Designing Global Strategies: Comparative and Competitive Value-Added Chains

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This article, the first of a two-part series, shows how the value-added chain can be used to analyze sources of international

The design of international strategies is based upon the interplay between the comparative advantages of countries and the competitive advantages of firms. These two advantages determine the answer to the two are not completely independent of each other. Firms differ in location of sourcing of their production and can, therefore, acquire a competitive edge with superior exploitation of the comparative advantages.

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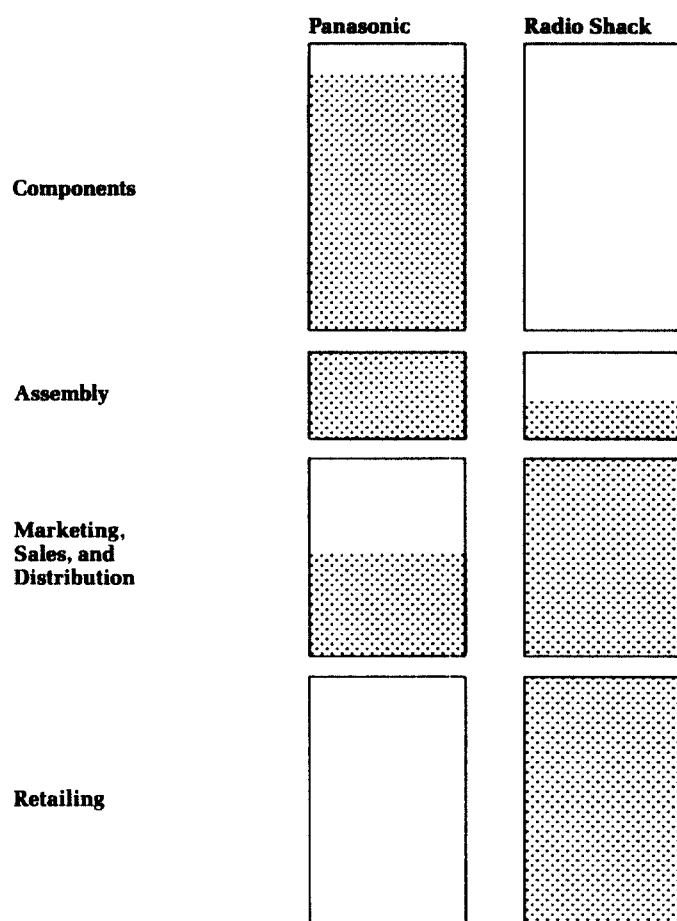*European Approaches
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agement.*

firm must devise a strategy that is superior to that of the competition. Techniques of strategy formulation are heuristic guides that aid firms in analyzing their competition and allocating resources to the most profitable courses of action. One such technique is industry competitive analysis. A second, and complementary, technique is the analysis of market segments in search of insights that will guide the allocation of resources to different productive units of the corporation. These productive units can be depicted, as will be shown later, by a value-added chain.

Consider first the technique of industry competitive analysis.[2] This technique implicitly begins with a static model of profit determination which is then expanded to incorporate how firms "game" against one another. The logic of the model commonly specifies two kinds of generic strategies. The first is characteristic of firms in a highly competitive industry in which products are qualitatively similar. In such industries, strategies tend to be *low-cost* oriented in order to either increase margins or lower prices. The danger of the latter strategy, of course, is that firms will simultaneously cut prices in anticipation of scale or experience economies, resulting in cutthroat competition. In less competitive industries, firms follow revenue-oriented strategies by *differentiating* their products. Rivalry by physically or psychologically differentiating products also spills back into price competition, as products invariably face competition from approximate substitutes.

tive markets, the value-added chain is best defined in terms of each link's contribution to total cost. (In the case of multiproduct firms, there may be horizontal links as well.) For many of these links, there exist price data on the value of intermediate products when these products are traded in markets. In some cases, firms have, or can acquire, fairly accurate estimates of the production costs of competitors. By comparing the costs incurred by each link and against competitors, a firm can locate the "critical success factors" that must be addressed. Such a comparison can lead to radical changes in strategy, such as the decision to divest or to acquire new technologies in certain links.[4]

