# Asian Business and Management

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# **ASIAN BUSINESS AND MANAGEMENT**

# **VOLUME III**

Edited by



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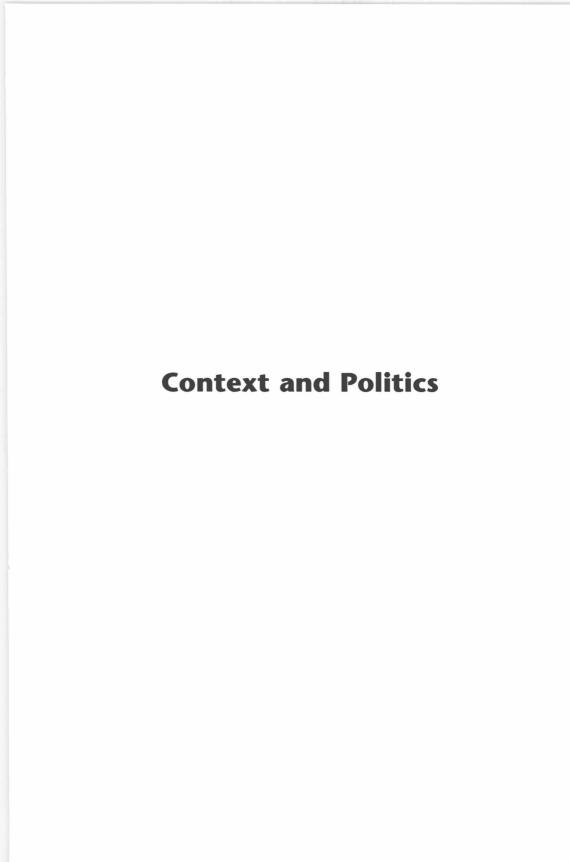
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Richard D. Whitley



# Industrializing through Learning

Alice H. Amsden

#### The Case of Korea

his is a book about Korea and how it came to be a major factor in the world economy. But it is also a book about the industrialization process that Korea followed. This process, which will hereafter be referred to as *late industrialization*, has profound implications for a range of other countries that are also struggling to compete in the world of international business. Korea's success in this struggle can thus be seen both as a fascinating story in itself and as an example from which others may learn. It is also an example of a new way of industrializing that challenges longheld assumptions of generations of economic thinkers.

## Learning: A New Mode of Industrialization

The First Industrial Revolution in Britain, toward the end of the eighteenth century, and the Second Industrial Revolution in Germany and the United States, approximately 100 years later, shared the distinction of generating new products and processes. By contrast, economies that did not begin industrialization until about the twentieth century tended to generate neither, their products and processes being based on older technology. Economies commencing industrialization in the twentieth century transformed their productive structures and raised their incomes per capita on the basis of borrowed

**Source:** Asia's Next Giant: South Korea and Late Industrialization (Oxford, UK: Oxford University Press, 1992), pp. 3–23 and 331–352.

technology. They produced using processes conceived by unallied economic and political units. The means by which they managed to compete will be referred to here as *learning*.<sup>1</sup>

The nature and role played by technical knowledge, therefore, separates the industrial revolutions in England, Germany, and the United States, on the one hand, from the industrialization that occurred in twentieth-century agrarian societies. If industrialization first occurred in England on the basis of invention, and if it occurred in Germany and the United States on the basis of innovation, then it occurs now among "backward" countries on the basis of learning.

The paradigm of late industrialization through learning generalizes to a diverse assortment of countries with different growth records: Japan (although in many respects it is unique among late-industrializing countries), South Korea, Taiwan, Brazil, India, possibly Mexico, and Turkey. (This list might be expanded, but one cannot add to it the city-states of Singapore and Hong Kong, because neither began from the agrarian or raw material base that is typically taken to be the starting point of industrial transformation.) Growth rates differ among late-industrializing countries, but in all cases industrialization has come about as a process of learning rather than of generation of inventions or innovations. Learning, moreover, has been based on a similar set of institutions. This book explores the nature of these institutions in general and suggests why Korea has performed so successfully. The conventional explanation for why countries like Korea, Japan, and Taiwan have grown relatively fast is that they have conformed to free-market principles. In fact, the fundamentals of their industrial policies are the same as those of other late industrializers. In all cases key prices do not reflect true scarcities. Instead, it is argued in the chapters that follow, Korea has had an outstanding growth record because the institutions on which late industrialization is based have been managed differently.

