

A Framework for Analyzing the Modern Multinational Enterprise and its Competitive Advantage

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The title of this paper is Professor Wilkins'. When Mira phoned me about presenting a paper, I told her that I could; but only if I might use something from the introduction or conclusion of my forthcoming study--something that might be relevant for analyzing the development of multinational enterprises. As is almost always the case, I continue to fall behind schedule so the conclusion is still to be written. The following piece comes, therefore, from my introductory chapter tentatively entitled "Scale, Scope and Organizational Capabilities" (The book will be called *Scale and Scope: The Dynamics of Industrial Enterprise*).

I begin the chapter and the book by defining the modern industrial enterprise and then proceed to a consideration of three basic historical attributes of that institution. The modern industrial enterprise is a sub-species of the modern business enterprise that I defined in *The Visible Hand* as containing a number of distinct operating units and being managed by full-time salaried executives. Such an enterprise constitutes more than a production function. It is a "governance structure" to use Oliver Williamson's term. It governs units carrying out different functions--production, distribution, research, accounting, finance, and the like. Each unit within the enterprise has its own administrative office, its own managers and staff, its own set of books, as well as its own resources in terms of physical facilities and personnel to carry out specific functions involved in production or distribution of a specific product in a specific geographical area. Each unit could theoretically act as an independent business enterprise. Indeed economies have always been heavily populated with single-unit business enterprises. The activities of the

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units within a multiunit firm are monitored and coordinated by middle managers who, in turn, are monitored and coordinated by a small team of full-time executives (or occasionally by an individual) who plan and allocate resources for the operating units and the enterprise as a whole.

Historically, such multiunit industrial enterprises have had three significant attributes. They appeared in the United States and Europe at almost the same moment in history, during the 1880s and 1890s. (They did so a little later in Japan only because Japan industrialized later.) From their beginnings they have clustered in much the same industries in all industrial nations. Finally they were born and continued to grow in much the same manner and for much the same reasons.

The sudden initial appearance of the multiunit enterprise in the last two decades of the nineteenth century is documented in chapter after chapter of my forthcoming study. The clustering of such enterprises is indicated in tables in its introductory chapter.¹ The first table shows the location country by country and industry by industry, of all the industrial corporations in the world that employed more than 20,000 workers. It indicates that in 1973, 263 (65 percent) of the 401 companies that made the list were clustered in food, chemicals, oil, primary metals and machinery. (These are 2-digit industrial groups as defined by the U.S. Census in its Standard Industrial Classification [SIC].) Just under 30 percent were in 3-digit categories of other 2-digit groups. These subcategories had the same high volume, capitalintensive technologies of production as those in which the 65 percent clustered, that is cigarettes in tobacco; tires in rubber; newsprint in paper; plate and flat glass in stone, glass, and clay; cans and razor blades in fabricated metals; and mass-produced cameras in instruments. Only 21 companies (5.2 percent) were in the remaining 2-digit categories--apparel, lumber, furniture, leather, publishing and printing, instruments and miscellaneous--industries characterized by relatively low volume, laborintensive processes of production. The other tables show that large industrial corporations had clustered throughout the twentieth century in the United States in the same industrial groups in which they were concentrated in 1973 and that the pattern was much the same for Britain, Germany, and Japan.

A second point that the initial table makes--one that is central to an understanding of the evolution of this institution--is the predominance of American firms among the world's largest industrial corporations. Of the total of 401 companies employing more than 20,000 persons, over half (212 or 52.6 percent) were American. The United Kingdom followed with 50 (12.5 percent), Germany with 29 (7.29 percent), Japan with 28 and France with 24.

¹They can also be found in [4, pp. 401-05].

Only in chemicals, metals, and electrical machinery did the total non-American firms outnumber the American firms by as many as four or five.

Other data demonstrate that the American firms were larger, as well as more numerous, than those in other countries. For example, in 1948, only 45 to 50 of the British firms had assets comparable to those of the top 200 in the United States. In 1930, the number was about the same. For Germany and Japan it was smaller. Well before World War II the United States had many more and many larger managerial hierarchies than did other nations.