The example of the American steel industry can be used to illustrate an application of value-added chain analysis in this vein. The American steel industry has consisted traditionally of large, vertically integrated carbon steel makers, some of whom are integrated from ore mining to finished products. Recently, their profitability has been abysmal, the result of in-roads made by mini-mills in long products (e.g., rails and bars) and import competition. Because of the increased competition, the carbon steel manufacturers have little power in influencing the price they charge on long products. (Flat products, e.g., sheet, tend to be more differentiated.) Faced with increased price competition and large investments in fixed assets, carbon steel producers must choose either a dramatic curtailment of crude steel production and a focus on flat and specialty steel prod-

Figure 1   **Value-Added Analysis for Consumer Electronic Products***

*Shaded portion represents proportion kept in-house.

Source: Ebeling and Doorley, 1983.

most strongly desired by consumers *and* which of those attributes correspond to the present and potential competitive advantage of a firm.

It is important to emphasize the last phrase of the above sentence. If the only issue were to determine demand for product attributes, strategy would simply be a market research question. But assets that underlie the production of these attributes are not easily redeployed along the value-added chain, nor is product or process imitation between competitors without uncertainty and risk. Because of the costs and risks of redeploying assets, firms can be found competing in an industry while pursuing different strategies, even though some strategies are recognized as dominant in terms of profitability.[7] Strategy is thus not just the selection of profitable product markets; it is also the attempt to create a competitive advantage by investing in the link that generates the product attribute most strongly desired by consumers and which corresponds to the firm's distinctive competence relative to its competitors.

An example of the contribution of value-added chain analysis for strategies of product differentiation is the selection of acquisition targets. Ebeling and Doorley compare, for example, the structural characteristics of value-added chains for three competitors by estimating the contribution of each link to market value and the extent to which each link is done in-house or sourced outside.[8] (Two of these chains are depicted in Figure 1.) There is no reason that the links should reflect the same value across firms, and they can, in fact, be expected to differ as each firm pursues a different product-market strategy. (Some links, such as R&D and after-sales service, are not shown.) Observations on activities sourced or contracted out externally permit insight into the question of which firm is best situated for entry into the home computer market. An application of the value-added chain in this context rests on the identification of the characteristics of consumer demand and the strategic positioning of firms in terms of their control over the critical links that supply these charac-

product attributes most strongly desired by consumers back upon the links of the value-added chain that generate this attribute.[6] For example, if consumers desire a home computer that is supported by strong after-sales service, and the firm is able to provide this service better than its competition, the implication for resource allocations is to shift investment from other links of the value-added chain in order to invest in the downstream link of servicing channels. The key question becomes what links of the value-added chain generate those attributes

teristics. If component manufacture is critical, then Panasonic is best placed because of its ownership of production activities. If the consumer desires easy access to distribution centers and after-sales service, then Radio Shack has the better position. Once the attributes desired by the customer and the relative strengths of the competition have been determined, a firm can determine its present strength in a business and decide either to redeploy its assets or pursue its traditional

These differences in macroeconomic variables greatly increase the risk associated with a firm's product/market and resource allocation decisions. The sheer number of variables reflects the most potent fact of international competition. That is, global competition brings together in multiple markets firms that differ widely in where they source and in their access to national markets.

