The American Miracle, 1875-1950, and After: A View in the European Mirror

Leslie Hannah
Centre for Economic Performance
London School of Economics

Business History: Theory and Comparisons

Grand Theory in business and technological history has been largely an American monopoly: it is difficult to amass a list of generalizers of the stature of Alfred D. Chandler, Jr., Louis Galambos, Thomas P. Hughes, William Lazonick, Nathan Rosenberg, and Mira Wilkins (and the list could readily be extended further) among European business historians. Indeed, even their domestic business histories typically have been less sophisticated conceptually than much American business history.[1] Comparative work in business and technological history also has been American-led, by books like *Scale and Scope* [Chandler, 1990] or *Networks of Power* [Hughes, 1983], though the non-American contribution to comparative studies -- for example, via the Fuji conferences and other bilateral meetings -- has been somewhat greater. Of course, comparative work is hard: Chandler, for example, has been extensively (if respectfully) criticized for *Scale and Scope* in Germany and Britain [e.g., Kleinschmidt and Welskopp, 1993; Supple, 1991; Church, 1993]. Only the exceptionally gifted and brave (or the criminally foolhardy) venture into both grand theory and comparative empirical work! I am only too aware that this paper,

[1]Continental European industrial economists, however, have been somewhat less hamstrung by the rigidities of Anglo-Saxon economics than U.S. industrial economists before recent theoretical reformulations. European economists have long considered industrial economics as the study of a process, rather than as a structure: a happy alternative that is more conducive to theorizing relevant to business history; see, e.g., the work of Alexis Jacquemin, Henk de Jong, George Richardson, Giovanni Dosi, or John Kay.

BUSINESS AND ECONOMIC HISTORY, Volume 24, no. 2, Winter 1995.
 ISSN 0849-6825.

born of a discussion with William Becker, runs similar risks, for my specialization is not America but Britain. In writing about America and comparing it with a wider Europe (and, from time to time, with Japan, for Japan cannot sensibly be ignored), I will therefore seek relative security by viewing America only in comparative perspective. I hope this is not a cowardly evasion, for, to misquote a nineteenth-century British imperialist, "what can they know of America, who only America know?"

Much of the U.S. literature views national competitive advantage as a constant warlike battle in which victory rarely lasts for long, and new competitors mercilessly defeat the top dogs of yesteryear. The historical litany since the "discovery" of the New World five centuries ago is well known: the Netherlands beat Spain, Britain beat the Netherlands, America beat Britain, and America -- in this doleful story -- is currently being beaten by Japan (or at least soon will be). This creates, I believe, a profoundly misleading perspective. It misconstrues the nature and (previously unequaled) extent of America's domination of the capitalist industrialized world in the first half of the twentieth century and encourages misunderstanding of the nature of the challenges that the United States now faces. America's experience was profoundly different from the other listed cases of alleged rise and decline. Moreover, the metaphors used, though they may be relevant to discourse in military history -- where absolute size and firepower are critical -- are quite out of place among the traditional concerns of economic and business historians, which I take to be living standards and the productive powers of business that underpin them.

Where was the American Miracle?

The business perspective rather than the military one immediately marks out America as special. Though the United States could not match Europe in total industrial output, exports, or military power in the middle decades of the nineteenth century, it could match Europe -- probably including Britain, the most productively efficient

country in Europe -- in living standards and productivity. As the United States quickly developed a wide range of manufacturing capabilities, moreover, it had to do so (given the high opportunity cost of free labor on the American continent) as an equal or superior, not as a mere follower, of the manufacturers of the Old World. Most of the statistics that show America "overtaking" Britain in the nineteenth century are, then, somewhat misleading. Indeed, as far back as statistics go (to the 1860s in Steven Broadberry's data [1993, p. 774]), American manufacturing labor productivity levels were already twice Britain's; in fact, Britain (after slipping disastrously and for rather obvious reasons between Broadberry's 1913-20 and 1937-50 benchmarks) is in the 1990s nearer to U.S. manufacturing productivity levels than it was in the nineteenth century.[2] Much of the change in the relative world position of their manufacturing businesses (which has occurred despite British catch-up) is due to the fact that in 1860 the two countries were roughly equal in population size, whereas in 1995 America's population is five times that of Britain. That, in turn, as the millions of entrepreneurial European migrants who created this change understood, occurred not merely because of the special nature of American manufacturing (many of whose lessons could be, and were, replicated in Europe), but rather because of the better life offered by America's large endowment of land and other natural resources and the liberal (in the European

[2]I have used Britain as the European comparator, but Germany is almost perfectly substitutable, having generally performed as badly as Britain. German manufacturing productivity was the same as British in 1875 and is slightly above (or, if the former East Germany is included, slightly below) in 1995: both have been well below America's for the whole period in which such measurements can be made. Germany's population has generally been rather larger than Britain's, however, except briefly in the decade following 1945. This explains some common American misperceptions, which are based on Germany's larger absolute size rather than on productivity calculations; and on data selected from periods (e.g., the 1900s or the 1950s) when Germany's productivity performance was superior to Britain's, while ignoring the periods (e.g., the 1940s and 1980s) when the reverse was true. These data also leave out the problem of changing *capital* productivities in manufacturing; data on that are less good, but it is not clear that allowing for this would change the conclusions.

sense) institutional arrangements that fostered their productive development [Wright, 1990; Engerman and Sokoloff, 1994].