Besides appearing at the same time and continuing to cluster in industries with the same characteristics, these multiunit firms were created and continued to grow in much the same manner. They had their start in a relatively large investment in new or greatly improved processes of production usually to produce new or greatly improved products. Then came the building of a network of offices and facilities to market and distribute their products nationally and very often internationally. These firms almost always obtained a comparable, though usually smaller, network to purchase, move, and store materials and supplies. In the more technologically advanced industries, such enterprises added separate units for research and development. To coordinate and monitor current operations of these multidivisional enterprises, their founders recruited managerial hierarchies whose activities were organized through centralized, functionally departmentalized administrative structures. Many, though not all, of such enterprises continued to grow by expanding their marketing units abroad and then by making direct investment in production facilities to support the distant sales organizations. They also expanded by investing in products whose production and distribution were closely related to their original product lines.

THE ECONOMIES OF SCALE AND SCOPE IN PRODUCTION

How then to account for these three common attributes? Let us begin by examining the characteristics of the new processes of production and distribution that were being put into place in the last quarter of the nineteenth century. What differentiated the industries in which the new multiunit enterprises clustered from those in which they did not was that, in the former, technologies of production permitted for almost the first time in history the exploitation of powerful cost advantages of the economies of scale and scope. In the older laborintensive industries, increases in production resulted almost wholly from adding more machinery and more workers to operate the additional machines. In the industries in which the modern industrial firm came to concentrate increasing output resulted from improving and rearranging inputs; from improving machinery, furnaces, stills and other equipment; from reorienting the process of production within the plant; from placing the sev-

eral intermediary processes involved in production of a final product within a single works; and from increasing the application of energy (particularly that generated by fossil fuel). The first set of industries remained labor-intensive; the second set became capital-intensive.

In these new capitalintensive industries, production units achieved much greater economies of scale (or scope), that is their cost per unit dropped much more quickly as the volume of materials processed increased, than in the labor-intensive industries. In the capital-intensive industries, large plants operating at their minimum efficient scale (that is, the scale of operation that brought the lowest unit cost) had a much greater cost advantage over smaller plants than was the case in industries using more labor-intensive technologies.

However, these potential cost advantages could not be realized fully unless a constant flow of materials through the plant or factory was maintained to assure effective capacity utilization. For such plants not only were operating costs high, but so also was the original capital investment. Therefore, unit costs rose sharply as volume of flow was reduced. The decisive figure in determining costs and profits was, and still is, then, not rated capacity for a specified time period but rather throughput--that is, the amount actually processed in a specific time period. Throughput became, then, the proper economic measure of capacity utilization. In the capital-intensive industries the throughput needed to maintain minimum efficient scale required not only careful coordination of flow through the processes of production but also of the flow of inputs from the suppliers and the flow of outputs to the retailers and final consumers.

Such coordination did not, and indeed could not, happen automatically. It demanded the constant attention of a managerial team or hierarchy. The potential economies of scale and scope were and still are, then, characteristics of a technology. The actual economies of scale or of scope, as measured by throughput, are organizational. Such economies depend on knowledge, skill, experience, and teamwork--on the organized human capabilities essential to exploit the potential of technological processes. The significance of the resulting economies of scale, as measured by throughput, can be illustrated by the well-known example of one of the very first modern industrial (as opposed to transportation, communication, or distribution) enterprises in the United States, the Standard Oil Company (its successor, Exxon, is still the world's largest oil company) and those of scope by that of the oldest and still largest German chemical companies.