Differences in factor costs have powerful

Figure 2   **Value-Added Chain of Comparative Advantage**
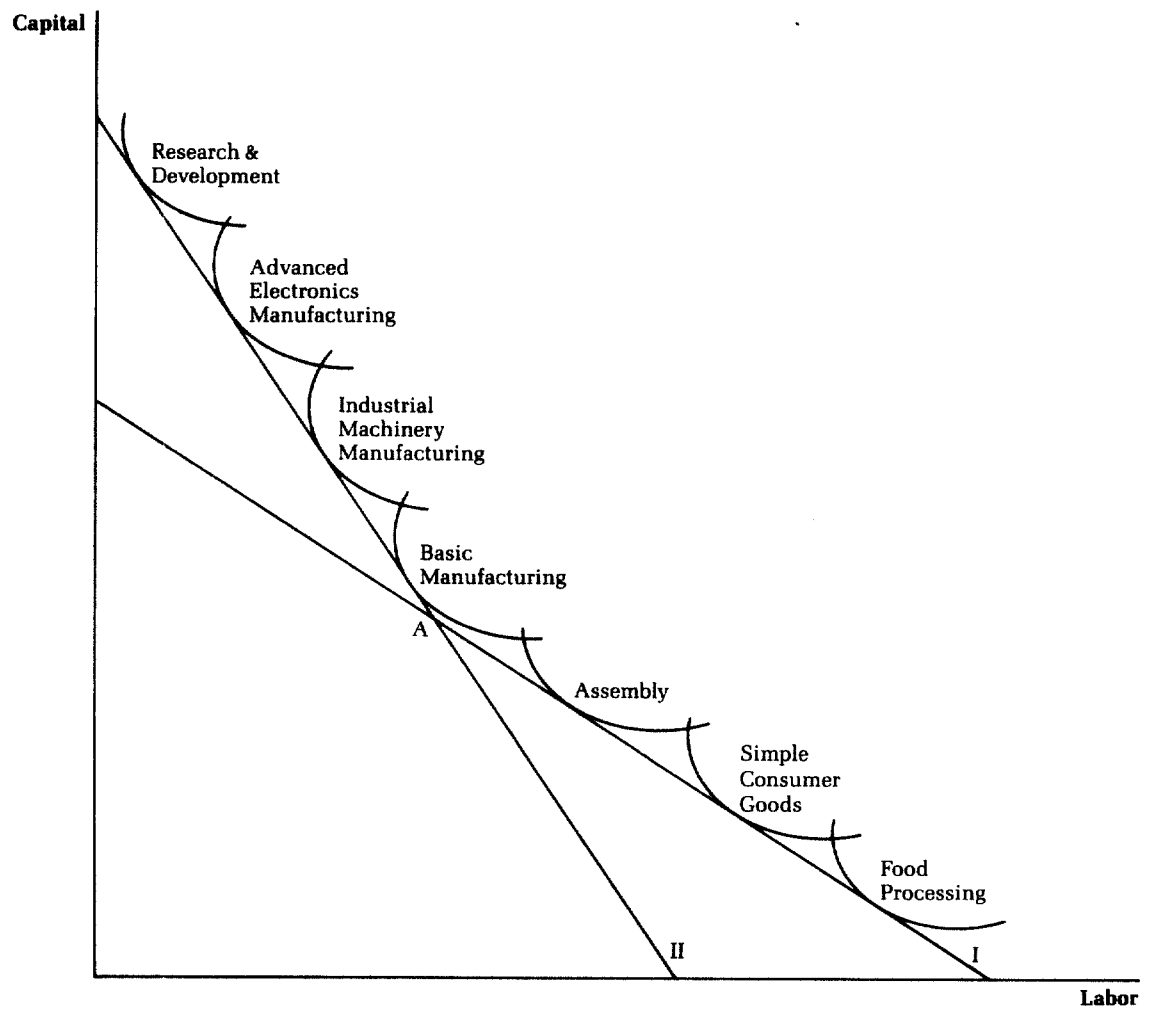
There are only two factors of production: labor and capital.

Isocost Lines and Isoquants

Based on these assumptions, countries can be ordered by a chain of comparative advantage along isocost lines. An isocost line shows the proportions of factor inputs that equal one dollar. (It can also be called a one-dollar cost line.) For Country I, where labor is relatively inexpensive, isocost line 1 is drawn in Figure 2. For Country II, where capital is relatively inexpensive, isocost line 2 is drawn. The lines for the countries differ because the factor costs of labor and capital are different between countries. Tangent to the isocost lines are unit-value isoquants whereby an isoquant represents the proportions of capital and labor that produce the same value of output. This value is set equal in Figure 2 to one dollar. (These isoquants can also be called one-dollar production curves.)

