Chapter 3: Determinants of National Competitiveness

In the previous chapter, we discussed the conceptual frameworks of national competitiveness such as the nature of national competitiveness; the development of ideas about competitiveness and international trade; the levels of competitiveness including firm, industry and nation; the “golden” rules of national competitiveness. Porter’s diamond model and stages of competitive development were introduced in the chapter.

In this chapter, relying on the above mentioned theoretical frameworks, six determinants of national competitiveness and their role will be presented: Production Resources, Technology Development, Market Conditions, International Business and Economic Activities, Government Role and Company’s Strategy and Operation. The interdependence among these determinants as a dynamic of national competitiveness also will be examined in the last section.

In the previous chapter we noted the diamond model which offered the basic understandings of the competitive advantages of nations and the mechanisms for creating these advantages. However, it must be said that the model is limited more or less in its application to developing nations (Cho 1994 and Moon 1998), such as China or Vietnam. Thus, the model’s determinants need to be modified to be applied to developing or less developing countries, because these countries create national competitiveness based mainly on resource advantage, international business and economic activities, and government support (Cho and Moon 2000, and Hämäläinen 2003). As a result, six determinants are determined based on the diamond model and stages of competitive development. They are: production resources, technology development, market conditions, international business and economic activities, company’s strategy and structure, and government role.

3.1 Production Resources

Each firm, industry and country possesses what economists have termed production resources (factor of production). Production resources are nothing more than the necessary inputs to compete in any firm, industry and nation such as labor, natural resources, capital, and infrastructure. Although the fundamental structures in industrialized economies have been changing, production resources will remain an important determinant of national competitiveness (Hämäläinen 2003, p 100). A nation’s endowment of production resources clearly plays a role in economic growth and national competitiveness such as the rapid growth of manufacturing, productivity and competitiveness in low-wage countries such as Hong Kong, Taiwan, and Singapore, and more recently, Thailand, China, and Malaysia. But
the role of production resources is different and far more complex than is often understood (Porter 1990).

3.1.1 Endowment of Production Resources

The endowment of production resources has been the cornerstone of the analysis of national competitiveness and economic growth since establishment of the classical school (Hämäläinen 2003, p. 101). As our review of economic growth and international trade theories revealed, classical economists divided production resources into relatively broad classes. The economists devoted the major parts of their works to analyzing the nature, origin and returns of three ‘cores of production’: land, labor and capital. In this research framework, production resources can be grouped into a number of categories: human resources, infrastructure, capital resources and natural resources.

*Human resources* is a core of a nation’s competitiveness. It includes the quantity, skills, and cost of personnel, and takes into account standard working hours and work ethic (Porter 1990). Human resources are a fundamental that develops all other factors such as technology, advanced infrastructure, knowledge resources, and so on. Human resources can be divided into unskilled, semiskilled and skilled labor, of which skilled labor is the most important, and it has been given the most attention by economists in recent decades. Skilled labor can be classified into a myriad of categories such as skilled workers, graduate engineers, scientists, management, and so on. Two aspects of the quality of human resources require attention and investment. *The first* is investment in people’s health. Current studies conducted in a variety of developing countries have confirmed the adverse effects on productivity of poor health and nutrition (Strauss, J., 1986, Deolalika 1988). *The second* is investment in education and training such as primary and secondary school, and tertiary education. Investment in education has become the prerequisite for any nation wanting to develop technology, productivity, competitiveness and economic growth, while technology has become inevitable for bringing education to society.

In the Global Competitiveness Report (2000), Horst Siebert, President of the Kiel Institute of World Economics in Germany, emphasized that improvement of national systems for human capital formation was a major determinant of competitiveness and economic growth. In the same vein, David Bryer, Executive Director of Oxfam, confirmed that the World Bank regards education as the single most valuable development intervention (Oxfam 2000, session 55 and session 25). A study uses India’s experience with the green revolution to shed light on this issue (Foster and Rosenzweig 1996, Foster.A.D and M.R. Rosenzweig) Using data on rural households, farming inputs, and crop yields, Foster and Rosenzweig
find that farmers with a primary education were in general more productive than their uneducated counterparts. Their findings strongly suggest that the benefits of education are greatest in the context of changing circumstances.

*Infrastructure* refers to the type, quality, and user cost of available infrastructure that affects competition, including the transportation system (road, ship, air, and railway), the communication system, mail and parcel delivery, payments and funds transfer, health care, and so on (Porter 1990). Infrastructure also includes the quality of life and the attractiveness of a nation as a place to live and work.

*Capital resource* refers to the amount and cost of capital available to finance firms and industries. Capital is not homogeneous, but comes in various forms such as unsecured debt, secured debt, 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 (Porter 1990, p. 75). The globalization of capital markets, and the large capital flows among nations, are slowly making national conditions more similar. However, substantial differences currently remain and are likely to remain indefinitely.

*Natural resources* refers to the abundance, quality, accessibility, and cost of a nation’s land, water, mineral, and 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 communication. 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 (Ibid., pp 76).

The combination of resources employed differs widely among firms and industries. A nation’s firms gain competitiveness if they possess low-cost or uniquely high-quality resources of the particular types that are significant to competition in a particular firm and industry. For example, Singapore’s location on a major trading route between Japan and Middle East has made it a centre for ship repair (Ibid., pp 154).
The role of resource endowment is more complicated than we often understood. Competitiveness from resources depends on *how efficiently and effectively* they are deployed. This reflects the choices made by a nation’s firms about how to mobilize resources as well as the technology used to do so. Therefore, the value of particular resources can be dramatically altered by choice of technology (see the next section). Not only *how* but also *where* factors are deployed in an economy is important, because technological expertise and the most capable human resources can often be utilized in a variety of industries.

In the context of current globalization and regionalization has made local availability of some factors less essential. Natural resources, human resources, knowledge and capital factors can be mobile among nations through the modern global corporation. Once again, it is not mere access to resources but the ability to deploy them productively that takes on central importance to competitiveness. However, resource advantages, such as natural or low-cost labor, have facilitated nations to maintain economic growth and improve national competitiveness in the initial phase of economic development (Ibid., pp 545-548).

### 3.1.2 Classification of Production Resources and their Role

To explore the role of production resources in national competitiveness, production resources need to be classified clearly. Since the days of Adam Smith, production resources were classified into three broad factors: labor, land and capital. Porter (1990) has criticized the broad classification of resources for not being very helpful in explaining competitiveness in particular industries. He argues that a nation’s firms gain competitiveness if they possess the specific resources that are significant to competitiveness in particular industry. This leads him to propose a new hierarchy of resources which defines the characteristics that determine their significance to particular industries. Dunning (1992) independently suggested a similar hierarchy of resources.

*Basic and advanced resources.* Basic resources include natural resources, climate, location, unskilled and semiskilled labor, and debt capital. They are important in extractive or agriculturally-based industries and in those where technological and skill requirements are modest and technology is widely available. Porter’s research showed that competitiveness based on basic factors (low-wage cost) succeeded in the initial period of development, for example, construction industry in Korea⁶, but the success is fleeting (Porter 1990).

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⁶ Korean firms have enjoyed international success in the construction of civil 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 resources include modern digital data communication infrastructure, highly educated personnel such as graduate engineers and computer scientists, and university research institutes in sophisticated disciplines. They are now the most significant resources for competitiveness. They are necessary to achieve higher-order competitiveness such as differentiated products and proprietary production technology. They are scarcer because their development demands large and often sustained investment in both human and physical capital. The institutions required to create truly advanced resources (such as educational programs) themselves require sophisticated human resources and/or technology. Advanced resources 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 company’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 (Porter 1990, pp 74-80).

A nation’s advanced resources are often built upon basic factors. A supply of doctoral-level biologists, for instance, requires a number of talented university graduates in the field. This means that basic factor pools, while rarely a sustainable competitiveness in and of themselves, must be of sufficient quantity and quality to allow for the creation of related advanced resources.

**Generalized and specialized resources.** Generalized resources consist of the highway system, a supply of debt capital, and a number of well-motivated employees with college educations. They can be deployed in a wide range of firms. Specialized factors include narrowly skilled personnel, infrastructure with specific properties, knowledge bases in particular fields, and other resources with relevance to a limited range of or even to just a single firm (Porter 1990, p 78).

Specialized factors based competitiveness is more sustainable than generalized factors based competitiveness. Generalized factors provide a support only more rudimentary competitive advantages in the initial stage of development process. They are often available in many nations and tend to be more easily nullified, circumvented, or sourced through global corporate networks. Activities based on generalized factors (such as labor-intensive assembly operations requiring semi-skilled employees) can often be readily carried on at a distance from home base (Ibid., p 78).

advanced nations such as Italy are sourcing cheap labor pools locally in nations where they bid on international contracts or from developing countries, nullifying the Korean advantage. The result is that the Korean construction industry is in sharp decline (Porter 1990)
Specialized factors need more concentrated, and often riskier, private and social investment. In many cases they depend on already having a root of generalized factors. Both of these things make them scarcer. Specialized or advanced factors are necessary in more complex or propriety company activities, and they are necessary to remain the competitiveness sustainable (Ibid., p 79).

When a nation possesses both advanced and specialized resources for competing in a particular industry, that nation’s competitiveness becomes more significant and sustainable. In contrast, competitiveness based on basic or generalized factors is unsophisticated and often fleeting. The specialization’s standard is also biased to rise, hence today’s specialized resources are prone to become tomorrow’s generalized resources (Porter 1990).

In the sophisticated industries that form the backbone of any advanced economy, a nation does not inherit but instead creates the most important factors of production, such as skilled human resources or a scientific base. Moreover, the stock of resources that a nation can enjoy at a particular time is less important than the rate and efficiency with which it creates, upgrades and deploys them in particular firms and industries (Ibid., pp 81).

Created and specialized resources tend to be human capital and skill-intensive. Charles Sabel has argued that organizations need more skilled employees in uncertain environments where the information processing requirements are more demanding (Sabel 1990). He expects to find such environments where the product market fluctuations are wide, each product is more or less unique or produced in small batches, there is rapid technological change, or raw materials and parts are not available in a standardized form. Many of these uncertainties have increased since the early 1970s as a result of macroeconomic instability and a shift in the techno-economic paradigm (Piore and Sabel 1984; Freeman and Perez 1988).

The demand for created and specialized resources is also increased by the changing nature of production processes. The increasing specialization and complexity of production processes decreases the importance of direct production activities relative to transaction and coordination activities (costs) (Wallis and North 1986). Since many transaction and coordination activities require advanced technology (airplanes, telecommunications equipment, computers etc.) and highly skilled human capital (manager, engineers, lawyers, traders etc.), the demand for knowledge-intensive, created and specialized resources are prone to increase at higher levels of economic development. At the same time the increasing specialization, mechanization and efficiency of production processes reduces the demand for basic raw materials and unskilled labor, and increases the demand for well-trained technicians, machine operators and service personnel.
In general, the increasing specialization and division of labor in modern value-adding systems has increased organizational uncertainties by making the production systems more complex and interdependent. The increasing complexity and interdependence of production systems increases the information processing needs of organizations and puts growing demands on the skill level of workers and managers. As a result, the demand for well-trained and knowledgeable workers and managers is likely to increase in economies characterized by an extensive division of labor.

3.2 Technology Development

Historically, many developing countries have attracted trade and foreign investment primarily due to their advantages in low-cost raw materials and cheap, unskilled labor. Since approximately the mid-1980s, there has been a trend toward export-oriented development, and many governments have attempted to bias foreign investment and domestic business enterprise toward exports rather than import substitutions (Abdullah, 1995, UNIDO). These policies often require offering incentives to firms to invest in technologies which are internationally competitive. As firms in developing countries acquire new technology but also become more exposed to international competition, there will be further need to combine technological and human resources in ways which enable them to compete at home and abroad (Abdullah, 1995; Tung 1994).

