innovations from outside the industry as well. Case example after case example has been documented where large firms turned down innovations developed by outside inventors which were later adopted by small firms and revolutionized the industry.⁸ The reasons seem to be the organizational bias of company R&D departments against ideas invented elsewhere, and a shortsighted desire to protect existing investment. From a strategy formulation viewpoint, such biases carry important implications and large firms with formal R & D programs must be careful to guard against them.

E. Changes in the Cost of Inputs

⁶ Innovations, of course, can also affect complementary products, substitute products and adjacent industries in ways important to competitive relationships in the industry. Here the focus is on innovation that affects the industry's own structure.

⁷ See Daniel Hamburg, "Invention in the Industrial Research Laboratory," *Journal of Political Economy*, April 1963.

⁸ For example, see J. E. Enos, *Petroleum Progress and Profits*, Cambridge, 1962 and E. Mansfield, *The Economics of Technological Change*, Norton, New York, 1968.

Every industry uses a variety of inputs to its production and distribution process. Changes in the cost or quality of these inputs can affect industry structure. The important classes of input costs subject to change are as follows:

- wage rates (encompassing the full costs of labor)
- material costs
- cost of capital
- communication costs (including media)
- transportation costs

Changes in wage rates or capital costs may change the shape of the industry's cost curve, reducing or increasing economies of scale, or promoting substitution of capital for labor. As labor costs rise, it is almost inevitable that firms will attempt to automate and raise economies of scale and capital requirements in the process. This has been going on for decades in the watch industry, where labor costs have historically been a major part of total costs.

Changes in the cost of communication or transportation can promote reorganization of production which affects entry barriers. Communication costs changes may lead to use of different cost-effective selling media (and changes in the level of product differentiation), changed distribution arrangements, etc. In addition, changes in transportation costs can change geographic market boundaries. This either increases or decreases the effective number of competitors in the industry.

In some cases, changes in input costs have asymmetrical effects within the industry. For example, wage rates can rise for large firms but not for smaller firms. Another common example is changes in relative wage rates in different countries where world industry competitors are based. Such asymmetrical changes give rise to different strategic responses and changes in relative positions of firms in the market, which carry important implications for strategy.

F. Changes in the Structure of Adjacent Industries

Since the structure of suppliers' industries and customers' industries affects the bargaining power of these adjacent groups with an industry, changes in the structure of adjacent industries have important consequences for industry evolution. If an adjacent industry increases in concentration, its threat of vertical integration into the home industry becomes more credible, its product becomes a more important input to the home industry's production process, and so on, its bargaining power increases and the strategy of firms in the home industry may have to adjust (and vice versa). For example, there has been substantial chain store development in the retailing of clothing and hardware in the 1960's and 1970's. As the structure of retailing has become concentrated, the retailers' bargaining power with their supplying industries has increased. Marketing and promotion strategies have had to adjust. The mass merchandising revolution in retailing generally has had similar effects on many other industries. (watches, small appliances, toiletries, etc.)

While broad changes in the concentration or vertical integration of adjacent industries attract the most attention, more subtle change in the ways in which competition occurs within the adjacent industries can often be just as important. For example, in the 1950's and early 1960's record retailers dropped the policy of allowing consumers to play records in the store. The effects of this on the adjacent recording industry proved to be profound. Since the consumer could no longer sample records in the store, what the radio stations played came to be critical to record sales. Radio stations were shifting to the "Top 40" format of repeatedly playing only the leading songs during this period, and it became extremely difficult to get a new unproven record aired on the radio. This change in retailing created a powerful new player for the recording industry—radio stations—which changed the strategic requirements for success. It also forced the recording industry to start purchasing advertising time for new record releases on radio stations, as the only sure way to assure that stations played new recordings.

The importance of changes in the structure of adjacent industries points to the need to diagnose and prepare for structural evolution in supplying and buying industries, just as it is in the home industry itself. The same range of factors as discussed in this Note apply to predicting change to these adjacent industries as well.

G. Governmental and Social Influences

Shifts in social attitudes and norms can have an impact on industries (and some have been discussed above), but the governmental influences on industries that result from them usually have the most significant and tangible impact on industry structure. While increases in the scope of regulation were modest in the 1950's and early 1960's, the last decade has seen a major new impetus for regulation in the U.S. and in some cases abroad. Regulation, then, is an issue that is very much alive.