The tangency of the unit-value isoquants implies that firms are earning market returns. An isoquant inside an isocost line represents a state of excess profits as the unit cost of factors used in production is less than the dollar unit value of production.[11] Excess profits (also called economic rents) lead to an increase in competition and lower prices: as prices fall, production must increase to earn the same dollar of revenue, increasing the required amount of factor inputs. Thus, the isoquants move outward. If the isoquants were outside the isocost lines, then the value of production is less than cost and unprofitable. The result of all this is that, for production under competition, the isoquants must be tangent to the isocost line farthest from the origin.

Isoquants are drawn in Figure 2 for a few economic activities and goods.[12] Some of these goods are raw materials; some are intermediate products, such as labor-intensive assembly or human-capital-intensive research and development. This description of goods and economic activities implies that they have been unbundled in terms of their contribution to the value-added chain. By examining the value-added chain, it can be determined which activities will be placed in countries where the comparative advantage is most favorable.[13] Only the goods for isoquants below point A will be produced by the labor-intensive country; the goods for isoquants above point A will be produced by the country with an advantage in capital-intensive production.

The ordering of isoquants along an isocost line corresponds to what can be termed a chain of comparative advantage for countries. This chain reflects the differences in factor costs between countries and the differences in factor intensities in the production of intermediate and final goods. The chain derived from Figure 2 shows that each country specializes in producing those goods for which it has a comparative advantage.
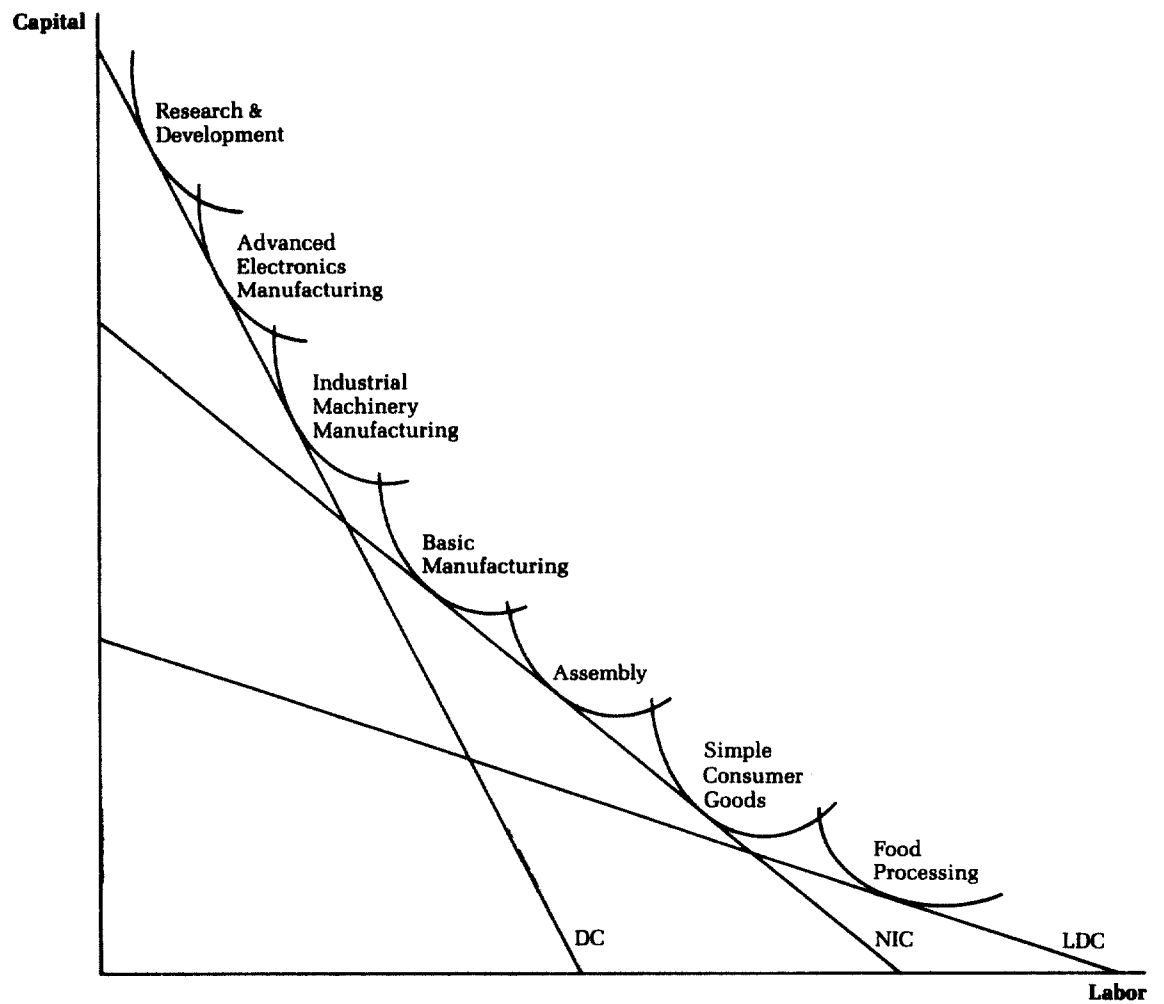
Factors Affecting Comparative Advantage

