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The way forward

INDUSTRY CAN BE A POWERFUL ENGINE FOR GROWTH AND STRUCTURAL transformation in developing countries. It remains vital to innovation and to the creation of new skills, organizations and attitudes. It lies at the core of technology transfer, learning and diffusion. It is thus essential for ensuring sustained productivity growth. And its importance is increasing.

To be emphasized is the enormous productive potential of new technologies and organizational methods (such as plugging into global value chains). There is enough productive knowledge around to transform standards of living in many poor countries, if they could build the capabilities (and raise the investment resources) to exploit them. The continuing disparity in competitive capabilities raises urgent problems, and it is vital to reverse this. The widespread liberalization of trade, investment and information flows is making it possible for industrial activity to encompass the developing world and to transfer resources to their enterprises. In short: the potential of harnessing industrialization for sustained development has never been greater. And the costs for countries that fail to realize this potential have never been larger.

So far, only a small number of developing countries are realizing the full benefits of industrialization. The data clearly show that industrial performance is diverging within the developing world—a few successful economies are pulling away from the rest. And there are few signs of reversal. Nor does this appear to be simply a delayed reaction to globalization and liberalization. If it were, it would have corrected itself by now.

The divergence of the groups of developing countries reflects the development of strong drivers of industrialization in only a handful of them. And it is highly likely that countries will diverge even more. Vexing and undesirable, this needs to be reversed.

The developing countries can build competitive industrial capabilities in the current setting. This is not in doubt. Also clear is

that building these capabilities, faced by pervasive market and institutional failures, needs extensive policy support. But policy interventions in developing countries do not have a happy history: inefficiency and waste have marked the post-war experience of planning, import-substitution and state-led industrialization. Even so, the countries that employed industrial policy in export-oriented environments—with complementary policies to build skills, technological capabilities and supporting institutions and to leverage foreign resources—show that such strategies can radically transform the industrial landscape in less than a generation.

A natural starting point in formulating national strategies and policies is for countries to benchmark their industrial performance along the lines detailed in chapter 3. They can also benchmark the drivers of that performance by looking at the key structural variables—at local technological effort, at foreign direct investment, at licensing royalties paid abroad, at physical infrastructure (chapter 4). That way, they can position themselves to see what technological capabilities to develop, what global value chains to latch onto and what services to support for innovation and learning. These efforts cannot be left to detached policymakers alone. Needed are broad coalitions of public, private, civil and academic players, committed to agreeing on a vision that can give direction to their industrial strategy.

As this chapter stresses, however, a country's industrial policies have to be couched in the broader developmental perspective of creating wealth and enhancing welfare. The idea is not just to promote industry. It is to promote efficiency throughout the economy—to sustain productivity growth and to ensure that the benefits are distributed equitably. That requires paying great attention to the framework conditions of political, social and macroeconomic stability—not just for industry but for all of society. It also requires putting in place the institutional foundations, again not just for industry but for all of society.

Framework conditions—cannot be ignored

Successful, sustained industrial development can take place only if the economic and political conditions are right. On this the consensus is widespread. The most fundamental conditions are clearly political, social and macroeconomic stability. Without them, investors of all kinds, local and foreign, will shy away, and the signals investors respond to may be distorted. High inflation rates will induce investors to eschew long-term projects in favour of short-term ones—and to shift from productive activities to those where payoffs are quicker and larger (property or stocks). Overvalued exchange rates will discriminate against exportable activities. An unstable political or social climate can induce short-term investments or drive them overseas. And so on.

Along with stability is an equally important need for clarity and predictability in the policy environment. Otherwise, capacity building and capability accumulation will suffer. These factors are even more important for internationally mobile resources, such as foreign direct investment. Some international investors may be willing to accept high levels of risk. But they will demand high premiums, tending to focus on quickly extracted resources rather than on building long-term competence.

Good policymaking goes beyond clarity and predictability—it increasingly entails transparency and participation. Transparency in the policy process inspires confidence. Participation ensures trust and the flow of information. Indeed, networking between governments and the other main actors is perhaps as important for effective policy design and implementation as it is for innovation. Why? Because policies, while predictable in broad terms, also have to be flexible and adaptable in their details and application. In a world of constant change, it is not always possible to correctly anticipate policy needs or to predict the consequences of particular measures. For processes as complex as industrial restructuring, upgrading and innovation, it is imperative to build in policy learning and flexibility.¹ Coherent strategy has, in other words, to be a learning process involving major stakeholders—exchanging information and sharing in implementation.

Being competitive entails greater openness to markets, to imported technology, to information flows—indeed, to new ideas. Export competitiveness, in particular, requires close and frictionless contact with foreign sources and customers. It also requires low business transaction costs (dealing with rules, regulations and the bureaucracy) and good governance. To attract export-oriented foreign direct investment, especially in high-tech industries, requires a very efficient business environment. The growing significance of efficient supply chain management

means that locations must offer more than good transport infrastructure. Also needed are rapid import and export procedures. In general there is a move away from discretionary procedures in dealing with the private sector and towards simple, universal rules that are easy to understand and comply with.

The Asian Tigers built up these framework conditions. They had a leadership committed to competitive industrial development, complemented by a broad education base and a fairly equitable income distribution. The government bureaucracy was skilled and highly respected—more important, it was relatively insulated from day-to-day politics and able to respond pragmatically to change. These attributes were not inherent to Asian society. Quite the contrary, these policy capabilities were built up in a long process of experimenting, making mistakes, changing and learning—very similar to the process of building industrial capabilities.² This policy learning may not be replicable in its entirety. But as studies note, it does offer lessons to other countries.³ Improving the bureaucracy, its base of skills and information, its coherence and linkages with the private sector—all these are things that governments can do elsewhere. The pace will depend on circumstances, but the process is clear—gradual and cumulative, advancing a step at a time.