3.2.1 Technology and Competitiveness

At a given period of the time, the competitiveness, productivity and growth of an economic system is determined by technology in two ways. First, the efficiency and costs with which the system transform its productive resources into growth-creating outputs is shaped by the available process technologies. Second, the existing product technologies are important determinants of consumer value, productivity, competitiveness and growth. As a result, technology influences both the price and non-price competitiveness of firms and economic systems (Hämäläinen 2003).

The importance of technological innovation for productivity, competitiveness and economic performance has been recognized at least since Joseph Schumpeter's seminal works (Schumpeter 1934). Schumpeter was particularly critical of the

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7 Although Schumpeter's name is usually mentioned in the context of technological innovation, his own definition of innovation was much broader. It includes five categories of inno-
prevailing neoclassical theory of the early twentieth century which explained economic growth in terms of resource accumulation.  

Both Schumpeter and Keynes' critiques of the neoclassical paradigm were published in the turbulent 1930s. During the postwar years, the stabilization of the macroeconomic environment and the relatively smooth evolution of technologies provided a more fertile ground for elaboration and policy application of the Keynesian macroeconomic theory than the Schumpeterian innovation theory. However, during the past three decades, the situation has changed quite dramatically as the macroeconomic theories and policies proved insufficient in the face of the growing macroeconomic problems of the 1970s and a sign of a new technological revolution has become stronger in the 1980s. As a result, the research on national productivity and competitiveness has recently begun to emphasize the importance of technological innovations for economic performance.

It is widely accepted in the economics literature that technology plays a significant role in productivity, competitiveness and economic growth. Partly due to its own fast-changing nature and partly because of the increasingly integrated world economies, technology per se has moved to the centre stage in economic analysis. Rapid technological advancement is quickly shifting the frontiers of technology, leading to tremendous improvement in the competitive strength of firms and industries. Increased globalization of economies is necessitating further improvements in the competitiveness of firms and industries by intensifying international competitive pressures. The competitiveness of a firm can be taken to be its ability to do better than comparable firms in sales, market shares, or profitability (Lall 2001). In highly competitive environments and in the context of international integration, the competitiveness of firms and industries depend primarily on technology. Technology makes higher sales possible in many ways, either through the introduction of a new and superior product; by improving the quality of existing products, or through efficient utilization of resources-productivity improvement resulting in cost reductions; by improving access to customers, or through a combination of all of the above. In other words, technology enables firms and industries to expand their sales in both domestic and foreign markets by making it possible for them to supply increasing quantities of quality products at cheaper prices.

8 The slow and continuous increase in time of the national supply of productive means and of savings is obviously an important factor in explaining the fact that development consists primarily in employing existing resources in a different way, in doing new things with them, irrespective of whether those resources increase or not (Schumpeter 1934, p. 68)
The productivity and competitiveness impact of new technology is determined by a two-phased process of transfer and innovation. The relative importance of transfer and innovation of technology for a particular economy depends on its indigenous technological resources and capabilities vis-à-vis those of the rest of the world. Thus small and developing nations are relatively more dependent on the transfer and diffusion of foreign technologies than on innovation and diffusion of indigenous ones. However, all economic systems are likely to need some indigenous innovation activities since their ‘absorptive capacity’, the ability to utilize technologies developed elsewhere, depends critically on such the activities (Cohen and Levinthal 1989; OECD 1996a).

Absorption and diffusion are two aspects of the transfer of technology. Absorption refers to technology users who import technology from other countries, often developed countries. In contrast, diffusion refers to technology exporters who create new technologies. The two next sections analyze the phases of transfer, absorption and innovation, and their roles in productivity and competitiveness.

3.2.2.1 Technology Transfer

Technology absorption is vital to developing countries. They import new technology, equipment, patents and so on from developed countries, but they have to learn to use these imports effectively. Using new technology is not an automatic and simple process. It entails the conscious building of technological capabilities: a mixture of information, skills, interactions and routines that firms need in order to handle the tacit elements of technology. If an economy does not build its capacity for technology absorption, technology transfer becomes less effective and wastes resources. As a result it reduces national productivity and competitiveness.

Transferring technology effectively is not easy, not costless or automatic (UNC-TAD 2003). Micro-level research on developing countries, based on the evolutionary theories of Nelson and Winter (1982), shows how complex and demanding the task can be. Technology is not sold in embodied forms. Its tacit elements need effort and time to master. Its efficient use cannot therefore be assumed for poor countries that expose themselves to more world markets and technologies. Technological mastery entails building costly new capabilities; it takes time and investment and is uncertain. Technology transfer requires supporting changes in factor markets, i.e., in the creation of skills to access, master and improve upon

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9 According to OECD small nations depend on imports for more than 50 percent of their acquired technology, OECD 1996.
new technologies. Enterprises cannot therefore develop capabilities in isolation (UNCTAD 2003). They need to coordinate with government, and local and foreign institutions. There are two broad approaches: fostering learning by domestic firms (autonomous) and depending on FDI to drive technological upgrading. Both entail the extensive use of foreign technologies, but the different agents for fostering learning involve different strategies to import, absorb and build upon new technologies.

Transferring and using new technology requires investment and conscious effort. Much of the effort lies has to be undertaken by the firms themselves, however, a significant part of the effort must be undertaken by other firms, factor markets and support institutions. While the transfer and capability-building process is essential in both developed and developing countries, it tends to be more difficult in the latter, due to weak enterprises, networks, markets and institutions. Furthermore, mastering new technology is not a one-off task. Most developing economies start with comparatively simple, labor-intensive technologies where skill needs are low, learning is short and relatively less risky, and there is little inter-firm or inter-industry coordination. Once mastery is achieved, continued development involves the upgrading and deepening of technologies. Otherwise, countries that establish a competitive niche in a low-technology activity may stagnate at the bottom of technology ladder. To sustain competitiveness, they must move into more advanced technologies and technological functions. The below salient features of technology and learning help us to understand further technology transfer and its roles as well.

**Box 1 The salient features of technology and learning**

1. Technological learning is a real and significant process. It is conscious and purposive than automatic and passive. Firms using a given technology for similar periods need not to be equally proficient: each would travel on a different learning curve according to the intensity and efficacy of its capability building efforts.

2. Firms do not have full information on technical alternatives. They function with imperfect, variable and rather hazy knowledge of technologies they are using.

3. Firms may not know how to build up the necessary capabilities — learning itself often has to be learned. The learning process faces risk, uncertainty and cost. For a technological latecomer, the fact that others have already undergone the learning process is both a benefit and a cost. It is a benefit in that they can borrow from the others’ experience. It is a cost in that they are relatively inefficient during the process.

4. Firms cope with uncertainty not by maximizing a well-defined function but by developing organizational and managerial “satisfying” routines (Nelson and Winter, 1982). These are adapted as firms collect new information, learn from experience and imitate other firms. Learning is path—dependent and cumulative.
5. The learning process is highly technology-specific, since technologies differ in their learning requirements. Some technologies are more embodied in equipment while others have greater tacit elements. Process technologies (like chemical) are more embodied than engineering technologies (machinery and automobile) and demand different effort. Capabilities built up in one activity are not easily transferable to another.

6. Different technologies have different spillover effects and potential for further technological advances. Specialization in technologies with more technological potential and spillovers has greater dynamic benefits than specialization in technologies with limited potential.

7. Capability building occurs at all levels: shop-floor, process or products engineering, quality management, maintenance, procurement, inventory control, outbound logistics and relations with other firms and institutions. Innovation in the sense of formal R&D is at one end of the spectrum of technological activity; it does not exhaust it. However, R&D becomes important as more complex technologies are used: some R&D is needed just for efficient absorption.

8. Technological development can take place at different depths. The attainment of a minimum level of operational capability (know-how) is essential to all activity. This may not lead to deeper capabilities, an understanding of the principles of technology (know-why): this requires a discrete strategy to invest in deepening. The deeper the levels of technological capabilities aimed at, the higher the costs, risk and duration involved. The development of know-why allows firms to select better the technologies they need, lower the costs of buying those technologies, realize more value by adding their own knowledge, and develop autonomous innovative capabilities.

9. Technological learning is rife with externalities and inter-linkages. It is driven by links with suppliers of inputs or capital goods, competitors, customers, consultants, and technology suppliers. There are also interactions with firms in unrelated industries, technology institutes, extension service, universities, associations, and training institutions. Where information flows are particularly dense, clusters emerge with collective learning for the group as a whole.

10. Technological interactions occur within a country and with other countries. Imported technology is generally the most important initial input into learning in developing countries. Since technology changes constantly, moreover, access to foreign sources of innovation is vital to continued technological progress. Technology import is not, however, a substitute for indigenous capability development — the efficacy with which imported technology is used depends on local efforts to deepen the absorptive base. Similarly, not all modes of technology import are equally conducive to indigenous learning. Some come highly packaged with complementary factors, and so stimulate less learning.

Source: Lall, S. 2000.b

The literature on technology transfer and diffusion distinguishes between two distinctions: internalized and externalized, and disembodied and equipment embodied technology transfer (UNCTAD, 2003; OECD, 1992, 1996a). Internalized technology transfer proceeds from a multinational company to affiliates under its control. In the case of externalized technology transfer the process occurs between
independent firms. While internalized modes necessarily involve MNCs, externalized ones may also involve MNCs selling technologies on contract (MNCs are the largest sellers of licensed technology). The sale can take a variety of forms: minority joint ventures, franchising, turnkey projects, sale of equipment, licences, technical assistance, subcontracting or original equipment manufacturing arrangements. Internalized transfers bring with them a package of supporting inputs to ensure their efficient deployment. Externalized transfers may involve additional inputs by the technology seller, but generally tend to call for greater learning effort by the recipient.

In general, internalized technology flows are a very efficient means of transferring a package of capital, skills, information and brand names to developing countries. For many new technologies, internalized transfers are the only possible mode of transfer, since innovators are unwilling to part with them to unrelated parties. Even where technologies are available at arm’s length, internalization may be the most efficient way of transferring the tacit knowledge involved because of the commitment of transferor and its capability to support learning. If the technology is changing rapidly, internalization provides the most direct access to improvements. If the activity is export-oriented, internalized transfers offer the additional advantages of international marketing skills and networks, established brand names or, of increasing relevance, access to integrated production structures spanning several countries.

However, internalized technology transfers also carry costs. Profits are realized by the MNCs on the package as a whole rather than just the innovation component. If the host country already possesses other elements of the package, it may be cheaper to buy the technology separately. In general, the more standardized and diffused the technology and the more capable the buyer, the more economical externalized modes will be. However, there is a more subtle reason: the existence of learning benefits, deepening and externalities may tilt the choice in favor of externalization, even for relatively complex and difficult technology. For these activities, reliance on foreign investment can shorten the learning period but reduce the other benefits of technology transfer and capability building (UNCTAD 2003).

One advantage of internalized forms of technology transfer lies in the long-term commitment of foreign partners to the project and its ability to provide the elements needed to operate new technologies. At the lowest level, therefore, foreign investment is a very efficient way of transferring technology. Since all technolo-

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10 Economies such as the Republic of Korea and the Taiwan Province of China did this because their enterprises had the necessary capabilities to master the technology.
gies need adaptation and improvement, foreign affiliates, with their base of high-
level management and technical skills, tend to be in the forefront of such activity
in developing countries. In addition, MNCs have the experience of other affiliates
in the developing world to draw on, and can shift knowledge and personnel across
countries to help with the upgrading of local capabilities.

Disembodied technology transfer is the process whereby new technology is
spread through channels other than embodiment in machinery and equipment. It
results from knowledge spillovers that characterize innovation processes. Equip-
ment-embodied or hard technology transfer, in turn, is the process whereby inno-
vations spread in the economy through the purchase of technologically intensive
machinery, components and other equipment.