In 1882, the Standard Oil "alliance" formed the Standard Oil Trust. The purpose was not to obtain control over the industry's output. That alliance, a loose federation of 40 companies, each with its own legal and administrative identity but tied to John D. Rockefeller's Standard Oil Company through in-

terchange of stock and other financial devices, already had a monopoly. [4, pp. 346-360] The members of the alliance of that time produced 90 percent of America's output of kerosene. Instead, the Trust was formed to provide a legal instrument to rationalize the industry so as to exploit more fully economies of scale. The Trust provided the essential legal means to create a corporate or central office that could, first, reorganize the processes of production by shutting down some refineries, reshaping others, and building new ones and, second, by coordinating the flow of materials, not only through the several refineries, but from the oil fields to the refineries and from the refineries to the consumers. The resulting rationalization made it possible to concentrate close to a quarter of the world's production of kerosene in three refineries, each with an average daily charging capacity of 6,500 barrels, with two-thirds of their product going to overseas markets. (At this time, refined petroleum products were by far the nation's largest nonagricultural export.) Imagine the diseconomies of scale, that is, the increase in units costs, that would result from placing close to one-fourth of the world's production of shoes or textiles or lumber into three factories or mills! The administrative coordination of the operation of miles and miles of machines and the huge concentration of labor needed to man these machines makes no economic or social sense.

This reorganization of the Trust's refining facilities brought a sharp reduction in average cost of production of a gallon of kerosene. It dropped from 1.5 cents a gallon before reorganization to 0.54 cents in 1884 and 0.45 in 1885, with a resulting increase in the profit margin from 0.53 cents in 1884 to 1.003 cents in 1885. The costs at the giant refineries were still lower--costs far below those of any competitor. However, to maintain this cost advantage required that these large refineries have a continuing daily throughput of from 5,000 to 6,000 barrels or a three- to four-fold increase over the earlier daily flow (1,500 to 2,000 barrels) with resulting increases in transactions handled and in the complexity of coordinating the flow of materials through the process of production and distribution.

In the same years that Standard Oil was investing in its large refineries to exploit the economies of scale, the German dye makers were making an even larger investment to permit them to exploit fully the economies of scope. The enlarged plants came to produce literally hundreds of dyes and in addition, many pharmaceuticals from the same raw materials and the same set of intermediate chemical compounds. The first three enterprises to make such an investment initially to exploit the cost advantages of scale and then those of scope--Bayer, Hoechst and BASF--reduced the price of the new synthetic dye, red alizarin, from 270 marks per kilo in 1869 to 23 marks in 1878, and to nine marks in 1886 and to make comparable price reductions in their other dyes [1, p. 119; 5, pp. 128-36]. The addition of a new dye or pharmaceutical to their total product line added little cost for the production of that dye and at

the same time reduced the unit cost of the other dye products. On the other hand, each addition involved the development of a specialized product--one requiring constant supervision to assure the necessary quality--and each increased the need for organizational coordination.

These stories of Standard Oil and the three German chemical firms are by no means unique. Indeed, in the last two decades of the nineteenth century, comparable investments were made in new production technologies in nearly all the industries where the modern industrial enterprise would continue to cluster for the next century--in the refining, distilling, processing, and packaging of food products, in the production of a wide variety of chemicals, rubber, glass, abrasives and other materials; in the making of steel, of copper and other nonferrous metals; and in the production of machines made through the fabrication and assembling of interchangeable parts and also in heavier machinery, including electrical equipment, that provided the furnaces, refineries and a wide variety of processing equipment used in the many new industries.

The differentials in potential scale and scope economies of different production technologies indicate not only why the large hierarchical firms appeared in some industries and not in others, but also why they appeared suddenly in the last two decades of the nineteenth century. Only with the completion of the modern transportation and communication networks--those of the railroad, telegraph, steamship, and cable--and the organizational innovations essential to operate them as integrated systems, could materials flow into a factory or processing plant and finished goods move out at a rate of speed and volume required to achieve substantial economies of throughput. Transportation that depended on the power of animals, wind, and current was too slow, too irregular, and too uncertain to maintain a level of throughput necessary to achieve the potential economies of the new technologies.