Industrialization on the basis of learning rather than of invention or innovation is not unique to the twentieth century. The global process of industrialization has always tended to be combined and uneven, with leaders and laggards, forerunners and followers. If England pioneered on the basis of invention in the eighteenth century, Continental Europe and the United States pursued on the basis of learning in the nineteenth. If Germany were itself an innovator in the nineteenth century, it also studied the examples of early England and other emulators such as France and the Netherlands. The United States in the nineteenth century has been described as both borrower and initiator (Rosenberg, 1972). While many American and German firms were innovative leaders, most were followers.

Nevertheless, a process of industrialization whose central tendency among leading firms is learning rather than invention or innovation of significantly novel technology is a distinct phenomenon and deserves treatment as such. For individual firms the absence or presence of new technology generation

is decisive in determining the basis on which they compete internationally. Innovators are aided in the conquest of markets by novel products or processes. Learners do not innovate (by definition) and must compete initially on the combined basis of low wages, state subsidies (broadly construed to include a wide variety of government supports), and incremental productivity and quality improvements related to existing products. In turn, different modes of competing are associated with differences in firms' strategic focus.

The corporate office, inclusive of research and development functions, tends to be the strategic focus of companies that compete on the basis of innovation. This is because it is at the administrative level that new technology gets developed and marketed. Critical significance is attached to the organization and operation of research and development because here are created the profit-making opportunities that drive the entire company.

The shopfloor tends to be the strategic focus of firms that compete on the basis of borrowed technology. The shopfloor is the focus because it is here that borrowed technology is first made operational and later optimized. Because products similar to those that the company produces are internationally available, the strategic focus is necessarily found on the shopfloor. where the achievement of incremental, yet cumulative, improvements in productivity and product specification are essential to enhance price and quality competitiveness.

Beginning in the 1960s, learners have moved rapidly into the mature markets developed by innovators. The high level of productivity of longestablished innovators has been contested by learners' lower wages, higher subsidies, as well as intense efforts to raise productivity incrementally. Total costs in many industries appear to have run neck and neck (see the discussions of cotton textiles, ships, and steel in later chapters). International competition has heated to a degree that may be unprecedented.

## The Relative Speeds of Industrializations

While the most successful twentieth-century industrializers have invited inquiry about their rapid growth and structural change, the nineteenth-century European emulators have drawn attention to their slowness. In the words of David Landes.

In this effort to study and emulate British techniques, the nations of western Europe were favored by a number of advantages. To begin with, they had behind them an experience of organized and increasingly effective political behavior. . . . Similarly, their supply of capital and standard of living were substantially higher than in the "backward" lands of today. And with this went a level of technical skill that, if not immediately adequate to the task of sustaining an industrial revolution, was right at the margin. . . . In short, if they were in their day "underdeveloped," the word must be understood quite differently from the way it is today. . . . Nevertheless, their Industrial Revolution was substantially slower than the British.

Why the delay? Surely, the hardest task would seem to have been the original creative acts that produced coke smelting, the mule, and the steam engine. In view of the enormous economic superiority of these innovations, one would expect the rest to have followed automatically. (Landes, 1969, pp. 125–6)

Why indeed the delay? And why was it that industrialization beginning in the late nineteenth century and then following World War II appears to have progressed far faster than that of the Napoleonic War period?<sup>2</sup> Part of the answer lies in the advancement of science, which is worth discussing here briefly. The advancement of science underlies the distinction between industrializing by invention in the First Industrial Revolution and industrializing by innovation in the Second. Scientific advancement also had an electrifying effect on the growth rates of twentieth-century latecomers.