Disembodied diffusion may be organized, e.g., when firms license innovation or
when MNEs transfer new process or product knowledge to their foreign subsidiar-
ies. More often, however, it is a by-product of the firm’s innovative activities as
new knowledge “spills over” to other firms. In either case knowledge transfer
takes place mainly through research channels (OECD 1996b).

Knowledge spillovers occur when innovating organisations cannot appropri-
ate fully the benefits of their innovations. As we will see, the weak appropriability\(^{11}\)
of technological innovation stems from its public-goods characteristics. Innova-
tion tends to leak into the public domain through channels such reversing engi-
neering, trade publication and patent application, conferences, seminars, turnover
of R&D personnel, and inter-firm cooperation. As a result, the private and public
benefits of innovatory activities differ and policy makers must weigh the benefits
of a strong appropriability regime\(^{12}\) against those of more rapid transfer and diffu-
sion of innovations\(^{13}\).

The equipment-embodied transfer of technology is typically related to a few key
industries that act as suppliers of new technologically intensive machinery,
equipment and components to several “downstream” industries, consumers and
government. These industries, which receive little inflow of embodied R&D from
other industries, are mainly in the R&D intensive manufacturing sector\(^{14}\). On the
other hand, service sectors are the main acquirers of technologically sophisticated

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\(^{11}\) Appropriability regimes will be discussed in next section.

\(^{12}\) A strong appropriability regime provides incentive for innovation.

\(^{13}\) A weaker appropriability regime provides greater macroeconomic benefits.

\(^{14}\) Some examples are: electrical machinery, drugs, medicines, chemicals, instruments, com-
munications, and information processing equipment.
The equipment-embodied transfer of technology is particularly important for developing countries which usually lack indigenous R&D capabilities and must acquire foreign technology (OECD 1996a). An OECD study on technology diffusion shows that the bulk of acquired technology comes from the cluster of industries related to information technology, and the importance of this industry has increased over time. This is the fastest growing technology cluster. Moreover, certain types of technology tend to gravitate to certain sectors: information technology to high technology manufacturing, communication, services and finances, insurance and real estate; transport technology to transport service; consumers good technology to wholesale and retail trade; materials technology to agriculture and to medium and low technology manufacturing; and fabrication technology to mining, utilities and construction (OECD 1996b).

The above discussion suggests that the processing of technology transfer and capability building are fundamental for following phase-technology innovation.

3.2.2.2 Technology Innovation

Most technological innovation is carried out by profit-oriented firms that weigh their innovatory investments in terms of expected profits (Pavitt 1987). Since outputs of an innovation are positively related to its inputs (Dosi 1984), the conditions for successful innovation are related to factors that influence the expected return and costs of innovatory investments. In this section, we discuss five such factors: market potential; technological opportunities; appropriability regime; organizational capabilities; and incentive mechanism (Hämäläinen 2003).

Market potential Other things being equal, innovatory investments and output will be positively related to the size of the potential market. One of the earliest references to the effect of the market potential on technological innovation can be found in Adam Smith’s Wealth of Nations, where it was argued that one of three main advantages of economic specialization was the “invention of a great number of machines which facilitate and abridge labor, and enable the one man to do the work of many” (Smith [1776] 1998). More importantly he emphasized that advantages of specialization were limited by the ‘extent of the market’. Thus Smith was probably the first to suggest that technological innovation is driven by market potential.

More recently, Jacob Schmookler (1966) has made a persuasive argument that links the increasing output of innovatory activities to the growth of markets in the United States. His time series and cross-sectional data show that technological innovations are driven by the market potential of the products and services involved. Schmookler’s argument is consistent with Nelson and Winter’s (1977)
observation that major technological trajectories tend to be characterized by a wide scope for specialization, division of labor and mechanization. Market potential affects the innovation process in three different ways: first, it provides the selection criteria among the alternative technological paradigms; second, it defines the precise trajectory of advance within an established paradigm; and third, it determines the rate of technical progress along the trajectory (Dosi 1988).

Technological opportunities Schmookler’s ‘demand-pull’ argument has been criticized by scholars who believe that the set of potential technological trajectories is quite limited by the rules, technical imperatives and specific scope of advance of each technology (Rosenberg 1976; Mowery and Rosenberg 1979; Freeman 1982) These scholars argue that technological opportunities are limited in the short term, and market conditions only stimulate, hinder and focus the research for new technological paradigms. Instead of demand-pull they emphasize the “technology-push” argument where scientific discoveries open up new possibilities for technological innovation. Salter explains:

An industry may be born around some scientific principles. Subsequently there is a great potential for improvement around the same basic principle. A specialized technology arises and, for a period at least, brings forth a continuous flow of significant improvement and modifications... At any one time, some industries are in this stage of rapid improvement, while others, more mature, find significant advances less frequent and less rewarding (Salter 1960).

As suggested by Salter, the technology-push argument recognizes that technological opportunities, and thus the expected returns of innovatory activity, are sector-specific and depend on the maturity of the technological paradigm (Dosi 1988).

Appropriability regime refers to the environmental factors that govern an innovator’s ability to capture the profits generated by his innovation (Teece 1987). Since most technologies have public-good characteristics, the nature of the appropriability regime, whether it is tight or weak, is an important determinant of the expected return of innovatory activities. Factors that affect the appropriability of innovations are related to: the properties of the technological knowledge (e.g., tacit versus codified); market structure; (oligopolistic versus competitive); legal environment (enforcement of patents, copyrights, trademarks, etc.); and access to necessary complementary assets. These factors are also likely to vary among industrial sectors and technologies (Magee 1977; Teece 1987; Dosi 1988).

The degree to which knowledge is tacit or codified affects the ease of imitation by competitors. Tacit knowledge is more difficult to transmit and receive than codified knowledge and thus offers better protection against potential imitators (Teece 1987). Market structure determines the intensity of imitation pressures faced by
innovators and thus the expected quasi-rents from a given innovatory investment. In general, the more competitive the industrial environment, the lower are the quasi-rents of the innovator (OECD 1992). The property rights regime is another, but often over-emphasized, determinant of appropriability. Secrecy, lead times, imitation costs, learning, scale economies, superior sales, and servicing efforts are often more important for appropriability (Levin et al 1987; Mansfield 1986; Dosi 1988). Finally, the appropriability of innovation may also depend on the innovator’s access to important complementary assets (Teece 1987). This factor becomes more important at higher levels of economic specialization where the complementary assets are increasingly firm-specific and dispersed in the production system.

Organizational resources and capabilities Firms possess a unique bundle of resources and organizational capabilities. Since a high proportion of technological innovation takes place within firms, their unique resources and capabilities become an important determinant of technological innovation. In particular, firms that are successful innovators tend to focus their innovatory efforts in areas that are close to their existing organizational strengths (Cooper 1983; Maidique 1983). Thus, technological change becomes a cumulative process where a firm’s new technologies are constrained by its past innovatory activities. If these cumulative and firm-specific patterns of technology can be identified, measured and explained, it is possible to predict the future evolution of technological innovations in firms, industries and nations (Pavitt 1987; Dosi 1988).

Incentive mechanism As with any other economic activity, the efficiency of innovatory activities depends on positive or negative incentives. Besides the key role of competition, the technological innovation literature identifies the following ‘incentive mechanisms’: technological bottlenecks; scarcities of critical inputs; abundance of particular resources (e.g., energy and natural resources); major shocks in prices or supplies; composition, change and growth of demand; industrial conflicts; close user-producer interaction; and tight regulatory standards. These factors stimulate technological innovation, however, incentive mechanism depends on the specific nature of technology and institutional context of each nation.

In sum, technology plays crucial role in improving productivity and competitiveness. It influences strongly other determinants of competitiveness, by creating dynamics for the competitiveness of firms, industries and nations. These influences will be analysed further in section 3.7.
3.3 Market Conditions

Market conditions are frameworks that create a competitive environment in which firms can compete and operate in order to achieve their goals. Market conditions have played a critical, if not decisive, role in improving a firm’s competitiveness as well as a nation’s one. A nation does not remain competitive unless it creates good market conditions (Porter 1990, pp 86-96). In this section, we analyze market conditions as the density of domestic competition.

Domestic competition is competition among firms in a local market. Porter’s study showed that nations with a leading world position often have a number of strong internal competitors, even in small countries such as Switzerland or Sweden. This is true not only in fragmented industries but also in industries with substantial economies of scale. It is also true in the United States in the computer and software industries. Nowhere is role of fierce competition more apparent than in Japan. Domestic competition is arguably the most important for the competitiveness of a firm, industry and nation because of powerfully stimulating effect it has on the others.

Static efficiency is much less important than dynamic improvement, which domestic competition uniquely spurs. Domestic competition, like international market competition, creates pressure to innovate and improve. The competition of local rivals leads to lower costs, improve quality and service, and create new products and processes. But unlike competition with foreign competitors, which tends to be analytic and distant, local competition goes beyond pure economic and business competition and becomes intensely personal. Domestic competitors engage in active feuds. They compete not only for market share but also for people, for technical excellence, and perhaps most importantly for “bragging rights” (Porter 1990). One local competitor’s success proves to others that advancement is possible and attracts new competitors to the industry.

Domestic competition not only creates pressures to innovate but also to innovate in ways that improve the competitiveness of a nation’s firms (Porter 1990). The presence of domestic rivals nullifies the types of advantages that come simply from being in the nation, such as factor costs, access to home market, a local supplier base, and cost of importing that must be borne by foreign firms. If there are a number of Korean rivals in an industry, for instance, none gets an advantage simply because of low labor costs or low-cost debt financing. This forces a nation’s

15 where there are more 112 companies competing in machine tools, 34 in semiconductors, 25 in audio equipment, 15 in cameras—in fact, there are usually double figures in the industries in which Japan boasts global dominance (Porter 1990).
firms to seek higher-order advantages and ultimately it becomes a sustainable source of competitiveness. Firms must seek propriety technologies, reap economies of scale, exploit national advantages more effectively than the competitors, and create their own international market networks. Intense domestic rivalry helps to break the attitude of dependence on factor-based competitiveness (Porter 1990).

Home competition also enhances the competitiveness of firms and industries which in turn improves the national competitiveness. A group of domestic competitors tries alternative approaches to strategy and creates a range of products and services that cover many segments. This enhances innovation and productivity, and a breadth of products and approaches builds defences against foreign penetration. The competitiveness of an industry 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 skills in the industry accumulates as firms imitate each other and as personnel move among firms. Ideas diffuse faster within a nation than across nations because it is difficult for firms from other countries to tap into such a process. Though individual firms cannot keep innovation proprietary for long, the entire national industry progresses faster than foreign competitors, and this supports profitability for many of the nation’s firms (Porter 1990).

A geographic concentration of competitors in a city or region within a nation both shows and strengthen the improvement of national competitiveness (Porter 1990). 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. Firms must move fast to sustain their competitiveness, whereby the overall national competitiveness improves.

The competition in a nation not only creates advantage but helps to avoid disadvantages in sustaining the competitiveness of a nation. With a group of domestic competitors following various competitive strategies, there is a check against forms of government intervention that stifle innovations and blunt competition (Porter 1990).

Another benefit of domestic competition is the pressure it creates for constant upgrading of the sources of competitiveness. The presence of home competitors automatically cancels the types of advantage that come from simply being in a particular nation-factors costs, access to or preference on home market, or costs to foreign competitors who import into the market. Companies are forced beyond them, and as a result, remain more sustainably competitive. Moreover, competing domestic rivals will keep each other honest in obtaining government support. Companies are less likely to get hooked on the narcotic of government contracts.
or creeping industry protectionism. Instead, the industry will seek, and benefit from, more constructive forms of government support, such as assistance in opening markets, as well as investment in focused educational institutions or other specialized factors (Porter 1990).

Furthermore, vigorous domestic competition that ultimately pressures domestic companies to look at global markets and toughens them to succeed. Particularly when there are economies of scale, local competitors force each other to look outward to foreign markets to capture greater efficiency and higher profitability. Also, having been tested by intense domestic competition, the stronger companies are well equipped to win abroad.