The most direct governmental influence on industry structure is through full blown government regulation of such key variables as entry into the industry, competitive practices or profitability. For example, pending national health insurance legislation with cost-plus reimbursement will fundamentally affect profit potential in the proprietary hospital and clinical laboratory industries. Requirements for licensing, an intermediate form of government regulation, tend to restrict entry and thereby provide an entry barrier for existing firms.

Less direct forms of governmental influence on the industry structure occur through the regulation of product quality and safety, environmental quality and tariff or foreign investment policy. The effect of many product quality and environmental regulations on an industry is to raise capital requirements, elevate economies of scale through imposing research and testing requirements, and otherwise worsen the position of smaller firms in an industry and raising barriers to the entry of new firms.

A good example of the impact of product quality regulation is in the security guard industry. There, criticism has mounted over the lack of training that guard companies give their guards in the use of weapons, arrest techniques, etc. Legislation to require mandatory training of a specified duration is on the horizon. While such a requirement will be easy to meet for the larger guard companies, many smaller companies may be severely hurt by the increased overhead and the need to compete for higher skilled employees that result. In the area of environmental regulation, expensive equipment required to meet pollution control requirements has also driven smaller firms, lacking capital resources, out of some industries. Environmental requirements may also force changes in the technology an industry utilizes or the geographic location of production operations, both of which can affect industry structural features.

There is usually some lead time in the introduction of government regulatory changes. The firm must constantly monitor trends in governmental influence on the industry, and analyze the structural impact of the range of possible government options under consideration. It is then in a position to attempt to influence regulation to minimize the adverse structural consequences, and to prepare strategically for the regulatory changes that are a real possibility. Depending on an individual company's position, it may actually want to support regulation in some cases.

H. Entry of Established Firms from Other Markets

The entry into an industry (by either acquisition or internal development) of an established firm operating in other industries or in another national market is often a major driving force for industry structural change. As was touched on earlier, industry size may play a role in when such entry occurs. Established firms from other markets generally have a set of skills or resources that can

be applied to competition in the new industry; in fact this often provides a major motivation for their entry choice. Such skills and resources are very often different from those of existing firms in the industry, and their application in many cases changes the structure of the industry.

An example will serve to illustrate. In 1960, the U.S. wine industry was composed primarily of small family firms producing premium wines and selling them in regional markets. There was little advertising or promotion activity, few firms had national distribution, and the focus of most firms in the industry was clearly on the production of fine wines.⁹ Profits in the industry were modest. In the mid-1960's, however, a number of large consumer marketing companies (e.g., Heublein, United Brands) either entered the industry through internal development or purchased existing wine producers. They began investing heavily in consumer advertising and promotion for both low cost and premium brands. Since several of these firms had national distribution through liquor stores because they produced other alcoholic beverages, they rapidly expanded distribution for their brands nationally. Frequent introduction of new brand names became the rule in the industry, and many new brands were introduced at the low end of the quality spectrum which old-line companies had generally downplayed while they developed a name for U.S. wines. The profitability of the industry leaders was excellent. Thus the entry of a different type of firm into the U.S. wine industry has caused or at least speeded up a significant structural change in the industry, and one which the early family-controlled participants in the industry had neither the skills, the resources, nor the orientation to cause themselves.

The impact that established firms from other industries can have on industry structure carries with it some important principles for diversification strategy, which will be discussed below. For existing firms in an industry, entry of an established firm from another industry should be a signal that pressures for structural change may occur; and it is usually possible to predict what kind of structural changes they will be from the identity and past behavior of the entering firm or firms. These pressures for change need to be prepared for, and can provide a strategic opportunity for existing firms if such preparation occurs.

While the focus thus far has been on established firms from other industries, the entry into the domestic market of foreign firms already in the industry elsewhere also can have major industry structural repercussions. This is because the industry competitive norms may be very different in foreign markets, and strategic approaches may be very different as well. Thus foreign entry is an important signal for strategic attention just like entry of an established firm from another industry is.

