

## Improving the Regulatory Framework for Innovation

Innovation in developing countries is based mostly on adoption, recombination, and adaptation of existing technologies rather than on development of new technology. Innovation is therefore more “new to the market” or “new to the firm” than “new to the world” (WBI 2007; World Bank 2008). In consequence, the capacity of developing countries to innovate depends, on the one hand, on foreign sources of knowledge and technology and, on the other, on the country’s capacity to absorb, adapt, and diffuse innovation. International trade rules and practices and intellectual property agreements strongly influence countries’ ability to attract partners and foreign investments, benefit from technology transfer through increased trade opportunities, and stimulate local innovation.

The international context aside, building an enabling environment that is both attractive to foreign investment and locally supportive of innovation, adaptation of technology, and dissemination of knowledge requires an adequate institutional framework. Recent studies agree that government policies to support innovation should embark on reforms that update the regulatory and institutional framework for innovation and remove bureaucratic, legislative, and regulatory obstacles to innovation (Chandra 2006; WBI 2007; World Bank 2008). These obstacles affect competition laws, licenses to operate, government authorizations, technical norms and standards, customs procedures, and many other regulations and processes.

This chapter begins by exploring the international context as it relates to knowledge dissemination, technology transfer, and innovation. While trade and

foreign direct investment (FDI) are well-recognized channels for technology transfer, trade regimes and conditions in which prices are fixed, particularly for agriculture goods, distort innovative efforts and achievements in a number of low- and medium-income countries. Tariff structures, and in particular tariff peaks and tariff escalation, prevent developing countries from diversifying their exports and moving up value chains. Intellectual property rights (IPR) regimes are also not favorable to innovators and innovation in low-income countries.

The chapter then turns to issues that depend primarily on domestic policies such as competition, customs practices, aspects of land property rights, organization of commercial and distribution networks, and infrastructure weaknesses and goes on to highlight reform processes that have been used successfully in various countries. Finally, the chapter draws attention to an essential proactive measure, public procurement, that can further stimulate innovation.

## **International Trade and Investment Framework**

Two critical issues in the international trade and investment framework are technology transfer and the intellectual property rights regime. This section considers impediments to trade, such as tariffs and other barriers to trade and intellectual property rights regimes in developing countries.

### **Technology Transfer and Trade**

Long recognized as an engine for wealth creation, growth, and poverty reduction, trade contributes to technology and knowledge transfer in at least three ways: through embodied technology in the form of goods and services; through knowledge, practices, and processes linked to the use of technological goods and to contacts with foreign suppliers and customers; and through capital and investment (notably FDI).

*Channels for Technology Transfer.* Imports enhance the technological knowledge of developing countries in various ways. The technological know-how embodied in goods and services, for example, enables developing countries to employ more efficient production processes and thus raise the quality of their own products and processes. Licensing also typically involves the purchase of production or distribution rights for a product and the underlying technical information and expertise for producing it. At the same time, trade openness and competition from technologically superior imports may produce large technology spillovers and boost domestic productivity (Keller 2004; World Bank 2008).

Export activities with foreign countries may also generate technological spillovers through interaction with foreign buyers and customers, for example, when exporters have to meet new specifications or higher standards. These can also support technological progress by increasing product consistency and improving product performance. Foreign buyers also provide information

about foreign markets and can assist with process improvements (Schiff and Wang 2006; World Bank 2008) as well as generate additional demand that may lead to economies of scale.

Finally, FDI constitutes a major channel for technology and knowledge transfer. Foreign firms can offer a package of mobile, tangible, and intangible assets that include capital, technology, know-how, skills, brand names, organizational and managerial practices, access to markets, competitive pressures that stimulate innovation, and environmentally sound technologies (UNCTAD 1999). Transnational corporations (TNCs) may promote local innovation in other ways, as follows: by acting as role models and enhancing competition; by developing local capabilities of workers through training and experience that can then spread locally through worker mobility; by encouraging efficiency and technical change in local firms and suppliers, especially when strong backward and forward links are established; and by engaging in collaborative research and innovation activities (UNCTAD 1999; World Bank 2008). The extent of spillovers depends on domestic absorptive capacity and may be greater when the difference in technological levels between host and home countries is not too large. Finally, rules and regulations affecting the investment climate determine not only how attractive the country is to FDI but also the degree to which TNCs are encouraged to upgrade the transfer of technology and skills and raise local capabilities and links.

*Tariffs, Tariff Peaks, and Tariff Dispersion.* Trade barriers have fallen in many countries, following unilateral efforts and bilateral, regional, or multilateral agreements. Indeed, over the past decade, most-favored nation (MFN) average tariffs have fallen dramatically, and a substantial amount of trade is conducted at a zero MFN tariff rate or through preferential trade agreements, free trade agreements, or customs unions (Islam and Zanini 2008; Portugal-Perez and Wilson 2008). But low average tariffs do not reflect the whole picture. Access to markets is often still restricted because of either tariff or nontariff barriers or a combination of the two.

While the average tariff at which international trade is conducted has been dramatically lowered in recent times, tariff barriers and tariff peaks still prevail in certain sectors and subsectors owing to developed countries' interest in protecting these sectors or subsectors.<sup>1</sup> These tariff peaks often apply to products in which developing countries have a comparative advantage: agriculture and the food industry, textiles and clothing, footwear, leather, and travel goods, as well as the automotive sector and a few other transport and high-technology goods, such as consumer electronics and watches (UNCTAD and WTO 2000; Watkins 2003; World Bank 2007; IAASTD 2008; Islam and Zanini 2008).

Contrary to perceptions, developing countries generally have higher tariff rates than developed ones. In agriculture, for example, the South Asian and

East Asia Pacific regions have the most restrictive policies, followed by high-income countries of the Organisation for Economic Co-operation and Development (OECD) (Islam and Zanini 2008). These policies limit both North-South and South-South trade. Although developing countries' tariff rates are generally higher, tariff dispersion and maximum tariffs applied are generally much higher in developed countries. Canada, the European Union, Japan, and the United States maintain tariff peaks as high as 350–900 percent for important export products of developing countries, and the European Union's food industry accounts for about 30 percent of all tariff peaks (UNCTAD and WTO 2000; Islam and Zanini 2008).

*Tariff Escalation.* It is mainly the tariff structure itself that constitutes a serious impediment to innovation, technological transfer, and upgrading. It is well known that developing countries have difficulty moving up the value chain in certain markets, as tariffs escalate with the degree of product processing.<sup>2</sup> According to one researcher, this escalation “has the effect of reducing the demand for processed imports from low-income countries, preventing appropriate structural adjustment in developed countries and frustrating the diversification of low-income countries into high value-added exports” (Oyejide 2003). For example,

although food processing is a major export industry of developing countries, their exports are largely concentrated in the first stage of processing. More advanced food industry products make up only 5 percent of the agricultural exports for LDCs [less-developed countries] and 16.6 percent of those of developing countries as a whole, against 32.5 percent for developed countries. (UNCTAD and WTO 2000)

This tariff structure is a serious problem for exporting countries wishing to diversify their exports and develop their industrial and manufacturing capabilities, especially since tariff escalation occurs precisely in those activities that would otherwise offer a chance for industrialization: food, textiles, clothing and shoes, and wood industry products (UNCTAD and WTO 2000).