Table 1. Productivity Performance in the Long-Run: the USA vs European Industrial Powers, 1889/90 - 1987/90

(USA = 100 at all dates)			
	1889/90	1937/8	1987/90
Manufacturing output per man-year †			
USA	100	100	100
Germany	48	49	46§
UK	51	48	53
GDP per man-year†			
USA	100	100	100
Germany	49	47	63*
UK	92	63	70

(§) West Germany only was higher at 57
(*) West Germany only was higher at 74
(†) Germany's performance improvement would look better in man-hour terms: Germany's workers used to work significantly longer hours but now work similar hours to British workers and rather shorter hours than US workers. It is more difficult to derive long-run series on a man-hour basis.

Source: Hannah [1994], ultimately deriving from Broadberry[1993] and Maddison [1989, 1991].

Nonetheless, much recent literature [e.g., Chandler, 1990; Mowery and Rosenberg, 1989] sees America's distinctive achievement in building organizational and technical capabilities within manufacturing firms as the wellspring of the American miracle. The evidence that such strengths existed is overwhelming, but one can see the limitations of an exclusive concentration on this view in Table 1, which compares America's *overall* productivity performance with that of *manufacturing only*, relative to two of its main world competitors. It is striking that Britain and Germany (the two powers that, at the beginning of the century, most nearly approached America's exceptional manufacturing productivity

standards) both quite failed to do very much to close the gap over the next hundred years. That dual failure is all the more striking in the light of the very rapid strides made by initially more backward countries: France, Italy, and Japan. Their manufacturing productivity levels were all behind those of the three nations shown in the table in the late nineteenth century, but they have now overtaken the United Kingdom and (united) Germany - though not yet America.[3]

The changes in the relative living standards of the three countries implied by the data in Table 1 are, however, almost entirely due to changes in the non-manufacturing sectors, captured in the GDP-per-worker figures in the bottom half of the table.[4] The enormous competitive advantages of Midwestern U.S. agriculture had been recognized (by the withdrawal from much farm production) in the late nineteenth century in, for example, Massachusetts (by its customs union with other U.S. states) and in Britain (by its free trade policy, which gave it access to cheap food from the United States, Argentina, and Australia), but not in Germany. Thus, though Germany could then equal British manufacturing productivity standards, only when it ran down its inefficient agriculture (after World War II) could it equal British living standards. This has long been understood, of course, in the literature of comparative economic growth [Denison, 1967]. Somewhat less clearly appreciated has been the importance of the service sector, which now overshadows agriculture as the non-manufacturing component in GDP in all the countries and which has

[3]On the same basis as in Table 1, the manufacturing scores of France, Italy, and Japan were, in 1889/90, only 33, 20, and 7, but by 1987/90 had risen to 59, 59, and 73, respectively. Japan achieved in twenty years from 1970 (when it reached European productivity levels) a convergence on U.S. productivity standards that Germany and the United Kingdom had failed to achieve in a hundred. These comments apply only to manufacturing, not to the greater part of Japan's economy, which is no more efficient (or, by U.S. standards, no less inefficient) than Europe's because of exceptionally low productivity in Japanese agriculture and services.

[4]Living standards (as proxied by GDP per head of population) are a product of changes in participation rates as well as of changes in GDP per worker. British and German losses of overseas investments as a result of wars, and the comparable American gains, also affected relative GNP and national income (though not the GDP shown in the table).

been for some time larger than manufacturing in terms both of employment and of value-added.

The point is not that manufacturing, and particularly capital investments in machine technology, was unimportant, but that it was important *everywhere*. Yet it is in the service sector that the distinctive nature of the twentieth-century American productivity miracle must principally be sought. This is found by standard growth-accounting exercises,[5] but it emerges clearly also if we look at the comparative international sectoral productivity trends that lie behind the data in Table 1.[6] Comparisons of nineteenth-century service industries like shipping and banking with their modern equivalents (airlines and financial services generally) suggest that (unlike in manufacturing) America was internationally uncompetitive in many service sectors in the later nineteenth century, but became the world productivity leader after World War II [Boyce, 1995; Jones, 1993; Gemmell and Wardley, 1990; Weiss, 1980; and compare Baily, 1993]. Britain could almost match American living standards in the

[5]Manufacturing in every advanced economy in the first half of the twentieth century (when America was clearly the world's most productive economy) accounted for only about a third of value-added, but in Germany, the United Kingdom, Japan, and France it accounted for more than half of the productivity increase, as measured by standard growth-accounting techniques. The United States was the only major country in which industrial productivity increases accounted for less than half the total productivity increase in that period. The United States was joined in this dependence on services by Britain after World War II, and it may shortly be joined by the other major "industrial" powers (see, e.g., Crafts, 1993, p. 16).

[6]There can be complex compositional effects accounting for divergences in trends in GDP per head and productivity changes in the sectors of which GDP is composed. This section represents a highly compressed summary of a complex argument; more effective disaggregation of the sectors in which superior American performance can be detected is forthcoming in the work of Steven Broadberry, to whom I am extremely grateful for discussion of these issues.

later nineteenth century, essentially because its service sectors were so superior; it now struggles hard to keep up in those sectors.[7]

Thus, what happened in the twentieth-century American miracle was essentially that America got its act together in the non-manufacturing sector to consolidate a lead it already held (perhaps for essentially non-replicable reasons) in manufacturing (and agricultural) productivity. That the United States was able to defeat potentially strong international convergence tendencies and to forge a stronger lead in services productivity than in manufacturing is perhaps not surprising. Many services -- unlike manufacturing -- were not traded, and multinational investment by American corporations in many of them was either legally barred by most countries or not pursued overseas. The two major means by which American competitive advantages in manufacturing leaked to follower countries were, then, less effective in the service industries. The results were striking, at least in those areas where meaningful productivity comparisons are possible. Europe's productivity gaps were generally larger in the service industries (particularly in transport, communications, and utilities) than in the manufacturing industries on which so much of the literature on national competitive advantage has focused [e.g., Smith, Hitchens, and Davies, 1982; Forsyth, Hill, and Trengrove, 1988; Foreman-Peck and Millward, 1994].