THE ECONOMIES OF SCALE AND SCOPE IN DISTRIBUTION

If the cost advantages of the economies of scale and scope can account for when and where the modern industrial enterprise made its appearance, they cannot explain the second investment essential to its initial growth, that is the investment in a national and often international marketing and distributing organization. The explanation requires an understanding of the operations of the new types of enterprise that appeared in distribution. For the new allweather, regularly scheduled, and historically unprecedented fast transportation and communication brought as profound a revolution in distribution as they did in production. The new commercial intermediaries that arose in response to the new opportunities included full line wholesalers and the new mass retailers--the department stores, the mail order houses, and the

chains or multiple shops. They made their profit on markup rather than on commissions, as had the traditional merchants, and they did so on the basis of high volume sales at low price. For them profits depended on the maintenance of high volume flow. For them "stock-turn," that is the volume processed in relation to inventory by a single set of facilities and personnel within a specified period of time, became as significant a criterion for performance as throughput was for the high volume producer.

These commercial intermediaries grew large by exploiting the cost advantages of both scale and scope. Because they handled the products of many manufacturers, they could ship and market more cheaply than could a single producer. They further reduced costs by using the same sets of facilities to sell many related products. These commercial intermediaries, therefore, lost their cost advantages in two ways: (1) when a manufacturer's volume reached the minimum efficient scale for the distribution of that line and (2) when marketing and distribution of a product required an investment in specialized skills and facilities that could only be used to market and distribute that one product. Moreover, they had even less incentive to make such investments in distribution since profitability would depend wholly on the decisions of a small number of manufacturers producing that product. In other words if they made that investment, they would become captives of the producers.

For these reasons the entrepreneurs who made the investment in production large enough to exploit the economies of scale and scope in production usually had to make a similar product-specific investment in national, and often international, marketing and distribution networks. Thus the makers of the new American massproduced sewing, office (typewriter, cash register, mimeograph machines, and the like) and agricultural machinery had to provide such product-specific marketing services as the demonstration, aftersales service and repair and consumer credit. For the producers of heavy machinery, close contact with customers was even more necessary, as the machines had to be designed to their requirements and often required even more complex aftersales service and even more extensive consumer credit. So also the makers of dyes not only had to show nearly every customer how to use the new products but often provided machinery to facilitate the process. And if the producers of the new powerful explosives--dynamite--failed to instruct carefully on its use, they often lost their customers.

Oil refineries, chemical manufacturers, meat packers, canners, and other food processors required more in the way of productspecific distribution facilities than of marketing services. The two pioneers in the oil industry, Rockefeller in the United States and the Nobel brothers in Russia, after building the world's largest refineries, invested heavily during the 1880s in railway tank cars, ocean-going tankers and storage depots in order to assure

steady, scheduled distributing of their products in the volume in which they could be produced.

The profitable utilization of extensive investment in production and in distribution required a third investment--in personnel. The founders of the new enterprises had to recruit full-time salaried managers, not only to administer each set of facilities, but also to coordinate the flow of materials from the purchasing of the materials to the distribution to the retailer or final customer. The founders, therefore, had to build a managerial hierarchy in which lower and middle managers handled production, distribution, purchasing and other functions; while they, assisted by the top managers, coordinated and monitored their activities and planned and allocated resources for future production and distribution.

FIRST MOVER ADVANTAGES AND THE NEW OLIGOPOLISTIC COMPETITION

This threepronged investment that created the modern industrial enterprise also transformed the structure and altered the ways of competition in industries in which it operated. As soon as a handful of firms had made such investments, they dominated. Their industries quickly became and remained oligopolistic and occasionally monopolistic. For the first to make the threepronged investment acquired powerful competitive advantages. To compete with the first movers, rivals had to build plants of comparable size and to make the necessary investment in distribution and, in some industries, in research. They also had to recruit and train a managerial hierarchy. However, the construction of a plant of the size needed to achieve comparable economies of scale or scope often meant that the total capacity of an industry came to exceed existing demand. If newcomers were to maintain capacity utilization essential to assure competitive unit costs, they had to take customers from the pioneers.

This was a challenging task. While the newcomer's production managers had to learn the unique characteristics of a new or altered technology, while its sales forces had to be recruited and trained, the first movers often had already begun to work out the bugs in the production processes and had taken strides in assuring prompt delivery, in meeting customers' special needs, and in providing the basic marketing services. In branded packaged products, where advertising was an important competitive weapon, the first movers were already investing some of the high profits resulting from low cost operations in massive advertising campaigns.

