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Determinants of National Competitive Advantage

The ways that firms create and sustain competitive advantage in global industries provide the necessary foundation for understanding the role of the home nation in the process. Yet this role is far from a simple one. Our search for a new way of understanding national advantage must begin from a number of premises.

First, the nature of competition and the sources of competitive advantage differ widely among industries and even industry segments. We must isolate the influence of the nation on the firm's ability to compete in specific industries and industry segments, and with particular strategies, rather than in broad sectors. We must allow for different sources of competitive advantage in different industries rather than rely on any single, overarching one such as labor costs or economies of scale. Since products are differentiated in many industries, we must explain why some nations' firms are better able to differentiate than others and not focus only on cost differences.

Second, global competitors often perform some activities in the value chain outside their home country. The globalization of competition does not negate the role of the home nation in competitive advantage but does change its character. It means that the task is not to explain why a firm operating exclusively in the nation is internationally successful, but why the nation is a more or less desirable *home base* for competing in an industry.

The home base is where strategy is set, core product and process development takes place, and the essential and proprietary skills reside. The home base is the platform for a global strategy in the industry in which advantages drawn from the home nation are supplemented by those from an integrated, worldwide position.

Third, firms gain and sustain competitive advantage in international competition through improvement, innovation, and upgrading. Innovation, as I described earlier, includes both technology and methods, encompassing new products, new production methods, new ways of marketing, identification of new customer groups, and the like. The innovations that lead to competitive advantage involve an accumulation of small steps and protracted effort as much as dramatic breakthroughs.¹

Firms gain advantage initially through altering the basis of competition. They sustain it through improving fast enough to stay ahead. This involves not only progress in executing existing advantages but also widening and upgrading the bases of competitive advantage over time. Often this involves the move to more sophisticated industry segments. Innovation and upgrading demand sustained investment both to perceive the appropriate directions of change and to carry them out.

As Schumpeter emphasized many decades ago, competition is profoundly dynamic in character. The nature of economic competition is not “equilibrium” but a perpetual state of change. Improvement and innovation in an industry are never-ending processes, not a single, once-and-for-all event. Today’s advantages are soon superseded or nullified. At the core of explaining national advantage in an industry must be the role of the home nation in stimulating competitive improvement and innovation.² We must explain why a nation provides an environment in which firms improve and innovate and continue to do so faster and in the proper directions compared to their international rivals. The behavior required to create and especially to sustain competitive advantage is an unnatural act in many companies, as I emphasized in the previous chapter. We must understand what it is about a national environment that overcomes the natural desire for stability and jars firms into advancing.

Finally, firms that gain competitive advantage in an industry are often those that not only perceive a new market need or the potential of a new technology but move early and most aggressively to exploit it. Each significant structural change has the potential to nullify the competitive

advantages of previous leaders, creating a new opportunity for shifting competitive position through an early response. We must explain why firms from particular nations move early and aggressively to exploit change in particular industries that foreshadows international needs.

Our task is to go beyond simply recognizing differences in competitive advantage among nations. The challenge is to explain them convincingly. It is now widely recognized that economies of scale, technological leads, and differentiated products create the conditions for trade: the nation whose firms gain them in an industry are able to export.³ However, the ability to gain these advantages and sustain them is not a cause but an effect. The real question is *which firms* from *which nations* will reap them. We know that some nations' firms achieve technological superiority, produce more differentiated or higher-quality products, or products which are more attuned to customer needs than others. The question we must answer is why.

DETERMINANTS OF NATIONAL ADVANTAGE

Why does a nation achieve international success in a particular industry? The answer lies in four broad attributes of a nation that shape the environment in which local firms compete that promote or impede the creation of competitive advantage (see [Figure 3–1](#)):

1. *Factor conditions.* The nation's position in factors of production, such as skilled labor or infrastructure, necessary to compete in a given industry.
2. *Demand conditions.* The nature of home demand for the industry's product or service.
3. *Related and supporting industries.* The presence or absence in the nation of supplier industries and related industries⁴ that are internationally competitive.
4. *Firm strategy, structure, and rivalry.* The conditions in the nation governing how companies are created, organized, and managed, and the nature of domestic rivalry.

The determinants, individually and as a system, create the context in which a nation's firms are born and compete: the availability of resources and skills necessary for competitive advantage in an industry; the information that shapes what opportunities are perceived and the directions in which resources and skills are deployed; the goals of the owners, managers, and employees that are involved in or carry out competition; and most importantly, the *pressures* on firms to invest and innovate.⁵

Firms gain competitive advantage where their home base allows and supports the most rapid accumulation of specialized assets and skills, sometimes due solely to greater commitment. Firms gain competitive advantage in industries when their home base affords better ongoing information and insight into product and process needs.⁶ Firms gain competitive advantage when the goals of owners, managers, and employees support intense commitment and sustained investment. Ultimately, nations succeed in particular industries because their home environment is the most dynamic and the most challenging, and stimulates and prods firms to upgrade and widen their advantages over time.

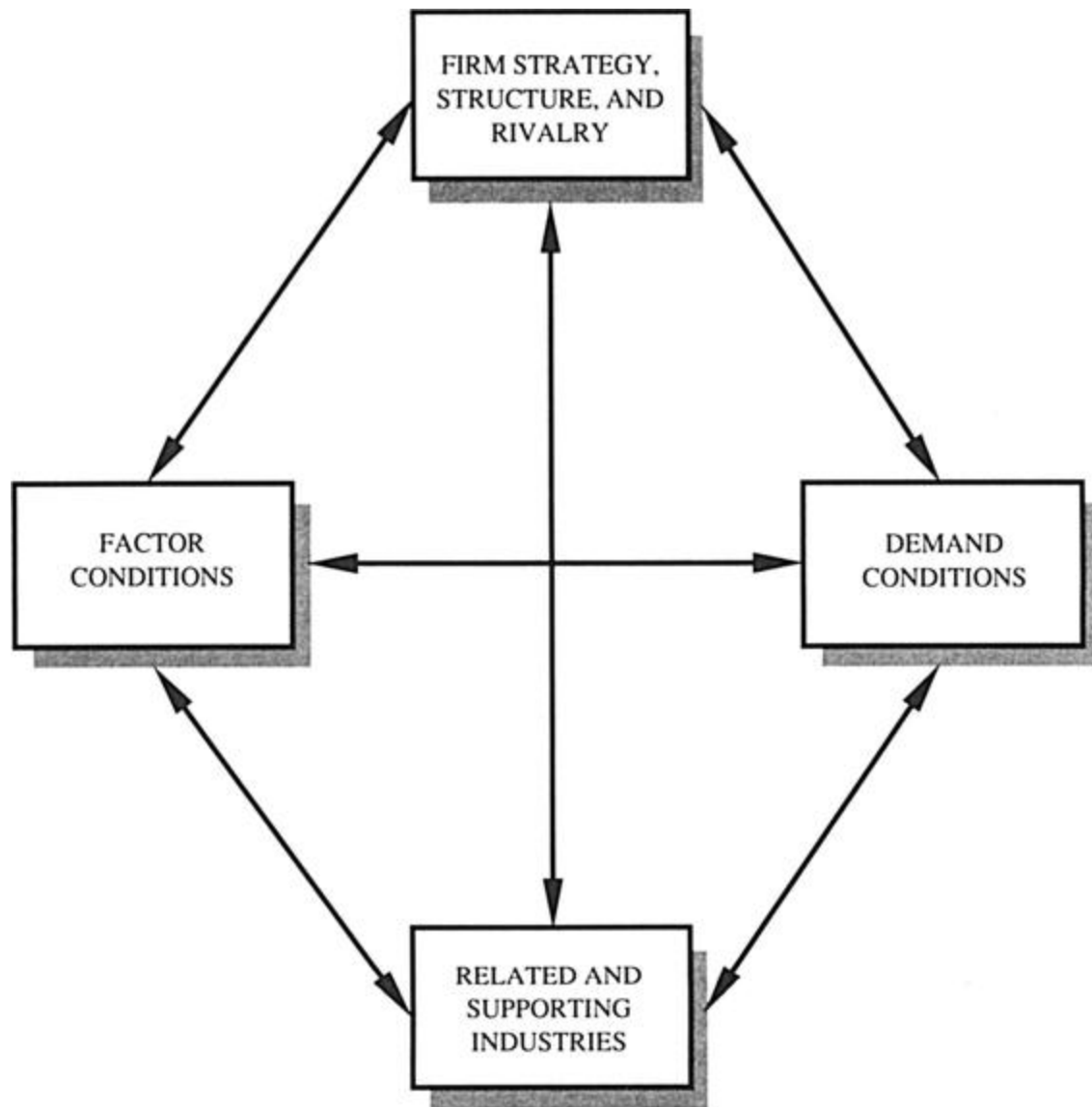


FIGURE 3–1 The Determinants of National Advantage

Nations are most likely to succeed in industries or industry segments where the national “diamond,” a term I will use to refer to the determinants as a system, is the most favorable. This is not to say that all a nation’s firms will achieve competitive advantage in an industry. In fact, the most dynamic the national environment, the more likely it is that some firms will fail, because not all have equal skills and resources nor do they exploit the national environment equally well. Yet those companies that emerge from such an environment will prosper in international competition.

The “diamond” is a mutually reinforcing system. The effect of one determinant is contingent on the state of others. Favorable demand conditions, for example, will not lead to competitive advantage unless the state of rivalry is sufficient to cause firms to respond to them. Advantages in one determinant can also create or upgrade advantages in others.⁷

Competitive advantage based on only one or two determinants is possible in natural resource-dependent industries or industries involving little sophisticated technology or skills. Such advantage usually proves unsustainable, however, because it shifts rapidly and global competitors can easily circumvent it. Advantages throughout the “diamond” are necessary for achieving and sustaining competitive success in the knowledge-intensive industries that form the backbone of advanced economies. Advantage in every determinant is not a prerequisite for competitive advantage in an industry. The interplay of advantage in many determinants yields self-reinforcing benefits that are extremely hard for foreign rivals to nullify or replicate.

Two additional variables can influence the national system in important ways, and are necessary to complete the theory. These are chance and government. Chance events are developments outside the control of firms (and usually the nation’s government), such as pure inventions, breakthroughs in basic technologies, wars, external political developments, and major shifts in foreign market demand. They create discontinuities that can unfreeze or reshape industry structure and provide the opportunity for one nation’s firms to supplant another’s. They have played an important role in shifting competitive advantage in many industries.

The final element necessary to complete the picture is government. Government, at all levels, can improve or detract from the national advantage. This role is seen most clearly by examining how policies influence each of the determinants. Antitrust policy affects domestic rivalry. Regulation can alter home demand conditions. Investments in education can change factor conditions. Government purchases can stimulate related and supporting industries. Policies implemented without consideration of how they influence the entire system of determinants are as likely to undermine national advantage as enhance it.

The balance of this chapter will explore the influence of the determinants individually and jointly on the ability of a nation’s firms to achieve competitive advantage in a particular industry. In the next chapter, I will

turn to the way the determinants affect each other as a dynamic and evolving system.⁸

The basic unit of analysis for understanding national advantage is the industry. Nations succeed not in isolated industries, however, but in *clusters* of industries connected through vertical and horizontal relationships. A nation's economy contains a mix of clusters, whose makeup and sources of competitive advantage (or disadvantage) reflect the state of the economy's development. How entire national economies develop in international competitive terms will be a subject I will return to later.

FACTOR CONDITIONS

Each nation possesses what economists have termed *factors of production*. Factors of production are nothing more than the inputs necessary to compete in any industry, such as labor, arable land, natural resources, capital, and infrastructure. While the terminology may be awkward to some, it is so deeply embedded in the language of economics, and so vital to the theory of trade, that I will adopt it throughout this book.

The standard theory of trade rests on factors of production. According to the theory, nations are endowed with differing stocks of factors. A nation will export those goods which make intensive use of the factors with which it is relatively well endowed.⁹ The United States, for example, has been a substantial exporter of agricultural goods, reflecting in part its unusual abundance of large tracts of arable land.

A nation's endowment of factors clearly plays a role in the competitive advantage of a nation's firms, as the rapid growth of manufacturing in low-wage countries such as Hong Kong, Taiwan, and more recently, Thailand attests. But the role of factors is different and far more complex than is often understood. The factors most important to competitive advantage in most industries, especially the industries most vital to productivity growth in advanced economies, are not inherited but are created within a nation, through processes that differ widely across nations and among industries. Thus, the stock of factors at any particular time is less important than the rate at which they are created, upgraded, and made more specialized to particular industries. More surprising, perhaps, is that an abundance of

factors may undermine instead of enhance competitive advantage. Selective disadvantages in factors, through influencing strategy and innovation, often contribute to sustained competitive success.

FACTOR ENDOWMENT

To explore the role of factors in the competitive advantage of a nation, the concept must be made more meaningful to industry competition. Factors of production are often described in very broad terms such as land, labor, and capital, which are too general to bear on competitive advantage in strategically distinct industries.¹⁰ Factors can be grouped into a number of broad categories:

- *Human resources*: the quantity, skills, and cost of personnel (including management), taking into account standard working hours and work ethic. Human resources can be divided into a myriad of categories, such as toolmakers, electrical engineers with PhDs, applications programmers, and so on.
- *Physical resources*: the abundance, quality, accessibility, and cost of the nation's land, water, mineral, or timber deposits, hydroelectric power sources, fishing grounds, and other physical traits. Climatic conditions can be viewed as part of a nation's physical resources, as can a nation's location and geographic size. Location, relative to other nations that are suppliers or markets, affects transportation costs and the ease of cultural and business interchange. For example, proximity to Germany has had an important historical influence on Swedish industry. The time zone of a nation relative to other nations may also be significant in a world of instantaneous global communications. London's position between the United States and Japan is often identified as an advantage in financial service industries, because London-based firms can do business with both Japan and the United States during a normal working day.
- *Knowledge resources*: the nation's stock of scientific, technical, and market knowledge bearing on goods and services. Knowledge resources reside in universities, government research institutes, private

research facilities, government statistical agencies, business and scientific literature, market research reports and databases, trade associations, and other sources. A nation's scientific and other knowledge resources can be subdivided into a myriad of disciplines, such as acoustics, materials science, and soil chemistry.

- *Capital resources*: the amount and cost of capital available to finance industry. Capital is not homogeneous, but comes in various forms such as unsecured debt, secured debt, "junk" (high-risk, high-yield) bonds, equity, and venture capital. There are varying terms and conditions attached to each form. The total stock of capital resources in a country, and the forms in which it is deployed, are affected by the national rate of savings and by the structure of national capital markets, both of which vary widely among nations. The globalization of capital markets, and the large capital flows among nations, is slowly making national conditions more similar. However, substantial differences remain and are likely to do so indefinitely.
- *Infrastructure*: the type, quality, and user cost of infrastructure available that affects competition, including the transportation system, the communications system, mail and parcel delivery, payments or funds transfer, health care, and so on. Infrastructure also includes such things as the housing stock and cultural institutions, which affect the quality of life and the attractiveness of a nation as a place to live and work.

The mix of factors employed (known as factor proportions) differs widely among industries. A nation's firms gain competitive advantage if they possess low-cost or uniquely high-quality factors of the particular types that are significant to competition in a particular industry. Singapore's location on a major trading route between Japan and the Middle East has made it a center for ship repair. Swiss ability to deal with different languages and cultures (Switzerland contains German-, French-, and Italian-speaking regions) is an advantage in services such as banking, trading, and logistics management. Germany and Switzerland have pools of workers uniquely skilled in optics-related fields. Such a match between industries and the factors present in a nation is what the standard theory of comparative advantage is all about.

Yet the role of factor endowment is more complicated. Competitive advantage from factors depends on *how efficiently and effectively they are deployed*. This reflects the choices made by a nation's firms about how to mobilize factors as well as the technology (including procedures and routines) used to do so.¹¹ Indeed, the value of particular factors can be dramatically altered by the choice of technology. Not only how but *where* factors are deployed in an economy is crucial, because technological expertise and the most capable human resources can often be utilized in a variety of industries. The mere availability of factors is not sufficient to explain competitive success; indeed, virtually all nations have some attractive factor pools that have never been deployed in appropriate industries or have been deployed poorly. Other determinants in the "diamond" will be necessary to explain where factor advantage translates into international success, because these shape the way factors are deployed.

