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UNIDO RESEARCH PROGRAMME

COMBATING MARGINALIZATION AND POVERTY
THROUGH INDUSTRIAL DEVELOPMENT

COMPID



**Supporting industrial development:
overcoming market failures
and providing public goods**



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

《COMPID》

COMBATING MARGINALIZATION AND POVERTY
THROUGH INDUSTRIAL DEVELOPMENT

Supporting industrial development:
overcoming market failures
and providing public goods

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Explanatory notes

References to dollars (\$) are to United States dollars, unless otherwise stated.

Countries are referred to by the names that were in official use at the time the relevant data were collected.

In accordance with the World Bank definition of low-income countries (economies with a gross national income per capita of \$767 or less (2003)), the following 61 countries are listed as low-income countries: Afghanistan, Angola, Bangladesh, Benin, Bhutan, Burkina Faso, Burundi, Cambodia, Cameroon, Central African Republic, Chad, Comoros, Congo, Democratic People's Republic of Korea, Democratic Republic of the Congo, Côte d'Ivoire, Equatorial Guinea, Eritrea, Ethiopia, Gambia, Ghana, Guinea, Guinea-Bissau, Haiti, India, Kenya, Kyrgyzstan, Lao People's Democratic Republic, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mongolia, Mozambique, Myanmar, Nepal, Nicaragua, Niger, Nigeria, Pakistan, Papua New Guinea, Republic of Moldova, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, Solomon Islands, Somalia, Sudan, Tajikistan and United Republic of Tanzania. The number of countries included in this list is subject to revision depending on the changing economic status of the countries concerned.

The term "newly industrializing country" is used to describe developing economies, be they countries, provinces or areas, where there has been particularly rapid industrial growth. It does not imply any political division within the ranks of developing countries and is not officially endorsed by UNIDO.

The following abbreviations and acronyms appear in this report.

ASEAN	Association of South East Asian Nations
GATT	General Agreement on Tariffs and Trade
GDP	gross domestic product
GNP	gross national product
ILO	International Labour Organization
IMF	International Monetary Fund
ISO	International Organization for Standardization
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organization



OVERVIEW

The present report, *Supporting Industrial Development: Overcoming Market Failures and Providing Public Goods*, is part of the broader Combating Marginalization and Poverty through Industrial Development (COMPID) research programme of the United Nations Industrial Development Organization (UNIDO). The principal aims of the report are to identify the contributions provided by public goods to an industrial development strategy, and to clarify the role of UNIDO in supporting the provision of public goods associated with industrial policy.

Chapter I considers how globalization has affected the concept of industry and the nature of industrial policy. Globalization has undoubtedly had significant effects on the nature of industrial production: cross-border production networks and global value chains are shaping the integration of developing countries into the global market in most industrial sectors. While it is true that most trade between countries was in final goods, current world trade demands specialization in stages of production and trade in intermediate goods. If developing countries are to engage in this global market, they must enhance their competitiveness and develop an appropriate industrial base. Public policy and international organizations, such as UNIDO, can assist in the process of industrial development.

Chapter II examines the possible sources of market failure in industrial development and identifies possible roles of the public sector in overcoming those failures. Effective industrial policy exhibits features in the form of public goods, providing both for coordination among investors and for activities that address market failures associated with access to credit, appropriate technology and skilled labour. Public intervention can ensure that the appropriate levels of research, training and dissemination of information are achieved. Moreover, public support can ensure the diffusion and adoption of cleaner technologies that provide environmental benefits and support the sustainability of industrial development.

Guidelines on the role of UNIDO in providing technical assistance for promoting industrial development are presented in chapter III. By increasing the relevance of public good elements in industrial policy and ensuring an appropriate mix of public support and private sector activities, UNIDO could assist in promoting efficient and appropriate production in low-income and marginalized countries. More specifically, if public intervention and UNIDO activities are concentrated on supporting the provision of public goods, they could mitigate the implications of market failures. Much of the work of UNIDO relates to the adaptation and adoption of cleaner technologies, and this supports the provision of a better-quality environment. UNIDO could enhance its work on knowledge creation and transfer by supporting the provision of knowledge public goods, and adopting a more focused approach in its dealings with individual firms. UNIDO global forum activities could be extended to address national and international conditions and activities outside industry for sustainable industrial development. Sustainable industrial development can be

promoted in different ways. The present report concentrates on the relevance of public support for industrial development, including UNIDO technical cooperation activities, in so far as the public good elements relate to industrial policy. Some guidelines are offered on the appropriate mix of public support and private sector activities.



Supporting industrial development:
overcoming market failures and providing public goods

I. NEW CONDITIONS FOR INDUSTRIALIZATION IN A GLOBALIZING WORLD

A. INTRODUCTION

The very nature of industry is changing rapidly under the forces of globalization. These changes manifest themselves in increasing specialization within manufacturing, creating implications for overall industrial development policy. Defining a role for public support within the new industrial realities is therefore important.* Many questions arising from this are yet to be answered. For instance, what is the need for, and nature of, public goods in industrial development? In what ways can the provision of public goods help to overcome market failures and promote industrial development? By analysing the nature of market failures and public goods within the new industrial realities, it is hoped that national and international organizations could be assisted in their efforts to support the industrialization process.

The aim of chapter I is thus to discuss the concept of industry by examining the ongoing development of increased specialization in the manufacturing process. When considering the forces of globalization, two major processes appear to shape the nature of industry: (a) the emergence of international production networks through fragmentation or disintegration of production leading to separate stages of production (Feenstra [16]); and (b) the emergence of global value chains with increasing international cooperation among firms at different stages in the value chain (Kaplinsky [32]). It is evident that what was once a manufacturing product produced in one location or “local network” can now be assembled in a location using manufactured and services inputs procured elsewhere.

To promote industrial development, countries and firms need to gain a better understanding of how to position themselves and connect their industrial activities to international value and production chains. On the one hand, the concept of industry relates to the combination of various inputs into semi-manufactured and manufactured goods. On the other hand, successful development of industry involves more than just focusing on the individual stages of production. Jones and Kierzkowski [29] argue that integrated production processes could be characterized as a series of production blocks that are connected by various service links. It is especially important to consider to what extent globalization affects—or bypasses—industry in low-income countries.

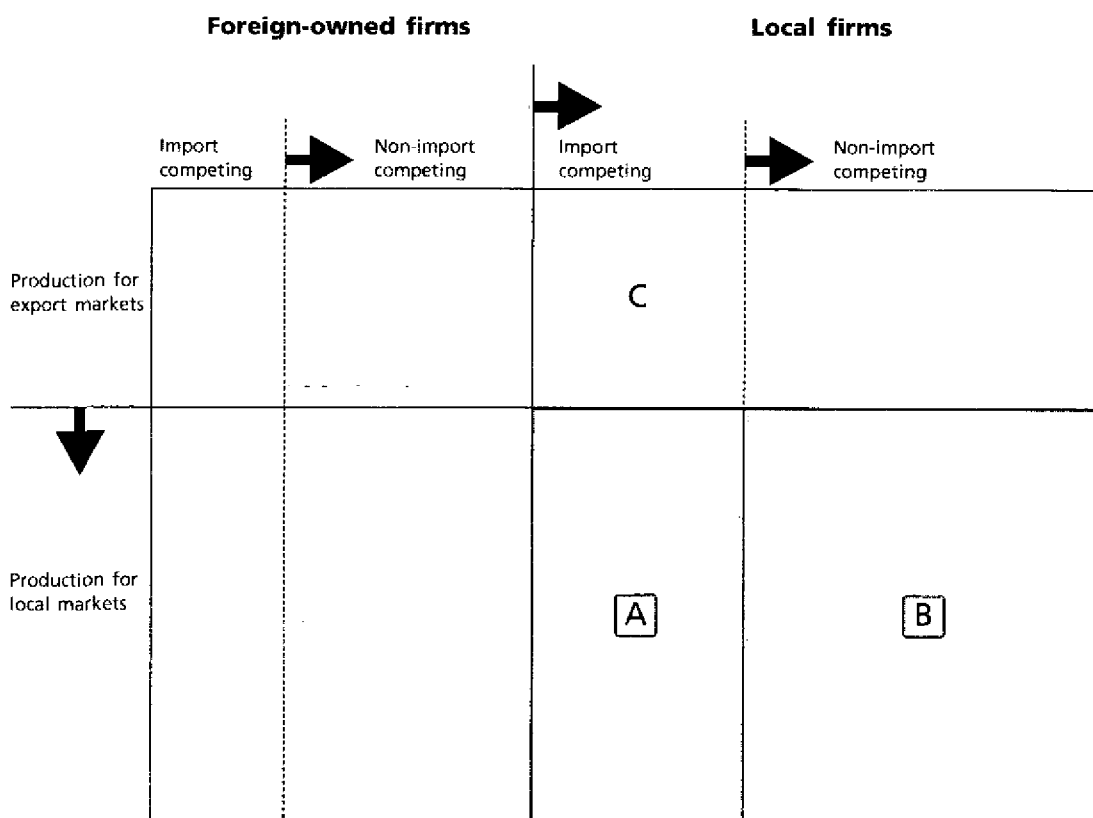
* UNIDO notes this as follows: “With regard to the discussion of the role of industry in Panel 1, it was noted that a new definition of industry was needed since manufacturing no longer always meant the making of things. Rather manufacturing was now increasingly closely coupled with such value-added activities as design, marketing, branding, selling and transport, and that the scope for innovation in such fields as materials, processes, the business structure and international trade relations was beginning to exceed the scope for innovation in manufacturing itself. Thus, the making of things had become a low value-added activity bringing very little profits. It was this feature of the changed nature of industry that explained to some extent the geography of the flow of investment. Based on this argument it was concluded that conglomerates invested in peripheral countries to make things at cheap prices, but retained control over the design, the materials, the marketing, from which they continued to derive monopolistic returns. For this reason it was argued that UNIDO should resist this ‘old division of labour’ and help developing nations to upgrade their industrial capabilities in the new sense of the word” (UNIDO, *Industry for Growth into the New Millennium* [69], p.13).