Of the many framework imperatives required for dynamic industrial development, each is necessary but collectively they cannot be shown to be sufficient (box 8.1). Indeed, the list in box 8.1 is not a list of policies—it is a list of framework imperatives to pay attention to. Each country has to use that list as a starting point for designing the policies best suited to its conditions and aspirations. The East Asian countries paid careful attention to each, but no two countries attained each in precisely the same way. Indeed, the considerable diversity among the East Asians' attainment of the imperatives reinforces the previous message: each country must design its own strategy with the expectation that it will, in the details, contain unique elements. The diversity among all countries will be as apparent in policy design and implementation as in institutions and organizations.

The framework imperatives are of fundamental importance for achieving and maintaining internationally competitive production, at the outset and as industrial development unfolds. Their vital significance can be seen wherever there is an apparent competitive advantage that is not being realized. Clothing production in Senegal (box 8.2) provides a fruitful illustration of this point, fruitful because it highlights two critical corollaries. One is that the imperatives are not easily or trivially put into practice. Reforms to implement them have more often been problematically incomplete. The other is that the framework imperatives must be seen as vital instruments of a coherently framed strategy, aggressively pursued.

Box 8.1 Framework imperatives for effective industrialization

1. Policies assuring macroeconomic stability—within rather narrow limits, and both in reality and in expectation—are important to encourage rapid factor accumulation and allocation in accord with comparative advantage (dynamic and static) as well as to make possible quick and effective responses to disruptive shocks. They are reflected in:
 - Relatively low inflation rates and positive real interest rates.
 - Fiscal balance (between government revenues and expenditures).
 - Real (purchasing power parity) exchange rates maintained at levels not greatly overvalued, if at all, relative to free-trade exchange rates.
2. Policies have to ensure resource allocation in accord with dynamic (or potential) comparative advantage, where ensuring is to be understood in the sense of maximizing the likelihood that allocative decisions are made on the basis of rapidly achieving and then maintaining internationally competitive production, whether sales are in open competition on world markets or on the domestic market in unprotected, unsubsidized competition with imports.
3. Rapid accumulation of physical and human capital—that is, the rapid growth of factor inputs—requires:
 - Forward-looking provision of infrastructure, sufficient to avoid problematic bottlenecks.
 - Expeditious attainment, first, of universal primary education—then, secondary education.
 - Attention to technical training and to technical education (engineering and scientific) at the tertiary level.
4. Successful agricultural development is important for equitable development—and to ensure that appropriate balance is maintained across sectors as each develops.
5. Institutions are required to enable effective commerce among economic agents:
 - Contractual arrangements, explicit or implicit, having adequate sanction, formal or informal.
 - Incentives, whether rooted in individualism and private property or in social solidarity pacts of one kind or another, free from being undermined by capricious authority.
 - Mechanisms fostering adaptive institutional and organizational change in the context of underlying social stability.
6. Competent bureaucracies are needed to orchestrate the development process effectively.

Source: Westphal (forthcoming).

Box 8.2 Comparative advantage—to be realized

Senegal should, from all appearances, have a strong competitive advantage in exporting clothing. At least that is the opinion of knowledgeable experts who have examined its prospects closely. Among its advantages are a location close to European markets and, very important, a vibrant informal sector of thousands of highly skilled, hard working tailors who produce for the high end of the local market. Senegal has also undertaken reforms to bring its policies into closer conformity with the fundamental imperatives. It has put in place what appears to be a typical package of investment and export incentives designed to attract foreign investment to its export processing free-trade zone.

But Senegal's export performance in clothing is below what would be expected on the basis of the reforms already undertaken. Why? A careful field study, including interviews, found that formal sector clothing producers were frustrated in their attempts to export. Among the reasons:

- Difficulties obtaining on-time deliveries from local fabric producers, and deficiencies in their quality control.
- Inadequate access to finance required to upgrade plant and equipment and to increase employment; insufficient technological capability to export in large volume.
- Absence of managerial and marketing knowledge to sell in export markets, with no practicable notion of how to attract foreign buyers or partner with foreign firms to enter clothing value chains.
- Poor quality of infrastructure (leading, for example, to frequent electricity blackouts) and government services (in contrast to the favored treatment of large fabric producers).
- Locational disadvantages due to being far removed from sources of imported fabrics.
- Training institutes incapable of providing useful training, and other supporting institutions ineffective in providing useful support.

The Government of Senegal has initiated consultations with the private sector to address these deficiencies. With UNIDO assistance, it plans to formulate a strategy to upgrade the competitiveness and capabilities of the textile sector, including establishing a textile center to promote exports.

Source: UNIDO and Golub and Mbaye (2000).

The objectives of policy reform must be stated in precise, operational terms, terms sufficient to permit meaningful monitoring of their achievement, this to enable the revision of policy or its implementation when necessary to accomplish the objectives sought. Strategies aggressively pursued are no less relevant to accomplishing sufficient policy reform than they are to achieving continued technological development, this even though the purpose in one case is to unleash market forces toward productive ends and in the other to supplement those forces so as to overcome market failures.

Regardless of their necessity, the framework imperatives are not sufficient to enable sustained innovation and learning

leading to continued industrial development. And they certainly are not sufficient if the imperative of resource allocation in accord with dynamic comparative advantage is conceived in narrow terms, adequate only to ensure the realization of static comparative advantage based on existing resources and competencies. This can be seen wherever the achievement of a significant competitive advantage in one area does not unleash a chain-reaction of innovation and learning that leads to a deepening of that advantage and a broadening of competitive advantage in unrelated areas (box 8.3).