As I discussed earlier, most advanced and even newly industrialized nations today have comparable factor endowments in terms of infrastructure; many also have similar pools of high school- and even university-educated workers (Korea, for example, has nearly 100 percent literacy and over two hundred institutions of higher learning). At the same time, globalization has made local availability of some factors less essential. The modern global corporation can source factors from other nations by purchasing from them or locating activities there. Once again, it is not mere access to factors but the ability to deploy them productively that takes on central importance to competitive advantage.

A final point is that human resources, knowledge, and capital factors can be mobile among nations. Skilled people move among nations, as does scientific and technical knowledge. This mobility has been enhanced by greater international communication and easier movement.¹² Factor availability in a nation is not an advantage if the factors leave. Other determinants will be necessary to explain those nations to which mobile factors are attracted and where they can be most productively deployed.

HIERARCHIES AMONG FACTORS

To understand the enduring role of factors in competitive advantage, it is increasingly necessary to discriminate among types of factors. Two particularly important distinctions stand out. The first is that between basic and advanced factors. *Basic factors* include natural resources, climate, location, unskilled and semiskilled labor, and debt capital. *Advanced factors* include modern digital data communications infrastructure, highly educated personnel such as graduate engineers and computer scientists, and university research institutes in sophisticated disciplines.

Few factors of production are truly inherited by a nation. Most must be developed over time through investment, and the extent and difficulty of the required investment varies dramatically. The distinction between basic and advanced factors, while inevitably a matter of degree, seeks to capture these distinctions. Basic factors are passively inherited, or their creation requires relatively modest or unsophisticated private and social investment. Increasingly, such factors are either unimportant to national competitive advantage or the advantage they provide for a nation's firms is unsustainable.

The importance of basic factors has been undermined by either their diminished necessity, their widening availability, or ready access to them by global firms through foreign activities or sourcing on international markets. These same considerations make the returns available to basic factors low, irrespective of their location. An unskilled worker is increasingly vulnerable to pressures on wages, even if the worker is American or German. Basic factors may explain some of the trade *within* firms, reflecting the location of selected activities in various nations to tap into low factor costs. But they do not explain the location of the home base in most industries.¹³

Basic factors remain important in extractive or agriculturally based industries (such as timber and soybeans) and in those where technological and skill requirements are modest and technology is widely available. An example is the construction of civil projects (such as apartments and schools) with a low engineering content. Korean firms have enjoyed international success in such projects, based in part on the availability of low-cost and disciplined Korean labor. However, firms from nations with even lower wages are supplanting Korean firms, and competitors from more advanced nations such as Italy are sourcing cheap labor pools locally in nations where they bid on international contracts or from other developing

countries (for instance, India), nullifying the Korean advantage. The result, combined with the decline in Middle East projects, is that the Korean construction industry is in sharp decline, an indication of how advantages due only to basic factors are often fleeting.

Advanced factors are now the most significant ones for competitive advantage. They are necessary to achieve higher-order competitive advantages such as differentiated products and proprietary production technology. They are scarcer because their development demands large and often sustained investments in both human and physical capital. The institutions required to create truly advanced factors (such as educational programs) themselves require sophisticated human resources and/or technology. Advanced factors are also more difficult to procure in global markets or to tap from afar via foreign subsidiaries. They are integral to the design and development of a firm's products and processes as well as its capacity to innovate, which best takes place at the home base and must be closely connected to the firm's overall strategy.

An important role for advanced factors is evident in numerous industries. Denmark's success in enzymes reflects a base of sophisticated scientific knowledge in fermentation, for example, and its success in furniture reflects a pool of university-trained furniture designers. America's unique stock of skilled personnel and scientific expertise in both computer hardware and software has yielded significant advantage not only in these industries but also in other U.S. industries such as medical electronics and financial services. Since the 1950s, Japan's large pool of engineers (reflecting a much higher number of engineering graduates per capita than almost any other nation) has been more important to success in numerous Japanese industries than the low wages of Japanese production workers.

It is important to recognize that a nation's advanced factors are often built upon basic factors. A supply of doctoral-level biologists, for example, requires a pool of talented university graduates in the field. This means that basic factor pools, while rarely a sustainable advantage in and of themselves, must be of sufficient quantity and quality to allow for the creation of related advanced factors.

The second important distinction among factors of production is their specificity. *Generalized* factors include the highway system, a supply of debt capital, or a pool of well-motivated employees with college educations. They can be deployed in a wide range of industries. *Specialized*

factors involve narrowly skilled personnel, infrastructure with specific properties, knowledge bases in particular fields, and other factors with relevance to a limited range or even to just a single industry. Examples would be a scientific institute with expertise in optics, a port specialized in handling bulk chemicals, a cadre of skilled model makers for automobiles, or a pool of venture capital seeking to fund software companies.¹⁴ More advanced factors tend also to be more specialized, though not in all cases. For example, highly skilled computer programmers, while an advanced factor pool, can be deployed in a wide range of industries.

Specialized factors provide more decisive and sustainable bases for competitive advantage than generalized factors. Generalized factors support only more rudimentary types of advantage. They are usually available in many nations, and tend to be more easily nullified, circumvented, or sourced through global corporate networks. Activities dependent on generalized factors (such as labor-intensive assembly operations requiring semi-skilled employees) can often be readily performed at a distance from the home base.

Specialized factors require more focused, and often riskier, private and social investment. They depend in many cases on already having a base of generalized factors. Both of these things make them scarcer. Specialized factors are usually necessary in the more complex or proprietary company activities, and they are necessary for more sophisticated forms of competitive advantage. This makes them integral to innovation. Specialized factors are necessary at a firm's home base and less effective at a foreign site. It is also frequently difficult for foreign firms to gain equal access to specialized factors (as well as to advanced ones). Non-Japanese firms, for example, have difficulty hiring the top Japanese engineering graduates or gaining equivalent access to local university research programs.

The most significant and sustainable competitive advantage results when a nation possesses factors needed for competing in a particular industry that are both advanced and specialized. The availability and quality of advanced and specialized factors determine the sophistication of competitive advantage that can potentially be achieved and its rate of upgrading. In optics, for example, an important reason why German firms have been able to steadily improve product performance and quality is the availability of graduates from special university programs in optical physics and a pool of highly skilled workers trained in specialized apprenticeship programs.

In contrast, competitive advantage based on basic/generalized factors is unsophisticated and often fleeting. It lasts only until some new nation, often one advancing up the development ladder, is able to match them.¹⁵ These considerations help explain the apparent paradox I noted in the previous chapter. To sustain international competitive advantage, a nation's firms often must deliberately nullify or supplant today's basic factor advantages even though they still persist. What jars a nation's firms away from resting on basic/generalized factors becomes an important question we must address; other determinants in the "diamond" provide some of the answers.

There is an important dynamic character to factor advantage. The standard for what constitutes an advanced factor rises continually, as the state of knowledge, the state of science, and the state of practice improve. The knowledge of an electrical engineer who graduated in 1965, for example, is nearly obsolete today. Only through continuous training and upgrading of skills could the 1965 graduate have the same capability as one in 1990. Over time, master's and even doctoral training in the field have become necessary to work on frontier problems.

The standard for specialization also tends to rise continuously, as today's specialized factors tend to become tomorrow's generalized factors. A college graduate in electrical engineering was once a specialized factor, finding employment in relatively few industries. Today, these skills are needed in many industries and subfields have proliferated. The tendency for factors to lose specialization over time is particularly evident in scientific disciplines where subspecialties emerge, but is apparent as well in human resources, infrastructure, and even sources of capital.¹⁶

A factor pool is a depreciating basis for sustainable advantage unless it is constantly upgraded and specialized. Skilled human resources and knowledge resources, perhaps the two most important categories of factors for upgrading competitive advantage, are particularly depreciating assets, though infrastructure is not far behind. This suggests that possessing factor advantage at any one point in time is far from sufficient to explain sustained national success.

FACTOR CREATION

Another important distinction among factors, apparent in my earlier discussion, is whether they are inherited by a nation, such as its natural resources or location, or were created. Those factors most important in achieving higher-order and more sustainable competitive advantage, the more advanced and specialized ones, are created. A nation's telecommunications system or pool of microbiologists is created through *investments* made by individuals seeking to develop their skills, firms seeking the tools necessary for competing, and social institutions or governments hoping to benefit society or the economy.¹⁷ Factor-creating mechanisms include public and private educational institutions, apprenticeship programs, government and private research institutes, and bodies providing infrastructure such as government-owned port authorities or community hospitals. The rising world standard for factors means that deriving competitive advantage from factors requires not just one-time investment but continual reinvestment to upgrade their quality, not to mention keeping the current pool of factors from depreciating.¹⁸ Advanced and specialized factors demand the greatest, most sustained investment in the most difficult-to-make forms.

Nations succeed in industries where they are particularly good at creating and, most importantly, upgrading the needed factors. Thus nations will be competitive where they possess unusually high quality institutional mechanisms for specialized factor creation.¹⁹ The factor-creating mechanisms in a nation are more important to competitive advantage than the nation's current factor pool, as numerous examples I will discuss will illustrate.

Furthermore, a *private sector* role in factor creation is necessary to attain factor advantage in most industries. Advanced and specialized factors are the most important to competitive advantage, and firms are best positioned to know which of these are necessary to compete in their industries. Government investments in factor creation usually concentrate on more basic and generalized factors. For example, investments in basic research, while important in seeding possibilities for commercial innovation, will not lead to competitive advantage unless transmitted to and further developed by industry. Government efforts to create advanced and specialized factors often fail unless they are closely coupled to industry, because government entities are notoriously slow or unable to identify new fields or the specialized needs of particular industries. A significant direct investment by

firms, trade associations, and individuals in factor creation, as well as close coupling of private and public investments, are characteristic of internationally successful national industries.

There are sharp differences among nations in the areas in which investments in factor creation are made, as well as in the nature and quality of the factor-creating mechanisms. In Denmark, for example, there are two hospitals that specialize in treating patients and conducting research in diabetes. They are owned by the two world-ranking Danish insulin producers, Novo Industri and Nordisk Insulin. In Germany, apprenticeship programs exist in such specialized fields as printing, automotive assembly, and toolmaking. America has a highly developed network of agricultural colleges and an Agricultural Extension Service that widely disseminates improvements in agricultural technology. Computer science is another field in which there are numerous educational programs and research efforts.

Some national differences in the mechanisms for factor creation extend to many industries. In Japan, for example, factor creation tends to be private while in Sweden the public role is much greater. In Italy, much factor creation is informal through transfers of knowledge within extended families. The character of the institutional mechanisms prevalent in a nation for factor creation, which is partly a function of its social and political values and history, constrains to some extent the range of industries in which a nation can compete, as we will see.

No nation can possibly create and upgrade all types and varieties of factors. Which types are created and upgraded, and how effectively, depends heavily on the other determinants, such as home demand conditions, the presence of related and supporting industries, company goals, and the nature of domestic rivalry. Even the direction of government investments is strongly influenced by the other determinants. The presence of advanced and specialized factors in a nation is often not only a cause of national advantage but, at least in part, an effect.

SELECTIVE FACTOR DISADVANTAGES

Competitive advantage can grow out of *disadvantage* in some factors. In a narrow conception of international competition, competitive advantage

results from factor abundance and disadvantages in factors cannot be overcome because technology is taken as a given. In actual competition, however, the abundance or low cost of a factor often leads to its inefficient deployment.²⁰ In contrast, disadvantages in *basic* factors, such as labor shortages, lack of domestic raw materials, or a harsh climate, create pressures to innovate around them. A steady rise in the nation's exchange rate can have the same effect.²¹ The result is that the firm's competitive advantage can be upgraded and made more sustainable. What is a disadvantage in a narrow conception of competition can become an advantage in a more dynamic one.

Italian steel producers, for example, faced high capital costs, high energy costs, and no local raw materials. Privately owned firms (such as Gruppo Lucchini) were concentrated in the area around Brescia in northern Lombardy, while state-owned producers were mostly in the south, near major ports. Private firms faced high logistical costs, due to distance from ports and an inefficient (and state-owned) Italian transportation system. The result was the pioneering of mini-mill technology, in which Brescia-area steel producers have emerged as perhaps the world leaders. Mini-mills require modest capital investment, use less energy, and employ scrap metal as the feedstock. They are efficient at small scale and allow producers to locate production facilities close to buyers and sources of scrap. Italian firms (such as Danieli) are not only important mini-mill operators but have also become world leaders in selling equipment for mini-mills.

The need for factors, particularly basic and generalized factors such as semiskilled labor or local raw materials, can often be circumvented, eliminated, or reduced through innovation. Automation reduces labor content, for example, while new materials eliminate the need for other materials. The returns from factor-saving innovations frequently far exceed their cost,²² sometimes by yielding second-order benefits (for example, reducing labor content may well reduce the rate of defects and raise product quality) that are sometimes hard to anticipate.

Innovations to circumvent selective disadvantages not only economize on factor utilization but can create new factor advantages, because a nation's firms will innovate to offset selective disadvantages in ways that play to local strength, such as using available local infrastructure, materials, or types of labor. Most importantly, however, innovating around basic factor disadvantages leads firms to *upgrade* by developing more sophisticated

competitive advantages (such as proprietary technology or economies of scale due to more automated facilities) that can be sustained longer and which may also support higher prices. At the same time, pressures are created to upgrade and specialize more rapidly other factors such as skilled human resources or infrastructure in order to keep pace.

A sports analogy illustrates some of these points. Some nations that have excelled in slalom skiing, such as Sweden, do not have large mountains at home with long ski runs. Instead, they have relatively small mountains and short runs. Aspiring skiers, to make such hills more interesting, make many turns and are pushed to refine their technique.

The role of selective factor disadvantages results from the fact that the rate and direction of improvement and innovation is a function of attention and effort. Firms have numerous avenues for innovation and face much uncertainty about all the possible directions and their payoffs. Innovation is disruptive. Firms concentrate their attention on those avenues they perceive to be the most promising, and particularly on those that address problems seen as the most pressing.

Innovation to offset selective weaknesses is more likely than innovation to exploit strengths. Selective disadvantages create visible bottlenecks, obvious threats, and clear targets for improving competitive position. They prod or force a nation's firms into new solutions.²³ This theme, that pressure instead of abundance or a comfortable environment underpins true competitive advantage, will resonate throughout this book.

Disadvantages in basic factors are part of what jars firms away from resting on basic factor costs and into seeking higher-order advantages. In contrast, local abundance of basic factors lulls firms into complacency and deters the application of advanced technology. The resulting competitive advantages are often fleeting as so is productivity growth.

Factor disadvantages that stimulate innovation must be *selective* to motivate and not discourage, involving some but not all factors. A lack of pressure means there is rarely progress, but too much adversity leads to paralysis. An intermediate level of pressure, involving a balance of advantage in some areas and disadvantage in selected others, seems to be the best combination for improvement and innovation.²⁴

Selective disadvantages best contribute to competitive advantage when they *send the proper signals* about circumstances that will ultimately confront firms elsewhere. A nation's firms then become early and

aggressive movers in dealing with problems that will be widespread. A good example is Switzerland. It was the nation that experienced perhaps the first labor shortages in the post-World War II period and was reluctant to allow immigration. This led Swiss firms earlier than most to upgrade labor productivity and seek higher value, and more sustainable, market segments. Firms from other nations had access to more ample supplies of workers and placed their attention elsewhere.

The most obvious case of selective disadvantage is where local firms experience high absolute cost of a factor compared to foreign rivals. Japanese firms in a variety of industries, for example, faced extremely high land cost and severe factory space constraints. To circumvent these difficulties, they created just-in-time and other space-saving production techniques that also dramatically reduced needed inventory. Factor shortages, unavailability, or strong restrictions on the use of particular factors are as or more stimulating to innovation as high factor costs.