The derivation of the chain of comparative advantage is based on strong assumptions. When the assumptions of perfect competition and the same price for a good across countries are relaxed, the argument must be modified strongly. Two factors prevent, in particular, the clean and tidy ordering of industries along the chain of comparative advantage.

The first factor is the cost of transportation and tariffs, which can create strong barriers between nations and permit domestically located firms to survive despite a disadvantage in f.o.b. prices. These costs are especially effective for goods characterized by low value to weight. Tariffs and transportation costs may prevent a clean ordering of trade between countries, but the general *tendency* of trade to reflect the comparative advantages of nations is certain to influence the allocation of world resources. The chain of comparative advantage will not hold for industries where factor cost differences between countries are small. It can be expected to hold for industries where these differences are large, although governments can, of course, strongly affect the allocation of production.

Figure 3   **Changes in the Value-Added Chain of Comparative Advantage**

Capital

- Research & Development
- Advanced Electronics Manufacturing
- Industrial Machinery Manufacturing
- Basic Manufacturing
- Assembly
- Simple Consumer Goods
- Food Processing

DC   NIC   LDC

Labor

The second factor is the difference in competitive advantages among firms. Firms can, in particular, exploit certain economies along and between value-added chains which create competitive advantages that can sometimes be transferred globally. Three economies are particularly relevant: scale, scope, and learning. If the economies captured by large-scale production outweigh the disadvantage in factor costs, then a firm can remain competitive despite a poor location. Similarly, the production of one good might lower the costs for the production of another. Thus, if a firm has a competitive advantage in one good, the production of a second may be profitable despite a location disadvantage. Finally, a firm may possess an advantage in knowledge or skill gained over time. Japanese trading companies have no apparent competitive or location advantage in acting as agents for non-Japanese firms selling outside of Japan, yet they have knowledge of trading on world markets. Learning might also take the form of superior technology in the manufacturing or marketing of goods. Because learning is not easily transferred or replicated, some firms maintain a competitive advantage through product or process technologies.

The second factor is particularly pertinent to analysis of the interplay between the comparative advantages of countries and the competitive advantages of firms. When firms achieve a competitive advantage in terms of scale, scope, or learning, firms can be disadvantaged in terms of their location but still compete successfully. In other words, the competitive advantage of a firm can overcome the comparative disadvantage of country location. However, the stronger the location disadvantage, the more potent the competitive advantage of the firm must be.

There is a common tendency to suggest that a firm change its strategy in response to international competition rather than recognize that its industry may be in decline because of a change in comparative advantage. In industries characterized by differentiated goods, firms can respond to international competition by investing in new competitive advantages. But in industries characterized by commodities or close substitutes, shifts in comparative advantage dictate only four responses, namely, divestiture, switching of technologies to use factors favored by a firm's country location, investment in overseas plants as source sites, or lobbying for government intervention.

Shifts in the Chain of Comparative Advantage

Not all industries are equally vulnerable to long-term shifts in the comparative advantages among nations. Industries that are vulnerable consist of goods or activities in the vicinity of point A of Figure 2. They represent the *weak links* of the chain of comparative advantage. Industries that embody goods that correspond to these weak links are especially vulnerable to fluctuations in factor costs and exchange rates when competition is international.