Focusing on the new realities confronting industrial production of low-income countries in a globalizing world, an important question is, how can public support for industrial development be most efficiently and effectively allocated among the various activities that are involved in creating a manufacturing product. In particular, what would be the most appropriate ways for international organizations, such as UNIDO, to assist countries in responding to changes in the nature of industry? Chapter I discusses the various ways to structure support, on the basis of several country examples of how the structure of industry has evolved under the forces of globalization. It also provides an insight into how the opportunities and threats of globalization affect industrial development in countries that have not been able to participate fully in the globalization process.

B. INDUSTRIAL DEVELOPMENT AND THE CHANGING NATURE OF INDUSTRY

Globalization of production is one of many important factors influencing the rapidly changing nature of industrial development. An attempt will be made here to discuss the extent of the influence of globalization, to review the causes of globalization of production and the manner in which it takes place, and to discuss the process of specialization of industry at different stages and functions on the basis of a number of products. Other areas dealt with include the ways in which interactions between the public and the private sectors, known as public-private interactions, affect industry and the implications of the changing conditions of industry for industrial development.

Figure I. Industrial production and the forces of globalization



Source: COMPID Research Programme.

1. Industrial production in developing countries

Even though the nature of industry is changing under the forces of globalization, it is important to note that industrial production in low-income countries is not always affected by it. Figure I shows the extent to which the forces of globalization affect the domestic industrial production base.

In particular, there is a need to distinguish between the following three aspects of globalization:

- Domestic industrial production meant for export markets as opposed to local markets (on the vertical axis);
- Domestic industrial production competing with imports as opposed to not competing with imports;
- Firms under foreign ownership as opposed to local firms.

Low-income countries can have a large industrial production base controlled by local firms for the local market. They do not necessarily have to compete directly with imports (area B in figure I). For instance, the food sector is the main manufacturing sector in the United Republic of Tanzania, accounting for close to a third of gross manufacturing output (see table 1). Although there are few foreign firms, most production, nearly 95 per cent, is for the domestic market (areas A and B in figure I), and it is possible that a substantial part of the production base does not compete directly with imports (area B). The textiles sector, on the other hand, is a more globalized industry, as a large share of production is exported, with competition from abroad through imports (Lall [36]) and foreign ownership more likely. It is also typical for countries at a lower level of development to have a manufacturing base aimed at domestic consumption, such as food and beverages, rather than at exports, such as textiles. There are exceptions, however, for various reasons, such as the use of trade preferences for textiles and clothing, as in the case of Bangladesh, Lesotho and Central American countries. Besides, concerns by local firms related to globalization of production have increased over time, as observed in the case studies presented later.

TABLE 1.
SECTOR CONTRIBUTION TO MANUFACTURED EXPORTS IN THE UNITED REPUBLIC OF TANZANIA, 1990
(Percentage)

Sector	Contribution to manufactured exports	Contribution to gross output in manufacturing	Gross output exported
Food	14.7	33.6	6.7
Textiles	56.2	21.4	40.4
Wood	6.9	3.5	30.2
Paper	3.5	3.6	15.0
Chemicals	10.7	11.9	13.7
Metals	8.0	24.6	5.0
Other	0.6	1.5	0.3
ALL	100.0	100.0	15.3

Source: Bureau of Statistics of the Republic of Tanzania, *Revised National Accounts of Tanzania, 1976-1990* (Dodoma).

Note: The first two columns may not add up to 100 per cent due to rounding.

The forces of globalization will decrease the size of area B, for instance, if tariffs are lowered. This will not only increase the share of production that competes with imports, but also increase foreign ownership, or increase the export share. The arrows in figure I reflect those changes. The present

report focuses mainly on two forces of globalization affecting the concept of industry (though as was noted, not all national industrial production is affected to the same extent): (a) exporting of intermediate products by producing products so that they fit in with global value chains; and (b) exporting by producing more efficiently, for example, as part of an affiliate in an international production network controlled by transnational corporations. While those two forces, combined with an increase in import penetration, were probably the major forces behind the changing nature of industry over the past decade, figure 1 shows that a substantial part of national industrial production may not take that form. For instance, it is unlikely that many firms in low-income countries are prepared to participate fully in global value chains.

2. Globalization of production: causes and forms

A number of forces can be attributed to making globalization, or internationalization of production, possible, in particular the following:

- *Policy liberalization.* Successive General Agreement on Tariffs and Trade/World Trade Organization (GATT/WTO) trade rounds have resulted in lower tariffs. Trade in products and services is cheaper with lower tariffs. It facilitates a separation of production and consumption, or a separation of different stages of the production process. Removing border barriers contributes to efficiency, providing larger possibilities for industrial upgrading;
- *Technical change in information and communication technologies.* Due to the emergence of cheaper information and communication technologies, it has become easier to manage production systems across borders;
- *Reduction in transport costs.* Due to technical change, shipping, air and rail freight have become cheaper elements in trade costs (Feenstra [16]);
- *Economies of scale and growing markets.* The size of the world market is growing, making production processes with economies of scale profitable. What was once a single activity can now be done profitably in more than one stage merely because the size of the market permits the realization of economies of scale. Jones and Kierzkowski [29] argue that growing production at the world level allows economies of scale in those services important to the linking of individual production blocks.

Globalization of production has led to an increase in trade. Trade has been growing more rapidly than value added in the past few decades. There has also been a substantial increase in intra-industry trade, that is, trade in differentiated products within the same industry. While there have been waves of increasing trade in the past, that is, prior to 1913, currently a significant share of trade is in semi-manufactured products for further processing as opposed to trade in finished products. This also shows that the trend is towards globalization, rather than mere internationalization, of production.

Data reveal clear patterns regarding the types of products that have benefited under the current wave of globalization in production. Lall [36] divides manufacturing trade into four technological categories: resource-based (processed foods, leather and wood products); low technology (textiles, clothing, footwear and furniture); medium technology (metals and simple electronic products); and high technology (computers, complex electronics and pharmaceuticals). Some are finished goods, while others are semi-manufactured products. Trade values of primary products increased by 3 per cent between 1980 and 1997, and within manufacturing, trade in resource-based products

increased by 6 per cent over the same period. Similarly, trade values of low- and medium-technology products increased by 8 per cent, respectively, and high-technology products by 12 per cent. Hence, the share of technologically intensive products in total trade increased substantially in both developed and developing countries.

While globalization of production and increased trade are two sides of the same coin, both manifest themselves in two ways: through fragmentation of production; and through global value chains. Each of these is discussed in turn together with their implications for promoting industrial development. It should be noted here that promoting industrial development involves much more than just taking account of globalization.

Fragmentation of production through foreign direct investment

A significant part of the increase in trade is due to the process of vertical specialization caused by fragmentation of production processes. For example, the search for cheaper production costs forces manufacturers of automotive or electronic manufactures to relocate parts of the production process to alternative sites. For instance, manufacturing multinational enterprises maintain design, research and development facilities or marketing functions at headquarters in developed countries where the necessary skills are available, but relocate labour and less skill-intensive production processes, such as assembly operations, to low-cost developing countries. Globalization of production occurs through fragmentation of production processes and often manifests itself in foreign direct investment through efficiency-seeking and vertically integrated transnational corporations. Evidently, foreign direct investment is often favoured over outsourcing (which does not involve ownership), as production processes contain proprietary and secret technological knowledge. The increase in exports of technology-intensive products from developing countries, such as Costa Rica, Malaysia, Mexico and the Philippines, have often been linked to the presence of foreign firms.

There are several examples of the importance of fragmentation of production, and all show that it has been increasing in world trade. One approach estimates the share of world trade in commodities classified as parts and components, and finds that it is currently rising to around 30 per cent of manufacturing trade. Campa and Goldberg [9] provide estimates based on input-output data (see table 2). They find that fragmentation of production, as measured by the share of imports in total inputs used in production, has increased substantially. The import share is highest for electrical and transportation equipment, and many developing countries, such as Malaysia and Mexico, have benefited as a result. Much of this trade takes place within transnational corporations.

TABLE 2.
SHARE OF IMPORTS—TOTAL INTERMEDIATE INPUTS, 1974, 1984 AND 1993
(Percentage)

Sector and country	1974	1984	1993
Manufacturing			
Canada	15.9	14.4	20.2
Japan	8.2	7.3	4.1
United Kingdom	13.4	19.0	21.6
United States	4.1	6.2	8.2
Chemical and allied products			
Canada	9.0	8.8	15.1
Japan	5.2	4.8	2.6

TABLE 2. (continued)
 SHARE OF IMPORTS—TOTAL INTERMEDIATE INPUTS, 1974, 1984 AND 1993
 (Percentage)

Sector and country	1974	1984	1993
United Kingdom	13.1	20.6	22.5
United States	3.0	4.5	6.3
Industrial machinery			
Canada	17.7	21.9	26.6
Japan	2.1	1.9	1.8
United Kingdom	16.1	24.9	31.3
United States	4.1	7.2	11.0
Electrical equipment			
Canada	13.2	17.1	30.9
Japan	3.1	3.4	2.9
United Kingdom	14.9	23.6	34.6
United States	4.5	6.7	11.6
Transportation equipment			
Canada	29.1	37.0	49.7
Japan	1.8	2.4	2.8
United Kingdom	14.3	25.0	32.2
United States ^{a/}	6.4	10.7	15.7

Source: Campa and Goldberg [9], tables 1, 3, 5 and 7.