There is a critical lesson here for U.S. business history. It may be just as important to study the development of the Tennessee Valley Authority, Universal Pictures, MacDonald's, Citibank, Marriott, and American Airlines as it is to study General Electric and Du Pont. A start has been made [e.g., Cleveland and Huertas, 1985; Vietor, 1994], though it is not always easy in such accounts to discern why America has done so well. Indeed, a striking feature of the business historiography of the U.S. utilities sector is its focus on the sector's problems rather than on its apparent superiority to European (usually

[7]The other reason was, of course, that America was a large international debtor, whereas Britain was a large international creditor: their GNP per head was rather closer than their GDP per head. This is true again in 1990, though America briefly became a large international creditor in mid-century.

state-owned) solutions to the market regulatory problems that such industries pose. Historians of technology have shown a more cosmopolitan approach [Hughes, 1983], but much work remains to be done in unraveling the secrets of America's twentieth-century service-sector successes. One key will certainly be a better understanding of the subtleties of regulatory policy [McCraw, 1984; Galambos and Pratt, 1988; Becker, 1992]. I shall not, however, take my own advice in pursuing that thread, but will return to the core business history literature on manufacturing.

Did Large Manufacturing Corporations Give the United States Sustainable Competitive Advantage?

A wide variety of American business and technological historians [Chandler, 1962 and 1977; Lazonick, 1991; Mowery and Rosenberg, 1989] have advanced powerful arguments that the organizational and technological capabilities of large American manufacturing corporations distinguished the United States in the first half of the twentieth century. Despite the inability of America to increase its manufacturing productivity lead in that period (Table 1), there may be something in this, though not, I shall argue, as much as is sometimes claimed. As Table 2 suggests, early in the twentieth century over half, and by mid-century perhaps more than three-quarters, of the world's largest corporations were in the United States. America was then clearly the pre-eminent industrial power; since then, its dominance has declined and now barely a third of large corporations are American. Obligingly, the source of many of America's current neuroses about its world position -- Japan -- shows up powerfully in the recent statistics. Yet great care is needed in interpreting this table. We should note, for example, that the Chandlerian picture of comparative European business history fails to appear in this data. Indeed, I have (only half-jokingly) suggested that in "deconstructing" *Scale and Scope* a helpful rule of thumb is to assume that (at least after World War I) what they say about Germany applies to the United Kingdom, that what they say about the United

Kingdom applies to Italy; and that neither can be assumed to have anything whatsoever to do with competitive advantage or economic performance [Hannah, 1994]. This is not because organizational and

Table 2. The "Nationality" of the World's Largest Industrial Enterprises, 1912-1993

	Expected* 1912 distribution	1912 (by capital)	1937 (by capital)	1956 (by sales)	1962 (by sales)	1993 (by sales)	Expected* 1993 distribution
USA	(27)	57	62	78	60	32	(32)
Japan	(14.5)	0	4	0	6	27	(16)
Germany	(19)	22	10	6†	7†	6	(10)
France	(11.5)	2	0	2	5	5	(7)
Italy	(10.5)	0	1	1	1	1	(7)
UK	(13)	14.5	18	10	11	9	(7)
Other	-----	4.5	5	3	10	20	-----

* The "expected" distribution is the actual percentage of the global top firms in the six large industrial countries, redistributed according to their relative national populations in that year.

† West Germany only in 1956 and 1962. East German corporations were included in 1912 and 1937; none, except arguably the Treuhand, were among the largest corporations by 1990.

Source: see Statistical Appendix. Nationality is determined by head office location.

technical capabilities are unimportant, but rather because their sources are more complex, varied, contingent, and subtle than much U.S. literature suggests. The European-oriented literature, stressing the importance of the German medium-sized firms or *Mittelstand*, the social capabilities of Germany's industrial training system, or the benefits of Italian inter-firm networks, seems somewhat nearer the mark in accounting for favorable European performance [see, e.g., Prais, 1981, 1994; Piore and Sabel, 1984], than the (judging from the table, ordinary or substandard) performance of German or Italian large corporations. But that is another story.

Nonetheless it is hard to ignore the evidence for America in Table 2. America was the only country to depend so heavily on large industrial corporations in the earlier years of the century, when its share of large corporations was significantly greater than its share of these countries' population (compare the first two columns of Table 2), or GDP. That observation is, however, far from conclusive evidence that these American corporations had a sustainable global competitive advantage, on the lines implied by Chandler [1990]. Indeed, the American achievement in the first half of the twentieth century was essentially the achievement of a self-contained, continental power, functioning behind high protectionist barriers and with the benefit of enormous endowments of natural resources [Wright, 1990], not primarily the outcome of facing global competition from equals.

American involvement in global competition was minimal compared with the two other major industrial powers. In 1913, for example, the highly protected U.S. industries exported only 5 percent of their manufactured output, compared with around 30 percent for Germany and around 40 percent for the United Kingdom. U.S. participation in direct investment overseas then was also proportionately much smaller than that of Britain, Germany, and even France; probably not until after World War II -- and the onset of relative decline -- did the United States overtake Britain as an international direct investor [Dunning, 1988]. Even in the new industries of the Second Industrial Revolution, as Table 3 suggests, American exports (on a population-adjusted basis[8]) were all below the levels achieved by Britain or Germany. In normal years,[9] America did not seriously approach the level of global market

[8]It cannot be over-emphasized that the usual comparisons of the decline in European exporting and the rise of America and Japan are highly distorted by the failure to make this correction. European populations have increased only slightly over the last century or so, while America's has quintupled and Japan's has more than tripled. For an exception to the quite general failure to adjust for this in international comparisons, see Maddison [1989].