The framework imperatives reflect two successive generations of international consensus about the conditions required for

Box 8.3 Broadening competitive advantage is far from automatic

The Mauritius clothing industry embarked on a successful path of exporting in the 1970s, and clothing exports continue to be the mainstay of its industrial sector. Careful reading of the studies to ascertain the basis of Mauritian success leaves no doubt that its exports are in large part the result of adherence to the framework imperatives. Not only do exporters in Mauritius benefit from a virtual free-trade regime governing their activity—they also enjoy an institutional setting that is free of the features that militate against profitable private entrepreneurial activity.

But adherence to the fundamentals in Mauritius entails export promotion in the presence of high levels of import protection. Moreover, serendipitous factors, some the product of its history, have played an undeniably important role. Its favorable institutional conditions derive from its particular social and political history, and it enjoys important trade preferences under the Multi-Fibre Arrangement. In turn, its colonial heritage includes a small community of well-connected ethnic Chinese who were instrumental in attracting Hong Kong Special Administrative Region (SAR) of China firms to initiate clothing exports from Mauritius. Hong Kong SAR-owned firms remain an important presence in the sector.

It is not enough simply to have succeeded at the outset; an evolving strategy is required if the momentum once gained is not to be lost. Here Mauritius has failed. Having created a successful albeit narrowly focused export enclave, the government has no promising strategy to exploit its potential linkages into the rest of the industrial economy or to foster deeper competitive advantages in clothing exports or to broaden the scope of the country's industrial competitive advantages beyond clothing. In short, Mauritius seems to lack a strategy for ensuring that innovation and learning will lead to continued industrial success.

Sources: Romer (1993); Rodrik (1990); Subramanian and Roy (2001); Lall and Wignaraja (1998).

accelerated economic development and thus about what should be the objectives of reform. The first generation centered on the so-called Washington Consensus regarding the necessity for macroeconomic stability and—using the popular aphorism—“getting the prices right”. The results of first generation reforms—of policies affecting resource accumulation and allocation—in the countries that seriously undertook them were distinctly mixed. Thus were born the second generation of reform imperatives focused on achieving a constellation of enabling economic, political and social institutions.

Policy reform sometimes requires a degree of radical institutional reform, while fundamental changes in the overall institutional setting often take place only over comparatively long periods in what is at best a loosely coordinated fashion. But there is ample reason to believe that policy and institutional reforms taken together are insufficient to trigger the activities of innovation and learning required to achieve rapid productivity growth in the industrial sector. Chile, for example, has realized substantial development gains from its reforms of

policies and institutions, but dynamic forces leading to rapidly increasing productivity have not taken hold in its industrial sector. What is missing in such cases is what was present in East Asia: a recognition of the necessity to serve the innovation and learning needs of firms.

A third generation of reforms, one that emphasizes the critical importance of innovation and learning, is at hand.⁴

What is needed

Industrial catch-up has been accelerating. What the Republic of Korea and Taiwan Province of China achieved in three decades took Japan much longer; Japan industrialized much faster than early predecessors, and today China seems set to overtake the records set by the Republic of Korea and Taiwan Province of China. Yet many latecomers are failing to catch up at all in the same technological, trade, investment and information environment. Their industrial capabilities are inadequate to the challenge of competitive growth. The explanation for the different development of national capabilities lies first in the presence or absence of the framework imperatives—then in the attention to innovation, learning and industrial development in a coherent country strategy and policy framework.

Policies must thus be changed, reoriented to focus squarely on domestic innovation and learning, on the building of industrial capabilities by linking to global markets and leveraging foreign resources. The objective of industrial strategies and policies is to develop and sustain competitiveness and productivity growth—the only viable way to promote industrialization today.

This simple but vital objective has many ramifications. At the outset, it usually entails the restructuring and upgrading of industrial activities. This in turn involves developing new capabilities, productive facilities and links with global value chains. To sustain long-term growth, leading to higher wages, also entails moving up the quality and technological ladder, within existing activities and across them, from simple to complex. Industrial maturation inevitably involves such structural upgrading in manufacturing, with the promise of significant benefits.

Over the past half century far-reaching institutional and technological changes have fostered the extensive vertical separation of production into separable, sequenced activities—from raw materials extraction through intermediate stages of production to sale of finished products. These changes have been associated with the appearance of

global value chains spanning many of the world's most important industries, and they have opened multiple entry points for less developed countries to engage in export processing. These changes have also been associated with greatly enhanced flows of technology among countries, enabling developing countries to take advantage of many of those entry points. Thus a number of developing countries have in recent years succeeded in becoming major players within dynamic global value chains.

A few have done so by building skills and technological capabilities within indigenous firms, to achieve entry as participants in globalized production. But most developing countries have done it by undertaking labour-intensive functions for transnational corporations in more formally integrated production systems. Transnational corporations have always established production facilities in other countries, but the traditional mode has been to replicate entire facilities overseas. The forces of globalization, including the emergence of new technologies facilitating information communication and organizational innovation, have radically transformed the ways in which transnational corporations operate.

Transnational corporations now separate production processes (and such functions as accounting, marketing, servicing and even research and development) into small slices and locate them across the globe to take advantage of fine differences in labour cost, delivery, skill, innovation capabilities, suppliers and so on. They can manage far-flung sites as a coherent whole to further the competitive position of the corporation. For newcomers participating in such systems opens enormous opportunities which can be more readily seized than can entry through more autonomous means. Newcomers can take on functions for which they are suited rather than the entire manufacturing or service process—all the while enjoying access to massive new markets. They can also enter dynamic activities with great opportunities for technological learning and spillovers.