The Forces Causing Structural Change and Strategic Planning

Each of these forces driving industry structural change should be translated into a key strategic question for a company. For example, the potential impact of governmental forces on an industry's structure means that the company must ask itself, "are there any governmental actions on the horizon that may influence some element of the structure of my industry? If so, what does the change do for my relative strategic position, and how can I prepare to deal with it effectively now?" A similar question can and should be formulated for each of the forces discussed above. The set of questions that result should be asked on a repeated basis, perhaps even formally through a strategic planning process.

Furthermore, each of the forces causing industry structural change identifies a key strategic *signal*, or piece of key strategic information, which the firm must constantly scan its environment for. The entry of an established firm from another industry, a key development affecting a substitute product, and so on, should cause a red light to go on in the minds of executives charged with maintaining the strategic health of a business. This red light should trigger a chain of analysis to predict the significance of the change for the industry, and the appropriate response.

⁹ The only important exception was Gallo, which as a result was later to play a major role in the industry.

Finally, the effects of learning and increasing market size discussed above mean that structural change will tend to occur even if there are no important “events” to signal it. This implies that regular attention should be given to looking for the structural changes that may result from learning and from increasing market size. Because the effects of these forces appear more subtly than the others since there is no discrete event, a regular review of the issues they raise in the strategic planning process may be indicated.

II. Key Relationships in Industry Change

In the context of the forces described above, *how* do industries change? They do not change in a piecemeal fashion, because an industry’s structure is a system of interrelated factors. Change in one element of an industry’s structure tends to set off changes in other areas. This section will examine some of the key relationships in industry change, which reflect these linkages.

The Question of Industry Consolidation

It seems to be an accepted rule of competition to many that industries tend to consolidate (or increase in concentration) over time. As a general statement, this is simply not true because historically some industries have increased in concentration, others decreased and others have not changed much as they mature. For example, in a broad sample of 151 4-digit manufacturing industries, 69 increased in four-firm concentration more than 2 points from 1963–1972, while 52 decreased more than 2 points over the same period.

The question of whether consolidation will occur in an industry raises perhaps the most important interrelationship among elements of industry structure—the relation among interfirm rivalry, entry barriers, and exit barriers.

Industry concentration and entry barriers move together. If entry barriers are high or especially if they increase, concentration in the industry almost always increases over time (e.g., consolidation occurs). The process works in the following way. If entry barriers increase, the factors that increased them tend to give some firms in the industry advantages over others. An increase in economies of scale, for example, helps the larger firms relative to the smaller ones. The larger firms will tend to gain even more market share and the disadvantaged firms tend to drop out of the market. Even if there are no such relative strategic shifts from external causes, the natural competitive processes in the industry will tend to lead to some firms losing out over others. With entry barriers increased, new firms are less likely to move in to take the place of losers, and concentration will tend to increase.

For example, concentration has increased in the U.S. wine industry. In the standard quality segment of the market which represents much of the volume, the strategic changes described earlier in this Note have greatly increased barriers to entry (high advertising, national distribution, rapid brand innovation, etc.). As a result, the larger firms have gotten further ahead, and few new firms have come in to challenge them.

If entry barriers into an industry do not increase but are merely high, consolidation may also occur if it already has not. For example, an industry with high entry barriers may not be very concentrated if it has been growing very rapidly. Rapid growth tends to keep inefficient firms in the industry performing satisfactorily. If growth slows down, the high entry barriers will take their toll and consolidation is more than likely to occur. As will be described below, this is not the case where entry barriers are less significant.

Consolidation will not occur if entry barriers are low or fall. With low entry barriers, unsuccessful firms which exit will be replaced by new firms. If a wave of exit has occurred because of an economic downturn or some other general adversity, there may be a temporary increase in industry concentration. But at the first signs that profits and sales in the industry are picking up, new entrants

or reorganized old firms will usually erase this gain. In industries where there is strong rivalry among firms and low entry barriers, then, there tends to be a lot of turmoil and movement in and out of the industry but little change in concentration.

If entry barriers fall, new firms tend to get attracted to the industry and concentration actually falls in many cases.

The presence of high exit barriers tends to keep consolidation from occurring no matter what entry barriers are. Exit barriers keep companies operating in an industry even though they are earning subnormal returns on investment.¹⁰ Thus exit barriers work against consolidation. Even in an industry with relatively high entry barriers, the leading firms cannot count on reaping the benefits of consolidation if high exit barriers hold unsuccessful firms in the market and make it in their interests to fight for incremental volume.