Innovation will also be stimulated if a nation's firms experience trends in factor costs early, even if other nations catch up. Particularly rapid or visible changes in the cost or availability of factors in a nation compared with others will also lead local firms to act earlier, since the importance of selective disadvantages lies in focusing attention and effort on addressing important perceived problems or constraints. Finally, high *relative* cost of a factor in a nation may stimulate innovations that circumvent it, even if the absolute cost of the factor is comparable to that in other nations. If a nation faces a high relative cost of unskilled to skilled labor, for example, local firms may place more attention on eliminating unskilled labor even if wage rates are lower than elsewhere. This has taken place, for example, in a variety of Italian industries where firms are among the most automated in the world (Italy is also a leader in factory automation equipment).

Selective factor disadvantages were prevalent in the industries we studied, and were important to the process by which nations' firms gained competitive advantage. Around the turn of the twentieth century, for example, BASF and Hoechst (Germany) spent many years developing a synthetic indigo dye to reduce dependence on imported natural dye unavailable at home. There was less pressure to innovate in Britain because of large supplies of natural indigo in the colonies. Lack of domestic raw materials was a frequent spur to innovate in a national industry.

Scarce, expensive, or difficult-to-fire labor was another prominent driver of innovation, especially in German, Swiss, Swedish, Japanese, and Italian industries. Lifetime employment, or constraints on firing workers, made Japanese, Swedish, and Italian firms careful about hiring and prone to automate. They also moved rapidly toward more differentiated market segments.

Selective disadvantages in climate or geography were also common stimuli to innovation. Swedish firms are leaders in prefabricated housing, for example, in part because of a short building season and very high wages for construction workers. This put a premium on designs that were efficient to construct. Distance from markets has led to a disproportionate rate of innovation in logistical methods in Japan and Sweden.

The positive role of selective disadvantages in stimulating innovation, however, depends on the other determinants. Firms must have access to appropriate human resources to support innovation in the industry, for example, and supportive home demand conditions. Another precondition is goals that lead to sustained commitment to the industry. Without commitment, firms will harvest or cede competitive position in the face of disadvantages rather than innovate. Also particularly significant is the presence of active domestic rivalry, which pressures firms to seek more durable advantages over their local rivals.

Other parts of the “diamond,” then, influence whether a nation’s firms innovate around selective factor disadvantages rather than take the easy but less desirable solution (for competitive advantage) of sourcing factors abroad. When these broader conditions for innovation are not present, selective factor disadvantages will not work. Faced with high relative labor costs, for example, American consumer electronics firms moved to locate labor-intensive activities in Taiwan and other Asian countries, leaving the product and production process essentially the same. This response led only to labor cost parity, instead of upgrading the sources of competitive advantage. Japanese rivals, facing intense domestic rivalry and a mature home market, set out instead to eliminate labor through automation. Doing so involved reducing the number of components which further lowered cost and improved quality. Japanese firms were soon building assembly plants in the United States, the place American firms had sought to avoid.

The example of the Dutch cut flower industry, while drawn from a nation we did not study in depth, is so clear an example summarizing the

influence of selective factor disadvantage that I could not resist including it.²⁵ Holland, by far the world leader, exports over \$1 billion of cut flowers per year despite its cold, grey climate. This selective disadvantage has led to innovations in glass house growing techniques, new strains of flowers, energy conservation, and other techniques that have created sustainable competitive advantages in the industry. Dutch innovation proceeded in a direction that took advantage of Holland's large supply of natural gas, illustrating how the directions of innovation around disadvantages in one factor often reflect the supply of others.

The impetus of an inhospitable climate forced an approach to competing in the industry that is much more favorable to upgrading advantage than traditional cultivation techniques. It has allowed the Dutch industry to achieve differentiation based on freshness, quality, and variety. Yet the Dutch success and ability to upgrade advantage have also depended heavily on the other determinants. One is the existence of highly specialized research organizations in flower cultivation, packaging, and shipping (such as the Sprenger Institute and the Aalsmeer Research Station). Holland has developed a highly efficient infrastructure in flower handling and air freight.²⁶ A strong home demand was present in Holland for fresh flowers year-round that triggered initial interest in the industry by entrepreneurs. Active domestic rivalry has taken place at the grower, auction house (there are ten in Holland), and marketer levels. Finally, specialized home-based suppliers of important inputs such as glass houses, who also sell internationally, have contributed to upgrading.

DEMAND CONDITIONS

The second broad determinant of national competitive advantage in an industry is home demand conditions for the industry's product or service. Home demand conditions had some influence in nearly every industry we studied.²⁷ While home demand, through its influence on economies of scale, can confer static efficiencies, its far more important influence is dynamic. It shapes the rate and character of improvement and innovation by a nation's firms. Three broad attributes of home demand are significant: the composition (or nature of buyer needs) of home demand, the size and

pattern of growth of home demand, and the mechanisms by which a nation's domestic preferences are transmitted to foreign markets. The significance of the latter two is contingent on the first. The *quality* of home demand, in terms that I will describe, is more important than the *quantity* of home demand in determining competitive advantage.

HOME DEMAND COMPOSITION

The most important influence of home demand on competitive advantage is through the mix and character of home buyer needs.²⁸ The composition of home demand shapes how firms perceive, interpret, and respond to buyer needs. Nations gain competitive advantage in industries or industry segments where the home demand gives local firms a clearer or earlier picture of buyer needs than foreign rivals can have.²⁹ Nations also gain advantage if home buyers *pressure* local firms to innovate faster and achieve more sophisticated competitive advantages compared to foreign rivals. Dissimilarities among nations in the nature of home demand underlie these benefits.

It might seem that home demand would be rendered less significant by the globalization of competition, but this is not the case. The home market usually has a disproportionate impact on a firm's ability to perceive and interpret buyer needs for a number of reasons.³⁰ The first is simply attention. Attention to nearby needs is the most sensitive, and understanding them is the least costly. Product development teams, as well as the managers who approve new products, are based with rare exceptions in the home market. Pride and ego also focus attention on success in meeting needs in the home market. Finally, pressures from buyers to improve products are most acutely felt in the home market, where proximity and cultural similarity make for clearer communications.

The importance of the home market goes beyond greater attention, however. Firms are better able to perceive, understand, and act on buyer needs in their home market and tend to be more confident in doing so. Understanding needs requires access to buyers, open communication between them and a firm's top technical and managerial personnel, and an intuitive grasp of buyers' circumstances. This is hard enough with home

buyers. It is extremely difficult to achieve, in practice, with foreign buyers because of distance from headquarters and because the firm is not truly an insider with full acceptance and access.³¹ Even if a subsidiary is able to gain sufficient access to fully understand foreign buyer needs and how they are changing, it is a daunting task to communicate them credibly to headquarters. Where foreign and home market needs diverge, signals from the home market usually dominate. A product's fundamental or core design nearly always reflects home market needs.³² All these considerations make proximity to the right type of buyers of decisive importance in national competitive advantage. Selling to foreign buyers is not a good substitute. There are three characteristics of the composition of home demand particularly significant to achieving national competitive advantage:

Segment Structure of Demand. The first is the segment structure of home demand, or the distribution of demand for particular varieties. In most industries, demand is segmented. In commercial aircraft, for example, there is a range of aircraft sizes and configurations which appeals to airlines with differing route structures and other circumstances. Some segments are more global than others.

A nation's firms are likely to gain competitive advantage in global segments that represent a large or highly visible share of home demand but account for a less significant share in other nations. In electrical transmission equipment, for example, Sweden is a leader in high voltage distribution (HVDC) equipment, used for transporting high voltage over long distances. This reflects large relative demand in this segment in Sweden because of the remoteness of Sweden's energy-intensive steel and paper industries as well as the fact that sources of electric power in Sweden are far removed from southern population centers.

It has been recognized that size of segments may be important to national advantage where there are significant economies of scale or learning.³³ Nations in which a segment is largest in absolute terms may gain advantages in reaping economies of scale. However, the absolute size of segments within a nation plays a complicated role in competitive national advantage, because firms compete globally and can achieve a large scale even if their home market is small.³⁴

The more significant role of segment structure at home is in shaping the attention and priorities of a nation's firms. The relatively large segments in

a nation receive the greatest and earliest attention by the nation's firms. Smaller segments, or those perceived as less desirable, are frequently accorded lower priority in allocating product design, manufacturing, and marketing resources, especially in a new or developing industry where firms are preoccupied with creating and perfecting the basic product and keeping up with growth in demand. Segments that are deemed less profitable (for example, those at the low end of the market, those perceived as oddball or unusual or those without the possibility for selling profitable ancillary services) will also be ignored. Such segments in the nation are prone to being preempted by foreign competitors. Even if they are not preempted, firms are more likely to cede such "less desirable" segments to foreign rivals over time.

A good example of these considerations is Airbus Industries' entry into commercial airliners. Airbus identified a segment of the market that had been ignored by Boeing and other U.S. manufacturers, a relatively large-capacity plane for short hauls. Such a need was quite significant in Europe with its numerous capital cities within short flying distances and served by few national airlines. American cities are more widely dispersed and the volume of traffic between most city pairs spread over a generally larger number of competitors could be met with a 100- to 200-seat aircraft. The attention of the European consortium was focused heavily on a segment which U.S. manufacturers viewed as secondary.

Another example is microwave equipment, where Japan's mountainous terrain makes microwave transmission an attractive alternative to copper cables. Japan had to rebuild its infrastructure after World War II, and Nippon Telephone and Telegraph aggressively built microwave capacity. Microwave technology was not well developed before the war, and nations whose infrastructure had not been severely damaged were heavily invested in cable. The large relative Japanese home demand for microwave led to intense attention to this technology and, ultimately, to a strong international position. Similarly, hydraulic excavators represent by far the most widely used type of construction equipment in the Japanese home market, whereas in other advanced nations its share of sales volume is far lower. Excavators are one of the few segments where Caterpillar does not hold a major share of the world market, and there is a large group of vigorous Japanese international competitors.

One implication of the importance of segment structure is that small nations can be competitive in segments which represent an important share of local demand but a small share of demand elsewhere, even if the *absolute* size of the segment is greater in other nations. Swiss firms, for example, have long held a leading position in equipment and services for tunnelling, where unusual Swiss needs are obvious. Similarly, Swedish firms have long been leaders in equipment and rock drills for mining in very hard rock, the dominant geology encountered in Swedish mining. American firms lead in rotary mining equipment, used principally for oil and gas exploration and production. This is the dominant segment in the United States. Firms from smaller nations often employ global focus strategies in which they concentrate on such a segment of the market worldwide.

In some industries, the *range* of segments in the home market influences competitive advantage. In highly engineered or tailored products and services, exposure to a wide range of significant segments at home provides experience that can be used in entering foreign markets. In commercial air-conditioning equipment, there are many segments reflecting differences in climate, building type, and end-user industry. One of the advantages of U.S. firms was that almost every climatic and industry condition encountered in other countries in commercial air-conditioning had already been experienced somewhere in the United States.

Particularly valuable in a nation is the presence of large segments that require more sophisticated forms of competitive advantage. Their presence provides a visible path for local firms to upgrade their competitive advantage over time, and positions in such segments are more sustainable.

Sophisticated and Demanding Buyers. More important than the mix of segments *per se* is the nature of home buyers. A nation's firms gain competitive advantage if domestic buyers are, or are among, the world's most sophisticated and demanding buyers for the product or service. Such buyers provide a window into the most advanced buyer needs. Proximity, both physical and cultural, to these buyers helps a nation's firms perceive new needs. It also allows close contact in the development process and, when buyers are companies, creates opportunities to engage in joint development work in ways that are difficult for foreign firms to match.

Sophisticated and demanding buyers pressure local firms to meet high standards in terms of product quality, features, and service. In Japan, for example, consumers are highly sophisticated and knowledgeable in purchasing audio equipment. Audio equipment is a status item, and Japanese consumers gather extensive product information and want the latest, best models. Their desire for quality leads to rapid improvement by manufacturers, and their desire to have the latest features leads to rapid saturation of new models.³⁵ The presence of sophisticated and demanding buyers is as, or more, important to sustaining advantage as to creating it. Local firms are prodded to improve and to move into newer and more advanced segments over time, often upgrading competitive advantage in the process.

Buyers are demanding where home product needs in an industry are especially stringent or challenging because of local circumstances. In very large diesel truck engines, America's vast road network and spread-out population creates unique needs for performance. Cummins, Caterpillar, and Detroit Diesel are strong international competitors. In residential airconditioning, Japanese firms have penetrated international markets with their compact, quiet units. Air-conditioning is much needed in Japan because of the hot and humid summers. Japanese homes are small and tightly packed together, however, and a bulky, noisy air-conditioner is simply unacceptable. This, along with high energy costs, pushed Japanese firms to pioneer energy-saving rotary compressors. This example can be extended to a number of other Japanese industries. Japanese home market conditions lead to an intense effort to innovate by producing products that are *kei-haku-tan-sho* (light, thin, short, small). The result is a constant stream of compact, portable, multifunctional products that are well accepted internationally.

Industrial buyers sometimes are unusually demanding because they face *selective factor disadvantages* in competing in their own industry. A good example is the American oil industry. The continental United States has been intensely drilled, and wells are being drilled in increasingly difficult and marginal fields. The pressure has been unusually great for American oil field equipment suppliers to perfect techniques that minimize the cost of difficult drilling and ensure full recovery from each field. This has pushed them to advance the state of the art and sustain strong international positions. The challenge of helping home buyers surmount such factor

disadvantages begets competitive advantage in the nation's industries that supply them.

A nation's buyers can have unusually stringent needs for a wide variety of other reasons as well, including geography, climate, natural resource availability, taxation, tough regulatory standards, and social norms. High taxes on gasoline in Europe, for example, have contributed to strength in high-horsepower, low-displacement engines which are fuel-efficient compared to larger engines of equal horsepower. Buyers also tend to be more demanding when facing competition than if they are tightly regulated or hold a monopoly. Competitive pressure stimulates more attention to new products and creates greater efforts to control costs, reflected in demands placed on suppliers. The heavily private and decentralized health care delivery system in the United States, for example, has, by stimulating innovation, been a major advantage for American suppliers of medical equipment and supplies. Privatization of state-owned firms often stimulates them to experiment more in purchasing.

The role of sophisticated and demanding buyers can be played by *distribution channels* as well as by end users.³⁶ In the United States, for example, the presence of large powerful chains of eyewear stores has stimulated American contact lens producers to cut costs, create new forms of customer service, and rapidly introduce new product varieties. Italy is another good case. There, such products as shoes, clothing, furniture, and lighting are sold in greater proportion through specialty stores than in other nations. These sophisticated retailers are a major force pressuring Italian manufacturers to constantly introduce new models and reduce prices and thus costs.

One important clue to where a nation's buyers are sophisticated and demanding is national passions. Japanese have long been particularly oriented toward using pictures to record travels and family events, dating back well before World War II. They are also very sophisticated camera buyers, and the Japanese camera industry now leads the world. Japanese also pay great attention to writing instruments, because nearly all documents have until recently been handwritten in Japan due to the impracticality of typewriters in reproducing Japanese characters; penmanship is an important indication of education and culture. Japanese firms have been the innovators and have become world leaders in pens.

Germans cherish their cars and polish them on Sunday between bouts of high-speed driving on the autobahns, which have no speed limit because Germans would not tolerate one. The popular slogan is “free speed for free people.” Success in durable, high-performance cars is no surprise. Americans have an unusual interest in popular entertainment (sports, movies, television, records), contributing to American world leadership in these industries. The British are known for gardening, and British firms are world class in garden tools. Italians are known for their sophistication about clothes, food, and fast cars, all areas of Italian international success. National passions translate into internationally competitive industries with striking regularity. Sometimes these passions are not only the cause but also an effect of the presence of a highly competitive national industry. More on this in Chapter 4.

Anticipatory Buyer Needs. A nation’s firms gain advantages if the needs of home buyers anticipate those of other nations. This means that home demand provides an early warning indicator of buyer needs that will become widespread. The benefit is important not only for new products but on an ongoing basis, because it stimulates continuous upgrading of products over time and the ability to compete in emerging segments. Anticipatory demand is sometimes another benefit of having the world’s most sophisticated buyers at home, because sophisticated buyers are often (though not always) early adopters of new product and service varieties that will come to be demanded elsewhere.