Choosing points of entry to promote the development of new activities requires great care, however. The economic and policy context is very different today than when the Asian Tigers mounted their industrial policies. Innovation has accelerated, and economic space has diminished. The rules of the game are also very different. These changes constrain countries from committing some of the more egregious policy mistakes of the past—but they also preclude the use of tools that have proved very effective in early stages of industrialization (in the mature industrialized countries, not just the newly industrializing ones). For example, promoting industries is now more circumscribed by trading rules—but the criteria for determining what to promote remain unchanged (box 8.4).

Strategy starts with a clear vision

Governments across the world now have to mount strategies to enhance the competitiveness and support the productivity growth of their firms. And if economies with the most advanced markets and institutions feel the need to undertake competitiveness strategies, the need on the part of poor countries, with much weaker markets and institutions, must be correspondingly greater.

Public efforts require direction. And without vision, there can be no focused direction. Nor can the direction be fixed—it demands constant monitoring and revision, as every success story details. Vision is not only about the broad dimensions of strategy, it is also very importantly about the technologies and industries to be promoted.

The basis of any industrial strategy is a national vision of industrial development. Vision is needed to coordinate and direct policies because it is possible to adopt a range of different development paths. In the textbook case of market failures, policies aim to restore a unique competitive equilibrium. In a world of imperfect markets, externalities, cumulateness and path-dependence, there is no unique optimum but a range of possible "*multiple equilibria*", some producing low growth or stagnation and others dynamism and high growth.⁵ Industrial success is the result of countries' ability to move across these equilibria—to keep jumping to the next curve. Each move needs coherent policies across a range of markets to exploit technological spillovers, scale and scope economies and dynamic learning.

The government has to decide on the broad national objectives—economic and non-economic—that cannot be thrown up by markets. The strategy may be explicit or implicit, but it provides the parameters within which all other allocation decisions are made. For instance, one government may decide explicitly to promote industrial deepening, greater indigenization of technological activity or the creation of large conglomerates to internalize various markets.⁶ Another may opt for leaving all choices to free markets (not intervening is as much a strategic choice as intervening). These choices reflect many things: resources, location, external pressures, political circumstances and ideologies as well as rational calculations of how to develop national industrial and technological resources. The four mature Asian Tigers adopted completely different strategies in these respects (box 8.5).

The next level of strategy has to do with the *design and implementation* of specific policies and programmes.⁷ Policies may be market friendly in that they seek to improve markets and institutions without favouring some over others. For instance, the government may subsidize R&D by enterprises for a period to create a technology culture in local industry or strengthen

Box 8.4 What to promote?

There is no sense denying that the formulation and implementation of industrial development strategy are an imperfect art. Efforts to quantify the costs and benefits of industrial promotion activities can at best yield rough approximations to what is in principle wanted. There are various reasons why this is true, but none is more pertinent here than the fact that many of the benefits sought by industrial promotion are imperfectly foreseen, while others are not foreseeable in any detail. Technological efforts leading to innovation and learning take place in an extensive profusion of cascading changes. Individual changes beget—sometimes—follow-on efforts and changes. And that process continues over the evolutionary course of a vibrant industrial sector.

But this reality is not reason enough to eschew cost-benefit determinations. Careful attention to the explicit enumeration of costs (typically relatively well-perceived) and foreseeable benefits (many poorly perceived) and to the quantification of those amenable to some degree of quantification are the only practical way of imposing discipline on actions taken in pursuit of industrialization. And some means of discipline is required to ensure some success in the pursuit of strategy. Blind faith in outcomes to justify costs incurred is no guide to effective action.

The accepted test for whether a particular activity should be promoted is the so-called Mill-Bastable test. The box figure illustrates its application in the traditional context of import substitution, but here with the additional expectation of eventual exports. The pronouncedly downward trending curve ABC represents the trajectory of the unit cost of domestic production, while the slightly downward tending line DBE shows the trajectory of the world price of the product in question; both trajectories are with respect to cumulative domestic output, measured on the horizontal axis. The unit cost of domestic production is initially above the world price owing to the absence of mature capabilities in the local industry; it falls with cumulative production as technological efforts—assumed here to occur, as occur they must to achieve maturity—leading to adaptive innovations and technological learning bear increasing fruit. The world price falls because of technological changes continuously occurring in other producing countries.

The test is passed in its most stringent form, but for the neglect of time discounting, only if the area representing initial excess costs, ABD, is exceeded by the area of eventual gains due to the competitive advantage reflected in unit cost being less than world price, BCE extended into the future until the point where the competitive advantage is lost, typically to a more lately developing country.^a But the test just stated is in fact too stringent, because it neglects the externalities that may spillover as technological efforts undertaken to achieve competitiveness in the activity contribute in multiple, cascading ways to technological developments in relation to other activities. Required is some estimate

Source: Bell and others (1984, pp. 102–106).

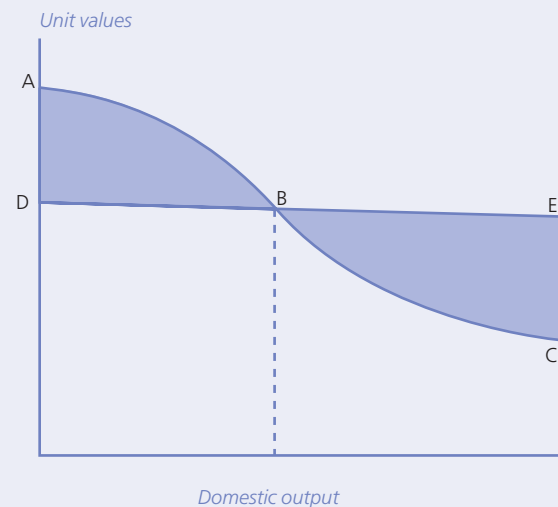
a. Time discounting of excess costs and competitive gains is not reflected in the figure but must be applied in computing the net benefit of the activity's promotion.

of the discounted value of these spillovers, which must be added to the direct value of discounted competitive gains in order to arrive at the proper magnitude for comparison with the value of excess costs.