*Quotas, Subsidies, and Other Nontariff Barriers.* Nontariff barriers—including quotas, antidumping measures, countervailing duties, and safeguard measures—significantly affect trading opportunities of developing countries. Such measures generally tend to restrict the volume of traded goods and are often used in combination with high tariffs. For example, prohibitive tariffs of up to 220 percent apply to above-quota imports of bananas into the European Union (UNCTAD and WTO 2000).

Subsidies, which also significantly distort international trade, are most prevalent and controversial in the agricultural sector. Overall trade policies depress prices of agricultural products in international markets by an average

of 5 percent (World Bank 2007). Cotton is one example. It is estimated that with a fully liberalized market, the European and U.S. share of cotton production would decrease dramatically (by 70.5 and 60.7 percent, respectively) and that the lowest-cost producers (Benin, Burkina Faso, Mali, Tanzania, and Uganda) could expand their share by 12.6 percent (Baffes 2004; Watkins 2003). Developed countries are shifting policies toward “decoupled” payments—that is, payments not directly linked to the type, volume, and price of products. These measures are considered less distorting than output-linked forms of support, but the subsidies are still substantial.<sup>3</sup> Nor are they always neutral for production as they reduce aversion to risk (wealth effect), reduce variability in farm income (insurance effect), and allow banks to make loans to farmers that they otherwise would not make (World Bank 2007).

Preferences along with special and differential treatment aim to facilitate developing countries’ access to developed country markets. A certain number of African countries benefit from trade preferences with both the United States and the European Union. Restrictive rules of origin, bureaucratic and administrative barriers, lack of institutional capacity, and volume limits on exports, however, make it difficult for these countries to benefit from the advantages of trade. These constraints impede further development and diversification and thus slow technological improvement and innovation. Moreover, while preferences are similar in different export markets, the rules of origin differ. Portugal-Perez and Wilson (2008) find econometric evidence that relaxing rules of origin by allowing the use of fabric from anywhere under the African Growth and Opportunity Act (AGOA) for less developed countries increased exports of apparel by about 300 percent for the top seven beneficiaries of AGOA’s “special rule” (for less developed countries), while broadening the varieties of apparel exported by these countries.

*Technical Barriers to Trade, Standards, and Norms.* Finally, norms, standards, and technical regulations applying to products and processes seek to address concerns and mitigate risks relating to health and safety, quality, environmental threats, and social conditions of production. On the one hand, they may encourage exporters to upgrade technology and improve the consistency and quality of their products and processes. By conveying valuable information relating to quality, safety, good practices, and the like, they also reduce transaction and information costs in the importing country. On the other hand, they may also restrict international trade and limit developing countries’ participation by raising the costs of compliance, so that it becomes necessary to alter production processes to adapt products to the importing country’s standards and regulations. Moreover, certification aiming to demonstrate compliance can generate additional costs for the exporter (Portugal-Perez and Wilson 2008).

Such costs are especially onerous when exporters face a range of constraints for exporting similar products to different countries. Processes that can be

useful in mitigating those adverse effects include mutual recognition agreements (which are used extensively within the European Common Market), unilateral recognition of equivalence (clearly defined criteria for accepting foreign standards, measures, and qualifications as equivalent to domestic ones when they pursue the same regulatory objective), promotion of supplier's declarations of conformity, and the like (OECD 2005). As a priority, governments should seek to reduce regulatory barriers to trade and investment arising from divergent and duplicative or outdated requirements, notably by developing standards and norms that build on international standards and seeking harmonization with them.

### **Intellectual Property Rights Regime: Rationale and Controversies**

Intellectual property rights are often seen as having an important impact on stimulating innovation and encouraging technology dissemination.<sup>4</sup> These are enforceable legal measures that confer monopoly rights on innovators for a specified period of time, after which they fall into the public domain and can be freely used by others. The underlying assumption and motivation behind IPRs are that they foster innovation by ensuring that innovators are sufficiently rewarded for their investments, including both their creative energy and financial capital.

*Rationale.* The last decades have witnessed an unprecedented increase in the scope and level of protection of intellectual property rights. New rights are created, and standards are being harmonized throughout the world (WBI 2007). Opinions about the impact of stronger IP policies on developing countries vary widely. Supporters argue that developing countries that wish to stimulate knowledge generation and diffusion and to attract and benefit from technologically rich investments need to establish strong IPR regimes. Opponents argue that strong IP protection can reinforce economic concentration and, by restricting competition, enable owners to maintain high prices and stifle innovation (see box 4.1).

Developing countries remain largely dependent on foreign technology and products, and effective technology transfer is paramount for their innovation strategy. The challenge is thus to devise IPR policies that strike an appropriate balance between effective generation of creativity and innovation, on the one hand, and diffusion of innovation in various ways and in a wide range of economic and technological contexts, at the lowest possible cost, on the other. But as the degree and scope of protection have increased in the past decades, controversies have arisen over the availability of knowledge and technologies, most notably in the fields of pharmaceuticals, traditional knowledge and folklore, and education.

*Controversies over IPRs.* First, strong IPRs are believed to impede knowledge diffusion and research in developing countries by depriving educational

**Box 4.1 Brazil's Policy on HIV/AIDS**

Committed to the policy of free universal access to diagnosis, prevention, and treatment of HIV/AIDS, the Brazilian government began mobilizing local manufacturers at the end of the 1990s to produce 10 low-cost generic versions of antiretroviral drugs (ARVs) within the national therapeutic guidelines. This initiative was possible because the 1970 reform of the IP law refused to recognize patents on processes or molecules and thus permitted the legal copying of molecules. As a result of these reforms, 56 percent of all ARV drugs consumed in Brazil in 2001 were produced nationally, with a price reduction of 82 percent over the period 1996–2001. In addition, the Brazilian government promoted intense price negotiations with multinational pharmaceutical companies to achieve consistent price reductions of patented ARVs. During these negotiations, the state used the threat of compulsory licensing as an argument. Since Brazil had produced ARVs on its own soon before the opening of these negotiations, it had demonstrated its capabilities in the field. However, its commitment to the TRIPS (Trade-Related Aspects of Intellectual Property Rights) agreement led the government in 1996 to immediately amend its IP legislation to recognize pharmaceutical products and processes and renounce its 10-year transition period.

In the end, the Brazilian negotiations provided short-term benefits—notably a reduction of 46 percent in the unit price of capsules and the prompt introduction of a new, reduced daily-dose formulation. According to many, however, the agreement contains a number of restrictive provisions: the Ministry of Health is prohibited from allowing flexibility on any formulation that includes patented molecules until the agreement expires in 2011; the prices on ARVs are fixed until the expiration of the agreement; and some formulations of medications are barred from use in the first stages of treatment, which raises the price of the overall treatment. Brazil thus now faces a dilemma in striking a balance between the financial sustainability of its national anti-AIDS program and access to newer (and more efficient) ARVs.

*Source:* Coriat, Orsi, and d'Almeida 2006.

systems of access to valuable copyrighted material. Because academic journals tend to be very expensive, for example, the availability of educational materials for developing country schools and university students is limited. Access to inventions for research use (biotechnologies) or for further improvement or adaptation (software) has reportedly been hampered by patents in a number of cases.<sup>5</sup> The extension of digital rights management systems is also meeting with resistance, as IPRs put tight restrictions on the rights of users, thereby reducing de facto the scope of “fair use” of copyright law (OECD 2007a). An inadequate balance between diffusion and protection may encourage copying of such material or turning a blind eye to these practices.