^{a/} United States estimates are for the years 1975, 1985, and 1995.

Global value chains through networks of firms across borders

Another form of globalization of production is through global value chains. A value chain includes the full range of activities required to lead a product or service from conception, through the intermediary phases of production (transformation and producer services inputs), to delivery to final consumers and its final disposal after use (Kaplinsky [32], p. 8). A value chain can be referred to as global only when it involves different firms at different stages in different countries. A chain consists of a number of different enterprises, each specializing in different functions but linked through cooperation in a network. One example is the textile-clothing value chain, starting with the use of raw materials to produce fibre, extending to textile and clothing production, and finally to retail and other end-uses. In the buyer-driven textile-clothing chain, large retailers, branded marketers and branded manufacturers play an important role in coordinating production networks, typically involving developing countries whose firms are contracted to supply goods according to specification. Gereffi [19] argues that profits in buyer-driven chains are derived not from scale, volume and technological advances as in producer-driven chains, but rather from unique combinations of high-value research, design, sales, marketing and financial services. They permit retailers and branded marketers and manufacturers to act as strategic brokers in linking overseas factories with evolving product niches in the main consumer markets.

Implications of fragmentation of production and value chains for industrial development

Fragmentation of production offers developing countries a wide range of possibilities for industrial development if firms are able efficiently to play a role in the supply chain, for instance, assembly with low labour costs. Globalization of production, as part of the value chain, is also based on the importance attached to efficiency (productivity or competitiveness) of the entire value chain. Hence it is

important to understand the systemic efficiency of the entire chain as opposed to efficiency of the individual parts (assembly of those products that meet certain consumer requirements). While fragmentation encourages firms to specialize and compete on the basis of efficiency of individual production processes, value chains encourage firms to specialize in stages of production within the entire value chain. The former is associated with firms becoming more efficient in certain production processes; the latter also requires a firm to possess the knowledge and capabilities to participate in a value chain and to assess how efficiently its production fits in with the efficiency requirements of the chain as a whole. If a firm is unwilling to participate, or to learn to participate, in a function that is needed to maximize the systemic efficiency of the entire chain, it will be sidelined, no matter how efficient the individual firm is. Thus, a focus on efficiency of production is not sufficient to succeed in globalization processes if the outputs do not help to maximize the entire value chain. In essence, this implies that both efficient and appropriate production are important.

3. Specialization in industrial activity

Globalization of production, through fragmentation and value chains, involves the specialization of the manufacturing process into different stages and functions. Appropriate production of manufactured goods involves a number of different activities, including manufacturing and services at various locations that fit in with the systemic efficiency of the entire chain.

Kaplinsky (2000) reviews specialization in production for several products and discusses the distribution of gains according to functions in the value chain for products, such as fresh and canned fruit, fresh vegetables and footwear. For instance, fresh fruit and vegetables involve seed design, growing, post-harvest processing, exporting and retailing. While the main value added activities are in growing and wholesale, seed design and new product development have become increasingly important. Retailers and importers capture a significant share of the value added, leaving little space for processors in developing countries, where competition is high. Brand names appear to be increasing in importance.

Canned deciduous fruit similarly involves seed design, growing, post-harvest processing, exporting, buyers and retailers. Producers and wholesalers in developing countries used to dominate this value chain, but currently growers and canners in Europe and the United States of America are increasing in importance. It is expected that brand names and marketing will also increase in importance, thus enabling retailers and brand manufacturers to capture a significant share of value added.

The footwear industry has also undergone tremendous change. Leather and shoe producers in developed countries used to capture a significant share of the value added. However, as changes in the industry now involve design, assembly, buying and retailing, most of the value added is in design, marketing and buying skills, leaving assembly or production, both low value added activities, to countries where cheap, low-skilled labour is available.

The structure of clothing is likewise changing. Clothing in the United States and Northern Europe is now dominated by a handful of retailers, leading to buyer-driven commodity chains. In producer-driven commodity chains, large transnational manufacturers play a central role in coordinating production networks. In buyer-driven commodity chains, large retailers, branded marketers and branded manufacturers play an important role in coordinating and relocating production

networks, typically towards developing countries where firms are contracted to supply goods according to specification. Only a few firms, including retailers and branded marketers and manufacturers, actually determine where to source clothing.

Some countries have fared well under the buyer-driven system, with some Asian countries becoming original equipment manufacturing and/or original brand manufacturing producers. The newly industrializing countries of East Asia became original equipment manufacturing producers. This was partly due to triangle manufacturing, in which, for example, buyers from the United States place orders with East Asian newly industrializing countries that, in turn, shift part of the production to low-wage countries, such as China, Indonesia or Viet Nam. Finished goods are then shipped directly from that country to the United States, under the United States quota system applicable to the exporting country (Gereffi [19]). However, other countries find themselves locked into the upstream part of the production chain, with few incentives from actors lower down the chain to upgrade.

Factors other than labour costs and labour productivity are becoming increasingly important for determining the competitiveness of the textile and clothing industry. Under offshore processing trade agreements, companies in the European Union have moved from manufacturing to managing producer networks, design, product development and distribution. The ability to do this is a factor in competitiveness as important as the ability to keep abreast with the latest trends in consumer demand. Just-in-time production, design and efficiency in marketing have recently become crucial in the sector. It is no longer sufficient to wait for customers. Efficient marketing strategies must therefore be developed in order to survive. A few large firms in the European Union, Japan and the United States have most experience in this area. The largest firms active in the clothing industry include Adidas, Benetton, Calvin Klein, Levi Strauss, Sara Lee and VF Corporation.

In addition to the textiles and garments value chain, the leather sector has undergone significant changes through globalization. Actors in the various stages of the production process in the leather sector include livestock and rural farmers, traders and dealers, tanners, manufacturers of leather products and buyers of semi-finished products. The demand for a wider variety of leather products has led to increasing fragmentation. Every product, be it leisure or sports articles, involves designer skills and knowledge of special distribution channels. Rapidly changing market requirements demand increasingly flexible production methods and shorter delivery times. In the case of Ethiopia, special attention must be given to the appropriateness of its production so that it fits in with the entire value chain. Apart from the efficiency of manufacturing processes, which must be enhanced, the major constraint for the sector as a whole is the supply of low-quality skins and hides that must be tackled urgently if the rest of the chain is to become more successful.

There are several other manufactured products whose production process has fragmented considerably and where services, such as marketing and transport, are increasing in importance. For instance, an automobile used to be an assembly of metal pieces, and production by assemblers accounted for 65-70 per cent of the total value added. Organizational change, for instance, the introduction of just-in-time techniques, has facilitated the process of outsourcing. As a result, final assembly plants currently account for less than 40 per cent of the value of an automobile. The most important stages, in terms of value added, apply to functions such as managing the subcontracting process and design. The functions in the value chain of an automobile involve raw material process-

ing, design, forming, assembly, exports and spares. Assembly, with significant competition in developing countries, is a relatively low-value added activity. For instance, 30 per cent of the value of a United States automobile goes to the Republic of Korea for assembly, 17.5 per cent to Japan for components and advanced technology, 7.5 per cent to Germany for design and 4 per cent to Taiwan Province of China and Singapore for minor parts; a further 2.5 per cent goes to advertising and marketing services and 1.5 per cent to Ireland and Barbados for data processing (Venables [79]). Fragmentation of production is also common in the semiconductor industry. UNIDO [73] argues that an enterprise may design a semiconductor in the United States with an affiliate in India, buy the wafer from Taiwan Province of China, assemble and test the chip in the Philippines, and then ship it to Germany where it can be marketed to the rest of Europe.

UNIDO [73] discusses the global value chain of wooden furniture. This value chain includes various stages from forestry to sawmills, furniture manufacture, buyers, consumers and recycling. The example of wooden furniture in South Africa was used to demonstrate how globalization affects industrial development through involvement in the appropriate value chain. Pine furniture in South Africa has faced increasing price competition and pressure on export prices. Products were also considered to be of low quality and poor delivery reliability. Even if the efficiency level at the manufacturing stage of this value chain were raised, it would not have prevented the global buyer, IKEA, to switch to more competitive East Asian locations. The appropriate solution for South Africa was to focus on a slightly different value chain using environmentally friendly wood.

Globalization of production involves specialization of activities, varying by product. As only a small part of the value added of a final product ready to be consumed relates to activities during manufacturing processes, the actual value of a manufactured product is reflected increasingly in the information or retail content, thus blurring the line between manufacturing and services. As mentioned earlier and in Lall [36], 50 per cent of the value of a new car is in its information content through design, process management and advertising. This can be even higher for a typical manufacturing product, if sales costs are included.

The manufacturing contribution to agriculturally processed products is 13 per cent for the packaging of fresh vegetables shipped from Kenya to a supermarket in the United Kingdom of Great Britain and Northern Ireland, and 15 per cent for canning and 12 per cent for the production of cans of fruit shipped from South Africa to a supermarket in the United Kingdom. Other costs relate to raw materials, exports and imports and retail margins (Kaplinsky [32]). Therefore, what may once have been a clearly defined product produced in one country, for example, a car or a computer, is now split up into different activities in different countries: research and development and design in developed countries; production of components in developing countries; and assembly and testing in either developed or developing countries.