The Mill-Bastable test reflects two essential principles that must, if only qualitatively, guide the prior assessment of promotional undertakings if they are to be sensibly pursued. The first is that the expected competitive gains must exceed the initial excess costs, both taken in total magnitude. Thus it is not sufficient simply to become minimally competitive in the sense of unit cost equal to world price (including transport and transaction costs); a true competitive advantage must be foreseen. The second principle is that conditions in other economies must not be thought static and unchanging; the target to be achieved is a moving target, one moving continually against the country's advantage. Thus it is imperative to take account of what is likely to happen elsewhere as it may affect production costs in other countries.

It may be obvious that these principles as here illustrated have immediate application only to the direct promotion, as through import protection, of activities to produce existing tradable goods. But the scope for direct promotion is now greatly restricted compared with what was possible in the past, so that reliance must now be placed on indirect means of promotion, through such means as the provision of industrial services. This makes the task of benefit-cost analysis all the more difficult. But it does not in any way invalidate the principles just stated or render them any less important. The foregoing statement applies equally when outcomes do not simply replicate what is available from foreign sources.

The cost, benefit and duration of infancy



incentives for employee training. Or policies may be selective, aiming to promote particular activities or clusters to tap dynamic learning possibilities, capture exceptional spillover benefits or attract the most promising global value chain activities. Both approaches are theoretically justifiable in the presence of market failures, and they are entirely complementary. The choice of appropriate instruments depends on the nature

of the failures and the capabilities of the government to undertake policies effectively. However, the more selective are the policies chosen, the greater are the competence, information, objectivity and flexibility required of the bureaucracy.

The choice of *appropriate measures* involves creating the mechanisms to implement policies. Implementation may

Box 8.5 Four Tigers—four broad visions

The four Asian Tigers were the first countries in the developing world to launch an export-oriented manufacturing strategy. While Hong Kong SAR was always free trade, the other three—Singapore, the Republic of Korea and Taiwan Province of China—turned from import substitution to export orientation in the early 1960s. They led the first wave of labour-intensive industrial exports: garments, textiles, toys, footwear and the like. Over the 1970s and 1980s they upgraded their export structures in different ways, depending on their differing visions of what they wanted their development paths to consist of. This depended in turn on their social and political structures, resource endowments, size and history.

In Hong Kong SAR the vision of the colonial government was market-driven resource allocation, with no particular ambition to develop local manufacturing. Although Hong Kong SAR was once the leader in the developing world in manufactured exports, this vision led to quality improvement in labour-intensive exports but to relatively little structural deepening. As a result, with rising wages, most manufacturing shifted to lower wage countries, and industrial and export growth stagnated or turned negative. The export structure remained at low technology levels, the lowest among the Tigers.

In Singapore, by contrast, the government had a strong vision of technological upgrading and deepening. This led it to intervene extensively in investment patterns, skill development and infrastructure building while retaining a free trade setting. The result was considerable deepening, allowing Singapore to combine high and rising wages (nearly 20 percent higher than in Hong Kong SAR) with output and export growth. Singapore moved rapidly from low-tech activities to petrochemicals and then producer electronics and equipment, simultaneously raising its technological levels from simple assembly to high-end manufacturing, design and development. Transnational corporations, providing state-of-the-art technologies and access to their global networks, dominated the process. While Singapore developed a very high-tech export structure, however, its research base stayed small and the main sources of innovation remained overseas.

The Republic of Korea and Taiwan Province of China also had very strong visions of industrial development, this time with larger ambitions for national enterprises. Transnational corporations were allowed a much smaller role, though foreign technology was tapped extensively in other forms. Their governments used infant industry

Sources: Amsden (1989); Wade (1990); Lall (1996); Westphal (forthcoming).

protection (offsetting its harmful effects by strong export incentives), credit allocation and subsidies, foreign direct investment restriction and skills and technology support. And they did this in ways to induce local firms to enter difficult activities, raise local content and take on advanced technological functions. The Republic of Korea's interventions were more pervasive and detailed. They involved fostering the *chaebol*, the conglomerates that spearheaded its heavy industry and high technology drive, learned the most advanced technologies and became major transnational corporations in their own right. Taiwan Province of China intervened less directly in the industrial structure, though it used public enterprises to enter several heavy industries. It supported its small and medium-size enterprise dominated structure with an array of technology, training, finance and export marketing policies and institutions. Because of their far-reaching efforts, the Republic of Korea and Taiwan Province of China have the greatest technological depth in the developing world, and their exports embody the most intense learning.

A vision gone sour

Some of the Republic of Korea's seeming policy successes later turned sour. The Asian financial crisis dramatically exposed the substantial risk inherent in the pursuit of an ambitious vision by aggressively interventionist means. The risk is that policies, while proving to be highly effective in the medium term, can have seriously detrimental consequences for long-term institutional development. The Korean government's practice of directing the allocation of credit severely retarded the development of modern financial institutions—and stifled the establishment of an adequate regulatory system. In turn, its promotion of the *chaebol* ultimately created a number of differently dysfunctional private entities whose exploitation of the policy regime resulted in unwise investments—leading in some cases to excess capacity, in others to bankruptcy in whole or in part. In a very real sense, then, the high costs imposed on the people of the Republic of Korea by the crisis-induced recession and the subsequent vigorous pursuit of systemic policy reform are the price paid for the government's earlier inability to rectify growing institutional deficiencies. Taiwan Province of China did not foster *chaebol*-like enterprises, but otherwise followed a similar though distinct set of policies. It has paid a far lesser price by managing the long-term consequences of directed credit more effectively.

need new institutions (in the public or private sector) to support, interact with and link market agents. In the public sector, for example, the government has to provide the technological public goods needed by industry, such as basic research, extension services, standards and metrology. In the private sector institutions may include business associations, consortia or large private conglomerates (like the *chaebol* in Korea) that can overcome deficient markets for capital, skills, information and entrepreneurship.