Second, appropriating knowledge through IPRs poses several problems. For one thing, it is seen as creating monopolies that maintain high prices in specific goods and services. The pharmaceuticals industry is a case in point.



Appropriating knowledge through IPRs raises questions about access to drugs, local manufacturing capacity, and the development of new drugs, even though developing countries may use compulsory licenses, parallel imports of patented products, or exceptions to grant authorization to a third party to exploit a patented invention for the domestic market under “national emergency” or “extreme urgency.”<sup>6</sup> For another, knowledge appropriation generates ethical concerns relating to plants, animals, genes, and gene fragment patenting, but also (mis)appropriation of indigenous knowledge (UNCTAD and ICTSD 2003; WBI 2007; IAASTD 2008). In fact, indigenous knowledge is increasingly recognized as a valuable asset in industrialized and developing countries alike, as it provides input into many modern industries (pharmaceuticals, cosmetics, agriculture, food additives, industrial enzymes, biopesticides, and personal care). Yet firms in industrialized countries appropriate most of the value added in such cases, with their advanced scientific and technological capabilities that make appropriation possible without the prior informed consent of the holders of that knowledge (Commission on Intellectual Property Rights 2002; cited in WBI 2007). Beyond ethical considerations, patents on plants, animals, genes, and gene fragments may stifle innovation as they raise costs and restrict experimentation by the individual farmer or public researcher and potentially undermine local practices that enhance food security and economic sustainability.

Finally, strengthened IPRs are increasingly seen as limiting the development of local capabilities and retarding developing countries’ future innovation capacities. Copying and counterfeiting affect various constituencies: consumers, whose health and safety may be put at risk; rights holders, whose sales decline; governments, which suffer lost tax revenues while facing the costs associated with fighting counterfeiting and piracy; and the innovative environment, in which copying and counterfeiting divert creativity, entrepreneurship, and incentives away from genuine innovation (OECD 2007a). While basic copying (such as compact discs or misappropriation of trademarks) provides little avenue for learning, the situation may be quite different for the manufacture of products that require the application of complex processes whose operation and adaptation to local conditions may require high levels of knowledge and skill (UNCTAD and ICTSD 2003). Imitation often serves as a learning process and as informal technology transfer by making it possible to establish basic competence on which to build innovations. History shows that becoming good at imitating, for example through reverse engineering, is a vital stage in the process of becoming innovative (see box 4.2).

*The Use of IPRs.* The third and last set of problems relates to the use of IPRs. In developed countries, few small and medium enterprises (SMEs) have the knowledge or capacity to take advantage of IPR systems effectively and efficiently,



#### **Box 4.2 From Duplicative Imitation to Creative Imitation and Innovation**

Recent studies seem to suggest that imitation with local improvements is a precursor of innovative capabilities. Examples from Indonesia and the Republic of Korea seem to support this view.

Small businesses in East Java, for example, now produce good quality leatherware. At one time, they simply copied Western designs. Employees would watch the carousels at the airport, waiting for examples of the latest designs from the most fashionable designers. They made exact imitations, including the brand name. After warnings from the Indonesian government, they changed the name simply to resemble the fashionable name. They have now begun to adapt the designs as well, and, with changes in design, they have also begun to use their own brand names.

In Korea, most large local pharmaceutical and cosmetic companies and some paper and chemical firms have evolved from small ventures, developing their own primitive production processes through imitation to become significantly large, innovative operations. Leading local pharmaceutical firms first started as importers and dealers of packaged finished drugs and later entered the drug manufacturing business by packaging imported bulk drugs. They gradually moved into more intricate operations by formulating imported raw materials and then, through backward integration, by producing the chemical components. Through this process, they grew in size and in technological capabilities. As a result, in the early 1980s local firms accounted for almost 90 percent of the domestic drug market in Korea as compared to 22 percent in Brazil, 47 percent in Argentina, and 30 percent in India. During this period, Korea respected process patents but not product patents in the chemical, cosmetics, and pharmaceutical industries. Local producers could therefore work around patented processes to produce relatively well-known chemical and pharmaceutical products. Were it not for the lax IPRs, the local pharmaceutical firms could not have achieved so much. Some local firms have advanced to the point that they can undertake serious research and development activities and discover new drug compounds.

*Source:* Kim 2003; Macdonald, Turpin, and Ancog 2005.

because they lack the information, understanding, and resources (human, time, and capital) to research the field and to make sure their IPRs are enforced. What is true of developed countries is even truer of developing countries, where SMEs dominate the economy.<sup>7</sup> Developing countries that strengthen their IP laws, however, often lack qualified examiners to handle the volume of patent applications. They therefore accumulate large backlogs of unexamined applications, create legal uncertainties, and generate concerns about the quality of the patents awarded (OECD 2007a).

The literature on the links between stronger IPRs, investment flows, research and development (R&D) spending, and technology transfer is inconclusive. While some studies find a positive influence on FDI or licensing decisions by multinational corporations, others find no relation between the level of IP protection and FDI or R&D spending.<sup>8</sup> Between these extremes, recent studies

seem to suggest that the effects of a stronger IPR regime depend on the country's level of development, the technological nature of the economic activities involved, and the absorptive capacity of individual firms (UNCTAD and ICTSD 2003; World Bank 2008).

Such findings suggest that the strength of IPR protection should evolve in line with local technological capabilities. This is not to say that developing countries should not protect intellectual property, but they should perhaps focus on stimulating adaptation by domestic enterprises, for example, through the use of utility models, industrial design, and compulsory licensing.<sup>9</sup> Soft IPR protection alone will not suffice to raise technological abilities without complementary policies in education and R&D. Encouraging technology transfer on generous terms, rather than trying to promote domestic innovation by making strong legal rights available to all, might best achieve technological capacity building in the early stages of development. In the evolving international regulatory regime, however, emerging economies appear to have little opportunity for instituting IP policies that support their development goals (UNCTAD and ICTSD 2003).

### **Domestic Institutional and Regulatory Framework**

Although innovation in developing countries comes mainly from technology transfer, the general business environment can also foster a climate conducive to innovation. In the first place, it determines a country's attractiveness for foreign investment in comparison with other potential locations. And in the second, it influences the country's ability to benefit from technology transfer; to learn, adapt, and disseminate innovations; and to maximize technological spillovers.

Rules and regulations that apply specifically to foreign companies can either attract or discourage FDI. Many countries still require transnational corporations to obtain a number of permits and licenses to invest and operate. This requirement lengthens the approval process (UNCTAD 1999). Most governments have by now, however, gradually made entry, establishment, and operations of foreign companies easier, notably by reducing sectoral restrictions on FDI and opening up privatization programs; removing foreign equity participation restrictions, compulsory joint ventures, or local-content requirements; replacing screening and authorization requirements by simple registration; loosening restrictions on foreign ownership and rules governing the nationality of board membership and management; relaxing some types of operational restrictions (such as limits on the entry of professional and managerial personnel); guaranteeing legal protection, national treatment, fair and equitable treatment, and most-favored nation status; and establishing bilateral treaties for the promotion and protection of FDI and treaties for the avoidance of double taxation (UNCTAD 1999; OECD 2006).