3.4 International Business and Economic Activities-IBEA

National competitiveness is driven by internal (domestic) and external (international) activities. International business and economic activities are considered to be an external driver of competitiveness. They have played a significant role in improving productivity and competitiveness, by influencing all other identified determinants of competitiveness. For analytical purposes IBEA can be divided into two groups: Foreign Direct Investment (FDI) and International Trade (imports and exports). In this section, we focus generally on introducing the static IBEA activities. The IBEA as a dynamic will be examined in more detail in section 3.7.

3.4.1 Foreign Direct Investment (FDI), Multinational Corporations (MNCs), and Competitiveness

Foreign Direct Investment (FDI) is defined as an investment involving a long-term relationship and reflecting a lasting interest and control by a resident entity in one economy. FDI implies that the foreign investor exerts a significant degree of influence on the management of the enterprise resident in the other economy. Such investment involves both the initial transaction between the two entities and all subsequent transactions between them and among foreign affiliates, both incorporated and unincorporated. FDI may be undertaken by individuals as well as business entities.

Flows of FDI are classified into inward and outward. They comprise capital provided (either directly or through other related enterprises) by a foreign direct investor to a FDI enterprise, or capital received from an FDI enterprise by a foreign
direct investor. FDI has three components: equity capital\textsuperscript{16}, reinvested earnings\textsuperscript{17} and intra-company loans\textsuperscript{18} (UNCTAD 2005).

FDI stock is the value of the share of their capital and reserves (including retained profits) attributable to the parent enterprise, plus the net indebtedness of affiliates to the parent enterprise. FDI flow and stock data used in the WIR (world investment report) are not always defined as above, because these definitions are often not applicable to disaggregated FDI data. For example, in analysing geographical and industrial trends and patterns of FDI, data based on approvals of FDI may also be used because they allow a disaggregation at the country or industry level. Such cases are denoted accordingly.

Foreign Direct Investment (FDI) is the largest source of external finance for developing countries. It has the potential to generate employment, transfer skills and technology, raise productivity, enhance competitiveness and exports, and contribute to the long-term economic development of the world’s developing countries. More than ever, countries at all levels of development seek to leverage FDI for development\textsuperscript{19}.

Multinational Corporations (MNCs) are incorporated or unincorporated enterprises comprising parent enterprises and their foreign affiliates. A parent enterprise is defined as an enterprise that controls assets of other entities in countries other than its home country, usually by owning a certain equity capital stake. An equity capital stake of 10 per cent or more of the ordinary share or voting power for an incorporated enterprise, or its equivalent for an unincorporated enterprise, is normally considered as the threshold for the control of an asset\textsuperscript{20}. In the WIR

\begin{enumerate}
\item[16] Equity capital is a foreign direct investor’s purchase of shares of enterprise in a country other than its own.
\item[17] Reinvested earnings comprise the direct investor’s share (in proportion to direct equity participation) of earnings not distributed as dividends by affiliates, or earnings not remitted to the direct investor. Such retailed profits by affiliates are reinvested.
\item[18] Intra-company loans or intra-company debt transactions refer to short or long-term borrowing and lending of funds between direct investors (parent enterprises) and affiliate enterprises.
\item[20] In some countries, an equity stake of other than 10% is still used. In the United Kingdom, for example, more of the ordinary shares or voting power for an incorporated or unincorporated enterprise in which an investor, who is a resident in another economy, owns a take that permits a lasting interest in the management of that enterprise (an equity stake if 10 per cent for an incorporated enterprise, or its equivalent for an unincorporated enterprise.
\end{enumerate}
Box 2 Noticeable features of recent FDI

1. FDI flows are growing faster than other economic aggregates such as national gross fixed capital formation, world trade and GDP. International production (by MNCs and affiliates) is steadily increasing its share in global production.

2. MNCs increasingly dominate world trade: around two thirds of visible trade is handled by MNCs, and the share is growing particularly in activities with significant scale of economies in production, marketing or innovation.

3. Of the visible trade handled by MNCs, between 30 and 40 percent is within MNCs’ systems, between affiliates and parents or among affiliates. Such internalized trade contains the most dynamic exports today, moving within integrated international production systems, where TNCs locate different functions or stages of production to different countries. Affiliates participating in such systems produce on massive scales and use the latest technologies, skills and managerial techniques. The globalization of the value chains is likely to spread across many other industries, and linking local production chains to become a major source of growth, technology transfer and skill development.

4. Some MNCs are relocating non-production functions such as accounting, engineering, R&D or marketing to affiliates. These are high-value activities that feed into manufacturing competitiveness and local capabilities. This is what UNCTAD terms “deep integration” in international production, in contrast to earlier “shallow integration” where stand alone affiliates replicated many functions and related to other affiliate or parents via trade. However, the transfer functions such as R&D lags behind that of production, particularly in developing countries. For deep integration to occur, host countries have to be able to provide not just only cheap labor but also the whole array of modern skills, infrastructure, institutions, efficient business practices and suppliers networks that MNCs need in order to be fully competitive in world markets. Very few developing countries are able to meet these needs.

5. Large companies with transnational operations increasingly dominate the process of innovation: the creation of new technologies and organizational methods that lies at the core of competitiveness in all but the simplest activities. Most such companies originate in mature industrial countries. About 90 per cent of world R&D expenditure is in the OECD. Of this group, seven countries (led by the USA) account for 90 per cent. Access to new technologies thus involves getting knowledge from technological leaders in these countries. Thus, FDI becomes the most important, and often the only, way of obtaining leading edge technologies.

6. MNCs are central to exports by local firms of technology-intensive products. Many such products are difficult to export independently because of the need for expensive branding,
distribution and after-sales services. MNCs are also active in exports of low-technology products where factors such as scale of economies, branding, distribution and design are less important.

7. MNCs can help restructure and upgrade competitive capabilities in import-substituting activities. Where the facilities are already foreign owned, MNCs are often better able than local firms by investing in new technologies and skills. They can also help local suppliers to upgrade, or attract investment by their suppliers overseas.

8. FDI in services is rising rapidly as formerly homebound providers (such as utilities) globalize activities and take advantage of liberalization and privatization in their industries. The entry of service MNCs can provide rapid improvements in productivity and efficiency to host countries.

Source: WIR, UNTAD, 2003

The above features of FDI show that MNCs have been playing dominant roles in FDI activities. FDI acts mainly through MNCs such as mobile capital, technology transfer, training human resources, and so on.

A subsidiary is an incorporated enterprise in the host country in which another entity directly owns more than a half of the shareholder’s voting power, and has the right to appoint or remove a majority of the members of the administrative, management or supervisory body.

An associate is an incorporated enterprise in the host country in which an investor owns a total of at least 10 per cent, but not more than half of the shareholders’ voting power.

A branch is a wholly or jointly owned unincorporated enterprise in the host country which is one of the following: (i) a permanent establishment or office of the foreign investor; (ii) an unincorporated partnership or joint venture between the foreign direct investor and one or more third parties; (iii) land, structure (except structures owned by government entities) and/or immovable equipment and objects directly owned by a foreign resident; or (iv) mobile equipment (such as ships, aircraft, gas-or oil-drilling rigs) operating within a country other than that of the foreign investor for at least one year.

The main impact of MNCs on national competitiveness is related to their advanced technologies and skills, access to capital and final product markets, and participation in globalized systems of production and exchange. These influences become increasingly significant for industrialization in host developing countries.
As a result, many local firms in developing countries are becoming MNCs themselves, and are striking alliances with major players directly (UNCTAD 2000).

In generally, MNCs have been playing a major role in global R&D, technology transfer, human resource development, mobile capital, whereby they enhance the productivity and competitiveness of firms and nations. In other words, MNCs influence all other determinants of national competitiveness and create dynamics of competitive development. These affects will be analysed more concretely in section 3.7.

3.4.2 International Trade Activities and Competitiveness

Both economic theory and countries’ experiences show that international trade (import and export) has been a major driver of economic growth in every open economy. As trade has been expanded, income has grown. Income growth depends heavily on a country’s capacity to raise its productivity. Open economies have been able to harness the power to boost productivity and competitiveness, helping improve living standards and sustain economic growth. Openness to trade (imports and exports) strengthens the drivers of productivity and competitiveness via six crucial ways:

More efficient allocation of resources Trade enables each country to specialise in the production of those goods and services which it can produce most efficiently. Countries can raise overall consumption by exchanging their surplus for the surplus production of other countries which have a different comparative advantage.

Economies of scale In the absence of trade, economies of scale are constrained by the size of the domestic market. Trade removes this constraint, allowing industries and firms to produce on a more efficient scale than would otherwise be possible.

Similarly, trade increases incentives for firms to innovate, because of the rewards from successful innovation will be proportionately greater if firms are selling in larger (i.e. export as well as domestic) markets. Where highly productive firms expand as a result of exports, this boosts general productivity and competitiveness.

Greater competition Trade openness exposes domestic firms to greater competition. This helps to encourage the exit from the marketplace of the least productive firms; reduces monopoly rents; drives down margin; and reduces prices for consumers. Competition further reinforces incentives to innovate, helping to create more competitive firms which can then compete more effectively in the world. Trade can provide direct access to goods and services that incorporate new tech-
nologies particularly where more open trade regimes have led to different stages of the production process being undertaken in different countries.

**Incentives for investment** Better access to import and to export markets increases the scope for productive investment by creating new business opportunities. Foreign direct investment enables technology and innovation developed abroad to be applied to domestic production, enhancing competition and leading to a faster diffusion of more efficient and innovative processes.

### 3.5 Company Strategy and Operation (Competitiveness)

Ultimately, only companies, not nations, directly create productivity and sustain competitiveness and the wealth of a nation (Porter 1990). To do so, they need appropriate strategies, goals and managerial approaches. The goals, strategies, and ways of organizing firms in industries vary widely among nations. It depends on the context and circumstance in which firms are created and organized. National competitiveness emanates from a good match between these choices and the sources of competitive advantages in a particular industry (Porter 1990, pp. 107-123).

#### 3.5.1 Company Strategy

Companies are on the front line of international and domestic competition. They must increasingly compete regionally and globally. Internationally successful companies, for example, are not passive bystanders in the process of creating competitiveness. Their competitiveness results ultimately from an effective combination of national circumstances and company strategy. Company strategy has played an important if not decisive role in sustaining the competitiveness of company, industry and nation. The company strategy reflects the following aspects (Ibid., pp 107).

*Competitiveness grows fundamentally out of improvement, innovation and change.* Companies gain competitiveness over international competitors because they perceive a new basis for competing, or find new and better means to compete in old ways. It means that they must recognize the central role of innovation.

Innovation, in strategic terms, is defined in its broadest sense. It includes not only new technologies but also new methods or ways of doing things that sometimes

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21 Government influences indirectly all six determinants to create an environment in which companies can compete and improve their competitiveness.
appear quite mundane. Innovation can be manifested in a new product's design, a new production process, a new approach to marketing, or a new way of training or organizing. It can involve virtually any activity in the value chain.

In international markets, innovations that yield competitiveness anticipate not only domestic but foreign needs. Some innovations create competitiveness when a company perceives an entirely new buyer need or serves a market segment that competitors have ignored. Innovations that lead to competitiveness are also frequently based on new methods or technology that render existing assets and facilities obsolete. Competitors fail to respond because of a fear of speeding up the obsolescence of their past investments.

*Competitiveness involves the entire value system.* The value system is the entire array of activities involved in a product's creation and use, encompassing the value chains of companies, suppliers, channels and buyers. Close and ongoing interchange with suppliers and channels is integral to the process of creating and sustaining competitiveness. Competitiveness frequently comes from perceiving new ways to configure and manage the entire value system. Companies restructure or integrate their activities with suppliers, modify the strategies of channels, and recombine or integrate activities with buyers.