The importance of these structural shifts in the world economy can be isolated by focusing on three regions of the world: developed (DCs), newly industrialized (NICs), and less-developed (LDCs) countries. Figure 2 can be altered to reflect this perspective. If Country I represents the developed countries and Country II the less-developed countries, the allocation of world production that existed after World War II and until recently can be seen in rough illustration. Through the 1970s, a third region consisting of NICs has been interpolated between LDCs and DCs. Figure 3 depicts this emergence and its implications on the ordering of comparative advantage for these three regions. If we compare Figure 3 with Figure 2, we can immediately see that a major change in the allocation of global production has been emerging from newly industrializing countries.

This emergence has placed tremendous pressure on the weak links of the post-war chain of comparative advantage. The rise of Japan, which was already fairly industrialized by the start of this period, affected

Table 1   **Estimated Shares in World Manufacturing Value**

	1963	1970	1975	1978	1980
Developed Countries	77.3	73.4	67.5	66.8	65.2
Developed Socialist Countries	14.6	17.8	22.5	22.9	23.8
Newly Industrializing Countries	5.5	6.0	7.0	7.2	7.7
Less Developed Countries	2.6	2.8	3.0	3.1	3.3

vulnerable to shifts in comparative advan-in output for steel and autos. Clearly, the most dramatic change has occurred in LDCs, with much of the increase stemming from economic growth in the NICs. For certain consumer electronic industries, the change has been equally dramatic; for example, the share of world production by LDCs of radio receivers grew from 33.3 percent in 1966 to

Table 2		The Changing Pattern of World Production in Automobiles and Steel, 1950–80		
	Year	Advanced Market Economies	Advanced Socialist Economies	LDCs and NICs
Automobiles	1950	10147	394	36
(in 1000s)	1960	15325	730	322
	1965	23058	936	548
	1970	27245	1530	912
	1975	28810	2851	1604
	1980	24972	3110	2275
Steel	1950	148.9	35.9	5.2
(in millions	1960	228.5	86.5	20.0
of tons)	1965	301.6	119.6	32.8
	1970	388.5	155.6	49.9
	1975	381.0	192.6	86.1
	1980	394.9	209.1	113.4

Source: Ballance and Sinclair, 1983, p. 74.

affiliates and related firms to the parent cor-

multiple markets in which they confront each other.

Analysis of the International Value-Added Chain

A value-added chain analysis of competition for a global industry is useful for outlining the nature and stakes of the different wagers placed on sourcing locations and on different links along the value-added chain. The value-added chain can be applied under two different assumptions. The first is that competitors have the same technology, but costs vary because of differences in location sites. Under this assumption, costs can be readily estimated by incorporating foreign wage and material rates into the estimates of production costs. The second assumption allows for differences in technologies, and estimates production costs when competitors may be at an advantage or a disadvantage in terms

transnational corporations has, moreover,

among the major European and, to a lesser extent, Japanese firms. The German and Japanese share of world foreign direct investment rose from 1.2 to 7.3 percent and 0.5 to 6.8 percent, respectively, between 1960 and 1978. During the same time period, the U.S. share fell from 49.2 percent to 41.4 percent.[16]

Because of the vast dispersion of the production activities of American, European, and Japanese firms, competition in international markets is a combination of both competitive and compar

precise data, a sensitivity analysis around first assumption can be estimated. Moreover, only the second calculation provides a reasonable answer to whether investment in new technologies overcomes the advantage of firms sourcing in cheaper sites. By focusing on competitors' locations and technological advantages, the above analysis, in an international context, is fundamental in determining where the value-added chain should be broken across borders and where new investments should be located.

In addition to analyzing global competitiveness in terms of costs, the value-added

example of a decentralized link is marketing to the extent that products must be redesigned or packaged to correspond to differences in the attributes demanded by the various national markets. Decentralized marketing programs that exploit upstream competitive advantages in terms of low-cost production are the cutting edge of a global strategy.