4. Public-private interactions and the nature of industry

Globalization forces countries to rethink how the private sector operates vis-à-vis the public sector. Public-private interactions are therefore a vital part of this rethinking process, as they affect the nature of industry. Over the past decades, the role of the State in providing industrial goods has diminished, but that of the private sector in providing services increased. Both the private and public sectors face limitations, but they join forces when necessary. This is, in part, due to globalization,

which forces countries to rely increasingly on private sector development. However, the private sector depends on market transactions being honoured. In this sense, countries prepare for market-led industrial development by setting the right governance structures and ensuring an enabling environment to promote the private sector and the process of industrial development. Nevertheless, this paradigm creates a more blurred distinction between public production (and what it provides), on the one hand, and private production (and what it provides), on the other. The literature distinguishes between various public-private interactions, as follows:

- *Public-private partnerships.* Public-private partnerships are a form of public-private interactions where both the public and private sectors assume joint ownership and responsibility as opposed to fully public or fully private organizations. They are specifically established and negotiated to cover in detail mutual responsibilities and obligations of public and private partners in order to provide agreed inputs and outputs under enforceable contracts (Mistry and Olesen [45]);
- *Public-private consultation mechanisms.* Public-private consultation is a formal consultation exercise where the public sector consults with the private sector on policy issues, but where the public sector ultimately makes the decisions (UNIDO [70]);
- *Joint public-private activities.* Other forms of public-private interactions could be termed joint public-private activities. These include activities such as the provision of subsidies for training and technology centres. Joint ventures between foreign and State-owned enterprises can also fall under this category.

Public-private partnerships can take a variety of forms ranging from subcontracting, to franchises and leasing. The private sector is often contracted to provide public services of a special nature. Public-private partnerships occur mainly in the service sector, such as physical infrastructure, namely roads, ports and airports; telecommunications infrastructure; energy services, such as electricity generation and distribution; and water supply and waste treatment. They therefore affect industry indirectly. Implemented with appropriate institutions and regulations, public-private partnerships can provide an enabling environment for industrial development, including good-quality, appropriate and affordable services. The general aim of public-private consultation mechanisms is to increase the relevance of public policies in support of private sector development. Some public-private consultation mechanisms appear to focus on industrial sectors (UNIDO, 2000), while others are more macroeconomic in design. They can be quite important in fostering dialogue between the public and private sectors in low-income countries, where there is often mistrust on both sides. Public-private consultation mechanisms could in the long run enhance industrial development.

Of the above, joint public-private activities seem to be the main avenue through which public-private interactions can affect industry directly. There are various examples of successful joint public-private activities. One well-known case is the Malaysian Penang Skills Development Centre, which is sometimes considered best practice for providing appropriate training (see <http://www.psd.com.my/>). The Centre was set up to address a growing shortage of skilled labour in the skill-intensive operations of transnational corporations in free trade zones and industrial estates. It was initially financed jointly by the public sector, through grants, training materials, equipment and trainers, and by the private sector, in the form of donations, loan of equipment, furniture and private training facilities. It is now self-financed, offers courses at competitive rates, and is officially recognized as a training centre for technical and managerial skills and higher

education. In addition, the centre has a unique advantage of being able to obtain immediate feedback from the private sector on course content and future training needs. The temporary support from the public sector distinguishes this type of joint public-private activity from those more formally negotiated and longer-term public-private partnerships or consultation mechanisms.

The case of the Intel investment in Costa Rica constitutes another form of joint public-private activity (Spar [58], Larrain and others [41] and Rodriguez-Clare [54]) that helped to coordinate the demands of industrial firms and ensure the supply of relevant capabilities. For example, local universities were able to transform themselves in order to provide suitable graduates at short notice, a factor that encouraged Intel to invest in Costa Rica. The crucial role of the Costa Rican Investment Promotion Agency in this process has been duly recognized (Spar [58]). Subsequently, Intel and the Government set up joint training and technology institutes that have benefited Intel as well as other firms working in the sector. Such supply-side, or competitiveness, interventions could help Costa Rica to benefit from high-technology foreign direct investment which could also be used to tailor existing educational courses to meet the needs of the private sector at short notice. There are several other successful examples of such interventions which, in effect, address market failures in the market for skills. The nature of market failures and how the supply of public goods can overcome those failures are dealt with in chapter II of the present report.

5. Changing conditions of industry and industrial development in a globalizing world

The changing conditions described above, in particular the increased emphasis on specialization in the manufacturing production process, have implications for industry and industrial support. The traditional view of industry was that of firms producing final goods, where support was focused on the economic efficiency of individual firms. The changing conditions demand the consideration of new issues in industry. In particular, it is important to note that individual firms increasingly need to be seen as playing a part, albeit small, in a long supply chain or value chain. Therefore, a better description of industry is that it consists of a range of industrial activities, some of which are inputs into others, and some of which produce final goods. A vibrant and productive industry depends not only on the efficiency of individual production processes, but also on the appropriateness of each individual production process in value and supply chains. Besides, one stage of the production process is more likely to fit in with the next, if it complies with national standards, or with international standards, if the next stage is in another country. Moreover, the different activities, such as design, production, marketing and research and development are becoming increasingly interlinked.

Support for industrial development needs to be concerned with both the efficiency and appropriateness of production. As industrial development is in itself a process that enables the range of industrial activities to take place, it is important to promote more efficient industrial activities. This includes the promotion of technical and human resource capabilities to facilitate the adoption of new technologies and to ensure that production tasks are carried out more efficiently. In effect, the aim is to facilitate the learning and innovative activities of firms. Many examples show that measures are being taken to improve the relevance of technology institutes for the private sector, and firms are also being encouraged to use more efficient techniques. If the focus is on increasing efficiency and productivity, firms will be able to produce better and cheaper products for the local market, compete with imported products, and finally become integrated into the international production networks.

However, the discussion of value chains showed that industrial activities, defined on the basis of efficiency alone, might not be sufficient for participation in later stages of the value chain. Given the changing conditions, the concept of industry needs to take other issues into account as well. Compliance with national and international standards is one important aspect. Moreover, a focus on the sustainability of industrial development is required. Sustainable development relates to economic and environmental as well as social aspects. An industrial activity should not only be efficient economically or of a short-term nature, but must also be environmentally efficient. For instance, cleaning up upon completion of an industrial activity, or taking preventive measures to stop any environmental damage caused by industry, is important, given the changing conditions of industry. Sustainable production includes activities such as the adoption of cleaner technologies. Strict adherence with national or international regulations and standards would help to achieve this.

Hence, to be successful industrial development must promote not only more efficient but also more appropriate industrial activities, that is, focus not just on the efficiency of industrial production but also on how industrial production fits in with value chains. Promoting appropriate industrial activities extends beyond the promotion of technical and human resource capabilities to facilitate the adoption of new technologies needed to carry out individual tasks more efficiently. It also entails promoting knowledge on the right quality and standards of products so that they fit in with the other stages of the production process or are ready to be supplied to the consumer market. Quality control and standards of production are necessary elements for products to be sold.

Again, focusing on the manufacturing supply-side issues alone may not be sufficient for successful industrial development, for instance, if there is a lack of demand despite efficient and appropriate production. Successful industrial development requires promoting more efficient and appropriate industrial activities, as well as creating favourable economic and regulatory conditions to produce and market both semi-manufactured and manufactured products. In this sense, there is an increasingly strong linkage between trade and industry. This linkage is being increasingly recognized by organizations such as UNIDO, in areas such as market access, trade facilitation and efficient provision of services for the production of both semi-manufactured and manufactured products. Other areas include promoting the right macroeconomic conditions and an efficient regulatory framework that could also help to set the right conditions for the service sector to become more competitive.

Given the forces of globalization, countries and firms need to understand how to go about positioning themselves. They must also learn how to link their industrial activities to value chains and international production networks. This involves improving market access and marketing and retail techniques for their products. Without such efforts, industrial capacities and capabilities would be useless. In the same vein, without good quality and appropriate manufacturing of products that comply with standards demanded by consumers or sourcing companies in other stages of the value chain, focusing on market access does not guarantee industrial development. Adopting efficient and appropriate production methods is thus a primary and necessary step for promoting industrial development, although it may not be sufficient.

While it is important to promote efficient production, the forces of globalization demand that ways be sought to promote appropriate production that comply with the standard demanded by value chains and international production networks. UNIDO seems well placed to assist developing

countries in promoting efficient and appropriate industrial production. More importantly, determining what is appropriate requires defining ways to obtain knowledge of demands placed by international sourcing companies and consumers and of the forces that shape such demands and market access more generally.

Other types of support should focus on how to improve market access through marketing, trade promotion and trade negotiations. Such support must, however, be coordinated closely. To improve the efficiency of production it is necessary that such improvements occur in areas where a (dynamic) comparative advantage can be assured.