The importance of the entire value system to competitiveness is manifested by the prevalence of clustering. The presence of suppliers and users in a nation is an important asset, and is associated with international advantage in countless industries. The strongest competitive advantages often emerge from clusters that are geographically localized. Companies compete in ways that take advantage of presence of the national cluster. To maintain competitiveness, companies must often create and extend these clusters by stimulating the formation of suppliers, improving the needs of customers, or encouraging entry into related industries.

*Competitiveness is sustained only via relentless improvement.* Companies that remain a static target are eventually overtaken by competitors. Sometimes entrenched competitive positions can be held for years or decades once improvement stops, on the strength of early advantages such as established customers relationships, scale economies in existing technologies, and the loyalty of distribution channels. However more dynamic competitors ultimately find a way around these advantages by discovering better or cheaper ways of doing things.

Competitiveness is only sustained by a continual search for different and better ways of doing things. Ongoing modifications in firm differentiation strategy, for example, must find a stream of new ways to add to its differentiation, or, minimally, improve its effectiveness in differentiating in old ways. Yet the need for
continuous innovation runs counters to organizational norms in most companies. Companies would rather not change. Particularly in a successful company, powerful forces work against modifying strategy. It takes strong pressures to counteract these forces. Rarely do these come exclusively from within an organization. Companies seldom change spontaneously; the environment jars or forces them to change. A company must expose itself to external pressures and stimuli that motivate and guide the need to act. It must create the impetus for change.

*Competitiveness ultimately requires a global approach to strategy.* A company cannot sustain competitiveness in international competition in the long run without exploiting and extending its advantages with a global approach to strategy. German chemical companies, for example, employ extensive foreign production and worldwide marketing networks to solidify their leadership.

A global approach to strategy involves a number of important elements. Firstly, it clearly means selling worldwide, not just in domestic market. However, international sales are viewed not as incremental business but as integral to strategy. The company builds an international brand name and establishes international marketing channels that it controls. Secondly, a global strategy involves locating activities in other nations in order to capture local advantages, or to facilitate local market penetration. Thirdly, and most importantly, a global strategy involves coordinating and integrating activities on a worldwide basis, in order to gain economies of scale or learning to enjoy the benefits of a consistent brand reputation, and serve international buyers. Simply operating internationally does not equate to a global strategy unless this sort of integration and cooperation takes place. A company must move toward a global strategy as soon as its resources and competitive position allow if it is competing in a global industry.

*Creating pressures for innovation.* A company should seek out pressure and challenge, not avoid them. Part of strategy is take advantage of the home nation to create the impetus for innovation. To do that, companies can sell to the most sophisticated and demanding buyers and channels; seek out those buyers with the most difficult needs; establish norms that exceed the toughest regulatory hurdles or product standards; source from advanced suppliers; treat employees as permanent in order to stimulate upgrading of skills and productivity (Ibid., pp. 109-115).

### 3.5.2 Company Goals and Management

Clear differences exist within and among nations in the goals that companies seek to achieve as well as the motivations of their employees and managers. Companies will succeed when goals and motivations are aligned with the sources of competitive advantage.
Company goals are most vigorously 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 business leaders. The goals of publicly held corporations reflect the characteristics of the nation’s public capital markets. Capital markets vary a great deal across nations, such as identity of shareholders, the local tax regime. In addition, the role of shareholders and debt holders in corporate governance also varies. In Germany, 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 the tendency to hold shares for sustained periods. Management pays attention to the board, but day-to-day stock price movement 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 time.

In contrast, in the United States, 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. 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 via takeover. In Korea, the public capital markets have been inefficient and poorly developed; government policy is the decisive factor in capital allocation, based on consideration other than short-term rate of return.

While we 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 owed firms are more complex. Often pride and the desire to provide continuity to employees are important. Private owners frequently have a very long time horizon, are intensely committed to the industry, and operate with different profitability threshold. The attitudes toward debt holders also influence company goals. An important difference among nations is the extent to which debt holders also hold equity. In Germany, for example, 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 competitiveness. 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. The 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 (Ibid., pp 121-122).

3.5.3 Company Size

In the past decades, a great variety of models have shaped the discussions on management, in particular as regards the question of what size of company and what basic orientation are apt to offer the best promise of success in competition. It is inevitable that company size depends on the context and circumstances of a nation. Company size influences robustly the competitiveness of the company. An optimal company size can take advantage of resources, seize new business opportunities and create competitiveness strongly in both domestic and international market, and vice versa. The discussions are stimulated by the emergence of a new techno-economic paradigm which seems to favour smaller companies.

The discussions on optimal company size have in recent years been marked by some experiences: developing efficient small and medium enterprises; competitiveness of Japanese corporate conglomerates; or corporate conglomerates with management problems and the exploding overhead costs in Western Industrial Countries. What is more important is the manner in which a company organizes its transactions.

Small and medium-sized enterprises (SMEs) In most countries, especially in less and developing countries, SMEs make up the majority of business and account for the highest proportion of employment (Fisher and Reuber 2001). SMEs are usually defined by the number of employees of the firm and definitions vary between countries. The definitions used in developed countries often have higher size thresholds than those in less developed countries. Within the general SME category a number of sub-groups can be identified: self-employed persons with no

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22 In Italy, for example, family owned companies are popular, so that most companies are small and medium enterprises

23 Some countries define SMEs on the basis of the value of sales or the value of assets. The differing definitions can make cross-country comparisons difficult.
employee, microenterprises with fewer than ten employees; small enterprises with
eleven to forty-nine employees, and medium-sized firms with between 50 and 100
employees (Ibid., pp132)

The contributions of SMEs to development There is a general consensus that the
performance of SMEs is important for both the economic and the social develop-
ment of developing countries (Levy et al, 1999). From an economic perspective,
SMEs provide a number of benefits (Ibid., pp 133):

SMEs, due to their size, can often easily adapt to changing demand patterns, trade
patterns and macroeconomic conditions. This increases industrial flexibility.

SMEs have a reasonable ability to acquire technological capabilities and develop
new products and processes and can thus contribute to national technological de-
velopment and competitiveness.

SMEs can be an important vehicle for generating income and employment and so
contribute to gross domestic product, economic growth and reduction in unem-
ployment.

SMEs provide a setting in which assets and skills can be accumulated. This can
lead to better economic opportunities for the individuals who acquire the skills,
and for the household they help to support.

SMEs can decrease wage inequality. They do so largely by increasing economic
participation among those in the lower half of income distribution.

A major corporation that maintains primarily conflict-oriented relations with its
suppliers and customers will be less competitive than a smaller company that is
integrated within a properly functioning network.

Japanese conglomerates are exceptionally efficient because they constitute the
basis for long-term supplier relations, because joint R&D is easier to organize,
because procurement of credit with conglomerate’s bankers is relatively simple,
and because there is here a large measure of tolerance for more or less protracted
initial losses. Japanese conglomerates link a dense, long-term network of relation-
ships with a low level of organizational rigidity. This distinguishes them from
conglomerates in North America and Europe in which growth of scale has been
associated with a multiplication of level of hierarchies, bureaucratization of deci-
sion-making processes, and explosion of overhead costs (Esser, Hillebrand, Mess-
ner, Meyer-Stamer 1996).
3.6 Government Role

Government plays an inevitable role in economic development because it affects many aspects of the business environment. Yet there has been a broad consensus among economists that the two major roles of government are to increase the overall efficiency and growth of national economies and reduce social inequities among their citizens (Hämäläinen 2003, pp 161). The first role stems from the presumption that, left on its own, a market economy cannot achieve rapid economic growth and efficient use of its production resources. Indeed it could be argued that without any government intervention a modern, highly specialized market economy could not even exist (North 1990). As a result, government activity is needed to overcome specific inefficiencies of the market mechanism, such as market failures. However, even efficient markets could not guarantee a fair distribution of income and opportunities in a society. Thus government activity is needed to ensure that the outcomes of market forces are socially more acceptable. The two principle duties of government have been given different weights in different countries and in different historical periods (Ibid., pp 162).

Historically, the classical (Adam Smith) and neoclassical schools neglect the role of government and have held the strongest belief in the efficiency of the market (price) mechanism. This view stems from Adam Smith’s ideas:

According to the system of natural liberty, the sovereign has only three duties to attend to; three duties of great importance, indeed, but plain and intelligible to common understanding: firstly, the duty of protecting the society from the violence and invasion of other independent societies; secondly, the duty of protecting, as far as possible, every member of the society from the injustice or oppression of every other man of it, or the duty of establishing an exact administration of justice; and, thirdly, the duty of erecting and maintaining certain public works and certain public institutions which it can never be for the interest of any individual, or small number of individuals, to erect or maintain; because the profit could never repay the expense to any individual or small number of individuals, though it may frequently do much more than repay it to a great society (Smith [1776] 1998, pp180-181)

The first two duties of government establish the institutional foundations of markets which are prerequisite for an advanced division of labor and complex economic transactions (North 1990). The third duty of government involves public goods such as roads, bridges, canals, postal services and so on. This mechanism emphasized a view collapsed after the Great Depression and was replaced by Keynes’ theory-macroeconomic theory. His theory got an enthusiastic reception from economists and policy makers. In essence, his theory involves government intervention through two major economic policies: fiscal and monetary policy.
It is important to note that Keynesian macroeconomics left the basic premises of neo-classical economics intact. Thus neoclassical scholars could continue their research relatively untouched with the managed flow of aggregate demand. Both neoclassical and macroeconomic approaches generally assume efficient competition (except for few monopolies) and a limited role for government at the micro-economic level. This is where the scholars of macro-organizational school disagree with their neoclassical and macroeconomic colleagues.

Government role in enhancing national competitiveness is inevitable. However, it depends on the stage of development and a country’s particular circumstances. Porter argued that government role reduces gradually through each stage of development (Porter 1990). In the early phase, resources-driven development, government intervention is significant to improve infant firms’ and industries’ competitiveness. Korea government role provides a good example. In this framework, we note government role following two areas: Public Institutions and Government Policy.

3.6.1 Public Institutions

3.6.1.1 Institutional Concept

The term ‘Institution’ has different meanings for different persons. In the work “Economic Institutions of Capitalism”, Oliver Williamson defined institutions as alternative organizational mechanisms: markets, hybrids, and hierarchies (Williamson 1985). John R. Commons viewed institutions as established societal organizations, which included inter alia universities, labor unions, churches, political parties and the government (Commons 1970). Douglass North argued that institution includes three major elements: informal behavioural constraints and incentives; formal rules and their enforcement (North 1990). In this study we focus on formal rules as a determinant which influences on national competitiveness.

Formal institutions consist of political, judicial and economic rules that complement and increase the effectiveness of informal institutions. The hierarchy of formal institutions extends from constitutions to statutes and common laws and further to government regulation, collective labor market agreements and individual contracts. Thus changes in formal institutions may originate from many different sources: the supreme court, federal and local legislatures and governments, regu-
latory agencies, collective bargaining and contracting organizations (Commons 1970, North 1990).

Economic agents often attempt to manipulate the judicial, legislative, regulatory and bargaining processes in their self-interest. These ‘rent-seeking’ activities often have a detrimental effect on economic efficiency and competitiveness (Olso 1982). Since the profitability of rent-seeking activities depends on the prevailing economic environment and institutional arrangements, some economic systems are burdened with more rent-seeking than others.

Formal institutions are shaped by the judicial and legislative processes of the society, rent-seeking activities of special interest groups, collective bargaining between labor unions and employers, private bargaining between buyers and sellers and other private sector regulatory processes (Commons 1970, Oslo 1982). Although formal institutions are more easily changed by purposive action, the complexity of the above processes typically makes the evolution gradual. Hence drastic changes in the institutional framework are extremely rare.

North argues that modern economies where complex and impersonal exchanges are prevalent require efficient enforcement of contracts in order to achieve the maximum gains from economic specialization and trade (North 1990). He notes that institutions will break down if they are not enforced. Thus violations of institutional rules need to be detected and punished and institutionally sanctioned behaviour rewarded. Although North emphasizes the importance of coercive third-party enforcement, the enforcement of institutional rules may also depend on the possibility of losing one’s reputation in case of defection or shirking.