Japanese firms in a variety of industries, for example, were confronted early with buyers very concerned about energy costs, a concern elevated by a stream of government reports, widespread publicity, and some early regulations governing the allowable energy consumption of products. Japanese firms began working early to improve the energy efficiency of products, well in advance of the rest of the world which woke up after the first oil shock (U.S. energy costs were held artificially low, in contrast).

Stringent home needs benefit national competitive advantage *only if* they anticipate needs elsewhere. If they are idiosyncratic to the nation, they will undermine the competitive advantage of local firms. If home demand is slow to reflect new needs, particularly sophisticated needs, a nation’s firms are at a disadvantage.

Anticipatory buyer needs may arise because a nation's political or social values foreshadow needs that will ultimately emerge elsewhere. Sweden's long-standing high level of concern for handicapped persons, for example, has spawned an industry supplying products for them that is becoming a world-class industry. A nation's home demand anticipates or lags behind world demand in part because the values embodied in its culture are spreading or are in retreat. American desire for convenience is spreading, benefiting international success in fast food, consumer packaged goods, and other industries. American appetite for credit (coupled with strengths in important technologies such as information technology used in credit scoring and validations) has led to commanding international leadership in credit cards with the likes of American Express, Visa, MasterCard, and Diners Club. Conversely, Scandinavian concern for social welfare and the environment tends today to be ahead of that in the United States. Swedish and Danish firms have achieved success in a variety of industries where this heightened environmental concern anticipates foreign needs, such as in water pollution control equipment.

Factor conditions sometimes play a role in the timing of demand. Danish dependence on imported energy, coupled with prevailing climatic conditions and government support for alternative energy sources, are important reasons why Denmark developed early demand for windmills. Danish firms have emerged as early leaders in producing and exporting them.

Regulations which lead those of other nations can also benefit competitive advantage. For example, Swedish regulations have long permitted very large and heavy trucks. Sweden has internationally prominent forestry and mining sectors located in the rugged northern regions of the nation. The prevalence of hauling timber and other materials over long distances necessitates large, extremely durable trucks. This is a typical example of how local regulations often strongly reflect local needs and values. Sweden has two leading international competitors in heavy trucks, Volvo and Saab-Scania, who have benefited from the Swedish context because large size and durability have been increasingly demanded abroad. At the same time, regulations in other nations limiting the size and weight of trucks have eased.

DEMAND SIZE AND PATTERN OF GROWTH

Provided that its composition is sophisticated and anticipates international and not just domestic needs, the size and pattern of growth of home demand can reinforce national advantage in an industry. The size of the home market has been prominent in discussions of national competitiveness,³⁷ though there is little agreement about the direction of causality or the reasoning. Some authors argue that a large home market is a strength, because of the existence of economies of scale. Other commentators see it as a weakness, reasoning that limited local demand forces firms to export, important to competitive advantage in global industries. Switzerland, Sweden, Korea, and even Japan are often-noted examples of nations where limited local demand led to pressures to export.³⁸ Home market size proves to play a complex role in national advantage, and other aspects of home demand are as or more important.

Size of Home Demand. Large home market size can lead to competitive advantage in industries where there are economies of scale or learning, by encouraging a nation's firms to invest aggressively in large-scale facilities, technology development, and productivity improvements. One must be careful, however, because global firms sell in many nations. Investments in large-scale plants or substantial R&D need not rely only on local demand, unless there is widespread protection that limits exports. The many world-class Swiss and Swedish industries attest to the ability of highly international firms to obtain scale from many different foreign markets.

The most important question in industries characterized by substantial economies of scale is which nation's firms will move first to reap them in producing products that will also meet foreign buyer needs. This is a function of the other determinants, especially home demand composition. The size of home demand may be significant in some industries, however. Local firms often enjoy some natural advantages in serving their home market compared to foreign firms, a result of proximity as well as language, regulation, and cultural affinities (even, frequently, if foreign firms are staffed with local nationals). Preferred access to a large domestic customer base can be a spur to investment by local firms. Home demand may be perceived as more certain and easier to forecast, while foreign demand is

seen as more uncertain even if firms think they have the ability to fill it. In our case studies, there was nearly universal emphasis in investment decisions on domestic demand, especially early in an industry's development.

Home market size is most important to national competitive advantage in certain kinds of industries (or segments), notably those with heavy R&D requirements, substantial economies of scale in production, large generational leaps in technology, or high levels of uncertainty. In such industries, the proximity of large home demand is particularly comforting in making investment decisions.

Large home demand is not an advantage, however, unless it is for segments that are demanded in other nations. For example, the vast U.S. agricultural sector has led to a large home demand for harvesting combines. Because of differences in climate, terrain, and farming practices as well as American regulations which allowed wider combines on public streets, however, combines designed for the United States were not practical in Europe. Claas, a German firm, was the pioneer in introducing more efficient and narrower combines that could work in the more varied (and difficult) conditions in Europe. It became the European leader, despite the European presence of established U.S. firms. In the highly scale-sensitive commercial aircraft industry, in contrast, the large U.S. home demand (due to a large and dispersed population) yielded a substantial advantage because American needs were similar but arguably more advanced than those elsewhere in most segments.

Sometimes, smaller countries represent very large markets for particular products, given local conditions. For example, demand for icebreakers and cargo vessels with icebreaking capacity in Finland is disproportionately high due to Finnish weather conditions, its dependence on trade, and its special access to the nearby Russian market (with its own icebreaker demand). While local demand for ships in Finland is insignificant in world terms, such is not at all the case in the segment where Finnish yards concentrate. Since home demand for icebreakers is also stringent and sophisticated, Finnish shipbuilders are strong internationally in this area.

Home market size is an advantage if it encourages investment and reinvestment, or dynamism. Because a large home market can also provide such ample opportunities that firms see little need to pursue international sales, however, it may undermine dynamism and become a disadvantage.

Other determinants, notably the intensity of domestic rivalry, are decisive in whether a large home market proves to be a strength or a weakness.

Number of Independent Buyers. The presence of a number of independent buyers in a nation creates a better environment for innovation than is the case where one or two customers dominate the home market for a product or service. A number of buyers, each with its own ideas about product needs and ideally under competitive pressure itself, expands the pool of market information and motivates progress. Serving one or two dominant customers, in contrast, may provide some static efficiencies but will rarely create the same level of dynamism.

A number of independent home buyers also stimulates entry and investment in the industry by reducing the perceived risk that a firm will be shut out of the market and limiting the power of a dominant buyer to bargain away all profits. I will discuss these issues further in the next chapter.

Rate of Growth of Home Demand. The rate of growth of home demand can be as important to competitive advantage as its absolute size. The rate of investment in an industry is as much or more a function of how rapidly the home market is growing as its size. Rapid domestic growth leads a nation's firms to adopt new technologies faster, with less fear that they will make existing investments redundant, and to build large, efficient facilities with the confidence that they will be utilized.³⁹ Conversely, in nations where the rate of growth of demand is more moderate, individual firms tend to expand only incrementally and are more resistant to embrace new technologies that make existing facilities and people redundant. Rapid home demand growth is especially important during periods of technological change, when firms need the conviction to invest in new products or new facilities.

A good case in point is the Italian appliance industry. The industry, less established in Italy right after World War II than it was in a number of other European countries, grew in the space of little more than a decade to be the European export leader. One of the reasons was the boom in appliance demand in Italy during the 1950s. Rapid growth led Italian producers to build uniquely large-scale, automated plants focused on individual types of appliances. Italian firms also began to supply the emerging private label

segment throughout Europe, under the brand names of the newly powerful European chain stores. Other European appliance producers, with established facilities and less buoyant home market growth, tended to expand incrementally and therefore did not fundamentally alter the production methods employed. Combined with this was the fact that Italian firms produced low-cost, relatively compact appliances that fit the needs of the Italian market. This segment was growing and underserved by European competitors. Demand growth, like all aspects of demand quantity, is not an advantage unless demand composition is favorable.

Japan is another country where rapid home market growth stimulated aggressive investment in a number of industries. In steel, tires, lift trucks, and many other industries, Japan experienced rapid home market growth somewhat later than in the United States and leading European countries. Rapid growth spurred Japanese firms to invest aggressively in automated facilities of the latest vintage. Western producers, facing more mature home markets and stuck with older facilities, were unwilling to do so.

Early Home Demand. Provided it anticipates buyer needs in other nations, early local demand for a product or service in a nation helps local firms to move sooner than foreign rivals to become established in an industry.⁴⁰ They get the jump in building large-scale facilities and accumulating experience. The product varieties demanded early by local buyers are particularly important to competitive advantage because they are where a nation's firms cut their teeth. Competitive strategies are established with these segments in mind, and investments are often directed toward them. Once again, however, the composition of home demand is more important than its size. Only if home demand is anticipatory of international needs will early home demand contribute to advantage.

These considerations find an interesting application in analyzing the impact of defense spending in promoting American competitive advantage. The defense sector has been the first market in the United States for many advanced goods, and the uniquely large U.S. defense budget has been viewed as an advantage to American firms. It is indeed an advantage if defense demand mirrors civilian demand both in the United States and abroad, because firms develop assets and skills that can be transferred to meeting civilian needs. In the case of jet aircraft, defense demand for the first military jet transport was an important advantage to Boeing in

becoming world leader in civilian transports—the 707 was essentially the same plane. The 747 was also originally a military aircraft design that lost out to the Lockheed C5A in the competition for a large military transport plane.

In many other industries, however, early defense demand has not necessarily been an advantage for U.S. firms. In computer-controlled machine tools, for example, defense needs were for product varieties with only modest applications in the civilian market. Japanese machine tool producers, without this distraction, concentrated on numerically controlled machine tools for general-purpose applications and became world leaders.

Whether defense demand is a strength or a weakness for U.S. firms depends on its composition—how accurately defense needs reflect or anticipate later civilian needs and how transferable skills are from defense to civilian applications. This will vary greatly from industry to industry, but it appears that the similarity between military and civilian needs has diminished.

Early Saturation. As significant as early home market penetration is early or abrupt saturation. Early penetration helps local firms become established. Early saturation forces them to continue innovating and upgrading. A saturated home market creates intense pressures to push down prices, introduce new features, improve product performance, and provide other incentives for buyers to replace old products with newer versions. Saturation escalates local rivalry, forcing cost cutting and a shakeout of the weakest firms. The result is often the emergence of fewer but stronger, more innovative local rivals.

Another frequent result of home market saturation is vigorous efforts by a nation's firms to penetrate foreign markets, in order to sustain growth and even to fill capacity. It was striking how many of the industries we studied began their first significant international activity after the home market saturated. This was particularly true in Japan and the United States, but there were examples in virtually every country. The abrupt end of the post-World War II reconstruction of Italy was an important impetus that propelled Italian construction firms to become successful international competitors, for example.⁴¹

Home market saturation is particularly beneficial if it is combined with buoyant growth in foreign markets. If foreign demand is surging while

home demand is maturing, a nation's firms have strong incentives to sell abroad just at the time when foreign firms lack the capacity to meet booming demand or are complacent because of the absence of domestic rivalry. In many industries, such periods have been seminal ones in determining eventual leadership.

An extreme example is the rise to world prominence of U.S. engineering and construction firms in the years following World War II. The American industrial base and infrastructure were largely intact, while much of the rest of the world's were destroyed and needed rebuilding. With available capacity and skills gained in working on wartime projects, American firms were swept into the vacuum created by the foreign reconstruction boom and the absence of qualified foreign firms. That U.S. aid was partially funding the reconstruction did not hurt. Similarly, Japanese firms got their break in semiconductors when American firms could not meet demand in the economic upturn of the late 1970s. Combined with heavy investment in newer metal oxide (MOS) technology when American firms were still committed to bipolar technology, this catapulted the Japanese to industry leadership.

Another good example is consumer electronics. In consumer electronic products, saturation in the Japanese home market is rapid and product life cycles are extremely short because of homogeneity of tastes combined with the sophistication and status-consciousness of the buyers I described earlier. The result is that Japanese consumer electronics firms are scrambling to find the next product when foreign consumers are just beginning to buy the generation that is already passé in Japan. This rapid saturation is a potent advantage because home buyers are picky and seek light, compact, multifeatured products that suit Japanese living conditions. Here, rapid saturation pushes producers to innovate in ways that are valued by foreign buyers and which tend to be neglected by foreign rivals.

Like early penetration, early saturation is an advantage only if home demand composition directs a nation's firms to products and product features that are desired abroad.

INTERNATIONALIZATION OF DOMESTIC DEMAND

The composition of home demand is at the root of national advantage, while the size and pattern of growth of home demand can amplify this advantage by affecting investment behavior, timing, and motivation. But there is a third way in which home demand conditions contribute, through mechanisms by which a nation's domestic demand internationalizes and *pulls* a nation's products and services abroad.

Mobile or Multinational Local Buyers. If the nation's buyers for a product or service are mobile or are multinational companies, an advantage is created for the nation's firms because the domestic buyers are also foreign buyers. Mobile consumers, who travel extensively to other nations, provide a base of often loyal customers in foreign markets. More important in many ways, however, is that their existence highlights the *opportunity* of establishing an overseas presence to a nation's firms and may well provide the conviction to pursue such a presence by lowering the perceived risk. This effect is quite apparent in travel-related industries, where U.S. hotel, rent-a-car, and credit card firms have benefited. It is also significant in such other industries as fast food.

A similar set of arguments applies where home buyers are multinationals, with subsidiaries or operations in many other nations. Multinationals frequently prefer to deal with suppliers of products and services based in their home nation, particularly in the early years of operating abroad but often long after their international position is established. These preferences stem from ease of communication, a desire to reduce risk, and the efficiencies of employing consistent inputs everywhere. Buyers' preference for homegrown suppliers provides an early impetus for suppliers to move abroad and a base of foreign demand.

A good example is the earthmoving equipment industry, where U.S. firms such as Caterpillar were encouraged overseas by preeminent American construction firms, mining companies, and forest products producers. In turn, U.S. oil drilling, mining, and construction equipment pulled heavy engine manufacturers, such as Cummins, abroad. American auto parts suppliers followed U.S. auto companies to Canada, Europe, and elsewhere. More recently, Japanese auto parts suppliers are following the foreign operations of the Japanese car companies.

Influences on Foreign Needs. Another way in which domestic demand conditions can pull through foreign sales is when domestic needs and desires get transmitted to or inculcated in foreign buyers. One obvious way is when foreigners come to a nation for training. They are taught approaches and values reflecting local conditions, and have a tendency to carry them back home. A typical result is the desire to use the same goods and services they were trained on. A good example is the extensive training of foreign doctors in the United States, which has aided U.S. medical equipment firms who find a receptive audience when they seek to sell abroad.

The same general phenomenon occurs because of a demonstration effect, often present in the scientific community. Foreign scientists seek to emulate the practices of those nations' scientists that are perceived as the world leaders. The leaders' procedures and equipment are often reported in technical journals as well as disseminated by word of mouth. A good example of a product that benefited from such a process is microscopes, where German firms (notably Zeiss) prospered internationally in part because of an association with world-class German researchers. A similar demonstration effect may surround any world-class national industry: foreign competitors will have a tendency to emulate the machinery and other inputs that industry employs.

Domestic buyer needs are also transmitted abroad through exports that disseminate culture, such as movies and television programs. Also significant is emigration, which creates a base of foreign demand and a demonstration effect for certain types of products, and tourism, which exposes foreigners to national tastes and norms that may prove appealing. None of these is significant to competitive advantage, however, unless home demand is advanced and sophisticated.

Another means by which home demand is transmitted is via political alliances or historical ties. This embeds in foreign nations such things as the legal system, product or technical standards, and preferences in purchasing. Britain gained enormously through such links in the 1800s through the mid-1900s. Foreign aid and special political relationships among nations are having less dramatic but similar effects today. Nations such as Italy and Japan, for example, are adept at using foreign aid to increase demand for their firms' products and services. Too much 'captive' foreign business can

undermine competitive advantage, however, by reducing the pressure to improve and innovate.