More generally, the investment climate affects both local and foreign firms and their ability to generate knowledge transfer and innovation. The quality of regulation and its enforcement are recognized as critical determinants of the capacity of new and innovative firms to grow and expand. Restrictions on firm entry, exit, and activities can impede technological progress by propping up inefficient firms and limiting the expansion and creation of innovative ones. An inadequate regulatory environment inhibits business development in general but affects smaller firms even more. A review of the regulatory burden in Australia, for example, indicated that compliance matters can consume up to 25 percent of the time of senior management and boards of large companies (World Bank 2004; Regulation Taskforce 2006). Such regulations can stifle innovation and crowd out productive activity, especially since small businesses have to spread the fixed costs of compliance over a smaller revenue base and often lack the necessary in-house resources or expertise.

Many issues affect a country's investment climate. They range from firm start-up to business closure, from competition to access to land and credit, from customs practices to business setup procedures (table 4.1).<sup>10</sup> This section highlights some of the main regulatory obstacles linked to the innovation agenda: competition policies as well as trade-related issues as they affect business creation, the movement of goods, and technology transfer. It gives some examples of how countries have successfully overcome them.

**Table 4.1 Example of Transaction Costs Related to the Legal and Regulatory Environment**

Area of operation	Transaction	Enterprise exposure	Effects on
Business entry	Registration, licensing property rights, rules, clarity, predictability, enforcement, conflict resolution	Monetary costs to firm, time costs (including compliance and delays), facilitation costs, expert evaluations of rules and their functioning, number of rules and formalities	Rate of new business entry, distribution of firms by size, age, activity, size of shadow economy, rate of domestic investment, FDI inflows, quantity and quality, investment in R&D
Business operation	Taxation, trade-related regulation, labor hiring/firing, contracting, logistics, rules, clarity, predictability, enforcement, conflict resolution	Cost of compliance, higher costs of operation, costs of conflicts and conflict resolution, search costs and delays, insufficient managerial control, "nuisance" value, problems in making contracts, problems in delivery	Business productivity, export growth, size of shadow economy, growth of industries with specific assets or long-term contracting, rate of innovation and R&D, rate of business expansion, rate of investment in new equipment, subcontracting
Business exit	Bankruptcy, liquidation, severance/layoffs, rules, clarity, predictability, enforcement, conflict resolution	Rate of change of rules, changes in costs and number of rules, availability of rules and documents to firms, rates of compliance or evasion, use of alternatives to formal institutions	Rate of exit (and entry), prevalence of credit, distribution of profitability of corporations

Source: World Bank 2006.

### **Barriers to Entry and Competition Policy**

The general environment for competition influences both the intensity of innovation efforts and the pace at which innovations spread to the market. Low levels of competition and regulations restraining competition in the product market have an adverse effect on productivity growth, while sluggish competition among suppliers may increase the cost of inputs, slow the adoption of best-practice production techniques, retard the diffusion of new technology by discouraging investment in equipment that embodies the latest technology, and reduce the diffusion of technology from abroad through FDI. It may also hinder the competitiveness of other companies or industries when they provide intermediate outputs (OECD 2007b).

*Benefits of Competition.* Policies that encourage or intensify competition in product markets may instead have positive effects on innovation as firms strive to adapt to competition, changing situations, and new market opportunities to stay ahead of competitors or to differentiate their products as they target different market segments. The competition policy regime may also encourage enterprises, local and foreign, to invest in developing local capabilities. In general, the more competitive and outward looking the regime, the more dynamic this process will be. It may prompt companies to move toward international standards while providing them with access to new markets. According to the *World Development Report 2005* (World Bank 2004), “Firms facing strong competitive pressures are at least 50 percent more likely to innovate than those reporting no such pressure.”

Greater competition may be achieved in various ways: elimination of state-owned and legal monopolies, barriers to entry and exit such as unnecessary licenses (see box 4.3), and other interventions into commercial decisions such as price controls (Jacobs and Astrakhan 2006). Areas requiring close attention include abuse of dominant market positions, mergers (to assess effects on competition and potential market dominance<sup>11</sup>), horizontal price-fixing agreements (cartels), vertical agreements on resale prices, and restrictions such as exclusive dealing or territorial assignments (OECD 2007b).

Crowding out may result from heightened competition. It can be positive if it increases the efficiency of local firms and forces inefficient ones to exit. It may be negative if it affects potentially efficient domestic enterprises (infant industry considerations). Distinguishing between sound competition and crowding out is not easy, however, and inappropriate restrictions can result in technological lags. A highly protected regime, or a regime with stringent constraints on local entry and exit, discourages technological upgrading and isolates the economy from international trends. In India for example, the production of more than 600 manufacturing products is still reserved to small-scale companies in the ill-founded belief that it is good for employment. In fact, this regime has cost India many jobs, for example, by preventing it from

**Box 4.3 Kenya's Radical Licensing Reform, 2005–07**

In 2005, the government of Kenya launched a reform to reduce the growing number of business licenses and fees and the related corruption. Moving beyond previous strategies based on reforming licenses one at a time, the government adopted a broad “guillotine approach” to rapidly identify, review, and streamline all business licenses and associated fees. A central reform committee was created under the authority of the Ministry of Finance, and a government-wide program began. The first task was to assemble Kenya’s first complete inventory of licenses and fees. Ultimately, 1,325 business licenses and fees imposed by more than 60 government agencies and 175 local governments were identified, far more than originally expected. Moreover, regulators continually imposed new licenses. Many were found to be unneeded, illegal, or unnecessarily costly. One reason for the growing problem was that the ministries and regulatory bodies, including local agencies, had a direct financial interest in creating new licenses and business fees because these revenues support staff salaries and expand opportunities for corruption.

Once identified, licenses were rapidly reviewed against clear criteria by a neutral body to ensure consistency and quality across the government. The burden of proof was on the regulators to show why a license had to be maintained. As a condition of maintaining their requirements, regulators had to demonstrate that they were acting in the public interest.

At the end of the process, any license that was not successfully justified as legal and needed for future policy needs for market-led development was eliminated, and any license that was needed but not business friendly was to be simplified to the extent possible. As of October 2007, 315 licenses had been eliminated and 379 simplified. A total of 294 were retained. Of the remaining licenses, approximately 300 have been deferred because new bills were under preparation or new laws had already passed; 25 were reclassified and not counted as a license.

*Source:* Jacobs and Astrakhan 2006; Jacobs, Ladegaard, and Musau 2007.

being competitive with China in the apparel sector (Palmade 2005). To date, only a handful of countries have managed to support and strengthen indigenous technologies by sheltering them from competition.

*Detrimental Effects of Competition.* According to some, competition may be detrimental to innovation, owing to the reduction of monopoly profits that would reward successful innovators (the idea being that the prospect of high profits may stimulate entry). Others claim that competitive pressures enhance efforts to innovate and to diffuse innovation.<sup>12</sup> Striking the right balance between protecting innovators’ efforts too much and protecting them too little creates incentives to innovate and ensures competition.

*Network Industries.* Some sectors and state-owned companies, such as network industries (telecommunications, electricity, air and rail transport), are

typically excluded from the competition regime on the grounds of consumer protection, security of supply, or universal service provision. Yet striking the right balance between regulation and competition in these sectors is also important. Indeed, it is crucial for the successful diffusion and implementation of technologies and for developing domestic competencies (World Bank 2008). For example, because of electricity's importance as an intermediate input, the reliability of electrical supply may be even more important for technology diffusion than its availability, as many machines are sensitive to the quality of electrical power and many processes are intolerant of interruptions.<sup>13</sup> Likewise, well-developed air transport and road networks are essential for linking producers to markets and thus for the diffusion and widespread adoption of technologies.<sup>14</sup> Information and communication networks are also positively correlated with the uptake and diffusion of innovation (introduction of new products, services, and business processes and applications) (OECD 2007a). Other recent studies suggest that the removal of anticompetitive regulations that impede the unbundling of information and communications technology software from hardware, the breakup of telecommunications monopolies, and the removal of restrictions on entry in parcel delivery or air transportation have often spurred major waves of innovation (OECD 2007b).