As the terms are typically used, *invention* and *innovation* are intimately connected, because innovation presupposes invention in a logical sense. In textbook treatments of new technological developments, invention is, associated with the idea and comes first, followed by innovation or the application of the idea to commercial uses. Invention and innovation are regarded here, however, not as abstract stages, one preceding the other in new technological discoveries, but rather as descriptions of particular historical periods, invention preceding innovation in an intergenerational sense. As characteristics of two distinct time periods, one key difference between the two lies in their degree of scientific content.

The scientific content of the inventions of the First Industrial Revolution moved the world far beyond the mysticism of the Middle Ages toward a transparent understanding of how mechanical devices worked, but discoveries occurred primarily by observation, trial, and error. The Second Industrial Revolution, however, represented a discrete giant step forward insofar as technological change began to occur, far more than previously, on the basis of theory and experimentation (Bernal, 1965).

The application of science to production provided the basis for the stream of German and American innovations that lowered the British flag. For three interrelated reasons, the advancement of science also made it far easier for technology to be transferred, and so science had a profound effect on the "backward" countries: (1) Although technology remained (and still remains) idiosyncratic even in basic industries, higher scientific content increased its codifiedness or explicitness, making it more of a commodity and hence more technically and commercially accessible and diffusible from country to country.<sup>3</sup> (2) The application of science in the fields of transportation, communications, and management improved the *means* of technology transfer. Technical assistance, not being dependent on the know-how of a particular person, can

now be dispatched over longer distances to larger numbers of people more quickly and anonymously. (3) The crowding out of art by science on the shop floor has dealt a blow to the skilled craftsworker.<sup>4</sup> The rise in the scientific content of technology has made operations far easier to transfer to a group of latter-day learners among whom all-around mechanical skills are scarce.

The impact of the advancement of science on the "backward" regions was ambiguous, however. Despite the benefits, it created a far wider gap in relative income levels and technological capabilities than existed previously between nations, and it also strengthened the hand of the stronger nations over the weaker. In any event, taking all factors into consideration, the speed with which late learners in the twentieth century have industrialized may not be any greater than that of the European emulators in the early nineteenth century. What is decisive is how one dates the onset of industrialization and how one decides when a country can legitimately be described as industrialized.

If one dates the start of industrialization in the European emulators from, say, 1776, when the new economic order in Britain was given theoretical recognition by Adam Smith; and if one dates the closing of the gap between Europe and England from, say, 1850 to 1873 - or about ninety years later - after which England began to be overtaken; then Korean industrialization, dating from the time Korea was opened by foreign imperialists, does not appear especially fast. Korea's industrialization can be said to have begun in the 1870s, when the 1,000-year-old Yi dynasty began to shatter as a consequence of Japanese intrusion, much as the Tokugawa regime in Japan had been shaken by the appearance of Admiral Perry only two decades earlier. Then followed a delay in the onset of industrialization in Korea of about ninety years, until the 1960s, when Korea's growth rate accelerated. Moreover, the revolutionary period of Korean industrialization continues, in that rapid growth and structural change are still in full swing and Korea has not yet come anywhere close to catching up with the most advanced countries. Even in mature industries, labor hours required per unit of output in the late 1970s were far higher in Korea than in Japan, by a scalar that averaged roughly 2.8.5 In the mid-1980s, Korea's share of industrial activity arising from its own R&D laboratories was minuscule. In any event, Korea's growth rates only surpass all records if industrialization's start is assumed to be the point of acceleration in the 1960s.

Nevertheless, why late industrialization was slow in starting in Korea can be explained by the same set of factors that explain why late-industrializing countries progressed faster than the European emulators once their industrialization got under way. The institutions of late industrialization that underscore its success, and whose absence is responsible for delay, are the following: an interventionist state, large diversified business groups, an abundant supply of competent salaried managers, and an abundant supply of low-cost, well-educated labor. These institutions are the focal point of later chapters.