The first movers had other advantages. In the more technologically complex industries, the first to install research laboratories and to train techni-

cians in very product-specific development in very product-specific development skills had a comparable advantage, one that often reinforced and expanded advantages of patents obtained on both product and process. Moreover, in most of the new industries the late comers had to make much larger initial capital outlay than did their predecessors, for they could not expand production up to minimum efficient scale or build their marketing networks out of retained earnings as could the first movers. The later investment was not only larger but riskier, precisely because of the first movers competitive strength. Thus, the pioneers not only were the first to exploit the cost advantages of scale and scope, but their head start in developing capabilities in all functional activities--production, distribution, purchasing, research, finance, and general management--meant that they were often well down the learning curve in each of these functional activities before the newcomers were into full operation.

Although these barriers to entry were intimidating, newcomers did appear, particularly when rapid demographic changes altered existing markets and when technological change created new markets and diminished old ones. However, in those industries where scale and scope provided cost advantages the number of players remained small. There was little turnover among the leaders of these between the 1890s and the 1950s. In these industries, the few large integrated firms competed for market share and profits in national and often world markets in what was a new, oligopolistic, manner. That is, they no longer competed, as firms had done previously and as firms continued to do in the more fragmented labor-intensive industries, primarily on price. Instead the largest (usually the first to make the threepronged investment in production, distribution and management) became the price leader basing prices on the estimates of demand in relation to its plant capacities and those of its competitors, as well as estimated demand.

Although price remained a significant competitive weapon, these firms competed more forcefully for market share and increased profits by functional and strategic efficiency. That is, they competed by attempting to carry out more capably the several processes of production and distribution, by developing and improving both product and process through systematic research and development, by locating new and more suitable sources of supply, by providing more effective marketing services, by product differentiation (in branded packaged products primarily through advertising), and finally by moving more quickly into new and expanding markets and out of old and declining ones. The test of such competition was changing market share, and in most of the new oligopolistic industries the players' market share and profits changed constantly.

Such competition for market share and profits tended to sharpen the capabilities of the middle managers responsible for each of the functional ac-

tivities. It also tested and enlarged the skills of the top managers in coordination, strategic planning, and resource allocation. Their combined capabilities can be considered those of the organization itself. These highly product and process-specific organizational capabilities and skills affected, indeed, often determined, the direction and pace of the continuing growth of the industrial enterprise.

CONTINUING GROWTH OF THE ENTERPRISE

Once the investment in production and distribution was large enough to exploit the economies of scale and scope and to provide the needed marketing and distribution facilities and personnel and once the necessary managerial hierarchy was in place, the industrial enterprise grew, that is, it added new units, in four ways. It expanded by acquiring enterprises that used much the same processes to make much the same products, that is, it grew by horizontal combination. Second, it became larger by obtaining units in different processes of production involved in making a product from the mining or processing of raw materials through the intermediate and final processes, that is, by vertical integration. The third way of growth was to expand geographically to distant areas, and the fourth by producing new products related to the firm's existing technology or markets. The initial motive for the first two ways of growth was usually defensive, that is to protect the enterprises' existing investment. On the other hand, the latter two paths of expansion used existing investments and, above all, existing organizational capabilities as the base to move into new markets and new businesses.

Because the first two ways of growth were primarily strategic in order to protect existing investments, their timing, extent and continuation varied from country to country, from industry to industry and even from firm to firm within an industry. Far more important to the continuing dynamic growth of industrial enterprise have been the latter two directions of growth—those that utilize the competitive capabilities of the enterprise by expanding (that is, by adding new units) in geographically distant markets and into related product lines. Here the patterns of growth are much more clear-cut, more continuous, and less affected by specific and constantly changing strategic considerations.

Obtaining new production facilities distant from the original works or factory came after, not before, the initial investment in production, distribution, and management. The first expansion of production usually occurred at home with the enlargement of the original plant, particularly when such expansion brought greater economies of scale or scope. As the marketing organization was geographically enlarged, opportunities appeared to reduce production, transportation, inventory, and other carrying costs by building plants

closer to markets distant from the original factory or closer to local sources of supplies, materials, or labor. The incentive for investment in production of facilities abroad was, therefore, quite similar to that for investment at home.