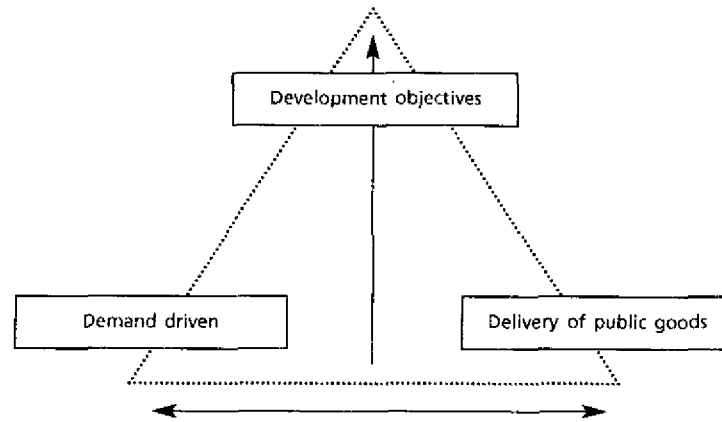
TABLE 3.
SUPPORT FOR INDUSTRIAL DEVELOPMENT

<i>Type of support</i>	<i>Example of activities included in technical assistance for industrial development</i>	<i>Knowledge requirements</i>
Promote efficient production at individual stages of production	Capacity-building for industrial policy. Promote transfer of technology and technology adoption through technology centres	Use demonstration effects and show best practices in successful adoption of new and cleaner technologies
Promote efficient and appropriate production through support at industrial level	Build capacity to assist firms with adoption of international product and process standards and regulations or international trade rules	Discuss new challenges created by the globalization process for the process of sustainable industrial development
Promote industrial performance through general measures, such as macroeconomic and trade support	Support for standardization and quality control No direct role	Discuss implications of national and international conditions and activities outside industry for industrial development

Table 3 explains this more clearly. It links various types of support for industrial development to different types of activities, including technical assistance and knowledge creation. The rows relate to the type of support for industrial development that is required, and the columns indicate possible roles for technical assistance activities and knowledge requirements, such as dissemination. While technical assistance could relate to efficient and appropriate production at various levels of production, knowledge creation is essential, for example, to discuss implications of national and international conditions, and of activities outside industry that have an impact on industrial development. It would also help to assess the appropriateness of promoting efficiency of certain stages in production.

The observation that support could be useful for industrial development is not sufficient to warrant any type of intervention. Further assessment criteria or guiding principles are therefore necessary, some of which are discussed in chapters II and III of the present report. The UNIDO *Industrial Development Report 2002/2003* ([73], chap. VII) elaborates on possible principles guiding support services for innovation and learning, in particular the following: there should be a demonstrated need for the service; services should be shared as widely as possible; and services should not be supplied solely by government. Te Velde [78] reflects on the importance of those principles and suggests the following three-dimensional evaluation criteria for public support programmes for private sector development: development objectives; demand-driven activities; and delivery of public goods (figure II).

FIGURE II.
CRITERIA FOR EVALUATING PUBLIC SUPPORT PROGRAMMES



Source: Velde [78].

Development objectives. Support programmes need to be assessed in accordance with certain predefined criteria, such as the quality and type of employment and the number of start-ups of small- and medium-sized enterprises, that fit in with wider private-sector development programmes and with the Millennium Development Goals set forth in the United Nations Millennium Development Declaration.^{*}

Delivery of public goods. As is explained in more detail in chapter II, support should focus as much as possible on the delivery of public goods for the following two reasons: (a) if private goods are provided, there is no guarantee of additionality to what firms intend to do; (b) by focusing on the provision of public goods, all firms will benefit, causing no harmful crowding out of other firms or unfair competition between private service providers.

Demand-driven activities. Involvement in industrial development is usually on the supply side, involving, for example, skills and technology, and the challenge is not to distort the market, thereby potentially compromising sustainability. This can only be done by stimulating those activities/sectors that are currently, or will be, in demand. Very often the private sector does not react well to more stringent rules and regulations, unless they ensure a workable and predictable future. Hence, support that is flexible and more in tune with private sector needs is more likely to be successful. Such a focus could prevent the establishment of failing institutions.

While adherence to such criteria is likely to guarantee more successful interventions in industrial development by the public sector, this does not necessarily lead to creating new institutions. There have been many cases of failed institutions that were too static, with few direct interactions with the private sector. Furthermore, in many cases, the private sector may have taken the lead to become more productive through coordinated action. Finding an appropriate role for the public sector amid the new realities of industrial development is therefore the real challenge. The present report focuses, in particular, on how the provision of public goods can stimulate industrial development by overcoming market failures.

^{*}General Assembly resolution 55/2 of 8 September 2000.

C. INDUSTRIAL DEVELOPMENT AND THE CHANGING NATURE OF INDUSTRY: COUNTRY EXAMPLES

This section discusses how globalization affects different aspects of industrial development in Bolivia, the United Republic of Tanzania and Viet Nam, countries that are among the poorest in Latin America, Africa and East Asia, respectively. The challenges that the forces of globalization pose for industrial development and the concept of industry in these countries are treated together with the three issues discussed earlier, namely, efficiency of production, appropriateness of production and overall conditions that support industrial development, including trade conditions, such as market access and macroeconomic conditions. Most of the discussion is based on examples from the selected countries to show how globalization could affect the concept of industry. Basic data for the three countries are given in table 4.

TABLE 4.
BASIC DATA FOR BOLIVIA, THE UNITED REPUBLIC OF TANZANIA AND VIET NAM

<i>Item</i>	<i>Bolivia</i>	<i>United Republic of Tanzania</i>	<i>Viet Nam</i>
Population (millions, 1999)	8.1	32.8	78.7
GDP (billions of dollars, 1999 or closest)	8.4	7.9	27.2
Share of MVA in GDP (1998 or closest, percentage)	16.5	6.6	21.5
MVA per capita (dollars, 1998 or closest)	178	16	39
Manufactures in total exports (percentage)	63.6	35.3	..
Manufactures in total imports (percentage)	97.1	96.3	..
Third level enrolment (percentage of population)	1.477	0.043	0.404
Total technical enrolment (percentage of population)	0.343	0.012	..
Royalty and licence payments abroad (1998, dollars per capita)	0.6	0.1	..
Telephone lines (1998, per 1000)	68.8	3.8	..

Source: UNIDO and Lall [37].

1. Bolivia

Manufacturing value added has been increasing in pace with gross domestic product (GDP) and the share of manufacturing value added in GDP has hovered around 17-18 per cent. However, there have been noticeable changes within the manufacturing sector over the past two decades. Petroleum refineries are currently playing an important role, while the share of the food sector is declining, partly reflecting a productivity or efficiency problem amid globalization and regionalization. Data on the contribution of main sectors to manufacturing value added in selected years are given in table 5.

TABLE 5.
CONTRIBUTION OF MAIN SECTORS TO MANUFACTURING VALUE ADDED IN BOLIVIA, 1985 AND 1999
(Percentage)

<i>Sector</i>	<i>Contribution to value added 1985</i>	<i>Contribution to value added 1999</i>
Food	49.2	20.5
Beverages	8.6	13.1
Textiles	6.6	2.4
Wood	1.2	1.3
Petroleum refineries	7.4	35.6
Printing and publishing	2.3	2.5
Other	24.7	24.6
All	100.0	100.0

Source: UNIDO Industrial Statistics Database.

For instance, wheat millers in Bolivia have had difficulties dealing with the competitive forces unleashed by globalization. In addition to Bolivia being a part of the Andean Group, in an effort to strengthen ties with the countries of Mercosur (Southern Common Market), Bolivia signed, in 1997, an agreement with, and has thus become an associate member of, Mercosur (comprising Argentina, Brazil, Chile, Paraguay and Uruguay). As part of the Mercosur agreement, tariffs on wheat and wheat flour imported from Argentina are being gradually reduced, and will be eliminated by 2011. The reduced tariffs on imports of flour are now equivalent to those on wheat. Ever since this tariff change, flour producers in Argentina cater to the needs of as much as 50 per cent of the Bolivian market. As a result, the national industry has declined tremendously, with 14 of the 20 flour producers in Bolivia going bankrupt. Hence, efficiency and productivity must be upgraded if flour producers are to withstand import competition and promote industrial development.

However, industrial policy needs to address not only the efficiency of production, but also the appropriateness of production, for example, the readiness to comply with international standards, as in the case of the textile and garment sector. As box 1 shows, Bolivia may be able to avail itself of special trade preferences in the United States market. But the extent to which Bolivia will use them depends on whether the efficiency level of existing textile producers can be upgraded to meet international standards such as those demanded by United States sourcing companies. As only a few are able to do this alone, a combination of interfirm cooperation and the right type of industrial support could help.

Box 1. Bolivia: linking trade capacity and supply-side capacity

The Andean Trade Programme, which is part of the Andean Trade Programme and Drug Eradication Act, has recently replaced the expired Andean Trade Preferences Act, of 1991 in an attempt to further increase market access by as much as 700 Bolivian products in the United States market (around 30 per cent of Bolivian exports to the United States fall under the Andean Trade Preferences Act), by December 2006 at the latest. It attempts to provide incentives to diversify Andean economies away from narcotics.

Among many new products, the Andean Trade Programme now offers opportunities for Bolivian textile manufacturers, as it will allow quota-limited (but increased) and duty-free imports into the United States of clothing made in Bolivia from Andean fabric (quota capped at \$250 million compared to the current \$40 million worth of Bolivian imports) or other fabrics, dyed and finished. It has been estimated that this could create up to 40,000 jobs.

However, there are only a few Bolivian companies that have the capacity to make use of this incentive. One source mentioned that the incentive applied to only 10 companies. If Bolivia wants to benefit fully from the tax-free entry, exporters must invest in updated technology and enhance the skills of workers ensuring full compliance with the stringent requirements of buyers in the United States (large sourcing companies). An active competitiveness strategy for the textile and clothing industry is essential.