Countries in which older technologies have yet to penetrate deeply may also face limitations on the extent to which other technologies diffuse. Authorities therefore need to focus on ensuring that publicly supplied technological services are available as widely, reliably, and economically as possible, whether they are delivered directly by the state or by private firms (World Bank 2008).

Regulation of some segments of network industries is necessary to prevent monopoly abuse, but competition should be possible in others. For example, securing nondiscriminatory third-party access to the network is crucial to inducing competition in the competitive segments of network industries (OECD 2007b). The challenge is to ensure a level playing field between state-controlled enterprises and private firms, on the one hand, and between domestic and foreign firms, on the other. In addition, the right incentives should be in place for investment in network industries in a more market-based environment, especially as capacity expansion may not be in the interest of a network owner if expansion undermines its capacity to charge high prices, if parts of the network are franchised, or if the franchising period is relatively short (see box 4.4). As universal service obligations in network industries in more competitive markets can no longer be financed through traditional cross-subsidization from profitable market segments, appropriate price regulation can, in principle, help stimulate investment in new capacity by ensuring adequate rewards.

Changes in the regulatory environment and in the nature of technologies partly explain the acceleration in the rate at which they penetrate developing

**Box 4.4 Railways and Competition**

A certain degree of unbundling of vertically integrated railway companies is desirable to encourage competition, but reform must be carefully designed to take account of country-specific characteristics (such as possibilities for competition on parallel tracks and competition from other modes of long-distance transportation) to avoid regulatory failure. Efficiency gains in the sector have been achieved in Australia, Denmark, Italy, and Switzerland, for example, through reduced regulatory restrictions, notably by lowering entry barriers, or in Denmark, Germany, Italy, and the Netherlands by improving market structures, especially in the freight business. Entry of alternative providers was made possible in Denmark, Finland, France, Italy, Germany, Hungary, Norway, and Sweden through accounting or legal separation of the network. Deregulation of the railway industry, however, is controversial owing to the unresolved question of how to provide market-based investment incentives in the network segment of the industry. In particular, regulatory authorities in the United Kingdom faced this problem after privatizing the rail sector, because of the lack of clear assignment of responsibility for investing in tracks and the lack of incentives to invest in rolling stock, partly owing to the short duration of franchise contracts.

*Source:* OECD 2007b.

countries. Many old infrastructure technologies, such as roads, railroads, sanitation, and fixed-line telephone systems, are often provided by the government and are subject to public sector budget constraints and the risk of government failure. By contrast, the most common new technologies, such as the Internet, mobile phones, and computers, are delivered in a regulatory environment that encourages competition and harnesses private capital (domestic and foreign) to provide basic infrastructure. The example of the diffusion of telecommunications technology in Africa illustrates this point:

About one-half of all low-income countries have opened their telecommunications markets to competition, leading to growing markets, lower costs, greater innovation, and customized services for different groups of users. . . . Ten years ago one million phones were available in all of Africa; now there are well over 100 million, mainly mobile. In addition Internet use has also grown rapidly; the number of users increased by more than four-fold between 2000 and 2005. (WBI 2007)

Moreover, the past 10 years have been more politically stable than the 1980s and 1990s, which has likely boosted the diffusion of newer technologies (World Bank 2008).

**Movement of Goods across Borders**

Cross-border trade is also a significant conduit for knowledge and technology transfer. For most businesses, speed of delivery of goods, predictability, and transparency throughout the process are of paramount importance. The ease



of trading across borders thus affects decisions on whether to operate in a given country. Bureaucratic processes, corruption, and unofficial payments prevent the smooth movement of goods across borders and keep businesses from efficiently trading in international markets.

Failure to meet the requirements of government agencies frequently causes delays, while the regulatory prerogatives of the border control agencies that deal with agricultural, veterinary, health, phytosanitary, and standards requirements, in addition to basic customs procedures, often lead to duplication of requirements and controls. These overlaps increase compliance costs, risks of error, and delays (IFC 2006). Governments can take several specific measures to minimize the incidence of customs interventions and speed up control processes:

- Eliminate, simplify, and streamline complex data and documentary requirements, work and paper flows, procedures, and controls
- Minimize and rationalize nontariff regulations<sup>15</sup>
- Ensure that proposed reforms are in full compliance with international customs conventions, recommended practices, and agreed standards.<sup>16</sup>

One way to reduce such delays is to authorize the release of goods before all controls have been imposed, while ensuring that the release may take place at the facility at which the goods are stored. Another is to implement “single windows” or “one-stop shops” for import and export formalities involving all border agencies. This arrangement minimizes reporting and clearance processes by eliminating or combining procedural steps from all border agencies involved. In the same vein, conducting joint inspections helps reduce delays, while mutual recognition of inspections from the exporting and the importing countries helps ensure that a single inspection suffices. The use of risk-management techniques can also reduce the number of physical inspections and delays. Authorizing prefilling of customs documents before arrival and the use of information and communications technology systems so that data requirements can be exchanged wherever possible in advance of cargo arrival are yet other ways to smooth the process (IFC 2006). Finally, ensuring that customs laws, regulations, and requirements are easily accessible and applied uniformly and consistently helps fight corruption.

Other initiatives may help modernize and transform customs administration into more efficient service providers. For example, customs services may offer highly compliant importers and exporters payment deferral regimes, release of goods upon presentation of a simplified declaration (with the full declaration presented at a later time), and a lower level of physical examinations of consignments.<sup>17</sup> Other measures enable manufacturers to import materials without paying the applicable duty or tax until such materials are re-exported as components of finished goods. In addition, the tariff burden on certain imports may be removed or reduced so that exporters gain access

to industrial inputs at world prices, thus making their exports more competitive (IFC 2006).

### **Removal of Obstacles**

Reform can remove regulatory, bureaucratic, and legal obstacles to innovation in various ways:

- Identification and sequencing of important reforms that are credible and feasible yet achieve substantial results
- Strategies to mobilize support and get reform on the policy agenda and to mitigate and eventually overcome opposition from interest groups
- Creation of incentives and capacity for implementation and institutional mechanisms to ensure implementation and sustain reform (Kikeri, Kenyon, and Palmade 2006; Jacobs and Astrakhan 2006).

*Steps in Reform.* Some reforms require little political negotiation or legislative change. Most of the constraints linked to bureaucracy and red tape can be overcome by simplifying procedures. Modern technologies such as the Internet also help simplify procedures and speed up processes. They can also increase transparency and limit the potential for corruption. For example, publishing rules and regulations may help limit options for corruption through the imposition of unofficial requirements. Cases of corrupt judges being caught and punished can be publicized.