[9]The temporary German-American disparity in 1950 was obviously the result of the outcome of the Second World War.

involvement that the leading European industrial producers routinely achieved (and, given their raw material disadvantages and smaller size, *had* to achieve). The exception was in the automobile industry, where higher American living standards and artificially low fuel prices created a large domestic market and gave American exporters access to economies of scale that were then unattainable in Europe. However, such U.S. "first-mover" advantages proved unsustainable: when European living standards after the war approached those of the United States between the wars, and the oil fields of the Middle East and North Africa were developed, firms like Volkswagen (which produced few cars before 1945) were quickly able to establish internationally competitive capabilities.

Table 3. Comparative Exports Orientation in Some "New" Industries in current £ Sterling of Exports per 100 Population

	Chemicals			Electricals			Automobiles		
	1899	1929	1950	1899	1929	1950	1899	1929	1950
USA	9	27	156	2	21	98	1	103	268
Germany	33	97	152*	2	48	192	1	15	79*
UK	31	78	236	5	43	280	2	53	599

* West Germany only, for population and exports

Source: Author's calculations from export data in Tyszynski [1951, pp. 277, 279, 281] and population data in Maddison [1991, pp.229-39].

There seems to be some ground, then, for doubting that America's unusual dominance among the world's large businesses in the first half of the century represented a source of sustainable, global, competitive advantage. Indeed, some of us have long suspected the contrary: that the unusually large corporations might rather be a symptom of temporary market limitations (or what economists, with some exaggeration, call market "failures") in America's rapidly developing economy. The high levels of vertical integration observed in large U.S. corporations [Chandler, 1977] derived partly from the

inefficiencies of a protected and dispersed continental market compared with the smoother working of efficient, established supply chains in Europe [Hannah, 1980, and see also Kocka, 1980]. One might expect to see U.S. vertical integration declining in the twentieth century if this were true. The weak quantitative data on the U.S. suggests stability or declining advantage [Scherer and Ross, 1990, pp. 94-96; Fligstein, 1990, p. 343], and in more successful follower nations, like Japan, the evidence for extensive vertical *dis*integration of firms is stronger [Fruin, 1993; Yonekura, 1994].

The widespread use of diversification, managed by multidivisional organizations, also may not be a sign of U.S. management strength [Chandler, 1962], but rather of U.S. capital market weaknesses [Hannah, 1994]. Some latecomer countries did, it is true, adopt similar strategies of corporate diversification to overcome backwardness -- Japan's *zaibatsu*, Germany's earlier diversified enterprises, Italy's state companies,[10] South Korea's *chaebol* -- but they generally abandoned them as they approached maturity; even Italy and Korea are now hesitantly doing so. But Germany and Japan engaged in substantial deconcentration and deconglomeration activity and developed more focused companies after World War II, a policy that may have been helped by loose intercorporate shareholdings and other network capabilities and monitoring devices not paralleled in U.S. capital markets [e.g., Fruin, 1992].

The hypothesis that America's precocious commitment to large-scale, integrated enterprises gave it powerful first mover advantages would acquire somewhat greater plausibility if those advantages had proved sustainable over time. The evidence is mixed, but, as the declining post-1956 U.S. share of the world's largest

[10]In the 1930s, this was merely a by-product of banking rescues under Mussolini; after the war, there were traces of more purposive diversification in the Italian state sector.

corporations in Table 2 suggests, many were not sustainable.[11] Yet America's earlier performance *was* the exception, and it certainly coincided with commitment to large-scale corporate organization. Overall, U.S. productivity performance in the critical transwar period, 1913-1950, was markedly better than all five major follower countries. Japan, Germany, France, Italy, and the United Kingdom all had slower overall productivity growth than the United States in that period, even though the United States was already well ahead of most of them (see Table 4). Such institutional and productivity divergence, however, has not been the norm among advanced countries [Maddison, 1989].

Table 4. Falling Behind and Catching Up: Per capita GDP at Purchasing Power Parities

	Annual Rate of Falling Behind the USA	Annual Rate of Catching up with the USA	Backwardness relative to the USA		
	1913-50 % p.a.	1950-89 % p.a.	1913	1950	1989
			(US GDP per head = 100 at all dates)		
Japan	-0.6	+3.9	23	18	82
Germany	-0.9	+1.7	54	39 †	76 †
France	-0.4	+1.2	56	48	76
Italy	-0.4	+1.6	43	24	71
UK	-0.6	+0.3	83*	66	74

* excluding Southern Ireland (which would have reduced the level)
† excluding East Germany (which would have reduced the level)

Source: Author's calculations from original data in Maddison [1989] at 1985 US $ prices, with "constant" borders for growth rate calculations.

It seems obtuse, however, to seek the reasons for these standings in the traditional subject matter of business history. The five laggards

[11]This decline is very much more rapid, it should be noted, than Britain's small postwar decline in representation among large firms, despite America's more rapid population increase.