THE INTERPLAY OF DEMAND CONDITIONS

It should be clear already that the various home demand conditions can reinforce each other and have their greatest significance at different stages of an industry's evolution. The television set industry (see insert) provides a good example. The most important attributes of home demand are those that provide initial and ongoing stimulus for investment and innovation as well as for competing over time in more and more sophisticated segments. Examples are especially demanding local buyers, needs that anticipate those of other nations, rapid growth, and early saturation. The resulting advantages are more decisive and enduring than one-time advantages from demand size and mix. Some aspects of home demand are important in initially establishing advantage, while others reinforce that advantage or help sustain it.

The effect of demand conditions on competitive advantage also depends on other parts of the 'diamond.' Without strong domestic rivalry, for example, rapid home market growth or a large home market may induce complacency rather than stimulate investment. Without the presence of appropriate supporting industries, firms may lack the ability to respond to demanding home buyers. The "diamond" is a system in which the role of any determinant cannot be viewed in isolation.

Demand Conditions in the Television Set Industry

Television sets provide a good example of the interplay of demand conditions that are working in tandem and are mutually reinforcing. Japanese home demand was primarily for small, compact, portable televisions because of lower per capita income and because Japanese homes are small and television sets are often put away after use. The American firms that had pioneered the industry were busy meeting home demand, which was primarily for large sets with fine furniture styling and large picture tubes. American firms spent relatively little effort designing small picture tubes and making sets compact. Japanese firms devoted most of their effort in these directions, content to license large set technology and purchase large tubes from the United States.

Japanese home demand for television sets, even though it took off somewhat later, was a much better mirror of world demand than was early American home demand because television sets became part of everyday life instead of something to put in the living room, and compact sets proved to be the global product. Also, as described earlier, Japanese buyers are extremely knowledgeable and demanding about consumer electronics, which led to intense efforts to improve quality, features, and price.

Although television set demand took off earlier in the United States than in Japan, the Japanese market reached saturation sooner. As American firms continued earning record profits, Japanese television set producers scrambled to deal with falling domestic demand. They reduced costs, introduced sets with new features, and moved aggressively to serve export markets. At the end of the 1980s, the Japanese firms were commanding world leaders, especially in differentiated segments.

RELATED AND SUPPORTING INDUSTRIES

The third broad determinant of national advantage in an industry is the presence in the nation of supplier industries or related industries that are internationally competitive.⁴² Japanese machine tool producers drew on world-class suppliers of numerical control units, motors, and other components. Swedish strength in fabricated steel products (for example, ball bearings, cutting tools) has drawn on strength in specialty steels. Swiss firms are leaders in embroidered goods and also embroidery machines. [Figure 3–2](#) illustrates how internationally competitive supplier industries underpin Italian success in footwear. Competitive advantage in some supplier industries confers potential advantages on a nation's firms in many other industries, because they produce inputs that are widely used and important to innovation or to internationalization. Semiconductors, software, and trading, for example, are industries that have important impacts on many others.

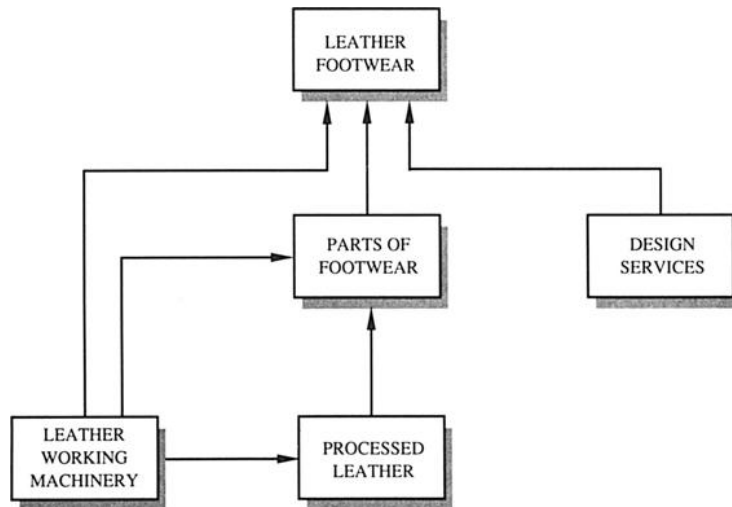


FIGURE 3–2 Internationally Successful Italian Supplier Industries to Footwear

The presence of competitive industries in a nation that are related is no less common or significant. The Swiss success in pharmaceuticals was closely connected to previous international success in the dye industry. Japanese leadership in facsimile owes much to the Japanese strength in copiers, while Japanese dominance in electronic musical keyboards grows out of success in acoustic instruments combined with a strong position in consumer electronics. [Figure 3–3](#) illustrates that the Italian footwear industry is also linked to a wide variety of related industries that are competitive.

The mechanisms by which competitive advantage in supplier and related industries benefit other industries are similar. The direct effects on competitive advantage are described below. Those that work through other determinants will be discussed in Chapter 4.

COMPETITIVE ADVANTAGE IN SUPPLIER INDUSTRIES

The presence of internationally competitive supplier industries in a nation creates advantages in downstream industries in several ways. The first is via efficient, early, rapid, and sometimes preferential access to the most cost-effective inputs. Italian world leadership in gold and silver jewelry has been sustained, for example, in part because other Italian firms produce two-

thirds of the world's jewelry-making machinery and are also world leaders in equipment for recycling precious metals. The Italian jewelry industry is quick to obtain new equipment models. Italian equipment suppliers compete intensely to serve their home market, for reasons I described earlier. The result is attractive prices and responsive service.

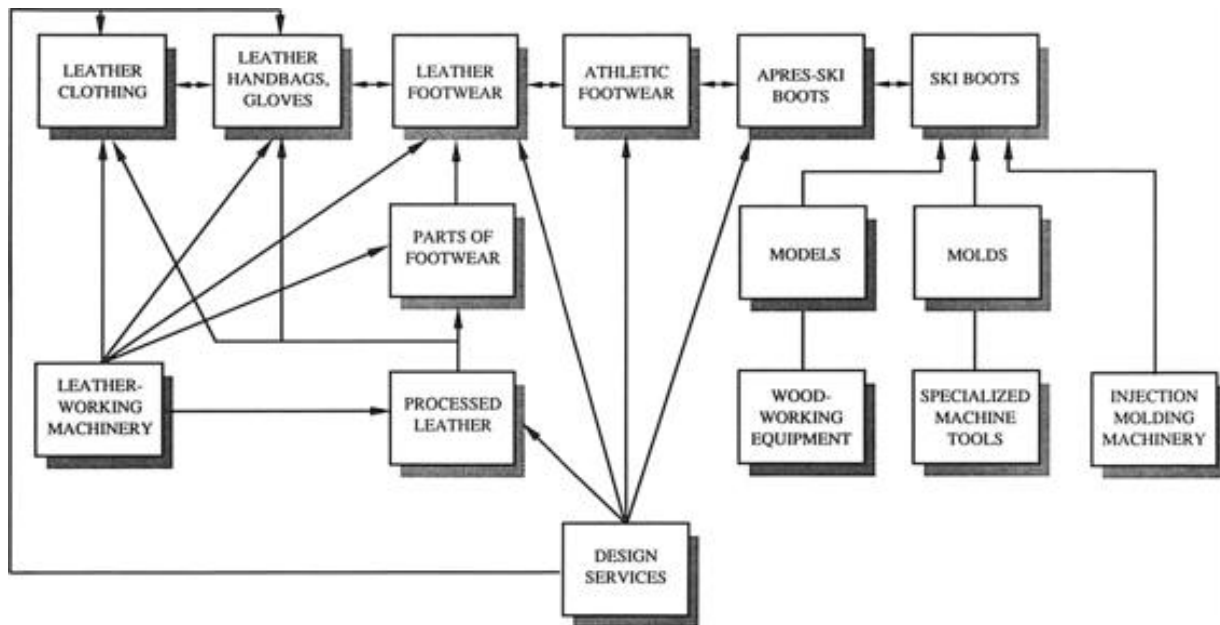


FIGURE 3-3 Internationally Successful Italian Industries Related to Footwear

Mere access or availability of machinery or inputs, however, is not the most significant benefit of having a home-based supplier industry that is internationally successful, even if it is early. In global competition, components, machinery, and other inputs are available on global markets, and availability is much less important than how effectively inputs are utilized.

More significant than access to machinery or other inputs is the advantage that home-based suppliers provide in terms of ongoing coordination. I described in the previous chapter how linkages between the value chains of firms and their suppliers are important to competitive advantage. Establishing such linkages is facilitated by having the essential activities and senior management of suppliers nearby. Foreign suppliers are rarely a complete substitute, even if they have local subsidiaries.

Perhaps the most important benefit of home-based suppliers, however, is in the *process of innovation and upgrading*. Competitive advantage

emerges from close working relationships between world-class suppliers and the industry. Suppliers help firms perceive new methods and opportunities to apply new technology. Firms gain quick access to information, to new ideas and insights, and to supplier innovations. They have the opportunity to influence suppliers' technical efforts as well as serve as test sites for development work. The exchange of R&D and joint problem solving lead to faster and more efficient solutions. Suppliers also tend to be a conduit for transmitting information and innovations from firm to firm. Through this process, the pace of innovation within the entire national industry is accelerated. All these benefits are enhanced if suppliers are located in proximity to firms, shortening the communication lines.

Italy provides many examples of this sort of interchange. In the leather footwear industry (Figure 3–2), for example, producers interact regularly with leather manufacturers on new styles and manufacturing techniques. Footwear manufacturers learn about the new textures and colors of leather on the drawing board. Leather manufacturers, in turn, gain early insights into fashion trends which help them plan new products. As this example illustrates, however, gaining the benefits of home-based suppliers *does not happen automatically*. Both firms and their suppliers must work to do so, a theme of later chapters.

Having a competitive domestic supplier industry is far preferable to relying even on well-qualified foreign suppliers. The home market is highly visible to domestic suppliers, and success there is a matter of pride. Proximity of managerial and technical personnel, along with cultural similarity, tends to facilitate free and open information flow. Transaction costs are reduced. Without the presence of a supplier's core research facilities in the home nation, it is unlikely that buyers will get information as early or have the same opportunities for joint development and other forms of deep interchange.⁴³ Foreign suppliers are also less desirable for the entire national industry because they rarely spawn new domestic entry (see Chapter 4).

A nation's firms receive maximum benefit when their suppliers are themselves global competitors. Only then will they possess the wherewithal to best upgrade their own advantages, thereby providing the needed technology flow to their home-based customers. Home-based suppliers with international positions are also more valuable sources of information and insights. Pressuring local suppliers not to serve foreign competitors is

ultimately self-defeating. “Captive” suppliers, dependent solely on a firm or the national industry, will provide less impetus to improve and upgrade.

Local suppliers that are strong by world standards still bolster competitive advantage in downstream industries even when they are not in industries that compete globally. A good case in point is the advertising media. Most media industries (television, radio, and magazines) are still multidomestic, though there are some signs of globalization. The United States has long been the home of some of the most innovative and sophisticated media companies in the world, and new forms of media such as television and magazine formats have been pioneered in the United States. American marketers benefited from close and ongoing interaction with sophisticated American media providers (as well as world-leading advertising agencies), and often were the first to exploit new media forms that ultimately diffused around the world. The importance of advanced media as suppliers to companies in marketing-intensive industries is such that it is rare to find internationally competitive consumer goods industries in nations that do not have well-developed private media. Germany and Sweden, in particular, are nations whose firms have had to learn modern marketing abroad because of restrictions on advertising. International success in marketing-intensive consumer goods is rare in both nations.

A nation need not possess national advantage in all supplier industries in order to gain competitive advantage in an industry. Inputs without a significant effect on innovation or on the performance of an industry’s products and processes can be readily sourced from abroad. So may other generalized technologies where the industry represents a narrow application area. In a variety of Swiss and German industries such as hearing aids and plastics processing machinery, for example, firms successfully established subsidiaries in the United States to tap into electronics or software expertise. Here, their in-depth knowledge of the user industry was more important than lack of expertise in supplier technologies. Compensating for the lack of a critical supplier industry in a nation is also feasible where the user industry is already well-developed and represents a specialized use of the supplier industry’s product.

COMPETITIVE ADVANTAGE IN RELATED INDUSTRIES

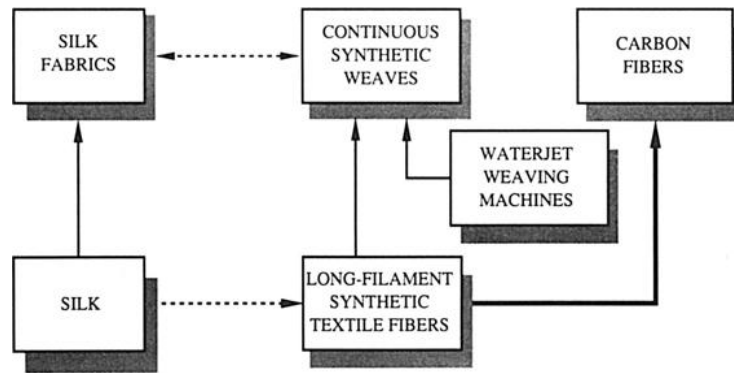
The presence in a nation of competitive industries that are related often leads to new competitive industries. Related industries are those in which firms can coordinate or share activities in the value chain when competing, or those which involve products that are complementary (such as computers and applications software). Sharing of activities can occur in technology development, manufacturing, distribution, marketing, or service. For example, copiers and facsimile machines employ many of the same technologies and components and can be distributed and serviced through the same channels.

Cases where nations are internationally competitive in related industries are pervasive. A few examples drawn from our case studies are shown in [Table 3–1](#).

TABLE 3–1 Internationally Competitive Related Industries

<i>Nation</i>	<i>Industry</i>	<i>Related Industry</i>
Denmark	Dairy products, brewing	Industrial enzymes
Germany	Chemicals	Printing ink
Italy	Lighting	Furniture
Japan	Cameras	Copiers
Korea	VCRs	Videotape
Singapore	Port services	Ship repair
Sweden	Automobiles	Trucks
Switzerland	Pharmaceuticals	Flavorings
United Kingdom	Engines	Lubricants, antiknock preparations
United States	Electronic test and measuring equipment	Patient monitoring equipment

[Figure 3–4](#) charts a group of related Japanese industries in more detail. Japan’s strength in long-filament synthetic textile fibers reflects a long tradition of success in silk, as does a leading export position in silk-like continuous synthetic weaves, woven from long-filament synthetic fibers. Carbon fibers employ technology closely related to synthetic filament fibers and many of the same competitors participate in both. Also, while not overall leaders in textile machines, Japanese firms are leaders in water jet weaving machines, used to weave long-filament synthetic fibers into synthetic weaves. Such groups of linked competitive industries in a nation are common.



NOTE: Broken lines refer to related industries Solid lines represent supplier relationship

FIGURE 3–4 Related Japanese Industries in Fibers and Fabrics

The presence of an internationally successful related industry in a nation provides opportunities for information flow and technical interchange, much like the case with home-based suppliers. Proximity and cultural similarity make such interchange easier than is the case with foreign firms. The presence of a related industry also raises the likelihood that new opportunities in industry will be perceived. It also provides a source of new entrants who bring a new approach to competing (see Chapter 4).

Domestic companies in related industries often share activities and sometimes forge formal alliances.⁴⁴ In Switzerland, for example, the herbal candy firm Ricola accelerated its international expansion through employing the foreign distribution channels of the Swiss chocolate company, Tobler/Jacobs. In Sweden, Atlas Copeo (mining machinery) and Sandvik (rock drills) have a history of formal and informal contacts including a formal marketing alliance. The presence of successful related industries in a nation may also hasten the development of supplier industries that serve both.

International success in one industry can also pull through demand for complementary products or services. The sale of American computers abroad, for example, has led to overseas demand for American computer peripherals, American software, and American database services. Service industries pull through sales of linked manufactured goods from that nation and vice versa (see Chapter 6). Complementary products or services provided by firms based in the same nation may be, or may be perceived to be, more cost effective. Companies contribute to this perception by actively recommending other firms from their home nation, because they are used to

dealing with them and have confidence that their products or services will not undermine the performance of their own. Close working relationships between firms producing complementary goods may also lead to product performance that is actually better.