Leveling growth increases rivalry in an industry, but whether this means consolidation will occur depends on entry barriers. Tougher rivalry in a slower growing industry tends to drive out marginal and poorly situated firms. If entry barriers are high and rising, this will probably mean that the industry will consolidate as discussed above. However, if entry barriers in the industry are low, new entrants will tend to take the place of departed firms and consolidation will probably be slight. Temporary consolidation may occur, but as reduction in the number of competitors tends to improve the profitability of those that are left, new firms will enter.

The future profit potential of an industry after its growth levels off, once the adjustment period to slower growth is over, will depend on whether entry barriers remain high or increase, and the forces of rivalry can be controlled.

In the period of very rapid growth early in the life of an industry (especially after initial product acceptance has been achieved), profit levels are usually high. For example, growth in skiing equipment sales were in excess of 20 percent per year in the late 1960's, and nearly all firms in the industry enjoyed good financial results. When growth levels off in an industry, usually after initial penetration of the potential buyer group has been achieved, there is a period of turmoil as stiffening rivalry weeds out the weaker firms. All firms in the industry may suffer financially during this adjustment period. Whether or not the remaining firms will enjoy above average profitability will depend on the level of entry barriers, as well as the other structural features of the industry influencing the strength of competitive forces. If entry barriers are high or have increased as the industry has matured, the remaining firms in the industry may enjoy healthy financial results even in the new era of slower growth. If entry barriers are low, however, slower growth probably means the end of above-average profits for the industry. Thus mature industries may or may not be as profitable as developing industries.

Forget the Product Life Cycle and Look at the Fundamentals:

Perhaps because it is a shorthand and seductively simple way of referring to industry evolution, the product life cycle concept has become the primary "theory" of how industries change. With it goes the familiar S-curve relationship of industry sales, and a number of other assumptions about competitive relationships as an industry moves through the cycle. Some of these are that consolidation will occur as the industry moves from growth to maturity, that profits will be hurt in the maturing process ("mature products are bad products"), and so on.

A number of recent works on marketing have discounted the relevance of the product life cycle as a general description of the way products behave, and point to it as an unfortunate self-

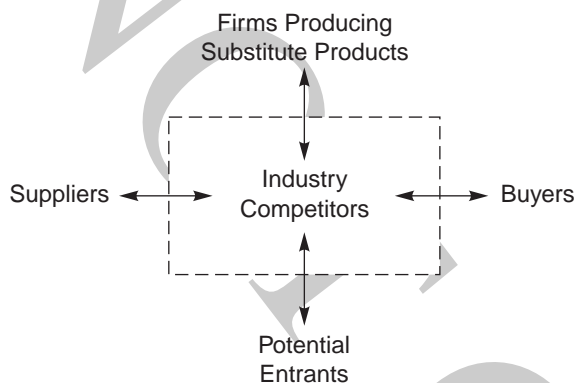
¹⁰ See M. E. Porter, "Please Note Location of Nearest Exit: Exit Barriers and Strategic and Organizational Planning," Harvard Graduate School of Business Administration, Working Paper, revised August 1976.

fulfilling prophesy which leads companies to abandon products and industries where real potential lies. The discussion above clearly supports this skeptical view of the life cycle idea. The fundamental forces that cause industries to change, and the key relationships in the change process are those that have been described. The S-curve, if it occurs, is a result of penetration and then saturation of the buyer group, coupled with the lack of innovations or changes in the size of the buyer group which would stimulate further sales increases. Such innovations do occur in many industries (e.g., Johnson's Baby Shampoo). Whether consolidation will occur depends on the industry, and its underlying structure. Whether maturity will hurt profitability also varies from industry to industry.

The product life cycle as a shorthand way to describing industry change is best forgotten. It can produce nothing but confusion about the path industry structural change is likely to take, and the consequences of that change for industry competition. The focus in diagnosing industry structural evaluation should be on the fundamentals.

Change in Industry Definition

Structural change of an industry is often accompanied by changes in the definition of what the appropriate industry is, and it is important to be alert to this. The appropriate definition of an industry is a judgment about the placement of the following boundaries:



All these groups “compete” with firms in the industry in one sense, and recognizing this makes the choice of just which competitors are in the industry and which are not somewhat arbitrary and a matter of degree. Whatever industry boundaries have been identified, however, industry structural change has a strong tendency to promote shifts in them.