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. Such human tendencies to collective mayhem in North America were more constrained: those parts south of Canada entered "world" wars reluctantly, late, and usually only after extreme provocation. Even then the United States's mobilization usually increased rather than compromised its organizational and technical capabilities, unlike the case in the other industrial powers. Moreover, the absurd imperial conceits of all the other five -- and no doubt some other factors -- contrived to perpetuate their problems into peacetime, creating inflationary and protectionist policy idiocies that further compromised their capacity to converge on U.S. productivity standards. (U.S. macroeconomic policy in 1929-39 was arguably nearly as damaging as inflation elsewhere, but at least the stupidities of U.S. protectionism did not divide its already large continental market as inefficiently as similar protectionist policies did in Europe and Asia.) With such profound geopolitical constraints on European and Japanese economic performance being present earlier, and with the clear evidence that the five exhausted combatants did far better under the postwar Pax Americana (as they had in some cases been doing under the relatively peaceful pre-1914 Pax Britannica), it is surely not necessary to look much further for the sources of the American miracle than the geopolitical maladies that afflicted her major potential competitors.

Certainly the evidence in the later columns of Table 4 is consistent with the view that all of these countries either already had or quickly created the social capability for business growth that enabled them confidently to resume a process of convergence on the standards of the global leader after the 1913-50 interlude. Whereas all of them grew more slowly than the United States during 1913-50, in the postwar decades all of them grew more rapidly, and their rate of catch up with the United States (with the notable and temporary exception of Britain) was faster than their earlier rate of falling

behind.[12] The "convergence" hypothesis -- which is generally thought to be appropriate to OECD-style economies that have the fundamental social institutions conducive to rapid growth -- explains much of this postwar pattern quite well. Each country's postwar rate of growth is proportional to the distance from U.S. living standards shown in the last two columns of Table 4. Japan, for example, was initially farthest behind and it grew fastest, but, since it has overtaken Europe, its growth rate has been about the same as Britain's, while French and German productivity growth rates have fallen behind even Britain's since 1979 [Crafts, 1993]. The long-run results are striking. In one sense the world is back where it was in 1913, in terms of balanced productive power: Japan is now about as near to U.S. living standards as Britain was in 1913. What has changed is that, whereas then only Britain and a few smaller European countries could rival America's productivity overall,[13] now there are five major countries with living standards around 75 percent of America's, with all that implies for their technical and educational sophistication and business competitive power.

U.S. industrial leadership, in this scenario, was already fragile and contingent at its greatest hour (that is, around 1950), for it relied not only on its own remarkable internal qualities, but also on the stupidity of others, which, under the postwar Pax Americana, they proved able and willing to put aside. This interpretation is reinforced by an examination of the long-run fate of the largest global enterprises listed in Table 2 for 1912, most of which were U.S.-based. Very few of them, in fact, have survived on anything like the relative global scale that they achieved in the years of the American miracle. Of the top ten global firms of 1912 -- most of which were American--

[12]In GDP per head; as we have already said, manufacturing is a more complicated story.
[13]In manufacturing alone; Germany in 1913 was also Britain's equal and a serious rival for the United States, as was France in the lighter manufacturing industries. Italy and Japan were not then serious industrial challengers.

headquartered -- only two (Exxon[14] and General Electric) have in fact survived in roughly the same position today, by virtue, respectively, of pre-emptive control of natural resources and extraordinary skill in diversification and managerial renewal. Most -- like Navistar[15] -- fell well below the top 100, or -- like Singer or Pullman (when aggregated with the more efficient British and Texas firms that recently took them over) -- fell well below the global top 500 [Hannah, 1994].

Even the firms in the 1912 list that remained in the top 500 often faltered more seriously and at an earlier date than American business historians have allowed. The treatment of the performance of American Tobacco and Imperial Tobacco in *Scale and Scope* [1990, pp. 148-49] demonstrates this point clearly. It is difficult, as simple descriptive history, to better the contrast between the "impressive management hierarchy" with centralized head-office control at American Tobacco and the "loose federation" of the family owners of Imperial. Where it strikingly misses out is in a discussion of the business results of the two enterprises' strategies and structures between 1912 and 1937, the period the narrative covers. In fact, Imperial was the fastest growing of the largest global firms of 1912, while American Tobacco was one of the clear corporate failures in that period: an elephant that did not "learn to dance." The market value of Imperial's capital in 1912 was $111 million (making it seventeenth in rank among global corporations), but by 1937 it had grown to $1,604 million, making it four times the size of American Tobacco (which in 1912 was larger than Imperial). Imperial Tobacco by 1937 was, in fact, the second largest capitalist firm in the world, after General Motors [Schmitz, 1993].

The ultimate fate of the renamed American Brands' cigarette interests starkly underlines the necessity of looking at long-run business performance rather than making arbitrary, a *priori* judgments about organizational efficiency. The position of American Brands

---

[14]Standard Oil of New Jersey in 1912.

[15]International Harvester in 1912.

was eroded, first by R.J. Reynolds, then by Philip Morris, and, with a current U.S. market share of only 7 percent, its cigarette interests have just (1995) been taken over by British-American Tobacco (BAT)[16] (better known in the United States as Brown & Williamson), a British firm already having a U.S. market share nearly twice that of American Tobacco. The one-time market leader now has a market share of precisely zero, hardly reflecting a "sustainable" competitive advantage of a first-mover managerial hierarchy!

But American Brands is merely an early and long-continued example of a general American -- or, perhaps more precisely, leading corporation -- problem. The large integrated organizations created in the U.S. turn-of-the-century merger wave were often performing reasonably in their protected domestic market (and also sometimes abroad), while global competitors marked time; but they were to become far more vulnerable when they met serious foreign competition, whether in home or export markets, after the war. Few of their first-mover advantages were sustainable, for reasons that are well understood by theorists of business strategy [Lieberman and Montgomery, 1988; Kay, 1993]. To suggest that first-mover advantages are easily entrenched by large, integrated corporations is, in fact, to trivialize the fundamental problem of business strategy.

Did Technological Capabilities Give the United States Sustainable Competitive Advantages?