Tariffs and other discriminatory legislation, by raising the cost of finished goods shipped across national borders, did provide additional reasons for constructing production facilities abroad. At times factories were built to forestall competition in a new market, or as a bet on potential market growth of an area or to produce a variation of the product line to meet local needs and tastes. In nearly every case, however, the investment was made on the assumption that the enterprise had a competitive advantage over local producers. The large integrated enterprise also expanded abroad, just as it did at home, for defensive reasons to obtain assured sources of essential supplies, usually mineral or agricultural products, for its domestic and, later, its foreign processing plants. Again it did so largely when such supplies were not available at home and where local entrepreneurs had not developed the resource, as was often the case of direct investment in oil fields, mines, or rubber plantations.

The primary incentive, however, for direct investment abroad in production and distribution facilities and personnel remained that of expanding market share in distant countries and lowering the costs of making and selling their products in those markets. The decisions to have plants abroad depended on a calculus that balanced, on the one hand, the costs of producing both primary and intermediate products in plants of minimum efficient size with, on the other hand, the costs of transportation, distribution, tariffs, and other regulatory legislation. This is why most firms became multinational by building facilities to produce their basic lines in advanced rather than developing economies, that is, in economies where high per capita income created promising markets. This is also why such investment in distant production facilities followed rather than preceded that in marketing.

Where first movers had the strongest competitive capabilities, they went abroad most quickly. Thus, the first movers among the American producers of light, massproduced machinery--sewing, office, agricultural machines, and, later, automobiles and a variety of comparable heavier products such as elevators and printing presses were marketing and then produced abroad well before World War I. For example, by 1914 the two largest commercial enterprises in Imperial Russia were Singer Sewing Machine and International Harvester [3, pp. 65, 78, 193-95, 208]. By then Singer was producing 679,000 machines annually in Russia with a work force of over 2,500 wage earners and 300 salaried employees in Moscow and a sales force of 27,439 whose agents covered the vast territory from the Sea of Japan to the Baltic. Harvester's 2,000 workers in Moscow produced machines that sold through a network of branch offices in 11 cities that controlled about 80 percent of the farm implement

dealers in Russia. Both had even larger factories and branch organizations to serve Europe outside of Russia. A decade earlier two first movers in the United States in the electrical equipment industry and their two counterparts in Germany--General Electric, Westinghouse, Siemens, and AEG--already dominated world markets. By 1913, the German organic chemical producers had dominated their world trade even more completely than the electrical manufacturers did theirs. In that year out of 160,000 tons of dyes produced, the German companies accounted for 140,000 tons of this amount (77 percent produced by Bayer, BASF, and Hoechst). The neighboring Swiss firms accounted for 10,000 more while the total British output was 4,000 and that in the United States even less [6, pp. 121, 123, 145].

It is worth noting here that the inventor of synthetic dyes was a Britisher, William Henry Perkin. The greatest market in the world for the new dyes until well after World War II was the British textile industry. Dyes were based on coal, which Britain had in greater abundance than Germany. Indeed, the German dye companies relied on British coal. And early in the 1870s several of the German chemists who would later head the industrial laboratories in the great German companies were working in Britain. But after the German companies had made in the 1880s their investment in production large enough to exploit scope as well as scale, built their international marketing network, invested in research and development and recruited impressive managerial hierarchies, they quickly drove the British not only out of international markets but out of the British market. The British had every comparative economic advantage; the Germans, by making the essential three-pronged investment, acquired the critical competitive advantages. For much the same reason, two-thirds of the output of electrical equipment in factories in Britain in 1911-1912 was produced by the subsidiaries of General Electric, Westinghouse and Siemens [2, p. 150].