Innovations in the industry or with respect to substitute products may effectively widen the industry by placing more firms into direct competition. Relative reduction in transportation cost, for example, has made timber supply a world market rather than one restricted to continents. Innovations increasing the reliability and lowering the cost of electronic surveillance devices have put them into effective competition with security guard services. Structural changes making it easier for suppliers to integrate forward into the industry may well mean that suppliers effectively become competitors. Part of the analysis of the strategic significance of industry structural changes is clearly an analysis of how industry boundaries have been affected.

The Question of Bounds for Industry Change

Are there any bounds on how much industries can change, or can structural evolution make any industry like another? The broad answer is that there are some bounds within which industry change occurs. Each product carries with it a basic technology, and has a set of inherent characteristics which place some limits on its cost, approximate size and shape, the uses it can be put to, and so on. On this very fundamental level, these factors place some limits on the configuration the

production and distribution process can take in the industry, the way the product can be differentiated, etc. But the boundaries are not narrow, and an industry can evolve in different ways depending on the patterns innovation takes, the type of firms that choose to enter it and a wide variety of other factors.

Yet in the long run, industries do seem to evolve in ways that are to some degree predictable. Concentration ratios in similar industries in different countries tend to be quite similar. While this is not an unbiased test since innovations cross national boundaries and conduct patterns adopted in industries in one country affect companion industries in others, it does reflect the way in which underlying technological and product characteristics may lead to a predictable structural outcome. This does not mean that predicting industry structural change is easy, however, since every industry has its own unique underlying structure. Predicting the form and consequences of the way this structure will evolve will remain a creative and judgmental task.

III. Strategy Formulation in Evolving Industries

While strategy formulation with respect to changing industries requires an analytical process unique to each industry situation, there are a few simple concepts which can serve as a useful context to this process. It should be strongly emphasized that these are no substitute for examining the forces and relationships described above, and assessing the appropriate preparation and response for the individual company. Rather, they may aid in thinking about these responses.

Influence Industry Structure in Favorable Directions if Possible:

Industry structural change can be influenced by firms' strategic behavior. In the context of an understanding of the significance of structural change for its position, the firm should seek to influence industry change in ways favorable to it. This may occur through the way it reacts to strategic changes of competitors, or in the strategic changes it initiates.

Another way a company can influence structural change is to be very sensitive to external forces which can cause the industry to evolve. With a head start, it is often possible to direct such external forces in ways appropriate to the firms' position. For example, the specific form of regulatory changes can be influenced. The diffusion of innovations coming from outside the industry can be altered by the form that agreements with innovating firms take. Positive action can be initiated to improve the cost or supply of complementary products through providing direct assistance, aid in forming trade associations or help in stating their case to the government. And so on for the other important forces causing structural change.

Industry change should not be greeted as a *fait accompli*, to be reacted to, but as an opportunity. Scrutinizing the potential of each and every force described above to improve the firm's position, and the actions which might promote this, will yield substantial strategic payoffs in many industries.

Do Not Necessarily Enter Early, But Enter Industries Before Entry Barriers Reach Their Peak:

In many industries, entry barriers tend to rise as the industry matures. As a generalization, with all the qualifications one must attach to same, it is best to enter the industry with entry barriers at their *mid point*. It generally costs less to enter relatively early in an industry's evolution. The best industries to enter are ones with currently low barriers, but barriers that are rising to high levels or ones that can be influenced upward through strategic choices. On the other hand, entering an industry in its formative period forces a company to bear the costs of market development, and the turmoil and instability that often accompany an industry full of new participants feeling around for some stable state.

Thus as a rule of thumb, it is generally best to enter someplace in the “middle” of an industry’s development. Where the product differentiation or technological lead gained by being first in the industry is very high, clearly it may be optimal to get in very early and bear the market development costs. Such a strategy should be the result of careful analysis, however.

A good example of a “middle” entry strategy was the entry of the large liquor manufacturers into the wine industry, which has been discussed above. None of these firms entered the industry during the relatively long period where U.S. wine producers were struggling to define an identity for U.S. wines, to sell the consumer on their equality with European varieties and to achieve that equality through grape growing and production techniques. Rather, they entered during a period when entry barriers were still low, and proceeded to drive them up through introducing advertising, national distribution, product innovation and so on.