Another route is attracting foreign direct investment. The Government of Bolivia is actively trying to lure textile/clothing firms in the United States to invest in Bolivia by creating tax-free or export processing zones and other firms. However, unless an attempt is made to create linkages between local firms and investors in the United States (or other foreign investors), local firms (and potentially the local economy) are unlikely to benefit much because firms in export processing zones often have few linkages with the local economy. The textiles and clothing sector has the potential to create opportunities for poor workers.

Some action is being taken at the government level to coordinate various ministries, such as Economic Development and External Trade. This is not trivial and appears to be a one-off coordination to make use of the Andean Trade Programme. It would be useful if trade and supply side capacity were effective, appropriate and sustainable in delivering the right mix of good-quality textiles and clothing for exports to the United States. Above all, this requires continuous dialogue among various ministries responsible for trade and competitiveness (including training, technology and cluster development). Bolivia is just starting to learn how to react to newly created trade incentives and how to make trade opportunities work for development, especially for the poorer segments of the population. There are undoubtedly real challenges ahead.

Source: Te Velde [78].

Special mention must be made of the remarkable experience of a Bolivian firm, AMETEX. Some observers indicate that AMETEX is solely responsible for some 70-90 per cent of total Bolivian textile exports. While more than three quarters of AMETEX income is derived from exports, half the sales orders are from one buyer, namely, Ralph Lauren. Again, while this is one example of a firm that has managed to be part of a global value chain (and the firm recently announced that it was able to offer 100 per cent Bolivian products, without the need to import), entertaining only one buyer can have negative effects. Thus, like many other firms in the sector that have gone bankrupt because of the recent adverse economic conditions, it is hoped that AMETEX, which has incurred high debts, will not experience the same fate. This shows that perhaps it is not investment in technology, but rather working capital, that firms are in need of.

The overall business climate is far from conducive to industrial development. Many factors in the index of current competitiveness produced by the Ministry of Finance show disadvantages for competitiveness of firms, with technology and infrastructure performing the worst. The private sector complains about high interest rates, poor quality of the education system and the lack of necessary infrastructure.

Industrial policy in Bolivia is virtually nonexistent. Until 2001, there apparently was not a single institution that implemented public policies to achieve greater productivity and competitiveness. In 2001, the Bolivian system of productivity and competitiveness was created with the objective of establishing a strategic alliance between the public and private sectors and civil society to generate and implement public policies designed to improve levels of productivity and competitiveness in the country. On the basis of a common long-term vision, the system aims to develop and strengthen productive clusters, abolish red tape, improve managerial skills and capabilities, and develop a regional apparatus to implement policies on a national scale. Various so-called clusters have been identified. Table 6 shows current and planned exports and job generation. To implement those plans, different types of support are required, including the adoption of technology to enable efficient production, the upgrading firms to meet international standards and ensure appropriate production, as well as other types of support, such as macroeconomic, trade and educational support.

Interviews conducted in Santa Cruz suggested that for industrial development to take place, public-private dialogue must be enhanced. Is the public sector able to meet the demands of the

private sector? According to the private sector, the Government needs to improve the functioning of financial markets, institutes and infrastructure. Privately funded institutes appear to be more in tune with the needs of the private sector. This points to the urgent need for improved public-private dialogue in order to withstand the forces of globalization.

TABLE 6.
EXPORTS AND EMPLOYMENT GENERATION IN THE MAIN CLUSTERS

Cluster	Current situation (2001)		10-year projection	
	Value of exports (millions of dollars)	Job generation (direct/indirect)	Value of exports (millions of dollars)	Job generation (direct/indirect)
Oleaginous products	300.00	104 000	600.00	160 000
Quinoa	5.00	30 000	40.00	120 000
Wood and manufactures	41.00	10 000	1 000.00	150 000
Leather and manufactures	23.00	2 352	80.00	10 000
Bananas	5.00	3 870	30.00	8 000
Tourism	160.00	60 000	2 000.00	125 000
Textiles and garments	42.30	2 483	300.00	17 600
Cameloid products	46.00	60 000	120.00	160 000
Poultry	0.17	30 500	5.00	68 000
Wheat	0.05	35 000	2.00	43 000
Brazilian nuts	30.00	30 000	116.80	110 000
Grapes and wine products	0.11	11 700	1.10	50 000
Hearts of palm	3.10	1 000	10.00	3 226
Meat	0.01	12 000	40.00	16 000
Total	655.74	392 905	4 342.90	1 040 826

Source: Bolivian system of productivity and competitiveness (2001).

2. United Republic of Tanzania

This section aims to provide an overview of the industrial, in particular the manufacturing, performance of the United Republic of Tanzania since the late 1990s. The topic is discussed in the context of how the concept of industry is changing and how industrial policy can support and promote development in a new environment, which places more emphasis on private sector development.

Lall and Pietrobelli ([39], chap. IV) discuss technology and competitiveness (or perhaps, more accurately, the reasons for the lack thereof) in the United Republic of Tanzania, identifying the critical need for technological upgrading. They cite the garments sector as an example of the devastating effects of the lack of technological capabilities and formal investment in research and development. The technology infrastructure in the United Republic of Tanzania "is small and largely ineffective, poorly funded and motivated, and has weak or no links with industry" (Lall and Pietrobelli [39], pp. 101-102). Furthermore, the almost complete absence of private technological activity imposes a heavy burden on the weak public technology infrastructure. The extremely weak technological capability is a fundamental factor underlying the lack of competitiveness in manufacturing. In the current global environment, technology is a prerequisite for industrial development.

Industrial performance and composition

The manufacturing sector of the United Republic of Tanzania has been weak, even by African standards. Only recently has mining, the other major industrial sector, assumed significance. As is the case throughout sub-Saharan Africa (Bigsten and others [6]), manufacturing exports of the United Republic of Tanzania are negligible: few firms export, and those that do, export only a small proportion of their output (Grenier and others [21]). When trade liberalization started in the late 1980s, it was perceived that there would be an increase in competition from imports, but firms competing with imports have been constrained in their ability to increase prices. Moreover, in contrast with firms that compete with other domestic firms, those that compete with imports or with foreign firms in foreign markets generally exhibit more concern regarding the trends in economic variables and how changes in policy could affect them. Exporters, on their part, appear somewhat more confident than non-exporters, as is to be expected if liberalization obviates biases against exports. If trade liberalization was perceived to have been associated with increased competition, while benefiting exporters it poses concerns for firms that compete with imports (Grenier and others [22]). By trying in this way to present a picture of industry in the United Republic of Tanzania in terms of competition (see figure I above), the aim is to identify the types of industrial policy measures that would be appropriate for different types of firms.

Considering the performance of the manufacturing sector over the period from 1985 to 1999, the latest years for which data are available, between 1976 and 1986 the United Republic of Tanzania experienced a relative and absolute decline in the manufacturing sector. Manufacturing output fell at an average rate of 3.6 per cent per annum. Likewise, the contribution of the manufacturing sector to overall GDP fell from 13 per cent in 1976 to 7.9 per cent in 1986. Following the initiation of economic reforms in 1986 (see Basu and Morrissey [4] and Morrissey[46]), the manufacturing sector made an absolute, though not relative, recovery. Despite the fact that manufacturing output grew at an average rate of 3.7 per cent per annum over the period 1986-1994, due to growth in other sectors of the economy (again, chiefly the primary sector), the contribution of the manufacturing sector to overall GDP was minimal. By 1994, the sector accounted for only 7.6 per cent of GDP. Investment in manufacturing reveals a similar pattern of decline in the early 1980s, and a gradual recovery thereafter. Since the mid-1980s, the proportion of overall GDP accounted for by gross fixed capital formation has never fallen below 30 per cent. Being relatively capital intensive, the manufacturing sector accounts for around one quarter of this investment. Even the contribution of manufacturing to exports declined from some 20 per cent in the early 1990s to below 10 per cent by 1998.

Table 7 presents data on trends in manufacturing output, distinguishing the four major subsectors. As can be seen, overall manufacturing production performed poorly during the 1980s, exhibited slow recovery in the early 1990s, but registered increasing growth in the late 1990s. Subsector performances differed significantly. Food, including beverages and tobacco, experienced a slow, erratic growth in production up to 1995, but thereafter was, by far, the best-performing sector. The performance of textiles, including garments and leather, was relatively strong in the late 1980s, but declined or stagnated during the 1990s, reflecting the lack of technological capability mentioned above. While wood, including furniture and paper, was broadly similar, with strong performance up to the mid-1990s, it faced virtual collapse in the late 1990s and recovered somewhat in 1999. As regards metal products and machinery, the performance has been very erratic: moderate during the 1980s, but quite weak in the second half of the 1990s.

