A Historical Perspective on U.S. Industrial Leadership: Comments on Hannah

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The central question in Professor Hannah's paper is whether "America's unusual dominance among the world's large [industrial] businesses in the first half of the century represented a source of sustainable, global, competitive advantage." His answer is that it did not. America's large firms "might rather be a symptom of...the inefficiencies of a protected...[domestic] market." U.S. supremacy nevertheless persisted, Hannah claims, because "[t]he five laggards (Great Britain, France, Germany, Italy, and Japan) spent much of the first half of the twentieth century killing one another, invading one another's countries, and destroying one another's cities, industry, and infrastructure." As those nations started catching up in the prosperous global economy after World War II, "U.S. industrial leadership...was already fragile and contingent at its greatest hour." But the United States could still sustain its economic hegemony and "defeat potentially strong international convergence tendencies," because the country had "got its act together in the non-manufacturing sector...[and had forged] a stronger lead in services productivity than in manufacturing...." In this sense, twentieth-century American growth has been service-led; thus, "[i]t is in the service sector that the distinctive nature of the twentieth-century American productivity miracle must principally be sought."

Ironically, Hannah's own evidence (his Table 1) disproves the plausibility of this service-led scenario. Whereas Hannah suggests that the productivity lead of the United States over Europe is larger in services than in manufacturing, the data he marshals indicate the

reverse. Hannah never presents positive proof of America's substantial lead in service efficiency; his thesis of the service-led growth of twentieth-century America depends on his interpretation of the data in his Table 1. But he misses one critical observation of the table: the labor productivity lead of the United States over Europe has been consistently smaller (except for 1937/38 Germany, when it was approximately the same) for the entire economy than for manufacturing only. For 1988/90, for instance, the U.S. labor productivity lead over Britain was 30 points for the entire economy and 47 points for manufacturing. This means that the U.S. economy as a whole has done relatively worse compared to its manufacturing segment. Behind Hannah's misinterpretation of the data is his failure to recognize that some segments of U.S. non-manufacturing fared unimpressively, lowering the efficiency level of the overall economy. The poorly performing non-manufacturing industry in question could not be agriculture, because U.S. agriculture, as Hannah notes, has exhibited far superior international efficiency. Most likely, therefore, following the same logic of elimination that Hannah himself employs, relatively weak performance in certain service industries undermined overall economic efficiency.

Our own Table 1 confirms the basic premise that, as we have inferred, the United States has continued to have the most substantial productivity lead over Germany and Britain in manufacturing, not in services. Our table is derived from what is perhaps the most systematic international comparison of industrial productivity, that of David Dollar and Edward Wolff. It supports one of Hannah's basic points, that the relative efficiency of British and German manufacturing has stayed almost constant. Such stability, however, is not pre-determined or universal across nations. In the case of Japan, as the table illustrates, manufacturing has been a significant part of the catch-up story. Hannah's contention is thus only statistically correct, in that the relative performance of non-manufacturing industries has determined the overall catch-up pace of Britain and Germany. But the figures of the table reject Hannah's service-led hypothesis, because the productivity lag of both Britain

and Germany relative to the United States invariably has been larger in manufacturing than in services.

Table 1. British, German, and Japanese Labor Productivity Relative to U.S. Level

(Index, U.S. = 100 for Easch Industry for Each Year)

	Great Britain					Germany				Japan			
	1970	'75	'80	'85	'91	1970	'75	'80	'85	1970	'75	'80	'85
Manufacturing	65	64	60	65	65	73	74	80	73	50	56	68	79
Agriculture	38	44	57	53	56	33	40	48	44	22	28	28	24
Mining and quarrying	--	--	--	--	--	16	18	25	22	11	20	31	36
Construction	57	55	62	70	93	50	67	82	92	49	59	67	63
Utilities	31	32	63	83	90	52	53	71	59	95	81	98	107
Trade, restaurants, hotels	62	54	53	54	56	73	75	83	85	43	54	69	80
Transport and communication	41	42	41	47	49	60	54	63	73	50	51	46	57
Finance, insurance, real estate	223	195	209	218	232	132	144	181	220	84	106	128	161
Community, social, personal	103	93	98	87	91	194	212	235	245	89	84	84	90
Government services	55	55	57	57	54	95	98	99	100	98	104	114	129
All services	71	68	70	72	76	91	95	105	114	62	70	77	89
All industries	55	59	62	66	69	72	79	90	95	48	57	66	78

Source: For Germany and Japan, adapted from Dollar and Wolff [1993, Table 5.2, p. 99]; For Great Britain, from unpublished data tables compiled by Edward Wolff from OECD databases. The kind assistance and permission of Edward Wolff is greatly appreciated.