On the other hand, if the advantage stemming from a strategic link cannot be internationally transferred, then an industry is consequently national in terms of competition. The primary example of a nontransferable advantage is distribution, though some firms have been able to build their competitive advantages precisely by developing fran-

brand labeling and distribution grew in importance. By the late 1970s, competition had shifted to the later stages of the value-added chain in terms of market value. Japanese firms responded by investing in distribution channels and brand labeling. Thus, the industry had evolved into cost competition in the lower line of television sets and marketing and distribution competition in the top line. The initial global advantage in terms of location and economies of scale for a world market largely evaporated by 1980.

Modes of International Competition

Figure 4   **Modes of International Competition**

Comparative Advantages of Countries

	No Advantage	Advantaged
No Advantage	• Nationally Segmented Markets	• Interindustry Trade • International Vertical Integration of Firms I
Advantaged	• Intraindustry Trade • International Horizontal Integration of Firms II	• Internationally Vertically and Horizontally Integrated Firms with Different Configurations of Market Penetrations and Sourcing Sites III

Competitive Advantages of Firms (row label on left)

The automobile industry is one such example. There is considerable intraindustry trade of vehicles which are differentiated on the basis of styling, quality, or advertising. And, as an alternative to trading, auto firms can invest in each other's country of origin and in other parts of the world. Such overseas investments are elements in the international horizontal integration of the multinational corporation.

The third mode of competition consists of the interplay between competitive and comparative advantage along a value-added chain. Whereas differences in competitive

competitive advantages, and product/market decisions.

These three modes of competition generate the pattern shown in Figure 4. Box I reflects the first mode outlined above, where competition is driven by comparative advantage in the form of exports and imports of intermediate and final goods. Box II reflects the second mode, whereby firms have no factor cost incentive to locate in a particular country but compete internationally in terms of their distinctive competencies and the competitive structure of the market, much as they do in the purely domestic case. The third mode is represented by Box III. Here, differences in both comparative and competitive advantages generate the international dispersion of the firm's sourcing and market penetration activities. The upper left-hand corner represents the endpoint case in which the similarity of factor costs between countries and competitive advantages between firms segments markets along national boundaries. Therefore, because of transportation and other costs, there is no international competition in the absence of comparative and competitive advantages.

Although useful in structuring the complex interrelations of competitive and comparative advantage, Figure 4 omits the extent to which the firm's global position augments its strategic position in its national markets. There are generally three sources for a sustainable global advantage: increase in economies of scale as a result of the increase in market size; increase in economies of scope

ing on the initial *transfer* of an advantage, through exporting a good from a plant favored by its location or a firm advantage by investing overseas, and competing on the basis of the *subsequent* advantages gained by being global. The Japanese entry into the United States frequently assumes a historical pattern of competition based upon an initial transfer of a comparative advantage in exports stemming from low wages, and a later transfer of a competitive advantage in the form of exporting by or investing overseas in capital-intensive production at minimum efficient scale. As comparative and competitive advantages between American and Japanese firms grow more similar, competition in the large North American market (which can often by itself support minimum efficient scale in production) takes on an increasingly domestic character, though the names of some of the players are foreign. Thus, the initial *global* advantage of Japanese firms is frequently not sustainable. New competitive advantages, such as brand labeling, must therefore be developed, but these advantages are not global as they are not uniquely acquired by virtue of participating in world markets.

What is often overlooked is that the creation of a global network provides the benefit of profiting from the uncertainty of the world market. A critical element of formulating an international strategy is creating the organizational flexibility and incentives that respond to changes in economic parameters between countries. To this extent, the international firm can be viewed as representing investments in flexibility that permit the exploitation of profit opportunities generated by environmental turbulence. Thus, the key operating dimensions in a global strategy are one, to recognize the potential profit opportunities, and two, to create the organizational flexibility that responds to changes in the environment. A number of the elements that compose this flexibility will be explored with regard to the multinational corporation in Part 2 of this article.

References

1
For a discussion of location- and firm-specific advantages in terms of foreign direct investment, see the seminal article by John Dunning, "Trade, Location of Economic Activity and the MNE: A Search for an Eclectic Theory," in *The International Allocation of Economic Activity*, edited by B. Ohlin et al. (London: Holmes and Meier, 1979).