The strength of this pull-through effect varies by industry, in rough proportion to the extent of technical interdependencies between the products involved. Pull through tends to be strongest early in the life cycle of the industries involved. However, the link between complementary goods can create first mover advantages that persist long after the link fades. Britain, for example, gained strong international positions in many services connected with trading because it was an early, powerful trading nation. The foreign infrastructure and brand franchises created through this process have proved to be quite a durable competitive advantage for some British service providers.

National success in an industry is particularly likely if the nation has competitive advantage in a number of related industries. The most significant are those important to innovation in the industry or those that provide the opportunity to share critical activities. Prior to the emergence of the facsimile industry, for example, Japan had leading positions in copiers, other office machines, photographic equipment, and some strong competitors in telecommunications equipment, covering all essential technologies important to facsimile.

The benefits of both home-based suppliers and related industries, however, depend on the rest of the “diamond.” Without access to advanced factors, home demand conditions that signal appropriate directions of product change, or active rivalry, for example, proximity to world-class domestic suppliers may provide few advantages. In the television set industry, for example, American competitors were concentrating on the home market and on segments less demanded elsewhere. They lacked the pressure to shift to solid state technology and to automate manufacturing. Proximity to then-preeminent U.S. semiconductor companies did not compensate.

FIRM STRATEGY, STRUCTURE, AND RIVALRY

The fourth broad determinant of national competitive advantage in an industry is the context in which firms are created, organized and managed as well as the nature of domestic rivalry. The goals, strategies, and ways of organizing firms in industries vary widely among nations. National advantage results from a good match between these choices and the sources of competitive advantage in a particular industry. The pattern of rivalry at home also has a profound role to play in the process of innovation and the ultimate prospects for international success.

STRATEGY AND STRUCTURE OF DOMESTIC FIRMS

The way in which firms are managed and choose to compete is affected by national circumstances. While no nation exhibits uniformity across all firms, the national context creates tendencies that are strong enough to be readily noticeable by any observer. In Italy, many successful international competitors are relatively small- or medium-sized firms that are privately owned and run like extended families. In Germany, the top management of many companies consists of individuals with technical backgrounds, and companies are hierarchical in organization and management practices. Efforts to explain why one nation's managerial system is superior have a long tradition; attention was once focused on American management, while in the 1980s it has been on Japan.

No one managerial system is universally appropriate. Nations will tend to succeed in industries where the management practices and modes of organization favored by the national environment are well suited to the industries' sources of competitive advantage. Italian firms, for example, are world leaders in a range of fragmented industries (such as lighting, furniture, footwear, woolen fabrics, and packaging machines) in which economies of scale are either modest or can be overcome through cooperation among loosely affiliated companies. Italian companies most often compete by employing focus strategies, avoiding standardized products and operating in small niches with their own particular style or customized product variety. Often dominated by a single individual, these firms rapidly develop new products and can adapt to market changes with breathtaking flexibility.

In Germany, in contrast, the engineering and technical background of many senior executives produces a strong inclination toward methodical product and process improvement. Intangible bases of competitive advantage are rarely pursued. These characteristics lead to the greatest success in industries with a high technical or engineering content (for example, optics, chemicals, complicated machinery), especially where intricate and complex products demand precision manufacturing, a careful development process, after-sale service, and hence a highly disciplined management structure. German success is much rarer in consumer goods and services where image marketing and rapid new feature and model turnover are important to competition. In Japan, a number of studies have stressed unusual cooperation across functions and the management of complex assembly operations.⁴⁵

Important national differences in management practices and approaches occur in such areas as the training, background, and orientation of leaders, group versus hierarchical style, the strength of individual initiative, the tools for decision making, the nature of the relationships with customers, the ability to coordinate across functions, the attitude toward international activities, and the relationship between labor and management.⁴⁶ These differences in managerial approaches and organizational skills create advantages and disadvantages in competing in different types of industries.⁴⁷ Labor management relationships are particularly significant in many industries because they are so central to the ability of firms to improve and innovate.

Many aspects of a nation, too numerous to generalize, influence the ways in which firms are organized and managed. Some of the most important aspects are attitudes toward authority, norms of interpersonal interaction, attitudes of workers toward management and vice versa, social norms of individualistic or group behavior, and professional standards. These in turn grow out of the educational system, social and religious history, family structures, and many other often intangible but unique national conditions. For example, Italy's small-sized firms and family ownership reflect, among other things, a high degree of individualism and a suspicion of authority unless coming from the family or extended family. Italy is a country in which family ties are strong, and even today people prefer to remain near their birthplace. Situations where family members all work in the same firm are very common, and rather than enlarging the

existing firm beyond a certain level, new firms are created for sons and daughters.⁴⁸

The orientation of firms toward competing globally (Chapter 2) takes on unusual significance in international competition and deserves more extended treatment here. The willingness and ability of firms to compete globally is partly a function of other determinants such as pressure from domestic market saturation or local rivalry and the pull through of international demand. However, managerial attitudes play an important role as well. Several aspects of the national environment affect the international outlook of firms, or their ease and willingness to operate globally. One is attitudes toward travel. Travel has a long tradition and is a way of life in countries such as Sweden and Switzerland. In several of the Swiss industries I studied, for example, founders of important companies had been trained or had lived for a long time outside Switzerland before returning home. Inevitably, one of the founder's first acts was to establish a foreign subsidiary in the country where he or she had lived. Both Swedish and Swiss firms do well competing in industries requiring far-flung global strategies and involving sensitive relations with local governments and buyers.

Language skills and attitudes toward learning new languages are also significant in influencing whether firms adopt a global outlook. However, the Japanese case illustrates that other determinants are more important causal factors. Japanese, who have difficulty learning Western languages and whose culture is not outwardly oriented, have mastered foreign languages because they have expended great effort to do so. Driven by intense rivalry and domestic market saturation, they found exporting a necessity.

Government policy frequently plays a role in influencing the ease or difficulty of internationalization of domestic firms and, hence, the type of industries in which they succeed. A straightforward example is in the area of foreign exchange controls that limit foreign direct investment. Because of a history of such restrictions, for example, Italian firms are rarely successful in industries in which foreign direct investment is essential to competing. A nation's political stance also plays a material role in promoting globalization in certain industries. Swiss and Swedish neutrality has been an important advantage in establishing international networks, particularly in politically sensitive industries. Other policies that bear on a

local firm's ability to operate abroad include controls on the movement of domestic or foreign managerial personnel.

GOALS

Sharp differences exist within and among nations in the goals that firms seek to achieve as well as the motivations of their employees and managers.⁴⁹ Nations will succeed in industries where these goals and motivations are aligned with the sources of competitive advantage. In many industries, one component of achieving and sustaining advantage is sustained investment. More broadly, nations succeed in industries where there is unusual commitment and effort.

Company Goals. Company goals are most strongly determined by ownership structure, the motivation of owners and holders of debt, the nature of the corporate governance, and the incentive processes that shape the motivation of senior managers. The goals of publicly held corporations⁵⁰ reflect the characteristics of the nation's public capital markets. Capital markets vary a great deal across nations, along such dimensions as the identity of shareholders, the local tax regime, and the prevailing standards for rate of return. In addition, the role of shareholders and debtholders in corporate governance also varies. In Germany and Switzerland, for example, most shares are held by institutions for extended periods and are rarely traded. Banks are important holders of equity shares and play a prominent role on boards of directors, guiding corporate investments. Long-term capital gains have been exempt from taxation, reinforcing a perspective to hold shares for sustained periods. Management pays attention to the board, but day-to-day stock price movements are not viewed as particularly important. Because of local accounting rules, companies can establish substantial reserves to shelter income and provide a cushion in hard times. Norms for reported profitability are modest. Companies do well in mature industries requiring ongoing investment in research and new facilities, even where industry average returns are moderate.

The United States is at the other extreme. Most shares are held by institutional investors, but institutions are measured on quarterly and annual share price appreciation. Lacking full information about companies' long-term prospects and seeking stocks which will soon appreciate, investment choices stress quarterly earnings growth. Institutions trade frequently in order to realize capital appreciation, and account for most trading in larger company stocks. Long-term capital gains of investors are taxed at the same rate as ordinary income, shortening the time horizon of investment. Many institutions, because they are managing pension assets, take no account of taxes in investment choices. When coupled with low transaction costs in the efficient U.S. market, more rapid trading is encouraged.

Shareholders have little direct influence in the management of American companies because boards play little role in corporate governance. In practice, the only effective way to remove underperforming management or affect corporate direction is through takeover. Management responds to stock price movements because of the takeover threat and the prevalence of stock options. In the United States, executive compensation is strongly influenced by overall company size and also involves a high bonus component compared to other nations, usually based on the current year's profits. Since the average tenure in management positions is short, foregoing this year's bonus for a higher one next year is unusual. The lack of effective shareholder governance means that there is little to counteract such behavior. For these reasons and others, the rate of return standards for evaluating investments are higher in America than in any other advanced nation we studied.

Coexisting in the United States with this capital market and governance structure for mature companies is a well-functioning public and quasi-public market for risk capital. This market is much less developed in most other nations. Start-ups and emerging growth companies can be readily funded, particularly if they are in glamorous industries or are viewed as "high tech." The rewards to founders are often substantial. In such industries, companies can and do show losses for five years or more. The biotechnology industry is a good example: few firms have ever made a profit in any year, yet billions of dollars of public equity have flowed into the industry over the last decade.

Britain's situation is closer to America's, while Sweden and Japan are closer to Germany and Switzerland. In both Sweden and Japan, large

industrial groups (which include banks) play significant roles as long-term investors. In Germany, large banks themselves are cast in this role. In Italy, public capital markets are of less importance and many internationally successful companies are privately owned. In Korea, the public capital markets have been inefficient and poorly developed. Government policy is the decisive factor in capital allocation, based on considerations other than short-term rate of return.

While I have concentrated on the goals of investors in public companies and their influence on management, private companies play an important role in many national economies. The goals of privately owned firms are more complex. Often pride and the desire to provide continuity to employees is important. Private owners frequently have a very long time horizon, are intensely committed to the industry, and operate with different profitability thresholds. In our research, it was striking how many internationally successful companies were either privately held, effectively private because of a controlling or *de facto* controlling equity block, or owned by a nonprofit foundation (for example Zeiss, Novo Industri, and Carlsberg). The sustained investment of such companies and their close identification with and commitment to their industry were palpable.

The attitudes of debt holders also influence company goals. An important difference among nations is the extent to which debt holders also hold equity. In nations such as Japan, Germany, and Switzerland, regulations allow banks to hold corporate equity. Major lenders hold significant equity stakes and play an important role in corporate governance. By holding both, banks are motivated to be concerned with long-term company health rather than short-term cash flow and interest coverage.

Ownership structures, capital market conditions, and the nature of corporate governance in a nation have two broad influences on national advantage. The first grows out of the fact that industries have different appetites for funds, different risk profiles, different investment time horizons, and different average sustained rates of return. National capital markets will also set different goals for different types of industries. Nations will succeed in industries where the goals of owners and managers match the needs of the industry. A given institutional structure can benefit competitive advantage in some industries and impede it in others.

German and Swiss circumstances favor industries requiring modest initial risk capital but a need for heavy and sustained investment and reinvestment. American conditions favor entry into new industries requiring risk capital and competing in industries where strong incentives for annual profitability are consistent with competitive advantage (for example, in many services) because of the nature of their investment needs. The United States does well in relatively new industries (such as computers, software, and new forms of services) or ones in which equity funding of many new companies feeds active domestic rivalry (such as specialty electronics and consumer packaged goods). In more mature and less glamorous industries, however, capital market pressures and the governance process will be prone to lead to harvesting of competitive positions and an inadequate level of investment to sustain improvement and innovation. Companies in mature industries are motivated instead to seek mergers, unrelated diversification, and other actions that can quickly affect size, financial results, and investor perceptions.⁵¹

Second, the influence of the capital markets varies with the need for funds. In industries where private ownership is feasible, for example, a nation can succeed despite public capital markets that set counterproductive goals. Other parts of the “diamond” govern in such cases.

Goals of Individuals. The motivations of the individuals who manage and work in firms can enhance or detract from success in particular industries. The central concern is whether both are motivated to develop their skills as well as expend the effort necessary for creating and sustaining competitive advantage.

One important determinant of individual behavior and effort is the reward systems under which employees operate. An aspect of this is social values which influence attitudes toward work and the extent to which individuals are motivated by financial gain, which vary a great deal across nations. Also significant is the nation’s tax structure. In Sweden, marginal tax rates are extremely high. People do not work primarily to enhance income but to contribute to the company and enhance their status. This facilitates coordination but slows decision making and limits risk taking, skewing success toward certain types of industries. Also important are pay and promotional practices. Bonus compensation based on individual performance and rapid promotion of the most outstanding employees, both

typical in America, reinforce competitive advantage in some types of industries but detract from it in others, especially those requiring long accumulation of skills and complex coordination.

The attitude toward wealth also varies across nations. It is a big motivator in the United States, while looked on with some suspicion in Sweden. Swedes are less motivated than Americans to seek a fortune on a new start-up. Sweden is rarely successful in industries where this behavior is important to competitive advantage.

Another important dimension is the relationship between the manager or employee and the company. Creating and especially sustaining competitive advantage in many industries requires ongoing investments to upgrade skills, better understand the industry, and exchange ideas across functions. In industries where these attitudes are present, often because of a norm of virtually permanent employment, nations are successful. In the absence of such a relationship, national success will gravitate toward industries where competitive advantage is more a function of the brilliance or performance of a small group of individuals, such as professional and financial services, movies and other entertainment products, and specialty products based on advanced technology like software and specialized integrated circuits.

Individuals' attitudes toward skill development and toward company activities also stem from professional or technical training and pride. In Germany, employees (including managers) have often invested their entire careers training in a field or profession. The possibility that a firm cannot match its rivals' technical achievements is unthinkable, and this promotes relentless advance in industries amenable to incremental technical improvement. Another influence on individuals' goals in some nations is geographic preference. The desire to live in a particular area is the strongest in Italy of any of the nations we studied. Staying in an area often means working in the local industry, and finding a way to sustain it is tantamount to defending the home.

Attitude toward risk taking is a final important aspect of personal goals that influences the ability to achieve success in particular industries. I have discussed how "outsiders" often are prominent in innovation because of their willingness to take risk. Attitudes toward wealth affect risk taking, but so do other social and historical factors. In some nations, such as Germany, Switzerland, and Singapore, failure is viewed as personally catastrophic. In

other nations, a failure or two are acceptable. The types of industries entered and the nature of the strategies chosen reflect these differences.

Also quite significant to risk taking is immigration, the ultimate source of outsiders. Nations such as America, Britain, and Switzerland, which have a history of immigration, have seen an unusual proportion of new firms emerge from newcomers.

The Influence of National Prestige/Priority on Goals. The quality of human resources attracted to particular industries and the motivation of individuals and even shareholders are affected by prestige or national priority. Unusual effort is often the result of such prestige or a sense of broader mission. Where an industry becomes a notable occupation or takes on national importance, competitive advantage often results.

Outstanding talent is a scarce resource in any nation, though the size of the pool may vary. In no small part, a nation's success depends on the types of education this talent chooses to obtain and where it chooses to work. Training the most promising young people in science and engineering is unusually beneficial to an economy because it provides the greatest spur to innovation. When an industry takes on the status of a national priority and/or a prestigious place to work, talented people flow into it and demonstrate unusual commitment and effort.

In the United States, for example, responding to Sputnik became an important stimulus to the aerospace sector. Outstanding people were attracted, and firms viewed their work as more than just business. Another good example is the German chemical sector. The sector has long been prestigious in Germany, based on early groundbreaking chemistry research. Prior to World War II, the drive for self-sufficiency in materials elevated the industry to a vital national priority. Remarkable accomplishments took place in a short span of time. In Japan, the steel and consumer electronics industries were the most prestigious in the period just after World War II.

Sometimes it is difficult to distinguish between cause and effect. The attainment of international success can make an industry prestigious. Prestige then becomes a powerful reinforcing mechanism for sustaining advantage in an industry, even if it was not decisive in creating it initially.

National priority can be attached not only to industries but to particular issues that affect many industries. This can have the same supercharging effect on motivation. In Japan, national campaigns to improve product

quality and reduce energy consumption had strong impacts on a number of industries. Japanese firms moved early and aggressively to confront these problems with techniques that helped them succeed internationally.