It has been difficult for business and technological historians of the United States to track the evolution of U.S. technical capabilities relative to other countries, for they necessarily lack what, for business historians of other countries, has become a fundamental tool of analysis: long-run statistics of foreign patenting in the United States [e.g., Dosi, Freeman, and Fabiani, 1994]. More recent figures,

[16]BAT was London-headquartered but mainly American-owned in 1912 but was fully acquired by British interests in the 1920s; Philip Morris, by contrast, was originally British but became American at roughly the same time, and after World War II took over from R.J. Reynolds as the principal competitor of flabby American Tobacco.

including U.S. patenting performance, are available, based on all OECD patents. America does not show up in a favorable light: its rate of foreign patenting per head of population, for example, in 1963 and 1983 was below the level achieved by Britain, France, or Germany [Hannah, 1994]. Yet this is not a fair test of American technological competence: European firms have a far stronger incentive to patent in the large U.S. market than U.S. firms have to patent anywhere abroad.

Table 5. Cross-Border Payments for Royalties, Loyalties, Licenses, Patents and Technical Know-how

	1968			1983		
Country	Credit	Debit	Surplus (+) or Deficit (-)	Credit	Debit	Surplus (+) or Deficit (-)
	(US$M 1968)			(US$M 1975)		
US	1,279	-	+	4,329	132	+
Japan	29	296	-	646	749	-
Germany	105	251	-	365	729	-
France	61	142	-	558	618	-
Italy	65	219	-	120	486	-
UK	250	209	+	651	510	+
US share of 6	71%	n/a	n/a	65%	4%	n/a

n/a - not applicable.

Source: 1968, Merigo and Potter [1970, p.15]; 1983, Sirilli [1992, p. 359].
(N.B. All the tables in this paper should have strong health warnings from the Statistician-General attached: this one more than most! These statistics are partial and biased towards intra-corporate payments).

Despite the lack of comparable patenting statistics as a validating yardstick, the common-sense view that in the first half of the twentieth century the United States became the world's foremost source of technological innovation seems to be sustainable. While

Streit's [1949] data have been criticized as containing an "Anglo-Saxon" bias, they show the United States's midnineteenth-century share of global innovations of about a quarter rising to above half in the twentieth century. Later (if somewhat imperfect) data on licensing and royalty income also confirm America's position as the world's largest source of technological know-how (see Table 5).

The stronger suggestion of David Mowery and Nathan Rosenberg [1989], that America devoted a significantly higher proportion of its resources to developing its scientific and technical capabilities than follower nations, appears more questionable. America's scientists, for example, could not match European propensities to win Nobel Prizes until after World War II: the United States was, indeed, an intellectual pygmy in basic science at the time it became an industrial giant [Hannah, 1994]. Moreover, R&D spending before 1939 was much less than it later became. Both Britain and Germany may have matched the low U.S. level of around 0.2-0.3 percent of GNP invested in R&D in the 1930s, but in the decade or so after World War II only Britain sustained the rates as high as 1.5 percent of GNP that were then set by a transformed level of American R&D spending [Hannah, 1994; Edgerton and Horrocks, 1994; Keck, 1993; Hack and Hack, 1985].

Given the size of America relative to all the follower economies, this nonetheless meant that most R&D in the capitalist world after the war was being undertaken in America, and this proved the source of some manufacturing competitive advantages that were sustained longer than elsewhere, notably in aircraft and computers [Hannah, 1994]. Indeed, aerospace was the only major industry in which (despite heavily subsidized European competition) the U.S. share of global markets rose in 1960-86, and (despite strong Japanese competition) computers were one of the areas in which U.S. relative decline was least marked [Chandler, 1994; Franko, 1989]. Yet first-mover advantages in science-based industries are also difficult to sustain, because patent protection is of only limited effectiveness except in a few areas like pharmaceuticals. This is, indeed, why the follower countries have found it so easy to catch up: though I have

argued that the most successful followers often differentiated their industrial organization and products [Hannah, 1994], they all also relied heavily on copying America.

Technical capabilities -- and much tacit knowledge -- are required for copying as well as for invention, but such development appears not to have presented an insuperable barrier for the major follower countries. Copying need not create only one-way flows from America to its rivals; but, as Rosenberg and Steinmuller [1988] have argued, America has been handicapped in global competition, not so much because U.S. businesses are no longer willing to invest in technical capabilities as because decades of technological leadership have left American businesses uniquely ill-equipped to benefit from learning from others.[17] The extremely low U.S. share in outward payments for technology -- 4 percent of the top six countries' expenditure in 1983 in Table 5 -- supports this view. The potential spillovers from global technical progress are now greater outside America [e.g., Bernstein and Mohnen, 1994] than inside it, as is to be expected now that the five follower economies generate substantially more than half the collective output of the six (as America did for much of the mid-century period).

The key determinants of copying capability are social learning and adaptability, which are fundamentally created or strengthened by the educational system. American business historians have generally been kind to their country's educational system and, historically, some aspects of it, such as the land grant college system, have been one of the country's fundamental competitive advantages. Education (outside America's remarkable elite institutions) appears, however, to have been a notable exception to the modern American productivity miracle. As we deduced from Table 1, a key part of the American miracle is its greatly improved relative performance in the service sectors. Yet, in the last thirty years, for which internationally

[17]For similar psychological reasons, Britain had also suffered from a milder version of the "not invented here" syndrome in the earlier and middle decades of the century: indeed, as Table 5 shows, it long remained the only major country besides America with a "technological surplus."

comparable educational output comparisons have become feasible, America has often ranked at the bottom of the class. Although the United States performs at the top of the international league table on measures of educational inputs (expenditure on schools, years of schooling, numbers of teachers) and on student self-assessment (are you happy? do you know enough?), it invariably appears near the bottom in league tables of educational output (literacy, scientific knowledge, math scores) [Anderson, 1967; Prais, 1994; Comber and Keeves, 1973]. The implied relationship, when observed in the business sector, is generally described as low productivity.