Successful regulatory reform processes generally include the following:

- Strong political leadership seems to be chief among the factors explaining successful reform processes. Once high-level political commitment and leadership are ensured, a number of factors—building on previous successful reforms,<sup>18</sup> spillovers from trade (for example, by becoming a WTO member), new information (such as international benchmarking, indicators, and cross-country comparisons),<sup>19</sup> times of crisis, or pilots<sup>20</sup>—can put reform on the agenda.
- Successful reform processes can also benefit from an independent cross-jurisdictional unit to ensure that the process is inclusive and ongoing and that reforms are seen as independent from entrenched interests. If located at arm's length from the president, prime minister, or ministry of finance, for example, the unit should have clear authority and be able to provide leverage for ensuring the cooperation of other parts of the administration, as well as coherence with the budget cycle.
- Identification of priorities for reforms and the appropriate sequencing of them are critical yet challenging steps in the reform process. Reformers, with a long list of constraints and potential reforms, are faced with the arduous task of identifying the reforms that will trigger support and momentum.

Fortunately, a growing set of diagnostic tools and information can help identify priorities. Benchmarking indicators,<sup>21</sup> country rankings, business surveys,<sup>22</sup> industry-specific analyses, and consultations with stakeholders can help identify key constraints in a country's investment climate and therefore help target the priorities for reform (Kikeri, Kenyon, and Palmade 2006; Ladegaard, Djankov, and McLiesh 2007).

- Transparency, communication, and extensive consultation with stakeholders not only help identify top priority areas or regulations but also trigger interest, generate support, and reduce resistance to change. Building coalitions to support reform is crucial. Stakeholder engagement and public participation should help identify supporters and then leverage and empower them to become “champions of reform.” Opposition can be reduced through dialogue, consultation, and, where appropriate, compensation.
- The reform process should include a provision to ensure that the underlying causes of regulatory problems are dealt with and that reregulation does not annihilate its achievements. Sound (re-)regulation may be achieved by putting in place regulatory impact assessment of new regulation, cost-benefit analysis of options for assessing new laws, cost of compliance assessments, or consultations in the process of developing regulations.

*Pace of Reform.* There are two prevailing views on the pace of reform. According to the incremental approach, governments should proceed by targeting a few regulatory constraints at a time, hoping to achieve quick wins and thus build gradual reforms and momentum on the basis of these first successes (OECD 2007b). Proponents of this view believe that broader and bolder reforms are not possible, given the resources available and the strength of resistance to change. Yet, to critics, “small reforms to big and expanding regulatory systems will not substantially or sustainably improve the business environment. Reforms aimed at single processes and rules will never catch up with the productive capacities and incentives of governments to create regulations and controls” (Jacobs, Ladegaard, and Musau 2007). Incremental or partial reforms can be risky if they produce little in the way of results—or even produce adverse effects and thus undermine the credibility of the entire reform process.<sup>23</sup>

Supporters of the alternative view, therefore, believe that radical solutions to improving the regulatory environment, like the guillotine approach,<sup>24</sup> work better than small reforms. While for tactical reasons the government might start with small, manageable reforms that can be accomplished rapidly, the end result should remain in focus to keep reform moving in the right direction and to reassure investors (Jacobs, Ladegaard, and Musau 2007). Finally, initiatives that obtain visible results quickly can help, especially in removing regulatory and legal obstacles to innovation.

## Procurement Policies for Innovation

Aside from reforms to remove legal and regulatory obstacles, governments can also take proactive steps to encourage innovation. Because innovation is traditionally believed to come from the supply side, proactive innovation policies generally aim at supporting product or service providers through targeted grants, fiscal incentives, or equity support. While demand was overlooked until recently, it is also a major potential source of innovation.

Indeed, in a recent survey of more than 1,000 firms and 125 federations, over 50 percent of respondents indicated that new requirements and demand are the main source of innovation. Illustrations of demand-driven innovations come from a variety of sources, from firms targeting bottom-of-the-pyramid consumers to public authorities using procurement policies to stimulate innovation.<sup>25</sup> While supply-side measures frequently support innovation, demand-side policies can also generate innovations by increasing demand, defining new functional requirements for products and services, and articulating needs more clearly (Edler and Georghiou 2007).

### Innovation-Friendly Procurement Policies

Public procurement is one way to drive the demand for innovative solutions, goods, or services, while improving the delivery of public services. It is demand-side policy that is now gaining momentum among policy makers: “An analysis of the Sfinno database collecting all innovations commercialized in Finland during 1984 and 1998,” write Edler and Georghiou, “shows that 48 percent of the projects leading to successful innovation were triggered by public procurement or regulation” (2007). Recent reports commissioned by the European Union also emphasize the importance that public procurement policies can have for encouraging innovation (European Commission 2008). They specifically identify several application areas: e-health, pharmaceuticals, energy, environment, transportation and logistics, security, and digital content. As Edquist, Hommen, and Tshipouri (2000) observe:

A public agency acts to purchase, or place an order for, a product—service, good or system—that does not yet exist, but which could probably be developed within a reasonable period of time, based on additional or new innovative work by the organizations(s) undertaking to produce, supply, and sell the product being purchased.

Since procurement is spread over a wide range of actors and contracting authorities, figures are not easily calculated. It is estimated, however, that the U.S. public sector spends US\$50 billion per year on R&D procurement (European Commission 2007b); that public procurement in Europe represents 17 percent of EU-25<sup>26</sup> GDP and 35 percent of EU-25 public expenditure (European Commission 2007c); and that the magnitude of central government

purchases ranges from 9 percent to 13 percent of GDP for the Middle East and Africa. Such figures suggest that public procurement can offer substantial market potential for innovation, first, because the state is frequently more willing or more able to pay the higher prices typically asked at the introduction of innovations and, second, because state demand often rapidly achieves critical mass, in particular by bundling the demand generated by various government agencies and bodies. The concentration of public demand brought about by such coordination creates clear incentives for suppliers and reduces their market risk (Fraunhofer 2005).

### Three Types of Innovation Procurement Policies

Public authorities stimulate innovation in three main ways: (a) the first occurs through the public procurement of innovative goods and services when government purchasers specifically look for innovative or alternative solutions to meet their needs and thus enhance public service delivery; (b) the second takes place when public entities procure for goods or services for which R&D still needs to be done and is referred to as *precommercial procurement* or *technology procurement*; and (c) the third, *catalytic procurement*, occurs when the government acts as launch customer for goods intended to be diffused more widely (Georghiou 2007).

*Procurement of Innovative Goods and Services.* In the first instance, innovative solutions can be promoted by using clear and robust output specifications and by setting functional or performance criteria, thereby leaving tendering companies room to propose solutions. Another way to encourage innovative solutions is to hold project-based competition and design contests. According to a European Commission study (2007a),

A design contest can be a powerful means of developing and testing new ideas. It gives firms room to come up with solutions, making optimum use of the market's creativity. Contracting authorities can award the contract directly to whoever comes up with the best idea. This makes it attractive for companies to bring their innovative ideas forward.

The advantages of such an approach are manifold: it helps improve the quality and performance of public services by ensuring that they are dynamically updated and upgraded; it stimulates private innovation by creating strong incentives to maximize the efficiency and performance of the products and services offered; it creates a market for innovative solutions and products that may otherwise not exist; and, finally, this one-time market, by example, can then trigger new demand by the private sector and eventually open up additional market opportunities (see box 4.5).

*Precommercial Procurement.* The objective of precommercial procurement is to create innovative solutions in areas for which solutions are not currently

#### **Box 4.5 Variable Message Signs for British Highways**

The English Highway Agency tendered for the development and installation of new variable message signs on motorways in 2001. The signs were to provide information to drivers on advisable speed, lane availability, and the like. The existing signs had very limited flexibility in the messages they could display.