Industries become celebrated in a nation for reasons that can be deeply rooted in history, geographic location, social structure, and many other things. If prestige and national priority favor an industry, the ripple effect on competitive advantage can be enormous. However, the reverse is true as well. If a nation's priorities shift away from success in an industry or toward an idiosyncratic conception of economic progress, competitive advantage can be systematically undermined. Working in the manufacturing industry has long been seen as low in status in Britain where the higher callings were the church, the civil service, the military, and academia. Many British manufacturing industries suffered from a lack of talented people and a lack of mission.

The role of national prestige in stimulating national competitive advantage can be extended to make a broader point: nations tend to be competitive in activities that are admired or depended upon; that is, where the heroes come from. In Italy, it is fashion and furnishings, among others. In Switzerland, it is banking and pharmaceuticals. In the United States, it is finance and anything to do with entertainment, including movies, popular music, professional sports, and related fields. In Israel, the highest callings have been defense-related endeavors and agriculture. National passions not only affect demand conditions, as I have discussed, but also how firms compete. Competitive advantage often results because celebrated professions or industries attract the most talented people as well as a steady stream of new entrants.

The Importance of Sustained Commitment. The goals of firms and individuals are reflected in the nature of the commitment of capital and human resources to an industry, to a firm, and, for employees, to a profession. The economist's ideal is freely mobile resources, which move quickly and fluidly from one industry to another based on what is their most productive use. This view is too simple, and our research suggests that easily movable resources are far from ideal for success in international competition.

The flaw in traditional thinking about resource mobility is that it assumes that the productivity of resource utilization in an industry is given.

Under these circumstances, it is sensible for resources to flow to industries where the productivity is higher. In reality, however, innovation can often boost the productivity of the resources employed in an industry much more than the gains from reallocating them. At the same time, the knowledge and expertise built up in the industry are preserved, and the competitive advantage of firms is upgraded and made more sustainable. Innovation, though, requires sustained investment in terms of both capital and human resources.

Those national industries we studied in which employees and shareholders had the most sustained commitment to the firm and the industry were often those with competitive advantage, provided other determinants were favorable. Preserving advantage may well require reinvesting all available profits in a major restructuring despite low current returns and in the face of substantial risk. Innovations are frequently most necessary at times when current profitability is down. The alternative, giving up, must be unthinkable if improvement and innovation are to take place. In contrast, nations in which resources were rapidly redeployed from one industry to another whenever conditions became difficult were rarely internationally successful in that industry.

A good case in point is the history of Italian firms in woolen cloth. As firms from other nations fled this industry in the face of competition from newly industrializing countries, Italian family firms reinvested everything to upgrade technology and try to preserve position. A long tradition in the industry, family ownership, and commitment to the local community were some of the reasons.

Not all such efforts succeed, and committed firms fail. Technological skills or appropriate human resources may be lacking. While commitment does not ensure success, however, the lack of it makes success highly unlikely.

Company diversification patterns are an important indication of commitment to industries as well as of how resources are redeployed. Focus on a single business, or tightly related diversification, are both signs of commitment as well as causes of it. Related diversifiers are also able in many instances to redeploy resources within the firm, a reflection of commitment to employees. Unrelated diversification, conversely, had a strong negative correlation with national competitive advantage in the

industries we studied. Corporate parents harvested subsidiaries instead of investing to preserve their competitive advantage.⁵²

Of course, some mobility of resources is a *sine qua non* of an upgrading economy, so that resources do not stay locked into hopeless situations indefinitely. Yet sustaining competitive advantage requires that resources flow only after a fight. The ideal is adjustment, not abandonment, in which committed resources are recombined or reconfigured to boost productivity instead of being frozen in their current modes of deployment by management lethargy or restrictive union agreements.

DOMESTIC RIVALRY

Among the strongest empirical findings from our research is the association between vigorous domestic rivalry and the creation and persistence of competitive advantage in an industry. It is often argued that domestic competition is wasteful, because it leads to duplication of effort and prevents firms from gaining economies of scale. The right solution is seen as nurturing one or two firms who become “national champions,” with the scale and strength to compete against foreign rivals or, alternatively, to promote interfirm cooperation. Some also take the related view that domestic rivalry is unimportant in global industries.⁵³

A look at the successful industries in the ten nations we studied casts grave doubts on this viewpoint. Nations with leading world positions often have a number of strong local rivals, even in small countries such as Switzerland and Sweden.⁵⁴ This is true not only in fragmented industries but also industries with substantial economies of scale. The Swiss in pharmaceuticals (Hoffmann-LaRoche, Ciba-Geigy, Sandoz), Sweden in both cars and trucks (Saab-Scania, Volvo), and Germany in chemicals (BASF, Hoechst, Bayer, and numerous others) and the United States in computers and software are illustrative. Nowhere is the extent of domestic rivalry greater than in Japan, as Table 3–2 illustrates.⁵⁵

These examples belie the simple notion that world leadership grows out of one or two firms who reap economies of scale in the home market. In global competition, successful firms compete vigorously at home and pressure each other to improve and innovate. Additional scale is obtained

by selling worldwide. The scale of the entire national industry is as important as that of individual firms.

We found, in contrast, few “national champions,” or firms with virtually unrivaled domestic positions, that were internationally competitive. Instead, most were uncompetitive though often heavily subsidized and protected.⁵⁶ In many of the prominent industries in which there is only one national rival, such as in aerospace and telecommunications, government has played a major role in distorting competition.

Domestic rivalry becomes superior to rivalry with foreign competitors when improvement and innovation, rather than static efficiency, are recognized as the essential ingredients for competitive advantage in an industry. Rivalry among a group of domestic competitors is different from and often takes forms far more beneficial to the nation than rivalry with foreign firms. In a closed economy, monopoly is profitable. In global competition, monopolies or cartels will lose to firms from more competitive environments.

TABLE 3–2 Estimated Number of Japanese Rivals in Selected Industries, 1987

Air conditioners	13	Motorcycles	4
Audio equipment	25	Musical instruments	4
Automobiles	9	Personal computers	16
Cameras	15	Semiconductors	34
Car audio	12	Sewing machines	20
Carbon fibers	7	Shipbuilding	33**
Construction equipment	15*	Steel	5***
Copiers	14	Synthetic fibers	8
Facsimile machines	10	Television sets	15
Lift trucks	8	Truck and bus tires	5
Machine tools	112	Trucks	11
Mainframe computers	6	Typewriters	14
Microwave equipment	5	Videocassette recorders	10

SOURCES: Field interviews; *Nippon Kōgyō Shinbun*, *Nippon Kōgyō Nenkan*, 1987; Yano Research, *Market Share Jiten*, 1987; researchers' estimates.

* The number of firms varied by product area. The smallest number, ten, produced bulldozers. Fifteen firms produced shovel trucks, truck cranes, and asphalt paving equipment. There were twenty companies in hydraulic excavators, a product area where Japan is particularly strong.

** Six firms had annual production exports in excess of 10,000 tons.

*** Integrated companies.

Domestic rivalry, like any rivalry, creates pressure on firms to improve and innovate. Local rivals push each other to lower costs, improve quality

and service, and create new products and processes. While firms may not preserve advantages for long periods, active pressure from rivals stimulates innovation as much from fear of falling behind as the inducement of getting ahead.⁵⁷

Domestic rivalry need not be restricted to price; in fact, rivalry in other forms such as technology may well lead to more sustainable national advantage. In Germany, for example, price competition is not typical, but active rivalry on product performance, features, and service have sustained strong competitive advantages in many German industries.

Rivalry among firms with the same home base is particularly beneficial for a variety of reasons. First, strong domestic competitors create particularly visible pressures on each other to improve. One domestic rival's success signals or proves to others that advancement is possible. It also often attracts new rivals to the industry.

Rivalry among domestic firms often goes beyond the purely economic and can become emotional and even personal. Active feuds between domestic rivals are common, and often associated with an internationally successful national industry. Local competitors received special attention in most of the industries we studied. Pride drives managers and workers to be highly sensitive to other companies in the nation, and the national press and investment analysts constantly compare one domestic competitor with the others. Domestic rivals fight not only for market share but for people, technical breakthroughs, and, more generally, "bragging rights." Foreign rivals, in contrast, tend to be viewed more analytically. Their role in signaling or prodding domestic firms is less effective, because their success is more distant and is often attributed to "unfair" advantages. With domestic rivals, there are no excuses.

Vigorous local competition not only sharpens advantages at home but pressures domestic firms to sell abroad in order to grow. Particularly when there are economies of scale, local competitors force each other to look outward in the pursuit of greater efficiency and higher profitability. In pencils, for example, the number two German competitor, Staedtler, concentrated very early on foreign markets because the industry leader, Faber-Castell, had a strong hold on the domestic market. Faber-Castell was, in turn, motivated by Staedtler's success to expand internationally as well. With little domestic rivalry, firms are more content to rely on the home market.

Toughened by domestic rivalry, the stronger domestic firms are equipped to succeed abroad. It is rare that a company can meet tough foreign rivals when it has faced no significant competition at home. If Digital Equipment can hold its own against IBM, Data General, Prime, and Hewlett-Packard, dealing with Siemens, ICL, or Machines Bull does not seem so daunting. Though some local rivals may go bankrupt and some mergers and consolidation may take place, the process of domestic rivalry produces stronger survivors.

Domestic rivalry not only creates pressures to innovate but to innovate in ways that *upgrade* the competitive advantages of a nation's firms. The presence of domestic rivals nullifies the types of advantage that come simply from being in the nation, such as factor costs, access to or preference in the home market, a local supplier base, and costs of importing that must be borne by foreign firms. If there are a number of Korean competitors in an industry, for example, none gets an advantage simply because of low labor costs or low-cost debt financing. This forces a nation's firms to seek *higher-order* and ultimately more sustainable sources of competitive advantage. Firms must find proprietary technologies, reap economies of scale, create their own international marketing networks, or exploit national advantages more effectively than the competitor down the street. Intense domestic rivalry helps break the attitude of dependence on basic factor advantages because local rivals have them as well. Without local rivals, a firm in a nation with factor advantages tends to rely on them and, worse yet, to deploy factors less efficiently.

The process of domestic rivalry also creates advantages for the entire national industry that are external to any particular firm. A group of domestic rivals tries alternative approaches to strategy and creates a range of products and services that cover many segments. This enhances innovation, and a breadth of products and approaches builds defenses against foreign penetration. The national industry's advantage is made more sustainable by removing some avenues for entry by foreign competitors. Good ideas are imitated and improved upon by local competitors, raising the overall rate of industry innovation. The stock of knowledge and skill in the national industry accumulates as firms imitate each other and as personnel move among firms. While a particular firm cannot keep all the knowledge and skills to itself, the whole national industry benefits through faster innovation. Ideas diffuse faster within the nation than across nations,

because it is difficult for firms from other countries to tap into such a process.⁵⁸ Though individual firms cannot keep innovations proprietary for long, the entire national industry progresses faster than foreign rivals, and this supports profitability for many of the nation's firms.

Geographic concentration of rivals in a single city or region within a nation both reflects and magnifies these benefits. It is strikingly common around the world. Many of the Italian jewelry firms, for example, are located around two towns, Arezzo and Valenza Po, whose streets are lined with hundreds of companies. Similar concentrations of firms in successful industries are numerous, for example, Solingen, West Germany and Seki, Japan (cutlery); Basel, Switzerland (pharmaceuticals); Hamamatsu, Japan (motorcycles, musical instruments); Route 128 in Boston (minicomputers); and Madison Avenue, New York (advertising). In such an environment, popular luncheon spots are patronized by executives from several companies, who eye each other and trade the latest gossip. Information flows with enormous speed. Though any one firm must move fast to sustain its advantage, the whole national industry is dynamic and sustains, or even widens, its advantage over foreign rivals who lack the same structure.

Domestic rivalry not only creates advantages but helps to avoid some disadvantages. With a group of domestic rivals following various competitive strategies, there is a check against forms of government intervention that stifle innovations or blunt competition. When there are only one or two domestic rivals in a nation, in contrast, pressures are created for all sorts of "assistance" that undermines dynamism, such as subsidies, guaranteed home demand, or favoritism of a local firm. None of this "help" is conducive to innovation and ultimately to competitive advantage (see Chapter 12).

Competing domestic rivals keep each other honest in obtaining government support. Government contracts do not become a guaranteed market for one company. Differences in international strategy work against protection. At the same time, the presence of rivals channels government support into more constructive forms that will benefit the entire industry, such as assistance in opening foreign markets and investments in specialized factor creation.

The phenomenon I have described is not confined to business competition. In the arts, in science, and even in sporting competition, there are many examples where one nation achieved disproportionate

international success for a period of time, often involving a group of artists, scientists, or athletes who were working in the same city. In tennis, for example, Sweden has achieved unusual success in the 1980s, as Australia did in the 1960s. A group of strong young players pushes and challenges each other. One player's success attracts and encourages new aspirants. One player's entry into international competition gives others the courage to try.

A group of capable domestic rivals, then, creates a fertile environment for creating and sustaining competitive advantage that is difficult to replicate through competition with foreign rivals. The role of selective factor disadvantages, sophisticated buyers, and world-class suppliers in stimulating improvement and innovation is accentuated by the active domestic rivalry. The benefits of domestic rivalry are greater still when account is taken of the ways in which a group of domestic rivals can favorably affect the availability of home-based suppliers, the pool of skilled human resources, and other parts of the "diamond" (see Chapter 4).

Nowhere is the role of domestic rivalry more evident than in Japan, where it is all-out warfare in which many companies fail to achieve profitability. With goals that stress market share, Japanese companies engage in a continuing struggle to outdo each other. Shares fluctuate markedly. The process is prominently covered in the business press. Elaborate rankings measure which companies are most popular with university graduates. The rate of new product and process development is breathtaking.

The number of domestic competitors required for effective rivalry rests on the underlying scale economies in the industry. The need for numerous competitors in all types of industries is not implied. However, the need for static economies of scale is tempered by the importance for competitive advantage of the rate of innovation. Dominant firms are not the innovators in many industries, as I discussed in the previous chapter.⁵⁹ They experience inertia and ties to old ways of competing. Many of the technologies of the 1980s and 1990s are also less scale-sensitive than earlier generations.

A completely open home market along with extremely global strategies can partially substitute for the lack of domestic rivals in a smaller nation.⁶⁰ The number of rivals may also fall gradually as an industry matures; more local rivals tend to be optimal in the earlier stages of an industry's

development. But strong domestic rivalry is a national asset whose value is hard to overstate.⁶¹

A number of domestic competitors is not itself sufficient to determine success. If there is no effective rivalry among the competitors, the advantages of domestic competition are nullified.⁶² Moreover, the nation must have other advantages in the “diamond” or competitive success is unlikely. In insulin, for example, there have been two British insulin competitors, Wellcome and Boots, but insulin represents a small fraction of their business and neither is committed to the industry. British demand conditions also tend to be less favorable because of tight cost controls on health care spending and the fact that most purchases are funneled through only one buyer, the National Health Service. Neither British competitor became significant internationally, and Boots exited the industry in the early 1980s.

Direct cooperation among competitors, an approach advocated as a means of avoiding duplication and reaping economies of scale, undermines competitive advantage unless it takes some limited and specific forms. It eliminates diversity, saps incentives, and slows the rate of industry improvement. There is a role for cooperation through trade associations and other independent entities to which many firms have access. I will discuss guidelines for beneficial cooperative activity in Chapter 12.

New Business Formation. Intense domestic rivalry depends on new business formation to create new competitors. New business formation is also vital to the upgrading of competitive advantage, because it feeds the process of innovation in an industry. New companies serve new segments and try new approaches that older rivals fail to recognize or to which they are too inflexible to respond. New entrants are often the “outsiders,” willing to take unconventional approaches to competing for reasons I discussed in the previous chapter. New business formation is also integral to the way in which one determinant reinforces others (Chapter 4). For example, aggressive rivalry among competitors leads to entry into supplier or related industries. The active formation of new competitors in the industry, by one means or another, was part of the history of virtually every internationally successful industry we studied.