## Korea as a Special Case of Late Industrialization

In late-industrializing countries, the state intervenes with subsidies deliberately to distort relative prices in order to stimulate economic activity. This has been as true in Korea, Japan, and Taiwan as it has been in Brazil, India, and Turkey. In Korea, Japan, and Taiwan, however, the state has exercised discipline over subsidy recipients. In exchange for subsidies, the state has imposed performance standards on private firms. Subsidies have not been giveaways, but instead have been dispensed on the principle of reciprocity. With more disciplined firms, subsidies and protection have been lower and more effective than otherwise.

Below the level of the state, the agent of expansion in all late-industrializing countries is the modern industrial enterprise, a type of enterprise that Chandler (1977) described as large in scale, multidivisional in scope, and administered by hierarchies of salaried managers. Even in Taiwan, an economy with a reputation for small-scale enterprise, the large-size firm (often a government enterprise) spearheaded industrialization in the early stages of growth (as will be discussed in Chapter 7). In Korea, the modern industrial enterprise takes the form of diversified business groups, or chaebol, whose size and diversity are similar to those of the zaibatsu, Japan's prewar big business groups. Diversified business groups are common to all lateindustrializing countries, but those in Korea are especially large. The Fortune list of 500 international private non-oil-producing firms in 1986 included ten from Korea and only seven from all other developing countries combined (Fortune, 1987). The size of the chaebol and their broad diversification into nonrelated products have allowed them to survive the hardships of late industrialization, to penetrate the lower end of numerous foreign markets, and to supplant the need for multinational firms to undertake major investments in targeted industries. Whereas Korea has depended heavily on foreign loans, it has entertained almost no direct foreign investment outside the labor-intensive sectors.6

Salaried engineers are a key figure in late industrialization because they are the gatekeepers of foreign technology transfers. The protagonist of industrialization has shifted from the entrepreneur in the late eighteenth century, to the corporate manager in the late nineteenth, to the salaried engineer in the late twentieth. Squeezed between the state on the one hand and the salaried engineer on the other, the private entrepreneur's usefulness in the multidivisional enterprises of late industrialization appears much reduced when measured by the standards of the entrepreneurial histories of advanced countries.

Salaried engineers have performed especially well in Korea because society has invested heavily in education, from the primary level on up. In terms of sheer quantity, enough engineers have been trained to ensure that sufficient numbers pursue the career intended by their education. A large number of engineers has meant competition among them for the best jobs and the fastest promotions, thereby driving up productivity.

While a strategic focus on the shopfloor may be a tendency in late industrialization, this tendency may be stronger, depending on the country. Chapter 7 highlights three outstanding points in Korea's case. First, Korean firms have shown a preference for hiring engineers over administrators. Beginning in the early 1960s, while the number of managers of all types increased modestly, the number of engineers grew far more quickly. Second, even as managerial capitalism in Korea has spread, overhead has been kept in check. The ratio of white-collar workers (excluding clerks) to blue-collar workers remained constant between 1960 and 1980, even declining slightly. Korean firms have not created huge overheads; instead they have appointed managers to production positions on the shop floor, which is where the competitive advantage of late-industrializing countries lies. Third, the number of layers of management has been kept quite small in Korea. Engineers at the plant level keep in close contact With the ranks.

Turning now to production workers, late industrializations have exceptionally well-educated work forces by comparison with earlier industrializations. Moreover, the wages of these workers have generally been prevented from rising rapidly by a conspiracy of forces: political repression, an unlimited labor supply at the onset of growth, an absence of international opportunities to migrate, and the insignificance of a class of skilled crafts-persons, who were the organizers of trade unions in earlier periods. Korea, however, like Japan before it, has set a number of world records in the area of labor, which has made its work force unusually productive.