Contrary to earlier tenders, the agency used an output specification and allowed for the application of new technology in the proposed solutions. The use of an output specification allowed suppliers to continue to develop their product. The result was a sign of a type not previously seen, capable of generating graphics as well as text. As a result, the Highway Agency acquired a good and innovative product. The company went on to win a Queen's Award for Enterprise in Innovation and sold to new markets in the Netherlands and the Russian Federation.

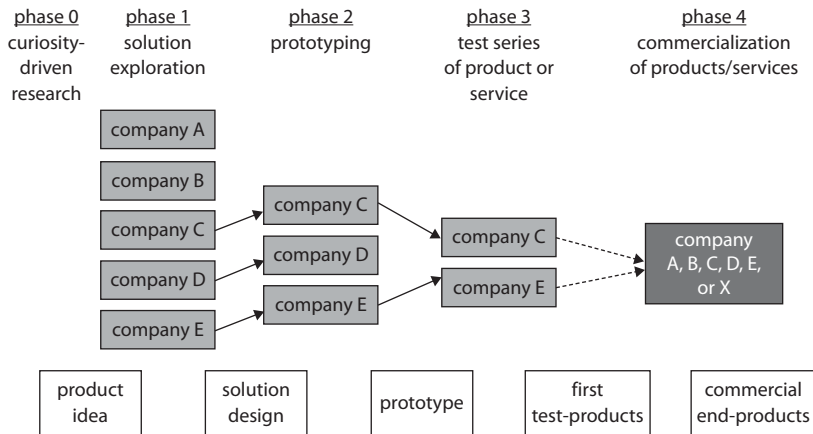
*Source:* European Commission 2007a.

available.<sup>27</sup> According to a report by VINNOVA (2007), the Swedish innovation agency, precommercial procurement

requires the contracting authority to be aware of its long-term needs. The authority also needs the skills to conduct a development process that involves several possible suppliers, to ensure that one or more of the finished solutions can match the functional requirements of the authority.

Technological innovations such as the Internet Protocol or the Global Positioning System (GPS) were developed in this way (European Commission 2007b). The United States, Japan, and the Republic of Korea use precommercial procurement as a strategic tool for creating a strong domestic economy for domestic suppliers in areas of national strength (VINNOVA 2007). For example, the United States and Japan have significantly reduced the cost of fuel cell stations through R&D procurement, enabling buses powered by fuel cells to become a viable energy-efficient public transportation option. China's last national long-range science and technology plan officially introduced public technology procurement in China as a way to encourage innovation (European Commission 2007c).

In practical terms precommercial procurement is in fact an R&D service contract, given to a future supplier in a multistage process, from exploration and feasibility to R&D up to prototyping, field tests with first batches, and finally commercialization (Edler and Georghiou 2007). Because the product or service does not yet exist, the risks of procuring such innovations is inherently higher. To reduce the R&D risks and costs associated with precommercial procurement, one can split the process into different phases and spread it over time, with constant competition to create a range of options (figure 4.1). In an exploratory phase, a selection is made among competing suppliers that have submitted proposals for possible solutions. A prototype phase follows, in which

**Figure 4.1 Example of a Phased Precommercial Procurement Process**

Source: European Commission 2007c.

selected suppliers are offered the opportunity to develop their prototypes (see box 4.6). These are evaluated step by step, and the number of competing suppliers is reduced. In the final phase, at least two suppliers should remain to secure future competition in the market (European Commission 2006).

This type of procurement enables public purchasers to filter out technological R&D risks and to identify the best possible solution the market has to offer before committing to a large-scale commercial rollout. For developing countries, it could be a way to test adaptation of solutions to the local context and conditions rather than adopting an “off-the-shelf” solution that may have been developed for a different context. Precommercial procurement, for example, may increase the chances of success for provision of e-government services or for a railway construction and maintenance system adapted to a Sub-Saharan context.

The advantages of precommercial procurement include sharing the risks and benefits of designing, prototyping, and testing new products and services with suppliers, without involving state aid. In addition, testing prototype products in an operational customer environment enables public purchasers to align product development with customer priorities and to select progressively the solutions that best fit public sector needs. Better anticipation of demand for new solutions shortens time to market for suppliers and helps public authorities introduce new solutions faster. It also enables public authorities to detect potential policy and regulatory issues that need to be addressed earlier to ensure timely introduction of the new solutions into public services and other markets (European Commission 2007a, 2007c).

*Catalytic Procurement.* Finally, in catalytic procurement, procurement is conducted on behalf of end users other than the public authority, as in the case of



#### **Box 4.6 The Swedish Energy Agency's Procurement Procedures**

The Energy Agency has developed a systematic procedure for technology procurement in seven phases. Initially, a feasibility study is conducted to investigate the market and determine the potential for improvement. Then, user and buyer groups are formed. These groups formulate the requirements for the product or system, which are developed into specifications. The tendering phase follows, in which manufacturers that seem to meet the requirements are allowed a period to develop a prototype, which is then evaluated and tested. One or several manufacturers can be named as winners. In certain cases, the Energy Agency pays an investment subsidy to the first buyers to stimulate interest. The group of users and buyers and the manufacturers pass information on the technology procurement to others to create demand for the new technology from more buyers. Many products and systems will continue to need further development after procurement, and those manufacturers in particular that did not fulfill all requirements may need to improve their products to keep up with developments. In the great majority of cases, the technology procurement process results in more efficient solutions.

*Source:* VINNOVA 2007.

*Note:* While this example is a good illustration of the three-step precommercial procurement process, according to EU rules, this is not considered procurement, but support to individual enterprises.

market transformation programs in the energy sector in the 1990s. Such programs involved, for instance, the procurement of energy-efficient home appliances, the main end users of which would not be public sector organizations but private individuals and households. Such policy schemes may aim, for example, to accelerate the diffusion of energy-efficient technologies by aggregating demand and initiating a technology procurement process.

If procurement is to permit innovative solutions, the evaluation criteria should shift from the traditional focus on price (the lowest-price bid) to one on solutions that offer the greatest advantage to users over the whole life of the purchase. Innovations are sometimes more costly, especially initially. To encourage innovative procurement, policies need to take into account the full life-cycle costs of the products or services and adopt most economically advantageous tender criteria rather than lowest-cost criteria for the awarding of bids (Edler and Georghiou 2007). Tendering for new lighting equipment and equipping a whole building with new low-energy light bulbs, for example, would create higher upfront cost but much lower running costs. Apart from price considerations, public purchasers may include a range of other criteria, such as running costs, lifetime maintenance costs, patterns and intensity, and potential downtime, among others.

Demand-driven procurement should not be seen as a replacement but as a complement to supply-side innovation policies. The role that public procurement can play with regard to innovation relates to its importance in public

spending, its ability to provide incentives to innovate while seeking to improve public services, its potential for tailoring solutions to the local context, and, more generally, as a way to stimulate a culture of research and innovation.

## Conclusions

All bureaucratic, legislative, and regulatory rules that directly or indirectly support or impede trade, investment (foreign and domestic), and business setup, running, and closure may subsequently support or impede innovation. It is especially important to improve the business climate for innovation, given that business is the principal impetus behind it. The OECD sums up critical elements of improving the conditions for innovation: “More innovation-friendly regulation, combined with lower barriers to trade and foreign direct investment would enhance competition and would foster the flow of technology and knowledge across borders” (OECD 2007a). It is widely recognized, however, that a supportive regulatory framework will not in itself suffice to promote innovation if science education and other policies are not well designed.