The separate forces that shape informal and formal institutions may sometimes lead to an ‘institutional disequilibrium’ where they contradict each other (North 1990). The situation in Russia immediately after the collapse of the communist regime provides a good example. The institutional disequilibrium erodes competitiveness and may lead to chaos when it lasts for too long.

3.6.1.2 Institutions and Competitiveness

The institutional framework influences economic environment and competitiveness by shaping the individual and organizational incentives (North 1990, Porter 1990). These incentives shape the processes of resource accumulation and allocation, technology transfer and innovation, the interaction of buyers and sellers in the product markets, and the international business and economic activities. This section discusses the ways in which institutions can affect each of these processes and, through them, the national competitiveness.
Institutional incentives shape the quality and amount of productive resources created and acquired in the economic system. The incentives to accumulate physical resources (through investment and savings) and intangible assets (through education, training and learning) are determined inter alia by the national career preferences, social status of education, educational standards, tightness of property rights regime and tax laws. Porter argued that the attractiveness of humanities among British students has been detrimental to the international competitiveness of British firms, while Japan has done very well with an institutional framework that encourages natural science education and applied research (Porter 1990).

Technology transfer and innovation is affected heavily by the institutional frameworks. The property rights regime is an important determinant of innovatory incentives. The better the innovator can appropriate the returns from his or her innovations, the better incentives he or she has to undertake innovatory activity (OECD 1996b). The approvability of innovations is also affected by the level of competition among producers which, in turn, is shaped by the prevailing regulatory regime and competition (anti-trust) laws. However it is not primarily through approvability that competition affects innovative behaviour but through its incentive effect.

Moreover the institutional incentives for physical investment will determine the pace of equipment-embodied technology transfer. In a similar way labor laws may affect firms’ decisions to adopt new production technologies or organizational arrangements. The transfer of systemic technologies is facilitated by established industry standards. Industry standards may either encourage or discourage competition and technology transfer among firms (Hämäläinen and Laitamaki 1993). Finally, tight competition law can make it more difficult for firms to form close users and producers relationships, which detrimentally effects both transfer and innovation processes (OECD 1996b).

An efficient institutional framework directs productive resources to their socially most productive uses. Efficient institutions also facilitate rapid structural adjustment by speeding up the withdrawal of resources from uncompetitive and unproductive sectors and stimulating the investments into new and more promising sectors. On the other hand an institutional framework may also encourage rent-seeking behaviour where economic agents focus on redistributive rather than value-adding activities. The resulting misallocation of resources hurts national competitiveness (Olson 1982). The most serious misallocation problem is mass unemployment. Although there are many different factors behind this problem,
the institutional rigidities in labor markets clearly play a central role (OECD 1994).

The work effort of individuals depends on pressures and incentives strongly influenced by the institutional framework. As previously mentioned, the competitive pressures on firms are shaped by the competition (anti-trust) laws, tariffs and regulation. Demanding regulatory standards can also pressure firms to become more efficient and gain ‘first mover’ advantages in new markets. Consequences of low effort levels and the working ethos in general are shaped by the cultural environment of society (Hämäläinen 2003).

In sum, institution is a juridical framework which strongly influences the competitiveness of firms, industry and the national economy.

3.6.2 Government Policy

In the continuing debate over the competitiveness of nations, no topic engenders more argument or creates less understanding than the role of the government policy. Many see the government as an essential helper or supporter of firms and industry, employing a host of policies to contribute directly to the competitive performance of strategic or target industries. Others accept the “free market” view that the operation of the economy should be left to the workings of the invisible hand. Both views are incorrect. Either, followed to its logical outcome, would lead to the permanent erosion of a country’s competitive capabilities. On the one hand, advocates of government assistance for industry frequently propose policies that would actually hurt firms in the long run and create the demand for more assistance. On the other hand, advocates of a diminishing government presence ignore the legitimate role that government plays in shaping the context and institutional structure surrounding companies and in creating an environment that stimulates companies to gain competitiveness.

The central goal of government policy toward the competitiveness of the economy is to deploy a nation’s resources with high and rising levels of productivity (Porter 1990, p126-128). Productivity is a fundamental factor in a nation’s standard of living. To achieve productivity growth, an economy must be continually upgrading. This requires relentless improvement and innovation in existing industries and the capacity to compete successfully in new industries. New business formation is necessary to create jobs for new persons entering the workforce, to replace any jobs free up by productivity gains in other successful industries, and to replace jobs lost in less productive industries that have become uncompetitive.
Government’s proper role is as a catalyst and challenger, it is to encourage— or even push—companies to raise their aspirations and move to higher levels of competitive performance, even though this process may be inherently unpleasant and difficult. Government cannot directly create competitive industries, only firms can do that. But government plays a critical role that is inherently partial, and that succeeds only when working in tandem with favourable underlying conditions. Yet, the government’s role amplifies the drivers of the national competitiveness. Government policies that succeed are those that create an environment in which companies can gain competitiveness rather than those that involve government directly in the process, except in nations early in the development process. It is an indirect, rather than a direct role (Ibid., pp 140).

It is hard to understand why so many governments make the same mistakes so often in pursuit of national competitiveness: competitive time for firms and political time for governments are fundamentally at odds. It often takes more than a decade for an industry to create competitiveness; the process entails the long upgrading of human skills, investing in products and processes, building clusters, and penetrating foreign markets. But in politics, a decade is an eternity. Consequently, most governments favour policies that offer easily perceived short-term benefits, such as subsidies, protection, and arranged mergers—the policies that retard innovation. Most of the policies would make a real difference either are too slow and require too much patience for politicians or, even worse, carry with them the sting of short-term pain.

Policies that convey static, short-term cost advantage but that unconsciously undermine innovation and dynamism represent the most common and profound error in government industrial policy. In a desire to help, it is all too easy for governments to adopt policies such as joint projects to avoid “wasteful” R&D that undermine dynamism and competitiveness.

Government policy should be a signal. It can influence how firms compete by identifying and highlighting the important priorities and challenges they face. Government leaders have a stage from which they can define issues of national importance and shape attitudes toward particular problems in industry. Campaigns of the Japanese government, for example, elevated national attention to quality and overcame the stigma of “cheap” Japanese goods. One of the most visible elements of program was the establishment of Deming Prize. This prize carries enormous prestige and sends a strong signal to all Japanese firms about the requirements for competitive success.

Government in nearly all nations today are taking steps designed to improve competitiveness. Some of the most prominent and common policy thrust are the fol-
lowing (Ibid, pp 141): devaluation, deregulation, privatization, relaxation of product and environmental standards, promotion of interfirm collaboration and cooperation of various types, encouragement of mergers, tax reform, regional development, negotiation of voluntary restraint or orderly marketing arrangements, efforts to improve the general education system, expansion of government investment in research, government programs to fund new enterprises.

3.7 Interdependence among Determinants as a Dynamic of National Competitiveness

The determinants of national competitiveness reinforce each other and proliferate over time in fostering competitiveness. This interdependence determines the level of productivity. The level of productivity, in turn, sets a basis of competitiveness and citizens’ standard of living (Ibid., pp 132). As this mutual reinforcement proceeds, the cause and effect of individual determinants become blurred. In reality, every determinant can affect every other determinant, though some interactions are stronger and more important than others. However, in this research framework, we solely analyse some of the strongest and most important influences among the determinants.

3.7.1 Effects on Production Resources

The types of production resources in a nation are influenced by other determinants, particularly those of resources most decisive for national competitiveness. Investment in generalized resources, such as transportation infrastructure and the secondary school system, are made virtually in every nation, normally as a natural outcome of public policy at various level of government. In turn, the size and quality of public investments in generalized resources can be and are influenced by the attitudes of business community and private citizens. What varies is a nation’s rate of investment, its desired standard of performance, and how well the institutions involved in creating resources are administered. Though generalized resources are not a sufficient basis for competitiveness in advanced industries, they serve as the foundation from which advanced and specialized factors are created. Sustained national investment is therefore essential to national economic progress.

Production resources are perhaps most strongly influenced by market conditions (Porter 1990). A number of local competitors in robust competition stimulate the rapid development of skilled human resources, related technologies, market-specific knowledge, and specialized infrastructure. Companies invest in such resources themselves, singly or via trade association, under pressure not to fall be-
hind. As important, however, is that a group of domestic competitors also triggers special programs in local school and universities, government-supported technical institutions and training centres, specialized apprenticeship programs, industry-specific trade journals and other information providers, and other types of investment in resources by government and other institutions. Domestic competition also stimulates job seekers to invest in gaining specialized skills. Human resource will be unusually rapid in industries viewed as prestigious or priorities, the attention of individuals, institutions, and government entities is most attracted. These effects will be most pronounced if the rivals are located in one region.

Production resources are also affected by demand condition (Porter 1990). A disproportionate level of demand for a product, or unusually stringent or sophisticated demand, tends to channel social and private investments into related production resources. Advanced and specialized resources of production grow up to help meet pressing local needs. High or stringent local demand raises the likelihood of a consensus in government for making factor creating investment. It also focuses attention of individuals and firms on the need for making private investments.

A single company can have some effect on production resources, particularly if it is a major economic influence on town or region. However, a group of rivals usually provides far more stimulation.

Competition among local competitors spills over into efforts to court and develop relationships with educational institutions, research institutions and information providers. This competition will increase the rate of creating and allocating resources. The presence of a number of rivals not only signals the importance and potential of the industry, causing individuals and institutions to take notice, but also reduces the risk of investing in specialized facilities, programs, and knowledge. Rivals mitigate each other’s bargaining power in sourcing specialized resources, promoting expended supply. The presence of some domestic competitors can elevate the support and consensus for investment in creating specialized resources by government.

The influences of a group of domestic competitors on advanced resources are more important and common, but far from automatic. Local companies must perceive the need for constantly upgrading the pool of resources, and work actively
to stimulate investments in them. Robust domestic competition plays a special role on encouraging such an outlook as pressure from buyers.

The pool of resources and the rate at which they are created are also shaped the presence of clusters. The clusters draw on common inputs, skills, and infrastructure also further stimulates government bodies, educational institutions, companies, and individuals to invest in relevant factor creation or resource-creating mechanisms. Specialized infrastructure is enlarged, and spillovers are generated that upgrade factor quality and increase supply. Sometimes, whole new industries bring up to supply specialized infrastructure to such clusters. Such a mutually reinforcing process is occurring in the United States, where the existence of world-class industries in mainframe computer, minicomputer, software, logic circuits has sent public and private institutions scrambling to create software training centres and courses. The resulting pool of skilled human resources, knowledge, scientific centres and specialized infrastructure not only benefits this whole group of industries, but spills over to benefit other industries that depend on information technology.

Resource-creating investment in a nation cumulates over time. The role of the other determinants influencing educational, research and other institutions provides an ongoing and additive stimulus for specialized resources. Over time, differences in the rate and direction of such investments among nations can lead to wide national differences in the stock of specialized resources relevant to company, industry and nation.

*International business and economic activities* affect heavily on production resources via foreign direct investment and international trade.

*Foreign Direct Investment.* The availability of advanced, created, and specialized resources in the national economy is most clearly affected by inward foreign direct investment. Multinational corporations (MNCs) must have some ownership-specific advantages over and above those of local firms in order to compete successfully in a foreign location (Hymer 1960). These advantages may stem either from ownership-specific tangible and intangible assets or the firm’s international network of operations (Dunning 1988). Both types of advantages may contribute to the productivity and competitiveness of the host economy. Moreover the greater the number and extent of the MNCs ownership advantages relative to those of its indigenous competitors, and the more countries in which MNCs operate, the more pronounced its impact (good or bad) is likely to be on the host economy (Dunning 1993).
MNCs are disproportionately well represented in the high value-added, technology and marketing-intensive industries which are characterized by strong ownership-specific assets (Dunning 1993). Their managerial and training resources, R&D activities, marketing skills and brand names can improve the human resources and intangible assets available in the host country. Besides the direct effects, FDI may improve the host country’s resource base indirectly through the competitive stimulus, improved working ethos and organizational innovations that they bring to national resource creation and accumulation processes.