TABLE 7.
REVISED INDEX OF INDUSTRIAL PRODUCTION FOR THE UNITED REPUBLIC OF TANZANIA, 1985-1999
(Total manufacturing and four main sub-sectors)

<i>Year, period</i>	<i>ISIC 3 Total manufacturing</i>	<i>ISIC 31 Food, beverages and tobacco</i>	<i>ISIC 32 Textiles, garments and leather</i>	<i>ISIC 33/34 Wood products furniture and paper</i>	<i>ISIC 37/38/39 Metal products, machinery and other</i>
1985	97.3	91.1	87.7	87.3	137.0
1986	98.6	87.1	89.2	116.9	152.0
1987	95.9	77.4	115.4	160.6	115.0
1988	101.4	91.9	126.2	156.3	102.0
1989	101.4	88.7	116.9	153.5	110.0
1990	113.5	100.0	118.5	142.3	141.0
1991	113.5	103.2	112.3	126.8	133.0
1992	100.0	100.0	100.0	100.0	100.0
1993	101.4	104.8	104.6	142.3	88.0
1994	106.8	106.5	101.5	101.4	125.0
1995	97.3	111.3	89.2	93.0	69.0
1996	98.2	127.3	91.1	62.4	71.8
1997	103.8	145.4	83.9	58.4	87.3
1998	112.3	149.4	104.7	50.5	101.4
1999	116.0	146.4	99.2	100.9	111.2
	<i>Five-year growth pattern (percentage)</i>				
1985-1990	16.7	8.8	35.1	62.9	2.9
1990-1995	-14.3	11.3	-24.7	-34.7	-51.1
1995-1999	19.2	31.5	11.2	8.6	61.2
1992-1998	12.3	49.4	4.7	-49.5	1.4

Source: Harding (2002)

Sources of competition

Given that the United Republic of Tanzania has been liberalizing its trade regime since the late 1980s, weak sector performance could be attributed to increased competition from imports. Grenier and others [22] classified firms according to the source of competition in product markets. Local firms are those that face competition from domestic firms or those that report no competition (see area B in figure I above). Open firms are those that face competition from foreign firms (imports or in foreign markets) or that export (areas A and C in figure I). Some 90 per cent of the firms either compete primarily with domestic firms or with imports. While half the sample is open, only half of these export. Local (open) firms are more (or less) likely to be small and domestically owned private firms. Alternatively, larger firms are more likely to be open and have some foreign ownership.

An examination of the raw data revealed that not all exporting firms reported foreign firms as their main competitors. Only a few manufacturing firms in the United Republic of Tanzania specialize in exports: the average proportion of output exported among exporting firms is about 20 per cent. The majority (54 per cent) reports domestic firms as the main source of competition, while 36 per cent mention imports.

The above findings are important when examining the concept of industry. While globalization and global competition may affect industry in the United Republic of Tanzania, the main source of

competition for the majority of firms remains the local market, especially for small firms. Even though it is the larger firms that show a tendency to export, industrial development does not depend on exports only, even though they could promote development.

Source of funds for investment

An important element of industrial policy and one where market failure is evident, underlining a role for the public sector, relates to the availability of finance for start-up and investment. The prevalence of high lending interest rates and credit-constrained banks, resulting in lending constraints, is frequently viewed as a major problem in African countries (Parker and others [50]). Grenier and others [22] find a significant difference in the source of start-up capital, which depends on whether or not firms have some foreign ownership. Fifty per cent of the firms with some foreign ownership report investment by a parent company as the main source of start-up capital, and a further third report finances provided by shareholders. Firms with some foreign ownership have a higher tendency to be larger and possess the ability to export; availability of funds is associated with the size and volume of exports. For firms without foreign ownership, shareholder investments account for 27 per cent of start-up finance. While investment by a parent is a relatively minor source, personal savings are often a very important source of financing. Besides, even though the distinction is less pronounced with regard to the source of funds for investment, personal savings are again far more important for firms without foreign ownership, especially since small firms rely heavily on personal savings.

Firms aiming to upgrade their technology require access to investment funds, which is a major constraint for small firms. Bagachwa and Mbelle [2] report that although investment is necessary, it is not sufficient for increasing export competitiveness. This is consistent with Grenier and others [22], who find that firms that compete with foreign firms are more likely to sustain investment, whereas firms that compete primarily with domestic firms are less likely to sustain investment and more likely to be small firms.

As observed from the sample firms in the United Republic of Tanzania, unlike in other African countries, parastatals, tend to be older, larger firms whose exports are generally higher than those of private firms. It is likely that firms are parastatal, that is, were placed under public ownership, because they are in an export sector, instead of being exporters because they are parastatals. For this reason, parastatals, at least those that export, are attractive to foreign investors. In this regard, it was noted that about a third of the firms in the sample with some foreign ownership are parastatals, and foreign investment is more common in older firms. Thus, parastatal firms survived better during the 1990s than other firms because they are larger, produce export commodities and are more attractive to foreign investors.

The following observations were made by Harding [23] with regard to the effects of the economic reform programme of the United Republic of Tanzania:

*The characteristics of the firms reported here are in line with other surveys conducted in the United Republic of Tanzania. The Helsinki School of Economics report [26] on the Regional Program on Enterprise Development survey, which allowed firms to list more than one main source of competition, found that about three quarters of firms mentioned domestic firms, while more than a third mentioned imports. The report also found that proportionally more small firms face mostly domestic competition, while larger firms are far more likely to report competition from imports.

- Larger firms have a tendency to decrease in size. These firms respond to increased competition from imports by reducing permanent employment levels. One consequence is that wage earnings reflected a similar decrease. This was prevalent at a time during the 1990s when cuts in public sector employment and spending were implemented. The combined effect was stagnation of domestic demand;
- Smaller firms had little scope to reduce in size in the face of declining demand for their output, due mainly to the decline in domestic demand rather than competition from imports. Their response was to become more informalized by using casual piece-rate labour instead of wage labour;
- There was a general decline in the level of capacity utilization in manufacturing. This was a result of increased competition and low demand rather than increased productivity;
- The stagnant economic environment caused the closure of many firms. Despite this overall manufacturing output grew during the 1990s due to rationalization in larger firms (that reduced employment) and informalization of small firms.

Limited access to technologies, given both the difficulties faced in raising the necessary funds for investment and the low levels of technical efficiency, are major problems facing the manufacturing sector of the United Republic of Tanzania, especially among smaller firms.

Technological infrastructure

UNCTAD [65] finds that the United Republic of Tanzania is one of the few African countries that has for some time accorded priority to science and technology in its national development strategy. Despite this, technological capability remains low, suggesting the need for reforms in technology policy, as elaborated in Lall and Pietrobelli [39], chap. IV. The level of innovative effort in manufacturing is minimal. What has occurred is mostly adapting technologies, low-level upgrading and developing new products, and this has not contributed to technological progress. Only large firms have innovative capacity, and innovative effort is sector-specific. For example, light engineering has been quite dynamic, whereas garments and textiles have been technically stagnant (Semboja and Kweka [57]).

The National Science and Technology Policy of 1986 aimed at reducing dependency on foreign technology suppliers by regulating technology flows. The changes made in 1986 have lagged behind reforms in areas such as trade and investment, and appear to have had little impact. For instance, most research and development is centrally planned and conducted by the public sector with little interaction with the private sector. There are many technology institutions (see box-2), but even they appear to have very little contact with the private sector.

It was argued in the National Science and Technology Policy that there is a need to refocus the direction of policy objectives in the following areas:

- Developing technology activities at the enterprise level. Specific policy measures could include direct fiscal incentives for enterprises to acquire more advanced technology and easy credit access;
- Selecting priority technology areas for research and development on the basis of enterprise needs and market demand;
- Building market-oriented and coordinated technology support infrastructure. This could result in the closure of ineffective technology institutions or even necessitate a thorough overhaul of existing institutions and a clear definition of their objectives.

Box 2. Technological infrastructure in the United Republic of Tanzania

- Tanzania Industrial Research and Development Organisation (focusing on the development of appropriate technologies and efficient use of energy, but mostly offering maintenance services which raise funds, effectively competing with private sector providers of maintenance services)
- Tanzania Bureau of Standards (focusing on metrology, standards, testing and quality functions; faced with low awareness of certification in the private sector)
- Centre for the Development and Transfer of Technology
- Tanzania Industrial Studies and Consulting Organisation
- Institute for Production Innovation
- National Construction Council
- Building Research Unit
- National Radiation Commission
- Small Industries Development Organisation (providing institutional support in marketing, skill formation, credit delivery and transfer of technology; not sufficiently relevant to the private sector)

Source: UNCTAD [65].

The Tanzania Industrial Research and Development Organisation provides a good example of the technological development problems confronting the United Republic of Tanzania. As an organization, it has been relatively successful in identifying, acquiring and adopting technologies, although little attention is paid to whether the technologies are appropriate for Tanzanian manufacturing. A major problem has been the failure to transfer technology to firms, largely because few firms have shown the capacity or willingness to innovate. The Tanzania Industrial Research and Development Organisation "does not produce any significant technological benefits for industry, though it performs some useful technical functions" (Lall and Pietrobelli [39], p. 102). Access to finance is yet another problem, and small- and medium-sized enterprises, in particular, lack the financial and human resources needed to innovate (Bongenaar and Szirmai [8], p. 189).

Privatization, public-private interactions and industrial development

Privatization of infrastructure would not only improve the general operating conditions, but would also change the overall investment and industrial climate. The lack of resources often forces governments to engage the private sector in the provision of telecommunications and power generation and distribution. The private sector can also participate through concessions in road, water supply, airport and customs areas. Privatization, if successful, could improve the general operating conditions of other firms through improved services and lower costs in power or communication. UNCTAD [65] revealed that following the privatization of infrastructure, new foreign-owned hotels, banks and consulting firms were established. Besides, as infrastructure is also a limiting factor for industrial development, successful privatization could improve industrial performance in the long run. There are some recent examples of public-private interactions with respect to the energy market. Mistry and Olesen [45] discuss the example of the Songo Songo Gas Development

and Power Generation Project, which plans to exploit natural gas reserves to generate exports of power and gas. While such public-private interactions are less common in industry, public-private interactions outside industry can influence the industrial performance.