Enter Industries Where Your Company Resources Allow You to Vault Entry Barriers or Build Them Up:

Closely related to the point discussed above, a company’s strategic advantage is maximized when it enters an industry where its resources and skills derived from other markets allow it to overcome entry barriers more cheaply than other firms. It also pays to enter an industry where the company’s resources allow it to adopt strategies which raise entry barriers for other new firms at very low cost to it. For example, in the early 1970’s General Motors and International Harvester entered the recreational vehicle industry, which had enjoyed booming sales growth during the preceding decade. The industry was then populated by a number of medium sized companies, engaged primarily in vehicle assembly only and selling through fragmented and independent dealer networks. Entry barriers into the industry were very low. However, the new entrant firms were able to accentuate a number of industry trends that had been occurring. One was a trend toward increased vertical integration in manufacturing, which increased capital requirements and economies of scale. Another was the use of nationwide sales promotion. Perhaps the most critical, however, was the use of exclusive dealers who had the capability to perform in-house service of both the vehicle frames and the chassis and engines. Since General Motors and International Harvester had manufacturing operations and dealer networks derived from their other markets, the cost of adopting strategies along these lines was very low to them, though it was enormous for many of the firms then in the recreational vehicle industry. Entry barriers into recreational vehicles were increasing already, but these two major new firms greatly accelerated their upward trajectory.

It should be noted, however, that building entry barriers often increases risks by raising exit barriers as well. Thus a strategy of pushing up barriers must proceed with caution.

Expect to Change Strategy as the Industry Evolves:

Early in an industry’s development, many strategies appear to work. Rapid growth often masks poorly chosen strategies, which are hard to distinguish from good ones by financial criteria alone. As an industry matures, however, strategic sloppiness tends to become exposed. The range of successful strategies tends to narrow, under the pressures of slower growth and increasing buyer sophistication. Not only do sloppy early strategies tend to get exposed, but often the skills required to compete in an industry change as its structure evolves. The forces described above all imply that the name of the game in the industry changes as its structure evolves. It is surprising, rather than to be expected, that the strategy serving the company well early in an industry’s structural evolution will serve it well later.

In some industries, evolution leads to increasing market segmentation and more rather than less variation in the strategies adopted by industry participants. This has been the case, for example, in the mechanical writing instrument industry where new products and new markets have given rise to a variety of specialists and broad line firms. Even in such industries, however, the same general principle holds—namely a company should be prepared to change its strategy as the industry

evolves. Those mechanical writing industry firms that were slow to change, such as Waterman and Scripto, have paid a heavy price in strategic and financial terms.

Avoid Vertical Integration Early in an Industry's Development:

Vertical integration generally exposes a company to risks of technological obsolescence, to the possibility that its heavy investment in the product chain will be crippled by product innovation and by the greater operating leverage and consequent vulnerability to economic fluctuations that are generally associated with vertical integration. It is generally preferable, given the forces described earlier causing industries to change, to increase vertical integration gradually over time. It is often tempting to build up integration early, when financial results may be good due to rapid growth and enthusiasm runs high. Yet doing so may create insurmountable difficulties in adjustment, and may be punishing if the industry goes through a shake-out phase following its early rapid growth period.

Over Time Industries Tend to Develop "Conventional Wisdoms" About Competition in Them, Which Can Provide a Strategic Opportunity for the Firm That Can See the Fundamentals:

Time and experience in an industry often lead to the development of accepted truths about the best way to compete in the industry. This "conventional wisdom" usually builds slowly and invisibly, and becomes the shorthand way of thinking about strategic problems in the industry rather than relying on fresh analysis. For example, in the light aircraft industry all the leading firms seemed to believe that a full line was necessary for success, and that the buyer traded up within a line. They all adopted full-line strategies which resulted in mediocre performance for the weaker firms. A new firm entering the industry became very successful by picking a specific target segment.

Since industries change, today's conventional wisdom is tomorrow's strategic blinder. Companies must challenge their key assumption about the industry as its structure evolves. Innovative firms can take advantage of such a scrutiny of the fundamentals to reap the benefits of others' adherence to conventional wisdoms.