Finally, when an innovation-friendly regulatory strategy has been devised, implementing and enforcing reform to sustain it will be crucial but difficult. As an OECD study sums it up,

Some of the required reforms may affect vested interests, such as in universities and scientific institutions, as well as business sheltered from competition, benefiting from public support or confronted by technology-induced structural change. Strong political leadership and efforts to develop a clear understanding by the various stakeholders of the problems and of the solutions—including the costs they involve—can all help to communicate the need for reform and foster acceptance. (2007a)

Thus, tackling such obstacles requires systematic audits, inspired, for instance, by the Investment Climate Surveys of the World Bank. Such audits should then be followed by sustained actions to ensure that the obstacles identified are duly reduced or removed, which in turn implies a somewhat functional and independent judiciary system.

## Notes

1. Tariff peaks are defined as tariff rates above 12 percent ad valorem (UNCTAD and WTO 2000).
2. According to Watkins (2003), average EU tariffs on fully processed foods are twice as high as on products in the first stage of processing.
3. According to World Bank (2007), producer support in member countries of the OECD still represents 30 percent of the gross value of farm receipts in 2003–05.
4. The issue raised by current international patent regimes and their impact on R&D in developing countries is discussed more in depth in chapter 5 (“Strengthening the R&D Base”).

5. The cost of software is a major problem for developing countries and the reason for the high level of illicit copying. Copyright can also be a barrier to the further development of software to meet local needs and requirements (WBI 2007).

6. Developing country governments may use compulsory licenses to grant authorization to a third party to exploit a patented invention, generally against remuneration to the patent holder or parallel imports of patented products when they are obtainable in a foreign country (where a patent also exists) at lower prices. They may also establish *exceptions* to the exclusive rights, such as the *early working exception* (also known as the “Bolar exception”), which allows generic firms to initiate and obtain marketing approval of a patented drug before the expiration of the patent (UNCTAD and ICTSD 2003; WBI 2007). In addition, the “use of a patent’s subject matter under compulsory licensing is permitted under TRIPS (Trade-Related Aspects of Intellectual Property Rights) agreement even without prior negotiation ‘in the case of a national emergency or other circumstances of extreme urgency’ or in cases of public non-commercial use, and should be ‘predominantly for the supply of the domestic market.’”

7. A survey of SMEs in the United Kingdom found that about half did not apply for patents even on inventions they thought were patentable. And of those that did patent an invention, 87 percent would have developed the invention even without a patent. See Macdonald, Turpin, and Ancog (2005).

8. For detailed references, see World Bank (2008), UNCTAD and ICTSD (2003), and OECD (2006).

9. Japan permitted compulsory licensing when the patent had not been worked continuously in Japan for more than three years or for public interest reasons (Kumar 2002).

10. See the *Doing Business* publications, [www.doingbusiness.org](http://www.doingbusiness.org).

11. While the European Union, for example, sets thresholds for market shares and concentration ratios of the merged entity above which competition is potentially at risk and therefore further investigation is needed, Canada, New Zealand, and the United States accept mergers that strengthen a dominant position as long as there are no barriers to entry and the merger results in efficiency gains (OECD 2007b).

12. The empirical evidence tends to favor the positive effect of competition on innovation. However, the impact of competition may depend on how far a country or an industry is from the technology frontier. Competition may be more important at the technological frontier both because it stimulates entry and forces firms to innovate to survive. According to OECD (2007b), however, competition has particularly powerful effects on productivity in countries far from the technological frontier, owing to stronger incentives to adopt new technologies.

13. In Bangladesh, for example, where transmission and distribution losses represent only 9 percent of produced power, some 70 percent of managers indicate that unreliable power is a serious constraint on business (see World Bank 2008).

14. A recent study estimates that trade among West African countries could expand by up to 400 percent on average if the road network were upgraded. Similar investment could increase trade in southern Africa by up to 300 percent, and several times more for some countries (World Bank 2006). Likewise, investment in transport infrastructure has allowed Brazil’s interior states to enter global markets for soybeans and other crops, whereas rice and maize, usually tradable commodities, are effectively nontradable in rural areas of Madagascar and Ethiopia, respectively, because of high transportation costs (World Bank 2007).

15. For example, using a single, standardized document format and content for multiple agency reporting purposes and customs regimes may help facilitate and simplify preparation and minimize opportunities for errors during transcription.

16. For example, the World Customs Organization’s *Revised Kyoto Convention on the Simplification and Harmonization of Customs Procedures* sets out internationally accepted best practices, recommendations, and standards governing customs import and export procedures and controls.

17. See, for example, IFC (2006) and Regulation Taskforce (2006).

18. In Kenya, for example, the approach, competencies, and support developed in the licensing reform have helped expand efforts to improve the capacities of regulatory institutions (building up skills for

regulatory impact analysis, regulatory quality control) and to reduce red tape costs by a further 25 percent by 2010 (Jacobs, Ladegaard, and Musau, 2007).

19. See Kikeri, Kenyon, and Palmade 2006.

20. Pilots may provide important learning, a testing ground, and demonstration for larger reforms, especially when there is uncertainty or strong opposition. China put pilots at the center of its reform strategy, using special economic zones to test market-oriented policies such as land use rights before extending them nationwide. Jordan, Peru, and South Africa also used pilots to learn about potential difficulties and to assess the feasibility and effectiveness of reform programs in land registration and customs (Kikeri, Kenyon, and Palmade 2006).

21. *Doing Business* surveys benchmark and rank the cost and quality of business regulations for key cross-cutting investment climate issues.

22. Annual business surveys that ask entrepreneurs to identify the top 10–20 regulatory burdens they face help reveal annoyance factors.

23. Before adopting a bold land reform program, Mozambique first took an incremental approach; Korea and the Slovak Republic did the same for regulatory reform. In these cases, the incremental reforms were unsuccessful and costly to taxpayers. Similarly, piecemeal inspections reforms in the Philippines and the Russian Federation were no more than short-term palliatives, and they quickly became victims of backtracking and reversals (see Kikeri, Kenyon, and Palmade 2006, 29–30).

24. “The guillotine . . . is a means of rapidly reviewing a large number of regulations, and eliminating those that are no longer needed without the need for lengthy and costly legal action on each regulation. . . . It is a quick scan process, and does not replace the more detailed reviews and revision that are needed for many regulations, and that can occur in later phases . . . . the guillotine should be seen as an entry point to implementation of reforms within a sustained strategy” (Jacobs and Astrakhan 2006). From the mid-1980s onward, the guillotine approach and variants have been used by countries as diverse as Hungary, Kenya, Korea, Mexico, Moldova, and Ukraine (see OECD 1999, 2001). Jacobs and Associates used these countries’ experiences to develop a systematic, practical guillotine process that can be widely applied in different countries. The guillotine approach is a trademark of Jacobs and Associates.

25. For example, Prahalad (2004) shows that small innovations and adaptations to products, packaging, or the like sometimes are enough to help spread new products, services, or technologies among the poor and thus contribute to the diffusion of innovation.

26. The “EU-25” are the 25 countries that constituted the European Union in 2006.

27. This form of R&D procurement is called “precommercial” because it applies to areas in which there is no commercial offer (see European Commission 2007b).

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