*International trade* shapes the national production resources through exports and imports. The clearest contribution of exports to the national resources relates to the financial reserves earned abroad. Besides the effect of a positive balance of payments, export receipts are often an important source of finance for national economies. However it is conceivable that some economic systems can also lose scarce human capital and raw materials. Thus an increasing number of countries are concerned about the ‘brain drain’, or exports of high quality human resources. On the other hand many developing countries are still quite willing to deplete their natural resource in an attempt to earn more export revenue.

Raw materials and other resources have become increasingly well available in the global factor markets. These markets allow firms and nations to outsource those basic resources which are more efficiently supplied by other economic systems. Japan, for example, imports large quantities of foodstuffs which it could also produce domestically but not only at prohibitive cost. Importing basic resources which could also be produced at home saves scarce domestic resources for those activities and industries in which the home country has a competitive advantage (Hämäläinen 2003, p 103).

### 3.7.2 Technology and Human Resources

Technology is affected heavily by human resources. The adoption of technology requires skilled human resources. The gaining of competitiveness in most new technologies requires a more highly skilled workforce at all levels of enterprise. What is more, it requires different kinds of skills and work attitudes: multi-skills, teamwork and flexibility, rather than simply people trained in traditional ways to do routine production line tasks. The pace of technological change also raises the need for a constant retraining of the workforce, and many developed countries are now emphasizing the central role of “lifetime education” to maintain an efficiency and innovation edge. Of course, different economies have different skill needs. However, all economies constantly need to upgrade their human capital stock to sustain industrial competitiveness.
3.7.3 Influences on Market Condition

Domestic demand conditions reflect many national attributes such as the standard of living, income, population, climate, social norms, and a mix of other factors in the economy.

Perhaps the most important influence is again domestic competition. A group of local competitors invests in marketing, driven by an intense commitment and attention to the domestic market that I have described. Pricing is aggressive to gain or hold local market share. Products are introduced earlier at home, and the available product variety is greater. The very presence of competitive local rivals builds an awareness of the industry. Primary demand in the home market is stimulated. Not only is home demand expanded, but saturation occurs sooner and leads to more aggressive efforts to internationalize. A good example is the wine industry, where high per capita consumption in wine-producing countries such as Italy and France is due in large part to the presence of local production that is associated with wide local availability of wine and greater product awareness by local consumers.

Active domestic competition also upgrades domestic demand. The presence of a number of aggressive local competitors works to educate local buyers, make them more sophisticated, and make them more demanding because they come to expect a lot of attention. In furniture and shoes, for example, Italian demand has been upgraded by the rapid pace of new product introduction in the home markets by hundreds of Italian companies. (Porter 1990, pp 133-134).

Robust domestic competition can also enhance foreign demand. A group of domestic rivals builds a national image in the industry. Foreign buyers take notice and include the nation in their review of potential sources. Their perceived risk in sourcing from the nation is reduced by the availability of alternative suppliers.

The presence of clusters can also enhance international demand for an industry’s products. One way is through transferability of reputation such as the image of Swiss watch or consumer electronics of “Made in Japan”.

Internationalization of home demand is also affected by factor conditions, especially factor-creating mechanisms. A nation with sophisticated factor-creating mechanisms connected to a particular industry will attract foreign students and firms, who will learn and observe. These students and firms often provide foreign demand for a nation’s goods and services.
Domestic competition structure is also influenced by other determinants. The role of other determinants in affecting the number, skills, and strategies of local rivals is particularly important.

Demand conditions enhance domestic rivalry when demanding home buyers seek multiple sources and encourage entry. Highly sophisticated buyers based in a nation may also themselves enter the industry. This is particularly significant when they have relevant skills and view the upstream industry as strategic. A good example is the Japanese robotics industry. Many of the early and leading robotics competitors, such as Matsushita and Kawasaki, are major robot users. They initially designed robotics for internal consumption but then began to sell to others. This example illustrates how sophisticated users who enter an industry can bring an acute understanding of buyer needs as well as pool of expertise and thus enhance the prospects for competitiveness. The response of other industrial participants to their entry further upgrades the entire domestic industry. Early market penetration by a product in a nation also stimulates entry, not only by users but from other industries and via start-ups.

New entry into an industry is also encouraged directly or indirectly by strong national position in related and supporting industries. Entry by established firms in downstream or related industries, which often occurs along with start-ups, produces a domestic industry structure that can be especially conducive to investment and innovation. Suppliers, particularly those that are internationally successful, often enter user industries. Entrants from supplier industries bring them skills and resources from their core businesses that can reshape competition in the new industry, providing the foundation for competitiveness. They can frequently share brand names, distribution channels and technological knowledge.

Entry by suppliers into downstream industries provides a ready means for transmitting information and skills and thus supports the sort of vertical interchange so important to competitiveness. Entrants from supplier industries in a nation also have a level of commitment to new industry that may be unmatched by start-up entrants in other nations. Suppliers view the new industries as strategic because they are interrelated with their base business, and their brand reputations may well be at stake. The time horizon for decisions is lengthened, and short-term profitability diminishes in importance. Supplier employees frequently leave to enter the industries they serve when they perceive an opportunity to transfer skills and relationships that can be an important advantage. A well-developed suppliers industry also lowers barriers to entry into downstream industries by firms. The presence of many parts suppliers, for example, facilitated new entries into the Japanese sewing machine and car audio equipment industries.
Many of the same reasons explain why competitiveness in a related industry leads to entry into an industry. A high-profile industry often draws attention to industries that are related to it. And the timing of entry from one national industry into related industries is not random. Often related diversification takes place when the base industry either becomes saturated or declines. This often leads to a number of local companies simultaneously diversifying into a related industry. Imitation merely compounds this process.

Entrants from related industries, like entrants from buyers and supplier industries, are particularly desirable types of entrants for the purposes of upgrading competitiveness in a nation. They often possess transferable strengths that lead to higher-order competitiveness. Many Japanese competitors in personal computers, for example, began as consumer electronics companies. While Japan’s overall international position in personal computers is modest, strength is now growing in laptops where compact size and liquid crystal display technology are essential to competitive success. These are areas where Japanese firms bring unique and transferable strengths not present in America and European competitors.

The most vibrant competitiveness often comes when entrants from a number of different supplier and related industries converge in a new industry (Ibid., pp 147). Here a variety of competing approaches are brought to bear and innovation often flourishes. Entrants from related industries also have the same high stakes on succeeding in the new industry as was the case with entry by suppliers. Japanese office machine companies who entered facsimile production, for example, had a brand reputation to protect and were anxious to have a full line of products to gain greater clout with distribution channels.

3.7.4 International Business and Economic Activities and Technology

The main benefit that host developing countries expect from International business economic activities (IBEAs) is access to technology and their ability to implement new technology effectively.

In the rapidly integrating world and regional economies where technological capacity is spread among an increasing number of countries, most economies must import the bulk of their new technology. Since IBEAs provide important mechanisms of international technology transfer, they play a central role in the technology development and diffusion processes of national economies. Besides their direct impact IBEAs shape the national technology base indirectly through the other parts of economic system which are closely linked to the domestic technology transfer and development processes: human resources, technological infrastructure, demand patterns, competitive environment and the institutional and pol-
icy frameworks. As a result IBEAs are a significant determinant of a nation’s technology transfer and capacity.

In the following we examine the impact of different forms of IBEAs (FDI and International Trade) on the determinants of technology transfer and innovation identified previously.

**IBEAs and technology transfer:** the rate of technology transfer is shaped by international business and economic activities. As we noted above, FDI (inward and outward) can provide indigenous firms with a better access to global markets. The larger demand of global markets not only favours technology innovation but also the transfer of technologies, particularly if they are characterized by large fixed costs. FDI also shapes the rate and extent of technology transfer by increasing the pressures of international competition. International competition tends to reduce the prices of technology-intensive inputs and thus improves the incentives for adopting new technologies. International competition also puts pressure on firms to use the most technologically advanced inputs and equipment.

In a national economy, the speed and extent of technology transfer depends on the systemic characteristics of technologies. Individual technologies cannot transfer efficiently if other parts of the interdependent technology system remain unchanged. The development and transfer of technologies also requires coordination. MNCs are in a unique position to coordinate complex technology development and transfer processes because such coordination cannot take place efficiently through the market mechanism.

Technology transfer also relies on the absorptive capacity of firms and nations (Cohen and D. Levinthal 1989). The lack of complementary assets, skilled human resources, and especially organizational capabilities can lead to counterproductive results in both firms and nations. Their productivity and competitiveness can be reduced. As we mentioned earlier, MNCs may be able to help their host countries by providing and upgrading the necessary absorptive capacity.

The pace and extent of technology transfer is shaped by the adaptation needs of specific technologies for the characteristics of particular socio-economic systems. As a result, a large part of the R&D conducted by foreign affiliates of MNCs goes into the adaptation of particular products, processes, functions and procedures of firms rather than to basic or fundamental research. Moreover, the fact that so much cross-border technology transfer takes place within MNCs hierarchies rather than through arm’s-length markets is a sign of the tacit and complex nature of the transferred technology. MNCs networks and related FDI are often the most efficient and least costly way to transfer such technologies.
As we noted previously, the cross-border transfer of disembodied technology is facilitated by the geographical proximity of MNCs and indigenous firms. On the other hand, a greater geographical dispersion of inward FDI could have a positive impact on technology transfer within host countries. Outward FDI, in turn, may have an adverse effect on the strength of local industrial clusters and hence on the national transfer of disembodied technology.

In general, FDI provides the fastest and most effective way to deploy new technologies in host developing countries. As the number of MNCs grows and their origins diversity, the range of technologies offered also increases. Emerging competition among MNCs can improve the terms on which host countries can obtain technology, potentially strengthening the advantage of FDI as a source of technology transfer, if Governments use their bargaining effectively (UNCTAD 2000).

*International trade* also has an impact on the transfer of technology (World Bank 1993). Increasing import competition may reduce the price of technology which facilitates its transfer. Exports, in turn, may provide important financial resources for the acquisition of newly transferred technologies. Exports may also help cross-border technology transfer by providing the competitiveness of domestic firms’ technologies and capabilities to prospective foreign partners. Exports also may attract inward FDI and hence facilitate technology transfer by signalling the good quality of national framework conditions for industry. In addition foreign buyers may give exporters technological information acquired from their other suppliers. Finally, both exports and imports expose domestic firms to more intensive competition which pressures them to adopt new technologies gradually.

*IBEAs and Technology Innovation*: IBEAs influence technology innovation processes through identified contents in the section of technology innovation\(^2\): Foreign direct investment (Inward and outward) can provide MNCs’ local affiliates and suppliers a ready access to global markets (UNCTAD 1995). The importance of MNCs’ global marketing and distribution networks for their host countries has often been demonstrated when they have acquired a foreign company with strong technological advantage but weak international marketing capabilities. The improved access to global markets, in turn, provides better incentives for technology innovation. Moreover foreign demand patterns are likely to be somewhat different from those at home which provides new incentives for innovative activities.

\(^2\) Market potential, technological opportunities, appropriability regime, organizational resources and capabilities, incentive mechanism and the geographical concentration of firms (Hämäläinen, 2003)
FDI can also contribute to local innovation processes by widening the scope of technological opportunities available to a national economy. MNCs account for around three-quarters of civilian R&D undertaken in market economies and as much as 90 per cent of the trade in technology or technology-intensive products (Dunning 1993). Moreover, in a world where technologies have become more systemic and independent, foreign MNCs often possess technologies which are complementary to those of domestic firms and thus create totally new technological opportunities in their host countries. The fact that MNCs provide crucial complementary resources to domestic firms may also be a drawback for the innovation of their host economies. The local appropriability of innovations may suffer if the MNCs can leverage their strategic position to appropriate the rents from local innovations. FDI can also make local markets more competitive which tends to decrease the approvability of innovations. However, in the longer term, the opposite result is also possible if the MNCs are able to conquer the host country market and thus improve the appropriability.