Envoi

The British used to enjoy frightening themselves by projecting recent growth rates into the future: a mere thirteen years ago, Sidney Pollard [1982, pp. 6-7] was telling us that only optimists could doubt that Spain and Greece would have overtaken British living standards by the 1990s. As of 1995, we are still waiting. Americans have, of course, recently amused themselves with similar Japanese scenarios, which the British (as old hands at decline) readily recognize. It is a simple matter of arithmetic to show that, if the relative growth rates of the last fifteen years are continued, Japan will overtake American living standards early in the next millennium. It is perhaps unnecessary to deepen the gloom unbearably by adding that, very shortly afterward, on identical assumptions of its own recent relative growth performance continuing, so will Britain. It need never happen (and probably will not),[18] but, if it does, I suspect that it will have more to do with America's social and political incapabilities than with its, often imagined, business and technological incapabilities. Political incapabilities were, after all, what -- in a different way --

[18]I have suggested, rather, that Japanese and British rates of growth are both likely to decline as they approach the American production possibility frontier, defined by (changing) current technology [Hannah, 1994]. Pushing the frontier forward is more expensive than moving toward it.

finished off the five follower countries in 1913-50 and helped to create the American miracle. In all nation states, business growth is still profoundly dependent on the institutions and rules of the game that the political superstructure establishes. Indeed, that is surely why, even in the age of the modern, footloose, multinational businesses that are diminishing such dependence, we are still fascinated and old-fashioned enough to indulge in the arcane science of judging business performance in national league tables at all.

✣✣✣✣✣

Statistical Appendix: The Largest Global Industrial Enterprises, 1912-1993

Table 2 in the text is derived from a variety of sources on the world's largest industrial companies, adjusted to achieve the maximum feasible coverage from extant listings, on an approximately comparable basis over eight decades. Before 1956 there are no global lists ranked by sales similar to the later *Fortune* lists, though partial U.S. lists - for example, for 1929 - suggest that many firms ranked high by the capital measure would also rank high by sales [Wilkins, 1974, p. 517]. Early firm sizes can also be measured by employment: comparison of national listings for Germany, Britain, and Japan [Kocka and Siegrist, 1979; Shaw, 1983; Fruin, 1992] suggest that countries at approximately similar stages of development would rank similarly, though more backward countries like Japan, with large, labor-intensive textile firms, would rank more highly by employment-size rankings than in the capital rankings used for the early years in the table. The 1956 *Fortune* lists suggest very similar rankings of countries by sales and by assets, though the capital-intensive United States is, of course, somewhat less dominant by sales (and *a fortiori* by employment) than by asset-based measures. The impact of the size measure on changes over time should be borne in mind, but careful comparisons can yield significant results. It is quite likely that the increased U.S. representation between 1937 and 1956 is a real change, not a statistical artifact, since the change from a capital measure to a sales measure might have been expected to depress the share of this capital-intensive producer: a rise in the U.S. share, *despite* the adverse change in measure, is thus impressive.

Only large changes over time or large differences in national totals at one point in time should be taken as significant. It is reasonable to conclude that the United States had more large firms than Italy in 1912; but it is merely probable that Germany had more of the world's largest firms than Britain in 1912, and vice-versa in 1937. The degree of vertical integration and diversification also affects country scores: Japan (which has fewer extensively vertically integrated or conglomerate firms than the United States or United Kingdom) ranks higher now in sales than it would rank by capital assets or employment. (Toyota has sales rivaling those of the top U.S. firms but fewer assets and employees, because it relies on a more extensive, vertically disintegrated network of subcontractors.) The more recent data are more comprehensive[19] and reliable. The impression that firms are now distributed among the United States,

[19]The sensitivity of arbitrarily truncated samples to small variations is clear in 1912, from the contrast between the top 80 (here Britain slightly predominated over Germany) and the 20 firms ranked 81 - 100 (none of them British and 11 German). Thus the tail of large firms creates the German predominance in 1912 in the table and the impression of a large German loss by 1937. Rankings in more recent periods also vary between the top 100 and the top

Japan, and Europe (collectively) approximately in proportion to their relative populations (with Japan and Britain having slightly bigger shares of the largest global corporations than their respective populations would suggest) is probably correct.

Because the original measures of size (market values of equity, firm sales, etc.) were valued in domestic currencies, they were converted to $US by the official exchange rates in order to obtain a global ranking. This may be justified by the argument that stock exchange investors or foreign customers used official rates in their global transactions in the corporate equity or in the corporate products underlying the figures. To the extent that purchasing-power parities differed from official exchange rates, inadequate measures of the relative domestic values of production or quantity equivalents of the firms' production will result. Exchange rates and the transactions that drive them were already heavily regulated at the 1937 benchmark date (especially in Germany and Japan), and none of the six large industrial countries except the United States permitted free international capital transactions by 1956. Even at the other dates, there may be distortions: for example, the dollar was generally overvalued relative to the pound before 1914 (because of the high U.S. tariff), but has been substantially undervalued relative to the yen and Deutschemark more recently (because of the international capital market's distrust of U.S. government policy). The likely result is that the rise of U.S. representation among large firms in the first six decades of the century is understated, and its subsequent decline overstated, relative to a measure based on purchasing-power parity, which may for some purposes be more relevant.