On the one hand, Korea appears to have the longest work week in the world, a throwback to the work week in effect in the harsh factory system under Japanese colonialism. On the other hand, Korea's real-wage growth rate may exceed that of any previous industrial revolution (with Japan's a close second) and that of any contemporary one. High average real-wage increases have acted as an inducement to workers to produce, and to managers to acquire more technological capability. In addition, Korea's work force is highly segmented, which has energized a new labor aristocracy. Korea has the dubious distinction of having one of the highest gender wage gaps, an honor shared by Japan. On average, Korean women earn less than half of what men earn. Korea, like Japan, also has one of the largest manufacturing wage dispersions between light and heavy industry, allowing both types of manufacturing activity to coexist.

All of these institutions are discussed in detail in later chapters. In each case there is a common thread that binds Korea, Japan, and Taiwan with other late-industrializing countries. In contrast, there is a distinct pattern in all three cases that makes their relatively fast growth rates more comprehensible. Rather than introducing each institution of late industrialization in more detail, however, a further introduction to the institution of the state only is presented here because the state's role in late industrialization is especially controversial.

#### The State

The first step toward understanding how "backward" countries in the twentieth century eventually expanded is to ask how they fell behind relative to the industrialized world in the first place. The development process is enormously complex, but one can say as a first approximation that (1) the onset of economic expansion has tended to be delayed by weaknesses in a state's ability to act and (2) if and when industrialization has accelerated, it has done so at the initiative of a strengthened state authority.

The reasons why some countries in the twentieth century have found themselves behind others in income and wealth can be grouped tentatively into four categories: natural resource endowment, population, market forces, and institutional factors. The natural resource explanation for backwardness can be dismissed out of hand. The association between resource endowment and per capita income is visibly weak, Korea and Japan being cases in point. The attribution of underdevelopment to excess population is now also pretty well discredited. Population explosions are currently believed not to have led to failure to industrialize but rather to have emerged as a consequence of such failure.<sup>7</sup>

There remain, therefore, two major contending views – the market and the institutional. The market explanation for economic development poses as the grand mover and shaker of the past 200 years of economic progress. Nevertheless, whereas no one could possibly deny the overreaching role that the market has played in speeding growth, one must distinguish between the market and the market *mechanism*. The former refers to the means to satisfy supply and demand. The latter refers to rules for allocating resources. All industrializations have made use of the market. However, defiance of the market mechanism does not explain why late industrializer delayed so long in starting to expand, nor can adherence explain why they eventually succeeded in growing.

The economic histories of "backward" countries are quite varied, yet the archetypal late industrializer in the twentieth century was at one time or another a colony of one of the Great Powers (Japan is unique as a learner among the potentates). Colonial histories differ, but the typical economic regime of a colony was quite exemplary from the viewpoint of competitive theory. Basically, colonies followed policies of free trade and exploited their comparative advantage in the agricultural commodities markets. Their growth, therefore, could not be said to have been stunted by failure to be guided by the market mechanism. Indeed, it could be said to have been stunted by failure to follow interventionist policies, namely, throwing up trade barriers and providing subsidies to promote local industry.

This leads to the final explanation, one related to institutions, not least of all the state. Quite simply, industrialization was late in coming to "backward" countries because they were too weak to mobilize forces to inaugurate economic development and to fend off a wave of foreign aggression begun in the second half of the nineteenth century. Their weakness, moreover, arose from internal social conflict - ethnic, racial, regional, or class. Such conflict precluded arrogating enough power to a central authority to prevent foreign intervention, invasion, or the catastrophic loss of statehood altogether.