Keep in mind that it is the process that is critical—not the instruments. The actual policies used must be specific to each strategy and context. That makes the policy process more an art than a science. Since mistakes are inevitable, the government has to be flexible and responsive to changing circumstances—policy has to build in *learning* and *adjustment*.⁸

Some final points on the strategy process. First, policy needs vary with the level of development. As markets and institutions become more efficient and complex, the need for direct interventions falls and their potential costs rise. Second, industrial policy must be *systemic*. No strategy can succeed unless it dovetails physical investment in capacity with technology development, skill building, cluster strengthening and so on. Third, policies must correspond to the phase of learning and so must change accordingly: policies in the infant phases of capability building must differ from those in the mature phase, when R&D and frontier innovation become vital.

Governments require disciplined means of strategy formulation, implementation and monitoring, with monitoring being imperative for determining whether and in what respects an ongoing strategy warrants revision. Two very important tools

that impose discipline within a process that embeds global knowledge in the articulation and pursuit of development objectives are finding increasing acceptance and use among developing countries: benchmarking and foresight exercises.

Benchmarking has long been used by successful industrial firms, first in the industrialized countries, as means of achieving best-practice levels of productivity, which can only be determined on the basis of comparative information across the universe of similar firms. It relies on the identification of measurable factors that are critically related to overall productivity, factors that are subject to the firm's control either directly or indirectly. Knowledge of the best values attained in relation to these factors across other firms provides targets that, if achieved, will result in the best-practice level of overall productivity within the individual firm. Targets set in this fashion act as powerful devices for focusing technological and related efforts toward the achievement of objectives that can be realized by searching for and using global knowledge pertaining to the factor and its relationship to overall productivity.

Benchmarking has immediate application where relationships between contributing factors and desired results are well known and easily quantified in simple terms; for example, in industries where engineering relationships dominate in determining productivity. It is less readily applied by organizations that provide services, such as those discussed in chapter 7, where the relationships between service norms and outcomes are complex owing to many factors beyond the control of the organization. Even so, benchmarking exercises are prevalent among the exemplars of global best-practice in serving the needs of industry.

Benchmarking is yet more difficult in the policy arena, and this for a variety of reasons, central among them the necessity to recognize that policies must often be tailored in conformity with national values and the institutional setting. Nonetheless, there has recently been substantial progress in bringing the discipline of benchmarking to the service of policy analysis and formulation. Just as information centers, extension agencies and the like play a vital role enabling benchmarking practices by industrial firms, so too can international agencies exercise a profound influence by providing the information and supporting technical assistance required for agency and policy benchmarking by developing country governments.⁹

In the process of selecting industries for promotion, technology foresight exercises, done hand in hand with the private sector, are particularly useful as a means to comprehend emerging global trends, enabling both firms and the government to formulate detailed strategies in areas that seem sensible.¹⁰ Having originated decades ago in Japan and France, they are now in widespread use in the industrialized countries,

where their application focuses on forecasting the course of global technological change in relation to the country's industrial strengths and weaknesses, to guide public science and technology policies and expenditures (Martin 1996). Even comparatively non-interventionist governments, like that of the United States, recognize that foresight exercises are vitally important owing to the fact that firms cannot remain competitive without relying extensively on complementary private and public sources of knowledge whose continuing development must in some fashion be coordinated within a common vision of how the future might unfold.

Similar exercises are now also being undertaken by many developing countries, with UNIDO's assistance. The focus of these exercises differs in that the objective relates to steps being taken to catch up with the global technological frontier, not to steps necessary to remain on, or at the forefront of, the changing frontier. Even so, developing countries require foresight in relation to existing industries, not simply for keeping up but also for catching up to a shifting frontier, and in relation to industrial activities for which potential competitive advantage is within grasp. They additionally require foresight not only about technological trends, but also about pending changes in the international ordering of economic activity—where, for example, new modes of accomplishing the division of labor among countries may seriously affect the way in which opportunities may be seized.

But foresight exercises, wherever conducted, are not simply about external factors, or emerging global trends. They are also fundamentally about internal factors, or assessing a country's industrial strengths and weaknesses in sufficient detail to ascertain where change efforts are required, and this even if only to come closer to existing best practice. Indeed, in developing countries much of the work most useful for foresight exercises goes into developing a vision of a future in which existing resources are used with greater productivity as a consequence of a diverse variety of technological and other efforts enabled by technology transfers from sources both internal and external to the country.

In days gone by, some countries—the Republic of Korea in the 1960s and 1970s, for example—practiced a form of visionary benchmarking, comparing their industrial structure with that over the past of some exemplary, more advanced country (for the Republic of Korea, Japan), to determine the activities next in line for development. Such benchmarking may still provide some, albeit limited, useful guidance. But vastly more important, indeed fundamentally essential, are targets and actions determined by the collaborative engagement of industrialists, technologists, academics, government agency officials and other importantly involved parties in coordinated deliberations based on intimate knowledge of the reality that is and

that could be. Indeed, such deliberations lay at the heart of the Republic of Korea's planning activity in the mid-1960s and were, in a very real sense, instrumental in the Republic of Korea's embarking on the path of rapid industrialization.¹¹

Then, as now (see box 8.6), the value of the exercise inheres not so much in the formulated vision but in the common understanding by both public and private actors engaged in its achievement of the steps that each must take if it is to be realized.