The international integration of markets and production and the tendency for technologies to become more systemic have increased the organizational advantages of large MNCs in innovatory activities. The commercialization of new technologies increasingly requires a network of organizational resources and capabilities which global companies are best equipped to supply (Dunning 1993). The countries which can offer the best framework conditions for innovatory activities are most likely to benefit from the MNCs’ technological capabilities.

The increasing competition related to inward and outward direct investment can increase the innovatory activities of indigenous firms (Porter 1990). With regard to inward FDI, the positive impact of competition on technology innovation is likely to be greater than the negative effect of decreasing due to the weakening appropriability regime. In a similar vein market-seeking outward FDI can expose home country firms to more intensive competition. On the other hand, resource-seeking outward FDI may be motivated by the cheaper input (such as labor and materials) costs in foreign countries. If such FDI is used as an alternative to innovative upgrading in response to the competitive pressure, it is likely to have detrimental effects on the long-term technological competitiveness of the home country (Hämäläinen 2003).

Finally, MNCs may sometimes be able to fill in the gaps or reduce the weakness of geographically concentrated user-producer networks. By locating close to domestic firms, MNCs can strengthen the agglomeration economies of geographically concentrated industries.
International trade can also have an impact on the technological innovation of an economic system. Similar to FDI, exports increase the size of potential markets and thus provide additional incentives for innovation. Exports may also provide better information about foreign buyers' preferences which improves the probability of successful innovation (World Bank 1993). Imports, in turn, may have a negative effect on the market potential of domestic firms by reducing their market shares. However, imports may also introduce new technological opportunities to a national economy and thus increase the innovative potential of domestic firms. International trade may also affect the appropriability of domestic innovations. Both exports and imports can decrease the appropriability of domestic innovations by increasing foreign competition. On the other hand, the more intensive international competition can also improve the firms' innovation. It may do this directly through increasing the opportunity costs of not being innovative, or indirectly by forcing the firms to develop the organizational resources and capabilities required for successful innovation.

Exporting to foreign markets exposes firms to new demand patterns which may work as incentives to technological innovation. Finally, imports may increase the number of possible sources of crucial complementary inputs and hence increase the appropriability of firms' innovations.

### 3.7.5 Effect of IBEAs on Human Resources

The contribution of MNCs to human capital (skill) is potentially large. Many foreign affiliates in developing countries pay higher wages to employees than local counterparts, and invest more in training. They tend to be more aware of emerging trends in training and the need for new forms of skill creation; they are able to use state-of-the-art training materials and techniques; and their training is oriented to global markets (UNCTAD, 1994, 1999). Several MNCs have set up training facilities to ensure that their need for specialized skills is fully met. Furthermore, the presence of advanced manufacturing MNCs also can attract a host of foreign investors in modern services, which create valuable new skills in finance, marketing, insurance, accounting, and so on.

However, host countries cannot rely on MNCs to meet their broader or emerging skill needs. MNCs use the technologies that are appropriate to local education levels and train mainly to create efficient operators of such technologies. They tend not to invest in creating the skills needed for higher levels of technologies because of the high cost and long-term nature of the training required. In other words, the upgrading of the general skill level and provision of high-level specialized training is something that host countries have to do for themselves. Indeed, such upgrading itself can be used to attract higher-quality inward FDI and to in-
elude existing investors to move into more complex activities. Moreover, MNCs from developed countries tend to concentrate in advanced technology industries, leaving a wide range of simpler activities in which skill creation has to depend on local firms. MNCs from other developing countries do enter into simply labor-intensive activities, but these tend not to invest heavily in training. In essence, MNCs cannot replace the education and training provided by the national education system, and this remains a vital area of host government policy (UNCTAD, 2000).

MNCs can make a valuable contribution to the upgrading of management and organization systems in host countries, with beneficial spillover effects on local firms. Nevertheless, the introduction of new organizational techniques has a life of its own.

3.7.6 Government’s Influence on all other Determinants

Government can affect (and be affected by) each of the six determinants either positively or negatively. Production resources are influenced by government through subsidies, policies toward the capital markets, education and training, and infrastructure. Government affect technology via science and technology policies. Market and demand conditions are influenced by government through antitrust law and expenditure. Government can create environment in which clusters are formed. Government plays significant role in international business and economic activities through investment attractive policy and exchange rate policy. Government policy also influences firm’s strategy and operation through such devices as capital market regulations, tax policy.

3.7.6.1 Government’s Effect on Production Resources

Government has critical responsibilities for fundamentals like the primary and secondary education systems, basic national infrastructure, research, and efficiently exploiting natural resources in areas of broad social concern such as health care. The government’s effect on production resources is justified by externalities or benefits to the economy that exceed those to any individual participant, and is especially significant where resources can be deployed in a range of industries. A nation’s industry will not be competitive if the government does not meet these responsibilities well.

Education and training Achieving greater competitiveness demands human resources with improving skills and competences. The quality of human resources depends on quality of education and training system. Education and training constitute perhaps the single greatest long-term leverage point available to all levels
of government in upgrading industry. Improving the general education system is an essential priority of government, and a matter of economic and not just social policy. The effectiveness of an educational system is partly a function of the rate of spending. The appropriate government policies toward education and training must reflect each nation’s particular circumstances.

**Infrastructure** Improving the competitiveness of a nation depends on enhancing national infrastructure. The improvement of national infrastructure is influenced strongly by government investments. Both firms and government have a role in creating and upgrading infrastructure. Governments have historically played a major role in most nations. Japan, Korea, and Singapore, for example, have adopted the most aggressive posture toward infrastructure investments and they have reaped significant benefits in improving competitiveness and economic growth.

**Capital** Raising the competitiveness of an economy requires that ample capital is available at low real cost and is allocated efficiently through the banking system and other capital markets to investments with the highest productivity. Government has a role in affecting both the supply and cost of capital as well as the markets through which it is allocated. A nation’s supply of capital is most influenced by the personal savings rate, the size of the government surpluses or deficits, and foreign capital flows. Government policy can affect all three. In Singapore, for example, there is a program of forced savings tied to the social security system. This has generated an enormous pool of capital that is beyond the ability of the Singaporean economy. Tax policy is another prominent tool for encouraging or retarding savings (Porter 1990).

**Natural resources** have been contributing to national competitiveness as an available element. The more natural resources are exploited efficiently the more sustainable competition an economy remains. Government policy affects the processing exploiting of natural resources through structure policy and scheme policy within the nation. If government policy of natural resources is efficient, it takes advantage of natural resources to gain competitiveness, especially in early phase of economic development.

### 3.7.6.2 Government’s Effect on Technology

An upgrading economy demands a steadily rising level of technology. Improvements in technology, broadly defined, are integral to improving efficiency, commanding higher prices through better quality, and penetrating new industries and segments, the underpinnings of productivity growth. Stimulating improvement in science and technology is a widely acknowledged role of government. Research
and development cannot be left solely to firms because the benefits to the national economy exceed those to individual firms due to spillovers. Technological progress not only benefits a firm but often raises the rate of advancement in the entire national industry as well as linked industries. This is particularly true in basic research and in fields with applications in numerous industries such as advanced materials, information technology, flexible manufacturing systems, health science, environmental sciences, and energy. At different degrees, government also participate directly in conducting research in government laboratories (Porter 1990).

The exhaustive principle in addressing science and technology should be to create an innovation-enhanced policy and not just a science and technology policy. Science and technology cannot be decoupled from its commercial application in seeking to enhance national competitiveness. Policies to stimulate commercial innovation must go beyond science and technology and include competition, regulation and other policies. In general, the effects of government policy on technology are via such policies as the match between science and technology policy and the patterns of competitiveness; principal emphasis on commercially relevant technologies; strong links between research institutions and industry; encouragement of research activity within firms; and primary emphasis on speeding the rate of innovation.

3.7.6.3 Government’s Effect on Market Conditions

Few roles of government are more important to the improving an economy than ensuring vigorous domestic competition. Competition at home is not only uniquely important to fostering innovation, but also benefits the national industry and cluster in many other ways. Maintaining vigorous domestic competition is also important to ensure that a nation’s firms gain competitiveness. Governments influence domestic competition through policies and regulation such as antitrust law and regulation competition and protection.

Antitrust policy The importance of domestic competition for competitiveness has heavy implications for antitrust policy, particular policy toward mergers and alliances. So far the need for antitrust has been questioned because of the globalization of industries and the view that domestic firms must merge to gain economies of scale.

A strong antitrust policy, especially in the area of horizontal mergers, alliances, and collusive behaviour, is essential to the rate of improving in an economy. Mergers, acquisitions, and alliances involving industry leaders should be disallowed. Acquisition of smaller domestic rivals by a firm in related industry seeking to transfer skills are more potentially beneficial to competitiveness and should be
permissible. The similar standards toward mergers and alliances should apply to domestic and foreign firms in order to prohibit acquisitions that significantly threaten domestic competition. A strong policy bias should favour internal entry, both domestically and abroad, instead of acquisition. Antitrust laws must also not be a barrier to vertical collaboration between suppliers and buyers that is so integral to the innovation process.

**Regulation of competition** Regulation of competition via such policies as maintaining a state monopoly, controlling entry, or fixing prices, usually works against the improving of competitiveness in an economy. It has double negative consequences. Firstly, the regulation of competition frequently makes the industry a less desirable buyer or supplier. Secondly, it produces a lack of dynamism and innovation which undermines the competitiveness of firms, industry and the nation.

In contrast, deregulation of competition, openness, and privatization of state monopolies are usually spurs to national competitiveness. They will encourage competition and have ripple effects on linked industries.

### 3.7.6.4 Government’s Effect on IBEAs

Governments influence international business and economic activities (IBEAs) via investment attracting policy and trade policy.

**Foreign direct investment** Policy toward foreign investment in a nation has long been an issue for governments. It raises concerns about national sovereignty and the effects on a nation’s industry. Foreign investment is a manifestation of global competition and the need for global strategies; it raises national productivity by stimulating improvements by domestic firms and supplanting the less efficient competitors. Government policy that creates a favourable business environment to attract foreign investment is extremely significant.

**Trade policy** National competitiveness will not be fully reflected in rising productivity unless a nation’s firms have access to foreign markets. Government trade policy should pursue open market access in every foreign nation. To be effective, trade policy should not be a passive instrument; it cannot respond only to complaints or work only for those industries that can muster enough political clout; it should not require a long history of injury or serve only distressed industries. Trade policy should seek to open markets wherever a nation is competitive and should actively address emerging industries and incipient problems.
Where a government finds a trade barrier in another nation, it should concentrate its remedies on dismantling barriers, not on regulating imports or exports. Orderly marketing or voluntary restraint agreements, which divide up and often effectively cartelize markets, are dangerous, ineffective, and often enormously costly to consumers. So are other specific quantitative targets for exports or imports, which have the effect of guaranteeing a market for inefficient firms rather than promoting innovation in a nation’s industries (Hasse 1988). Dumping remedies are also fraught with danger. However, compensatory tariffs than punish companies from the offending nation, no matter where goods are actually produced, are a far better remedy for unfair trade practices than quantitative restrictions. Another remedy is restricting firms from the offending nation from investing in the nation either in the form of acquisitions or production facilities.

Any of these remedies from government, however, can backfire. It is virtually impossible to craft remedies to unfair trade practices that avoid both reducing incentives for domestic companies to innovate and export and harming domestic buyers. The aim of remedies should be adjustments that allow the remedy to disappear.