The process by which new businesses are created in a nation bears importantly on the competitive advantage of national industries. There are

two basic mechanisms by which new businesses are formed. One is the establishment of entirely new companies, whether they are spin-offs from established firms, are founded by employees of suppliers and customers, or are the result of ideas gleaned during academic training or university research. The national circumstances that promote this form of new business formation are varied.

One local rival in a nation frequently leads to others through the mechanism of spin-offs. Frustrated (or ambitious) employees with good ideas leave to form their own company, often nearby. One spin-off encourages others. The dynamic of spin-offs is often healthy for the national industry. It creates more rivalry. It also unlocks new product and process innovations that were stifled by inertia or conflicts with existing strategies. It leads to the serving of new segments or segments that were ignored.

Spin-offs are not equally prevalent in every nation, nor during every phase of industry development.⁶³ However, they were common in the internationally competitive industries we studied. Many of America's minicomputer firms are descendants of a company called General Automation (GA). For example, Digital Equipment grew out of GA, and Data General emerged out of Digital. Control Data, the early leader in what are now called supercomputers, gave birth to the current world leader, Cray Research. In the Italian packaging machinery industry, one firm (ACMA) led directly or indirectly to more than two hundred competitors, all located near Bologna.

Each of the other determinants plays some role in determining those industries in which new companies appear. Factor conditions, in the form of a pool of skilled and specially trained personnel, are a prerequisite for founding new businesses. So is access to risk capital, especially in industries where capital requirements cannot be met with individual savings and internally generated funds. Favorable demand conditions attract new entrants. The motivation of individuals is also important. National prestige and priorities can influence the industries to which outstanding people are attracted. The existence in the nation of the institutions from which new businesses typically emerge in a particular industry is also important: America has many start-ups in industries where new ideas grow out of university research laboratories, while Japan has but a few. Japanese researchers typically join the research staffs of larger companies. Finally,

the nature of buyer, supplier, and related industries is also important because they are sources of personnel and ideas to form new companies.

The other mechanism for new business formation is internal diversification into new industries by established firms (acquisition is rarely new business formation, because no new entity is created).⁶⁴ National success in an industry benefits from active internal entry by firms from related industries. Diversification through internal development is almost always through related diversification, because creating a new entry from scratch almost demands that a company possess a base of relevant skills. Knowledge and assets are transferred from the existing to the new business, enhancing the prospects for competitive advantage. Conditions which foster active internal entry into an industry by firms from related fields are a potent source of national competitive advantage.

The prevalence of internal development in a nation is most affected by the goals of firms (see earlier) but also reflects other institutional characteristics. Internal entry is very common in Japan, Korea, and Germany where much diversification has historically been by means of start-ups, and acquisitions are rare. In Japan, for example, a long time horizon, the desire to redeploy employees freed up by productivity improvements, and historical difficulty in making acquisitions has led to widespread internal development by established firms. Internal development used to be commonplace in America and continues in a few sectors such as consumer packaged goods, business services, and health care (all areas of national advantage). By and large, however, shifting goals have led American companies to focus on acquisitions, many unrelated to their core businesses.

The industries in which internal development occurs, as in the case of start-ups, is a function of the “diamond.” I will have more to say about these connections in Chapter 4.

THE ROLE OF CHANCE

The determinants of national advantage shape the environment for competing in particular industries. In the histories of most of the successful industries we studied, however, chance events also played a role. Chance

events are occurrences that have little to do with circumstances in a nation and are often largely outside the power of firms (and often the national government) to influence. Some examples which are particularly important in influencing competitive advantage are the following:

- Acts of pure invention
- Major technological discontinuities (for example, biotechnology, microelectronics)⁶⁵
- Discontinuities in input costs such as the oil shocks
- Significant shifts in world financial markets or exchange rates
- Surges of world or regional demand
- Political decisions by foreign governments
- Wars

Chance events are important because they create discontinuities that allow shifts in competitive position. They can nullify the advantages of previously established competitors and create the potential that a new nation's firms can supplant them to achieve competitive advantage in response to new and different conditions. The advent of microelectronics, for example, was enormously important in neutralizing American and German dominance in numerous electromechanically based industries. It provided an opportunity for Japanese firms (and others) to gain position. Similarly, a surge in demand for ships gave Korea the opportunity to enter the shipbuilding industry against Japan. The apparel industry developed in Singapore after Western nations placed quotas on apparel imports from Hong Kong and Japan, while the world-leading Korean wig industry prospered only after America banned imports from China during the cold war.

The determinants of national advantage work together as a powerful system for sustaining advantage. However, this system is to some extent specialized to a particular industry structure. A discontinuity is necessary to alter the bases of advantage enough to allow a new specialized national "diamond" to supplant another.

Chance events play their role partly by altering conditions in the "diamond." Major shifts in input costs or exchange rates, for example, create selective factor disadvantages that catalyze periods of significant innovation. Wars viewed from this perspective can raise the level and urgency of local scientific investments (factor creation) and disrupt

customer relationships (demand conditions). World War I caused the loss of foreign assets and trademarks (including Bayer aspirin) of German chemical companies. It also provided a dramatic stimulus for the chemical industries in the United States, the United Kingdom, and Switzerland. Because of their neutrality in World War II, Switzerland and Sweden benefited enormously in many industries.

Chance events have asymmetric impacts on different nations. The two oil shocks hit energy-dependent nations earlier and harder. Wars often have very different effects on winners and losers. It is interesting that the defeated powers, Germany, Japan, and Italy, are perhaps the three most successful nations in the postwar period in terms of broadly based success in international competition.⁶⁶ Nations that feel the effect of a chance event first, or most severely, may move early to deal with it. The oil shocks ultimately helped upgrade Japanese industry, because Japan was especially vulnerable to energy costs and took aggressive steps toward energy conservation.

While chance events can allow shifts in competitive advantage in an industry, national attributes play an important role in *what nation exploits them*. The nation with the most favorable “diamond” will be most likely to convert chance events into competitive advantage. This will reflect an environment aligned to the new sources of advantage and firms pressured to move most aggressively to seize them.

INVENTION, ENTREPRENEURSHIP, AND CHANCE

Invention and entrepreneurship are at the heart of national advantage. Some believe these acts are largely random; a visionary or inventor might be located in any nation, which means that the birth of a world-class industry can take place anywhere. If we accept this view, the determinants become important in developing an industry but its initial formation is a chance event.

Our research shows that neither entrepreneurship nor invention is random; assigning a role to chance does not mean that industry success is wholly unpredictable. For example, the United States is such a favorable environment for commercializing medical innovations that dozens of

American entrepreneurs sprang up in most new product and service areas. In fact, foreign entrepreneurs have come to the United States to start their medical products companies because it is such a hospitable environment for this particular sector.

The determinants play a major role in locating where invention and entrepreneurship are most likely to occur in a particular industry. Demand conditions signal needs better in some nations than others. National factor creation mechanisms affect the pool of knowledge and talent. Supplier industries provide crucial help or are the source of new entrants. And so on. What looks like chance is actually the result of differences in national environments. The particular firm or individual that will do the innovating is less predictable, though, than the nation or nations in which they are likely to be located.

Sometimes the act of invention is indeed wholly decoupled from other national characteristics. For example, insulin was first isolated in Canada despite the lack of particularly favorable demand, scientific infrastructure, or other national circumstances bearing on insulin. Whether such pure inventions, or isolated acts of entrepreneurship, develop into a competitive industry, however, is again not random. The “diamond” has a major influence on the ability to convert an invention or insight into an internationally competitive industry. If a nation has only the invention, other nations’ firms will be likely to appropriate it. Insulin, for example, was turned into an international commercial success by companies based in Denmark and the United States, not in Canada. Both Denmark and the United States possessed favorable demand conditions, specialized factor pools, and other advantages. Therefore, the invention, once the basic technology was known, took root and prospered elsewhere.

THE ROLE OF GOVERNMENT

Having described the determinants of national competitive advantage, a final variable is the role of government. Government is prominently discussed in treatments of international competitiveness. Many see it as a vital, if not the most important, influence on modern international

competition. Government policy in Japan and Korea is particularly associated with the success these nations' firms have enjoyed.

It is tempting to make government the fifth determinant. Yet this is neither correct nor the most useful way to understand government's role in international competition. Government's real role in national competitive advantage is in influencing the four determinants. This is illustrated schematically in [Figure 3–5](#), which now reflects the complete system.

Government can influence (and be influenced by) each of the four determinants either positively or negatively, as should be evident from some of my earlier examples. Factor conditions are affected through subsidies, policies toward the capital markets, policies toward education, and the like. Government's role in shaping local demand conditions is often more subtle. Government bodies establish local product standards or regulations that mandate or influence buyer needs. Government is also often a major buyer of many products in a nation, among them defense goods, telecommunications equipment, aircraft for the national airline, and so on. The way this role as a buyer is played can either help or hurt the nation's industry.

Government can shape the circumstances of related and supporting industries in countless other ways, such as control of advertising media or regulation of supporting services. Government policy also influences firm strategy, structure, and rivalry, through such devices as capital market regulations, tax policy, and antitrust laws.

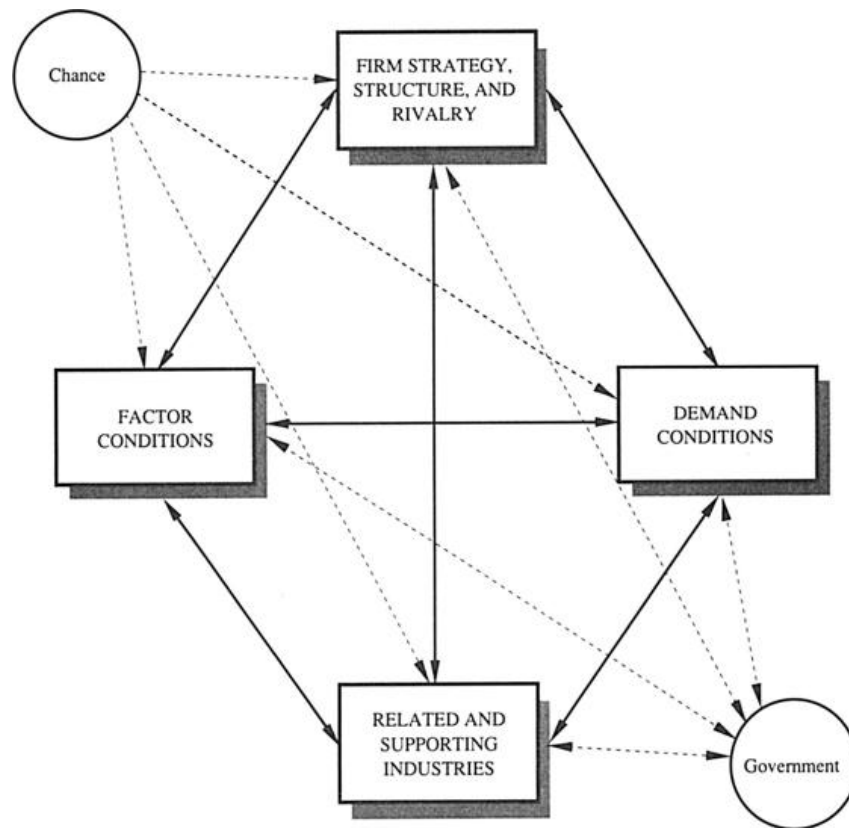


FIGURE 3-5 The Complete System

Government policy, in turn, can be influenced by the determinants. Choices about where educational investments are made, for example, are affected by the number of local competitors (see Chapter 4). Strong home demand for a product may lead to early introduction of government safety standards.

It is evident that the influence of government on the underlying determinants of national competitive advantage can be positive or negative. By stimulating early demand for facsimile machines, for example, the Japanese government aided competitive advantage. Facsimile documents were approved as legal documents by the Japanese Ministry of Justice, and Japan was among the first nations to allow the connection of facsimile machines to normal telephone lines. Yet if government regulation or purchases lead to unusual or anachronistic early demand that distracts local firms from serving international markets, the role of government is negative. For example, the highly restrictive Italian regulation of local financial markets has contributed to the inability of Italian financial institutions to compete internationally.

The positive and negative roles of government in the process of creating competitive advantage are highlighted and clarified by viewing government as an influencer of the national “diamond.” A far broader array of public policy options and outcomes is possible than is normally explored. The determinants suggest government policies that are starkly different in some cases from those suggested by a less holistic conception of national advantage. Attempting to hold down the value of a nation’s currency, for example, appears desirable if factor costs are seen as the dominant determinant of national advantage in a static world in which technology and skills are constant. My theory emphasizes that market pressures and resulting innovations can overcome factor costs, however, so that undervaluation can slow the upgrading of competitive advantage and direct firms to less sustainable, price-sensitive market segments. The result is a long-term loss of competitive advantage. Government “help” that removes the pressures on firms to improve and upgrade is counterproductive.

Government has an important influence on national competitive advantage, though its role is inevitably *partial*.⁶⁷ Government policy will fail if it remains the only source of national competitive advantage. Successful policies work in those industries where underlying determinants of national advantage are present and where government reinforces them. Government, it seems, can hasten or raise the odds of gaining competitive advantage (and vice versa) but lacks the power to create advantage itself. I will return to all these issues when I discuss government policy (Chapter 12).

THE DETERMINANTS IN PERSPECTIVE

In this chapter I have described the determinants of national advantage in an industry and the role of chance and government in affecting them. The determinants measure the extent to which the national environment is a fertile one for competing in an industry. I described earlier the forces that lead firms to create and sustain competitive advantage. The “diamond,” reflecting many diverse elements of a nation, measures how well the nation creates and transmits these forces to its firms, as well as the presence of the insight and tools needed for competitive advantage.

The individual determinants that define the national environment are mutually dependent because the effect of one often depends on the state of others. Sophisticated buyers will not translate into advanced products unless, for example, the quality of human resources is sufficient to act on meeting buyer needs. Selective factor disadvantages will not motivate innovation unless rivalry is healthy and company goals support sustained investment. At the broadest level, weaknesses in any one determinant will constrain an industry's potential for advancement and upgrading.

As I have described the "diamond," I have touched on many examples of the role of social and political history and values in influencing competitive success. Social norms and values affect the nature of home demand, for example, as well as the goals of managers and the way firms are organized. Social and political history influence the skills that have been accumulated in a nation and the institutional structure within which competition operates. These aspects of a nation, which some called cultural, cannot be separated from economic outcomes. Also, "cultural factors" are, upon close inspection, often closely intertwined with economic factors. For example, Japanese management-labor relations are not particularly cultural but a function of lifetime employment, the nature of incentive systems, and management behavior toward workers. These practices all grew out of bitter labor strife in Japan both before and immediately after World War II.

Cultural factors are important as they shape the environment facing firms; they work through the determinants, not in isolation from them. Such influences are important ones to competitive advantage, however, because they change slowly and are difficult for outsiders to tap or emulate. Social and political history and values create persistent differences among nations that play a role in competitive advantage in many industries. They will be apparent when I turn to individual nations in Part III.

I have had little to say in this chapter about leaders, a popular subject in historical analyses of industrial or national success. This is not to diminish the importance of leaders but to suggest that they too do not work separately from the determinants I have described. Leaders confront problems, challenges, and opportunities that are produced by their national environments. Leaders are attracted to different problems in different nations, a function of the determinants. In Japan, revered leaders such as Akio Morita and Konosuke Matsushita work in consumer electronics. In America, individuals such as Thomas J. Watson, Jr., Seymour Cray,

Kenneth Olson, and Steve Jobs work or have worked in computers. These are both instances of industries where the national environment is particularly favorable for competitive advantage. The success of leaders depends on possessing insights into opportunities and the tools to exploit them, about which this chapter has had much to say.

Indeed, one definition of a leader is someone who understands and believes in the determinants more than other individuals. Leaders believe in dynamics and change. They do not accept constraints, and know that they can change the nature of outcomes. They are in a position to perceive something about reality that has escaped others, and have the courage to act. It is often leadership that determines *which* of the firms from a favorably situated nation will succeed and fail.

So far, I have described the determinants of national advantage singly and jointly. But the “diamond” is an interactive system in which the parts reinforce each other. These dynamics will be the subject of the next chapter, along with their implications for the emergence and development of competitive industries and their eventual loss of competitive advantage.