Five principles for government conduct of national strategy

1. *Set priorities for policy intervention in line with the vision.* Resources—financial and human—for policy intervention are necessarily limited, even in rich countries. They are far more constrained in poorer countries. That makes it essential to mobilize resources and set priorities in line with the national development vision. The priorities will depend on the circumstances of each country, of course, and these are likely to vary with the level of development. At higher levels the most pressing needs tend to revolve around innovation and specialized skills and infrastructure. At lower levels they revolve around building entry-level competencies, strengthening resource-based and labour-intensive industrial activities, upgrading smaller enterprises or providing basic infrastructure.
2. *Leverage national resources with foreign ones—in global value chains.* The most effective means of connectivity to technological resources will often be through value chains, and, as noted in chapter 6, it is vital to understand the nature of each chain and the lead players in it. But sustaining linkages requires building complementary capabilities locally. Linking and leveraging strategies will again vary with the level of industrial development and with national strategic priorities. Countries with strong industrial and technological bases can follow strategies pioneered by the Asian Tigers. Those with weaker bases have to use more modest strategies, helping firms and clusters to connect with global players and climb up the value chain from modest levels, relying more heavily on direct foreign investment.
3. *Coordinate the vision, the framework conditions and the drivers.* Competitiveness-enhancing strategy involves close coordination of the vision, the framework conditions and the drivers. Most governments do not formally exercise such a coordinating function, since it cuts across traditional lines of responsibility in domestic ministries

Box 8.6 Foresight in Hungary

Hungary's Technology Foresight Program adapted the conventional advanced-country type of exercise to its strategic needs in becoming fully integrated into the European socio-economic system. Seven sectorally focused panels made up of industrialists, academics, government officials, and other stakeholders were formed to assess strengths and weaknesses together with opportunities and threats in their sectors, with the aim of formulating visions and recommending policies and programs necessary for their fulfillment.

Complementing their effort was a large scale survey using the Delphi method (a disciplined means of aggregating individual forecasts of emerging trends stated in detailed terms) that was focused on probable external changes. The program was carefully orchestrated to achieve the greatest possible awareness and participation, toward the end of developing a strong consensus centered around its outcome. Thus the core exercise, which required two years to complete, was preceded by an initial stage devoted to promoting understanding of its importance, and followed by a terminal stage during which results were disseminated and widely discussed. To enable meaningful discussion and to further the objective of achieving consensus around a plan of vigorous action to achieve effective integration and robust economic development, three alternative visions of the future were presented, with only one of them having been fleshed out in considerable micro detail.

Hungary's experience in its foresight exercise demonstrates that the methodology can be of great value to developing countries and transition economies alike. Individuals having important responsibilities within the private and public sectors gained in their understanding that innovation is an inherently collaborative enterprise that entails mutual effort and learning among cooperating entities. The exercise additionally led to an enhanced awareness of the importance of communication within and across organizational boundaries, while at the same time it strengthened existing, and established new, network relationships, both formal and informal, among the parties engaged in innovation. Moreover, it reinforced the comprehension that innovation and learning do not only relate to technical matters, but also to economic, organizational, and social factors as well.

Hungary's experience is also significant in showing that foresight exercises both can and must, if they are to yield fruitful results, be tailored to the capabilities and institutional settings of the countries in which they take place. And to the central matter at issue, which in Hungary's case was enhanced integration within the larger European system; in many developing countries it would importantly involve greater integration into the world economy to enable greater levels of productivity. Foresight exercises by no means need be as complex and long-lasting as was Hungary's. Simpler, shorter, and more narrowly focused exercises can add real value in formulating and implementing intelligent strategies for industrial development.

Source: UNIDO.

and agencies. Coordination tends to be dispersed and ad hoc, based on implicit rather than explicit objectives and strategies. This may be effective where drivers are fairly well developed, when decisionmakers agree on priorities and actions and when the line ministries exchange information to support each other. But it is not effective in other situations. In particular, where a country has to mount major policy changes and embark on significant

structural change, there is a need for a formal mechanism to formulate strategy and coordinate the development of industrial drivers.

The coordinating function does not necessarily need a new agency; it may be exercised by a group of existing ministries and institutions. But the function can be carried out only if its execution is placed close to the apex of policymaking. Effective coordination, wherever it is located, needs regular secretariat support for the collection and analysis of data—locally and in international benchmarks and immediate competitors. The data need to cover production, trade and productivity performance, the major drivers and the lead institutions. Everything has to be based on a sound understanding of technological and market trends.

4. *Build skills, knowledge and bureaucratic competence.* The conduct of strategy can be very demanding in skills, information and bureaucratic competence. But many measures can reduce the pressures on national governments. The private sector can contribute much to the design and implementation of policy, relieving government of many difficult data collection and analysis functions. Indeed, the private sector is much better placed to gauge productivity, technological and market trends at the individual activity level than is the government. What the government needs to do is provide a higher strategic and structural perspective—and to distill diverse private sector views into a coherent vision of development for the medium term.
5. *Enlist the key actors in the international community in strategy formulation.* The international community can help in strategy formulation. Apart from material assistance, it can provide valuable information on—and analysis of—benchmarks, institutions and policies in other countries. Many competitiveness analyses by industrialized countries are publicly available. And technology and training institutions are often willing to provide aid or sell their services. Aid agencies furnish technical assistance, often drawing upon the services of industrial experts. Consultants provide analyses of competitiveness as a whole and of its various components; their services tend to be expensive, but they possess a wealth of experience and data. In addition, there is a need for analytical support for governments at a higher level, particularly in evaluating different strategic approaches and the lessons of experience in other countries.