2
For a complete statement, see Michael Porter, *Competitive Strategy* (New York: Basic Books, 1981).

3
Although the concept of the value-added chain has been circulated among consultants and academics for several years, it has only recently been discussed in academic publications. See, for example, Bruce Kogut, "Normative Observations on the International Value-Added Chain and Strategic Groups," *Journal of International Business Studies*, Fall 1984, pp. 151–167 and Michael Porter, *Competitive Advantage* (New York: The Free Press, 1985).

4
Although we cannot pursue this point further, it is important to note that the decision to divest because of a relative cost disadvantage may be deterred because of supply or price uncertainty arising from a scarcity of suppliers. For the impact of small numbers of suppliers on the decision to source externally, see Oliver Williamson, "Transaction-cost Economics: The Governance of Contractual Relations," *Journal of Law and Economics*, October 1979, pp. 233–261.

5

I thank Stephen Schaubert for his description of how Bain & Company have applied the value-added chain to an analysis of the steel industry.

6

The microeconomic underpinnings of our approach is the treatment of goods as bundles of attributes that differ in terms of consumer demand. For this line of inquiry, see the seminal article by Kevin Lancaster, "A New Approach to Consumer Demand," *Journal of Political Economy* 74 (1966): 132–57 and the interesting extension to product rivalry by Richard Schmalensee, "The Ready-to-Eat Breakfast Cereal Industry," *Bell Journal of Economics* 9 (1978): 305–27.

7

The costs of redeploying assets result in the existence, to use a term from the strategy literature, of different "strategic groups." These different product-market strategies can be mapped back upon the value-added chain.

8

See H. Ebeling and L. Doorley, "A Strategic Approach to Acquisitions," *Journal of Business Strategy* 3 (1983): 44–55.

9

Our discussion is consistent with a theory of foreign direct investment called the international product life cycle, which predicts that as products become more standardized, their production shifts to sourcing from overseas plants. See the collection of articles edited by Louis Wells, *The Product Life Cycle* (Boston: Harvard Business School Press, 1972).

10

See Alan Deardorff, "Weak Links in the Chain of Comparative Advantage," *Journal of International Economics* 9 (1979): 97–209.

11

The term "profits" may cause some confusion. Profits are earned as a competitive payment to capital. Earnings in excess of the competitive return to capital are considered excess profits or economic rents.

12

Our ordering is drawn from data give by Chad Leechor,

Harinder Kohli, and Sujin Hur in *Structural Changes in World Industry: A Quantitative Analysis of Recent Developments* (Washington, D.C.: World Bank, 1983).

13

Assuming competitive markets, the production of intermediate goods is defined as the value of the output minus the intermediate good inputs. Because labor and capital are paid their marginal products, and there are no excess profits, we can also order intermediate products along an isocost line.

14

This and the following data are drawn from Robert Ballance and Stuart Sinclair, *Collapse and Survival: Industry Strategies in a Changing World* (London: George Allen & Unwin, 1983) and Leechor et al. (1983).

15

See Gerald Helleiner, "Transnational Corporation and Trade Structure: The Role of Intra-firm Trade," in *On the Economics of Intra-industry Trade*, edited by H. Giersch (Tubingen: J.C.B. Mohr, 1979).

16

See John Dunning, "Changes in the Level and Structure of International Production: The Last One Hundred Years," in *The Growth of International Business*, edited by M. Casson (London: George Allen & Unwin, 1983).

17

The inadequacy of the Heckscher–Ohlin model, which rests upon comparative advantage, to explain intro-industry foreign direct investment and trade has led to a number of new theories which incorporate product differentiation and economies of scale as critical variables. For a representative work, see Paul Krugman, "Increasing Returns, Monopolistic Competition, and International Trade," *Journal of Political Economy* 9 (1979): 469–79.

18

For a variety of reasons, firms may choose to enter into joint ventures, license, or franchise. Most studies show, however, that a firm tends to maintain full ownership over its strategic assets unless it can arrange enforceable claims on their use and derived profits.

19

See Kogut (1984).