The most striking feature of our table, though, is the significant deviations of relative efficiency levels across industries and across countries within non-manufacturing industries.

Furthermore, the historical trends of the relative productivity levels of individual industries vary even within an economy. In Britain, for instance, the relative productivity of service industries like finance, whose efficiency has been historically impressive by international standards, and transportation has been more or less stable, whereas construction and utilities (which Hannah includes in services) have quickly caught up with the U.S. level. These irregularities in performance are specially notable for the industries that Hannah categorizes as "services," and they thus cast reasonable doubts on Hannah's general approach, which singles out the service sector as though it were a coherent and critical determinant of the international competitiveness of the United States.

The most intriguing question, however, is why and how U.S. industries have held their competitive strength in manufacturing for more than a century since the Second Industrial Revolution. Hannah and we agree on one basic answer. Organizational and technical capabilities have been critical for economic growth and sustained competitive advantage. The consensus, however, ends here. Hannah thinks that the sources of those capabilities are "complex, varied, contingent, and subtle." We suggest that large industrial enterprises are the prime agent embodying those capabilities.

Large industrial firms did play a key role in commercializing the products and processes of the new capital-using, increasingly knowledge-intensive technologies that drove twentieth-century economic growth. They were created to exploit those technologies and throughout the twentieth century continued to dominate the resulting industries. At the core of this sustained dynamism has been the learned capabilities accumulated through the firms' large-scale investment in improving existing products and processes and in developing and commercializing new ones. These capabilities have been sharpened by oligopolistic competition among large firms, global as well as domestic.

Naturally, as Hannah stresses, large enterprises, European and Asian as well as American, often failed to make the necessary investments in physical capital, human resources, technology, and

organizations and thus disappeared from the international oligopoly competition. The blunder of such firms, however, does not mean that the contributions of large industrial enterprises are unsustainable or unnecessary. On the contrary, it highlights the critical significance of healthy and vibrant large enterprises in capital-intensive, knowledge-enhancing industries for the development of a national economy.

The available historical lists of the 200 largest companies in the United States, Britain, Germany, France, and Japan affirm the intimate relationships between large industrial enterprises and the development of capital-intensive, technology-oriented industries. During the first half of the century, these firms concentrated in food and related products, chemicals, petroleum, primary metals, and the three machinery categories -- industrial machinery, electrical machinery, and transportation equipment. The distribution of the world's largest 500 industrial enterprises in 1962 and 1993 in our Table 2 indicates that this pattern has changed little in the past decades, except for a general movement toward more science-based areas such as chemicals, computers, and scientific instruments. (The growth in petroleum companies reflects the postwar development of state-owned companies.)

The industries in which the large corporations concentrated were at the base of the nations' technological capabilities and sustained competitive advantage. They were the industries that accounted for the critical mass of new capital and R&D expenditures and that were responsible for a major portion of the value-added in manufacturing. These are the investments that ultimately matter for the economic success of industrial nations, not the Nobel Prizes or patents that Hannah underscores. As the U.S. Census figures report, the largest 200 manufacturing enterprises accounted for an average of just under 50 percent of total new capital expenditures in manufacturing and for between 41.6 and 43.2 percent of total value-added by manufacturing between 1967 and 1987. By 1990, two-thirds of R&D expenditures came from two groups of oligopolistic industries: chemicals and pharmaceuticals and the three machinery categories.

Table 2. Industrial Distribution of the 500 Largest Industrial Enterprisesin the World, 1962 and 1993 (ranked by sales)

SIC	Industry	1962	1993
20	Food	63	65
21	TobaccoTobacco	9	5
22	Textiles	24	9
23	Apparel	0	3
24	Lumber	0	0
25	Furniture	0	0
26	Paper	22	23
27	Printing and publishing	5	12
28	Chemicals	59	79
29	Protroleum	36	50
30	Rubber	9	11
31	Leather	0	0
32	Stone, clay, and glass	14	21
33	Primary metals	90	33
34	Fabricated-metal products--	14	
35	Non-electrical machinery	39	26
35	Office and computing machines	18	
36	Electrical machinery	44	44
37	Transportation equipment	62	61
38	Instruments	1	10
39	Miscellaneous	11	4
Total		497	500

Note: Enterprises, including private and state-owned, are from market economies only. Firms included are manufacturers, though they often engage in such related activities as mining and distribution. Because of the lack of adequate data, 497 companies are listed for 1962. Fabricated metal enterprises (SIC 34) for 1962 are included in the primary metal group (SIC 33).

Source: For 1962, adopted and reorganized from Dunning and Pearce [1985, pp. 51, 171-80]. For 1993, compiled and reorganized from *Fortune* [July 1994].