Location of corporate headquarters has been taken as the primary indicator of corporate nationality. Thus London-headquartered British-American Tobacco is throughout treated as wholly British, though in 1912 two-thirds of its capital was still owned by American stockholders, and its senior management was American; by the same token, in the same year, four South African companies (drawing substantial capital and managerial resources from the United Kingdom but with Kimberley or Johannesburg headquarters) are counted as "other," not as British. Companies like Royal Dutch-Shell and Unilever, with joint headquarters in Britain and the Netherlands, are allocated half to each country. An industrial company - following *Fortune* -is generally defined as one with more than 50 percent of its sales in manufacturing and mining (because of extensive integration between the two it is impracticable, particularly in the earlier years, to disentangle mining and manufacturing enterprises). I am grateful to Dr. Christopher Schmitz of St. Andrews University for generously sharing his unpublished work with me and for helpful discussion of the problems of consistency and compatibility.
The sources of the data in Table 2 are as follows:

Column 1 (1912 "expected"): The 95.5 of the 100 largest firms that are headquartered in the top six large industrial nations (column 2) are redistributed according to those countries' relative population in 1912, using data from Maddison [1991, pp. 229, 231].

Column 2 (1912 actual): From Schmitz [1995]. Size for most companies is measured by equity market capitalization in 1912, but for thirty-seven companies - some U.S. closely held and all German companies - it is approximated by balance sheet assets in 1912 and 1913. I have adjusted Schmitz's listings by counting Shell as half Dutch (though the British side alone was ranked twenty-fifth). Pending the calculation of equity values for German companies, the results for Germany should be considered provisional. Note that the United States was unusual in having a number of firms (for example, Du Pont, Ford) still family-owned and without substantial quoted equity stock; this was rare among firms of this size in Britain and Germany, though members of the founding families sometimes remained strongly represented on the boards of directors after public quotation (for example, in Shell or Siemens). It should be noted that America - and decidedly not Britain - was at this stage the pre-eminent home of the very large privately held family firm.

500: Japan and Britain would do rather less well and Germany and France better in the top 100 than in the top 500.

Column 3 (1937 actual): A listing of the top fifty-two companies for 1937 is published in Schmitz [1993, pp. 32-33]. Dr. Schmitz also kindly provided me with his unpublished extension of this list of firms ranked 53-100. I adjusted this as follows:

- Unilever, "Ltd." and "NV" are counted as one company (Anglo-Dutch), not two.
- "Royal Dutch," "Shell," and "Shell-Union" were counted as one company (Anglo-Dutch), not three.
- three Japanese zaibatsu - Mitsui, Mitsubishi, and Sumitomo - were added. Their market value would qualify at least the first two for admission, but they were rather loose holding companies with more than 50 percent of their sales outside manufacturing and mining. They thus would have been excluded by the postwar *Fortune* definition of an industrial company, but their inclusion is perhaps justified by the size of their extensive heavy industry interests alone [*Economist*, 1938]. (The one Japanese unitary company to qualify for inclusion in Schmitz's original list was Japan Steel.)
- One Italian company - the state-financed Istituto per la Ricostruzione Industriale (IRI) - was added, because it appears in *Fortune's* later lists, and because its assets were clearly sufficient in the 1930s to justify inclusion, though the same qualifications apply as to Japanese zaibatsu.
- Seven U.S. non-industrial (mainly retailing) companies were omitted.
- No French companies were added, as Professor Maurice Lévy-Leboyer confirmed that, by his calculations, the largest 1937 market capitalization for a French company was $72 million (FF 794 million) for Rhone-Poulenc [letter, 19 May 1994], putting it well below the cut-off for inclusion.
- Five German companies were arbitrarily added, to compensate for the probable systematic bias against Germany (Schmitz lists only five German companies) by the use of an assets measure for 1930s Germany and by the omission of state-owned armaments producers such as the Reichswerke. This should be considered provisional pending the calculation of market-value measures and more precise adjustments.
- Two further companies were added: one to "other," on the assumption that somewhere else in the world there was by then one such company valued above Schmitz's cut-off point of around $108 million of issued equity stock, and one to the United States, as the most probable country from which the company required to bring the total up to 100 again would come.

Column 4 (1956 actual): Author's calculations based on the first list of non-US industrial corporations in *Fortune*, spliced to the comparable U.S. list, to total 100 global companies, with a cut-off point at $495 million sales [*Fortune*, 1957, a and b]. Later *Fortune* lists include nationalized mining companies, and I have added Britain's National Coal Board and Charbonnages de France to the 1956 list in order to maintain comparability over time (displacing one U.S. and one German company).

Column 5 (1962 actual): Calculated from totals in Amsden and Hikino [1994, p. 116], ultimately deriving from *Fortune's* global ranking by sales for 1962 and therefore compatible with column 4 and column 6. The 1962 figures are based on 497 (not 500) firms, but arbitrary allocation of the missing three firms to any country would not materially affect the percentage calculation after rounding. The shift between the top 100 firms in 1956 and the top 500 in 1962 clearly accounts for some of the change: the U.S. share among the top 100 in 1962 was still 67 percent (that is, a real reduction from the 78 percent of 1956, but not as much a gap as the 60 percent shown for the top 500 in 1962 in the table). Japan (2 percent, as against 6 percent in the table) and France (3 percent, as against 5 percent in the table) had significantly less representation in the top 100 than in the top 500 in 1962; Germany (13 percent as against 7 percent in the table) was better represented in the top 100 than in the top 500.

Column 6 (1993 actual): Calculated from the totals in *Fortune*, 1994.

Column 7 (1993 "expected"): The 80 percent of large firms in the six large industrial countries are redistributed according to their country's relative population in 1993, using data from World Bank [1994].