International dimensions

The desired, appropriate level of openness may not entail completely free markets for trade and investment or the

removal of all such policies as local content rules and performance requirements, as envisioned in negotiations for trade-related investment measures (TRIMS). Indeed, the optimal level of openness and the ideal pace of trade liberalization remain a matter for debate.¹² Accepting that many countries have intervened excessively in trade (and to the detriment of their industrialization), it does not follow, given the market and institutional failures facing the acquisition of technological capabilities, that completely free trade is a desirable objective, certainly not in the near future, for developing countries. That some interventions were wrongly designed or implemented does not imply that all interventions are inefficient or distorting.

Theory suggests that where deficient markets give distorted signals to economic actors, intervention is needed to restore efficiency. Careful trade interventions, set in the context of strong export orientation and balanced by stringent performance requirements can work well. Going further back in history, trade and other interventions were used extensively to promote industrial catch-up in the presently developed countries. Qualifications of the same nature apply to TRIMS-related policies.

Similar considerations apply to the widespread application of stricter intellectual property rights in the developing world (under agreements for trade-related intellectual property rights, TRIPS). There is a growing feeling that the universal application of TRIPS offers little to countries at low levels of industrial and technological development, while imposing additional short-term costs on them as importers of technology.¹³ There may be long-term rewards to them in accepting TRIPS, but the gains may well be negative in present value terms (after discounting future gains at a reasonable interest rate). Careful analysis is needed of whether existing rules are flexible enough to allow the losers to prolong their grace periods or whether the rules need to be changed.

Building capabilities is a costly, demanding and continuous process—and no amount of good policy can get around the problem of severe resource constraints in most developing countries. As the gap widens between the more successful and less successful countries, the benefits of modern technology and globalization appear further out of reach to many. This raises social and political stresses, threatening the pace of economic reform and integration and affecting the stability of the international economic system.

Current development aid practice attaches less weight to the industrial sector than it did in the past. Perhaps donors assume that market forces (liberalization and globalization) will suffice for industrial development. This is wrong. The upgrading and regeneration of manufacturing need support from aid donors. True, the current donor emphasis on edu-

cation, infrastructure and micro or small enterprises does feed into industrial development. But it does so at one remove. It does not directly address the needs of industrial restructuring by the formal enterprise sector—or the specific skill and technological needs of modern industry. And for reasons just noted, it cannot be taken for granted that national governments in developing countries will on their own be able to meet these needs. Without a substantial increase in assistance, many viable activities may go under—and many more promising activities may never be launched.

The time is ripe for a new international agenda on industrial development—and for a new vision of how developed countries and international agencies can best assist industrial development. Countries have to be helped in their efforts to build competitiveness, attract resources, use more productive technologies and enter larger, more dynamic markets. Otherwise the enormous potential of economic integration and globalization may be lost to a large part of the developing world.

Most of the effort has to come from within countries, providing the right environment for capability building and investing in the necessary factors and institutions. But such local efforts should be helped from outside. Opening markets completely in industrialized countries will help greatly, but much more is needed to narrow the widening gap between countries and to build industrial capabilities in developing countries. Indeed, this is the mission of UNIDO—all of our activities deal directly with building and enhancing industrial capabilities. We will continue working to narrow that gap and to ensure support for that work with financial and other resources.

Notes

For further details on sources, information and the literature on subjects covered here, see the background papers.

1. Lall and Teubal (1998).

2. See Cheng and others (1999) and Evans (1999) for analyses of this process. The Tigers set up specific institutions to manage industrialization strategy (such as the Economic Development Board in Singapore, the Economic Development Bureau in Taiwan Province of China and the Economic Planning Board in the Republic of Korea). They reformed traditional bureaucratic structures, focusing on the few critical ministries responsible for industrial policy. They had frequent and active interaction with private companies and associations.

3. World Bank (1993); Evans (1999).

4. See Magariños (2001). Magariños' discussion also identifies other key aspects—relating to environmental sustainability and the equitable distribution of productivity gains—plus additional elements missing from the current consensus that for similarly now-obvious reasons require inclusion in the third-generation consensus.

5. On the possibility of multiple equilibria and the need to shift across them see Redding (1999), Rodrik (1996), Stokey (1991) and Stiglitz (1996).

6. Most strategic choices at this level have to do with identifying groups of activities that have the greatest potential for dynamic growth or create most beneficial externalities for other activities (Lall and Teubal 1998). To the extent that such activities involve greater risk and learning costs, coordination problems and capital market failures, free markets cannot lead to their development. Only deliberate promotion would lead private agents to enter such activities in a coherent fashion and on a scale necessary to make the local value chain efficient. Examples would be the strategic targeting of heavy or high-tech industries in Japan and the Republic of Korea, or the targeting of information technology in many industrialized countries. Once activities and clusters are identified, governments have to set priorities between competing uses, taking into account complex feedbacks and linkages.

7. Industrial policy needs are not “discovered” by computing a substitute for a perfectly competitive equilibrium from an innumerable number of shadow prices. They are built up in a more mundane manner by looking for ways to build on the existing base of technical and other capabilities and to push them to exploit future opportunities offered by markets, technologies, externalities and international value chains. Industrial policy in the Asian Tigers did not rely on collecting vast amounts of information to calculate the “optimal” set of activities. It did, however, involve, considering in detail available technological and market information and the experience of more industrialized countries. But beyond this, the process was akin to creating rather than picking winners: the governments acted rather like venture capitalists. And, despite mistakes, on average they achieved good results in their strategies (Stiglitz 1996).

8. Teubal (1996, 1997).

9. For extensive discussion along these lines, see Sercovich and others (1999).

10. Martin (1996).

11. Adelman and Westphal (1979).

12. Lall (2001b); Rodrik (2001).

13. See chapter 1 and McCulloch and others (2001), UNCTAD (1996), UNDP (2001), World Bank (2001a).