The significant growth in both number and size of the European and Asian enterprises listed in Table 2 (181 firms in 1962 and 316 in 1993) has been the primary aspect of the postwar catch-up of other nations with the United States. If the European "laggards" were to catch up and if the industrial nations were to compete in global markets, they had to develop comparable capabilities in the core industries by building comparable and competitive large enterprises. Indeed, late industrializers like Japan and South Korea particularly made large-scale investments in those industries and the latest technologies since World War II. In both nations, as Hannah admits, industrial growth was driven by large diversified firms exploiting the opportunities inherent in these technologies. It is no mystery that Japan and Korea have been the prime examples of postwar catch-up, through which they have transformed their economies into international powers.

Beyond the general significance of large industrial enterprises in capital-intensive industries in twentieth-century growth, Hannah ignores two specific mechanisms through which the competitive capabilities of those large enterprises spill over into the rest of the economy. First, his assertions about the role of large enterprises fail to appreciate the linkage between those businesses and other firms that transact with them. In general, productivity and competitive advantage in one sector are intimately related to productivity and competitive advantage in the other. The most dramatic example is the development of the computer and accompanying software in the electronic data-processing industry. The writing of software requires the closest coordination with the makers of semiconductors and computers for which the software is written. Because European hardware manufacturers lost out to the American and Japanese makers, European markets for software operating systems are now dominated by American and, to a lesser degree, Japanese firms.

Second, the major sources of productivity growth in the service sector, one of Hannah's major concerns, have in fact come from product development in the manufacturing industries. The entertainment industry, for instance, has throughout the twentieth

century changed with technologies that originated in manufacturing--radio, movies, television, and video equipment, for example. In general, service productivity in industries such as transportation, communications, and finance improved substantially in the postwar years by means of manufacturing-based technologies, particularly computers and related products.

Not only have large industrial enterprises made significant technological contributions to increased service productivity, but also the firms themselves have integrated into such services as marketing, distribution, and finance and thus played a special role in technological diffusion. Indeed, their competitive success has depended on their ability to coordinate effectively flows of materials and information among their manufacturing, R&D, marketing, and financial operating units.

If organizational and technical capabilities are the most essential characteristics of economic growth, U.S. enterprises have maintained and developed sustainable competitive advantage in the major high-technology industries. European companies have lost out in such key areas as computers, semiconductors and software, and, except for Philips, in consumer electronics. On the basis of their long-established industrial firms, however, European nations still retain competitive strength in telecommunications, chemicals and pharmaceuticals and, through a consortium, are making a challenge in aerospace. On the basis of learned capabilities within large groups and corporations, Japanese companies dominate consumer electronics, large general-service computers, and bulk semiconductors and are strong in telecommunications. But they have had little impact on global markets in chemicals, pharmaceuticals, or, of course, aerospace. The United States has lost out in consumer electronics but still leads worldwide in microcomputers, microprocessors, and software and retains its strength in telecommunications, chemicals, pharmaceuticals, and aerospace.

Finally, Hannah's simplistic use of the market value of Imperial Tobacco's capital as a measure of competitive success seems to indicate that he is unaware of the most significant event in the history

of the international tobacco industry since its beginnings in 1880. Surely the U.S. Supreme Court's 1911 decision had a profound impact "on the business results of the two enterprises' strategies and structures between 1912 and 1937." By that decision, which became effective January 1912, the court divided American's tobacco business among four companies -- American, Liggett & Myers, Lorillard, and R.J. Reynolds. It also required American to sell its stockholdings in BAT and Imperial by 1915. This decision reduced American's size in terms of assets by more than half. Of more importance, by transforming the U.S. industry into an oligopoly, it permitted it to follow the patterns of oligopolistic competition described in *Scale and Scope*: "in most of the new oligopolistic industries market share and profits changed continually" [Chandler, 1990, p. 36].

As relevant to the competitive performance of the two companies was the Court's annulment of the agreement between the two after American's competitive victory over Imperial in 1902. By that agreement, Imperial retained the British and Irish markets and American kept those of the United States and its dependencies. The rest of the world was turned over to a new company, BAT, in which American held two-thirds of the shares and appointed two-thirds of the directors, with James B. Duke as chairman. Duke quickly rationalized international markets by building organizational structures and capabilities comparable to those he had developed at American Tobacco in the 1890s. BAT subsidiaries in China, Japan, and Germany (Georg. Jasmatzi) became the industry's giants in East Asia and continental Europe. Although American had sold its stock by 1950, Duke and his executives managed the firm until Duke's retirement in 1923. In this way BAT, "the overseas arm of American Tobacco," became "the overseas arm of Imperial" [Chandler, 1990, p. 247]. Would this transfer of the sustainable competitive advantage created by Duke and his managers have occurred if the Supreme Court had not annulled the 1902 agreement by forcing American Tobacco to sell its shares?