States in modern history have always intervened to spur economic activity. Even the First Industrial Revolution, whose guiding principle was laissezfaire, is now being reassessed by historians with this axiom in view.9 The British government intervened to maintain law and order and to minimize the flight of technological capability to foreign lands, albeit flat-footedly (Henderson, 1954). In the second phase of intervention, that associated with the Second Industrial Revolution in Germany and the United States, state intervention intensified because the economies of Germany and the United States were required not merely to industrialize but also to catch up. We can think of infant industry protection as the primary characteristic of this era. Analytical coherence has been provided by writers like List (1856) and Sombart (1933).10

To catch up in the twentieth century has required still heavier doses of government support because backwardness has been relatively greater. The instruments of intervention have been cumulative. Not only have states in late-industrializing countries intervened by protecting infant industries. They also have intervened by providing private investors with a battery of incentives that, simplified, boil down to subsidies. The tariff epitomizes the age of infant industry protection. The subsidy, which includes tariff protection and financial incentives, epitomizes the struggle to industrialize after the Second World War.

As Gerschenkron (1962) has pointed out, backward countries are fortunate to have a backlog of technologies to draw upon. Yet Gerschenkron failed to give equal weight to the proposition that the more backward the country, the harsher the justice meted out by market forces. The inherent conflicts of the market apply to all users, rich and poor alike. But the conflicts are sharpest among the least well endowed. Countries with low productivity require low interest rates to stimulate investment, and high interest rates to induce people to save. They need undervalued exchange rates to boost exports, and overvalued exchange rates to minimize the cost of foreign debt repayment and of imports - not just imports of raw materials, which rich and poor countries alike require, but also of intermediates and capital goods, which poor countries alone are unable to produce. They must protect their new industries from foreign competition, but they require free trade to meet their import needs. They crave stability to grow, to keep their capital at home, and to direct their investment toward long-term ventures. Yet the prerequisite of stability is growth.

Under such disequilibrating conditions, the state's role in late industrialization is to mediate market forces. The state in late industrialization has intervened to address the needs of both savers and investors, and of both exporters and importers, by creating multiple prices. Some interest rates are higher than others. Importers and exporters face different prices for foreign currency. Insofar as the state in late industrialization has intervened to establish multiple prices in the same market, the state cannot be said to have gotten relative prices "right," as dictated by supply and demand. In fact, the state in late industrialization has set relative prices deliberately "wrong" in order to create profitable investment opportunities.

Korea is no exception to this general rule. Chapter 3 examines accumulation in Korea at the industry level, a departure from typical practice because most studies of government intervention in late-industrializing countries tend to be highly aggregative. The industry focus of Chapter 3 is cotton spinning and weaving, Korea's leading sector in the 1960s. Even in a relatively labor-intensive sector like cotton textiles, the government intervened to protect local industry from Japanese competition, intervention taking the form of tariffs, quotas, export subsidies, subsidized credit, and so forth. As later chapters indicate, subsidization rose further in the heavy industries.

Korea, therefore, provides supporting evidence for the proposition that economic expansion depends on state intervention to create price distortions that direct economic activity toward greater investment. State intervention is necessary even in the most plausible cases of comparative advantage, because the chief asset of backwardness – low wages – is counterbalanced by heavy liabilities. Where Korea differs from most other late industrializing countries is in the discipline its state exercises over private firms.

Discipline by the state over private enterprise was part and parcel of the vision that drove the state to industrialize. Park Chung Hee, who presided over Korean industrialization from 1961 until his assassination in 1979, revealed the vision in 1963 in a book modestly entitled *The Country, the Revolution, and I.* Park's ideas were influenced by the "revolutionaries" Sun Yat Sen, Kemal Pasha, Nasser, and the Meiji rulers. From the Meiji, the only unreservedly successful of the revolutionaries, Park learned the importance of indigenizing foreign ideas, of crowning a political hierarchy with an emperor (the *I* of the Revolution), and of allowing "millionaires who promoted the reform" to enter the central stage, "thus encouraging national capitalism" (Park, 1963, p. 120). The millionaires were envisioned by Park to have created large-size plants to realize economies of scale. He saw the government's role as one of overseeing the millionaires to avoid any abuse of power.

The discipline exerted by the state, and the rise of big business, were interactive. Big business consolidated its power in response to the government's