The fourth path to growth--that of product diversification--was based more on the competitive advantages of the economies of scope rather than those of scale, which drove multinational expansion. As the purpose of this paper is to help develop a framework for analyzing multinational enterprise, it is unnecessary to review that way of expansion. All that needs to be said about the development of organizational capabilities that permitted enterprises to diversify and to compete successfully in industries other than the one in which they began is that they utilized the economies of scope in the same manner as did the German dye firms when they moved into pharmaceuticals and photographic film. In the interwar years nearly all the leading American chemical companies took this same route to growth. The Du Pont Company, for example, used its facilities and skills based on nitrocellulose technology to move from explosives to rayon, cellophane, film, pigments, paints, varnishes and other finishes and refrigerants. Other firms such as Borden's, General Foods, General Mills, American Home Products, and other

food and drug companies used the economies of scope in marketing and distribution to take on successfully new product lines. Most important of all to successful product diversification was the organizational skills acquired by top management in selecting and in supervising the costly development processes that resulted in the successful commercialization of these products. Thus, by the 1930s, the top management of Du Pont was not only able to coordinate, monitor and plan for product lines based on nitrocellulose technology but also develop and oversee others based on organic chemical, electrochemical, polymer chemical, and high pressure synthesis processes.

THE MODERN MULTINATIONAL IN LABOR-INTENSIVE INDUSTRIES

This review has attempted to outline a preliminary framework to analyze the growth of multinational enterprise by examining the beginnings and continued dynamic growth of a new institution--modern industrial enterprise. The great majority of such multi-unit, multi-functional enterprises that came into being in the last two decades of the nineteenth century in the newer capital-intensive industries had direct investments abroad by World War II.

This framework, it must be stressed, is far less relevant to the labor-intensive industries with low-volume technologies of production. In industries where, given the technology, the minimum efficient size of plant remained small, where mass distribution did not require specialized skills and facilities, and where coordination of flows was a relatively simple task, manufacturers had much less incentive to make the three-pronged investment. In such industries as publishing and printing, labor, furniture, textiles, apparel, leather, seasonal and specialized food processing, and specialized instruments and machinery, the large integrated firm had few competitive advantages. Indeed, it often had competitive disadvantages. For size not only failed to bring lower costs but made the firm even less flexible in meeting changes in demand. This was normally the case in apparel (both cloth and leather), a number of food and drink processing industries, hardware, and specialized metal working trades. Even where scale and scope and the integration of production and distribution brought cost reductions, as occurred in textiles and lumber, they were rarely sharp enough to permit a small number of firms to dominate the industry. Many small single-unit firms continued to prosper. In these labor-intensive industries, the competition remained more on the basis of price and the ability to move quickly with changing demand.

In these industries, however, firms did go abroad. They often had developed capabilities that gave them advantages in both product and process. These competitive advantages, however, were not powerful enough to bring oligopoly and permit a few firms to dominate the market. Consider, for example, the different performance in the American market between foreign

producers of natural fibers and those of synthetic fibers. In 1917 the second and third largest textile firms in the United States--American Thread and Botany Worsted Mills--were subsidiaries of a British and a German multinational, respectively. Although each continued to be profitable, neither were listed among the top 200 American industrials in 1929. The four textile firms on that list in 1930 had become larger and enjoyed a greater market share than the 1917 leaders. On the other hand in rayon where scale economies were great, American Viscose, a subsidiary of Courtaulds, the first mover in Britain in rayon, remained throughout the interwar years the largest producer of rayon in the United States. Other European first movers--the Belgian, Italian, and German leaders that had followed Courtaulds after the War--remained major players. In fact, the only two American firms able to enter the American rayon market, Du Pont in 1922 and Tennessee Eastman in 1932, did so by exploiting the economies of scope existing in production and research of their existing lines.

This contrast between the processors of synthetic and natural fibers emphasizes again the significance of technology as a prime determinant of the structure of firms and industries, for the market for natural and synthetic fibers continued to be much the same. It also emphasizes the historical importance of the threepronged investment. Where the technologies led to substantial economies of scale and scope, where the distribution of volume-produced goods required an investment in product-specific facilities and skills, and where managerial hierarchies were needed to coordinate, monitor, and plan--in those industries the modern industrial enterprise quickly dominated and the first movers almost always became leaders in their global oligopoly.

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