Implications of the changing nature of industry for industrial policy

Three specific policy issues appear to cause great concern to those manufacturing firms endeavouring to increase efficiency: bank lending rates (and access to finance for investment); privatization (attracting foreign investment); and relevance of technology policy for the private sector. Of these, priority is given to the latter. If the United Republic of Tanzania is to have any hope of being competitive even in the few activities where it may have a comparative advantage, "it is vital to invest in upgrading industrial technology" (Lall and Pietrobelli [39], p. 103). While there has been a consistent technology policy in place for some time and institutions to implement it exist, the rate of effective technology adoption by firms has generally been very low. This is partly due to the high cost of financing investment. As a result, only larger firms, namely those with foreign investment, are able to afford technology. This failure has undermined the ability of firms to respond to the opportunities and challenges of globalization, and of trade liberalization, in particular. Firms in the United Republic of Tanzania responded to the need to increase competitiveness not by increasing productivity through technical progress, but by cutting costs through shedding labour. While Tanzanian manufacturing may be weathering the storm of globalization, measures need to be taken to implement an effective industrial development strategy.

The technology institutions in the United Republic of Tanzania have failed to cope with the new challenges brought about by the forces of globalization and the increased emphasis on private sector development. The problem is not the lack of institutions but their focus and relevance in a global economic environment. While issues relating to taxes, exchange rates and other macroeconomic policies are important to firms, especially those competing with imports and foreign firms, evidently these are not elements of industrial policy. Thus, the big issue facing policy in the United Republic of Tanzania is how to support firms in adopting new technologies (for policy recommendations in this respect, see Lall and Pietrobelli [39], pp. 103-106). In the context of the changing global environment discussed in the present report, this issue assumes greater importance, and the solution must be inherently internal. Although foreign direct investment is increasing, it is mostly in privatized industries and resource-based activities, with minimal evidence of technology transfer.

3. Viet Nam

Viet Nam is a low-income country that has been in transition from a centrally planned economy to a market-oriented, socialist economy. As industry has been restructured considerably, it provides a good example for understanding the changing nature of industry in countries with economies in transition. The major focus of reforms is on the domestic transition process, with the forces of globalization playing only a secondary role.

Over the past two decades, there have been many reforms affecting industry, in general, and the private sector, in particular. The transition towards a more market-oriented economy started in 1986. It paved the way initially for the establishment of household businesses, then in 1990 for

private enterprises, culminating in the official recognition of the private sector in 1992. The East Asian crisis of 1997 led to further major improvements, creating an enabling environment for the domestic private sector by streamlining administrative procedures and establishing institutions for commercial disputes, which finally led to the 1999 Enterprise Law.

The enactment of the Enterprise Law and the formal endorsement of the private sector at the Party conference in 2002 were the most significant steps ever taken towards a market economy, according to the World Bank [80]. This, in effect, changed the business licence system, where the Government controls and directs private sector activities, to a business registration system, setting the rules under which the private sector can operate. Following these changes, different laws appear to apply to different (public and private) industrial actors. For instance, the private sector faces more difficulties when registering or accessing credit.

The state sector still dominates parts of the economy of Viet Nam, despite the growth of the (foreign) private sector. The private sector, industrial output in particular, has grown rapidly. Between 1997 and 2002, the annual average growth rate of industrial output averaged 14 per cent, higher than the GDP growth rate, which has now fully recovered from the East Asian financial crisis. In fact, the overall economic performance has been remarkable in the last decade and a half, achieving both macroeconomic stability and impressive human development indicators. Within industry, actors responsible were the State sector (10 per cent per annum), the domestic private sector (15 per cent) and the foreign private sector (19 per cent). However, the State sector still accounts for a large share of industrial output (see table 8).

While the State sector dominates many industrial subsectors, domestic non-State firms own large shares of industrial production in garments, metal products, wood and wood products and furniture, and foreign firms have large shares in oil and gas, motor vehicle assembly and production of consumer electronics. Employment data, on the other hand, show that employment generation is largely promoted by the private sector: 90 per cent of a total of 36 million employed in the country as a whole, and 77 per cent of some 4 million people employed in the industrial sector. The (foreign) private sector is increasingly responsible for employment generation and industrial production.

Growth in foreign direct investment in Viet Nam has been remarkable (Freeman [18] and Le Dang Doanh [42]), impacting many industrial subsectors. Viet Nam started attracting foreign direct investment later than other countries, but since 1988 foreign direct investment totalling some \$22 billion has flowed into the country. At its peak, inflows of foreign direct investment into Viet Nam were the second highest in the world as a percentage of gross national product. After the peak, the slowdown in foreign direct investment following the East Asian financial crisis was more pronounced, and the subsequent recovery has been slower in Viet Nam than in other countries of the Association of South East Asian Nations (ASEAN). A substantial share of foreign direct investment flowed into manufacturing (60 per cent of total projects), which currently accounts for 35 per cent of industrial output.⁷

⁷In 2001, foreign direct investment contributed 13.3 per cent to GDP, 35 per cent to industrial output, 23 per cent to exports and 25 per cent to the State budget revenue, but only 0.3 per cent to employment creation because of its concentration on capital-intensive activities.

TABLE 8.
SHARE OF INDUSTRY OUTPUT BY OWNERSHIP
(Percentage)

Industry group	1995				2000			
	Total	State	Domestic non-state	Foreign investor	Total	State	Domestic non-state	Foreign investor
Total	100.0	50.3	24.6	25.1	100.0	42.0	22.4	35.5
Mining	13.5	2.3	0.7	10.5	13.6	1.8	0.5	11.2
Coal	1.6	1.6	-	-	1.2	1.1	-	-
Oil and gas	10.5	-	-	10.5	11.2	-	-	11.2
Metal ores	0.2	0.2	-	-	0.1	0.1	-	-
Stone and others	1.1	0.5	0.6	-	1.1	0.6	0.5	-
Manufacturing	80.5	42.0	23.0	14.6	80.5	34.3	21.9	24.3
Food and beverages	26.1	12.5	8.7	5.0	20.2	9.3	6.6	4.2
Tobacco products	3.9	3.8	-	-	2.9	2.9	-	-
Textile products	6.0	3.4	1.5	1.0	4.8	2.6	1.3	1.0
Garments	2.9	1.0	1.3	0.5	3.1	1.0	1.4	0.7
Leather tanning and processing	3.4	1.3	0.9	1.2	4.6	1.4	1.2	2.0
Wood and wood products	3.2	0.7	2.2	0.3	1.9	0.4	1.3	0.2
Paper and paper products	1.9	1.1	0.5	0.3	2.1	1.1	0.8	0.2
Publish print, copy recorded materials	1.5	1.4	0.1	-	1.1	1.0	0.1	-
Coke and refined petroleum products	0.3	-	-	0.3	0.1	-	0.1	-
Chemicals	4.9	3.7	0.5	0.7	6.1	3.8	0.7	1.6
Rubber and plastics	2.2	1.0	0.9	0.3	3.5	1.1	1.6	0.8
Non-ferrous metals	8.9	6.0	2.5	0.4	8.9	5.2	2.0	1.7
Metal production	3.3	2.0	0.3	1.0	3.0	1.3	0.4	1.3
Metals products	2.3	0.4	1.6	0.3	3.2	0.5	1.8	0.9
Machinery and equipment	1.3	0.9	0.3	0.1	1.2	0.7	0.2	0.3
Computer and office equipment	-	-	-	-	2.6	-	-	2.6
Electrical machinery and apparatus	1.1	0.8	0.1	0.2	1.9	0.9	0.3	0.7
Radio, television sets and communications equipment	2.0	1.0	0.1	0.9	2.4	0.4	-	2.0
Medical and precision instruments	0.2	-	0.1	-	0.2	-	-	0.2
Assembly and repair of motor vehicles	1.4	0.2	0.2	1.0	1.1	0.2	0.2	0.8
Produce/repair other transport equipment	1.8	0.7	0.4	0.8	3.6	0.5	0.4	2.7
Furniture	1.9	0.2	1.6	0.1	2.1	0.1	1.5	0.5
Recycling	0.1	-	0.1	-	0.1	-	0.1	-
Electricity, gas and water supply	6.0	6.0	-	-	6.0	6.0	-	-
Production, distribution of electricity and gas	5.3	5.3	-	-	5.4	5.4	-	-
Supply, purification and distribution of water	0.7	0.7	-	-	0.5	0.5	-	-

Source: Mallon [44], based on General Statistics Office of Viet Nam.

The increasing importance of the private sector as a whole is also observed in the increasing number of new business registrations (Mallon [44] and World Bank [80]). The number of household businesses increased from 0.84 million in 1990 to 2.2 million in 1996. Following the 1990 Enterprise Law, there were 190 joint-stock businesses, 8,900 limited liability firms and 21,000 private enterprises in 1996. The 1999 Enterprise law was followed by a new wave of registrations: between January 2000 and October 2002, almost 50,000 new businesses were registered, most of which are fully privately owned. Nearly all private enterprises in Viet Nam are small- and medium-sized enterprises. The number of State-owned enterprises declined from 3,000 in 1988 to 2,000 in 1996.

The restructuring process is viewed by some to have come to a virtual standstill, with relatively few transformations from State to private sector firms (UNIDO [66] and World Bank [80]). The supply of (cheap) credit to the State sector has continued at a rapid pace. This appears unsustainable given the need for less soft budget constraints, if State-owned enterprises wish to continue operating in a market economy. The future of industry in Viet Nam depends largely on whether and under what circumstances domestic restructuring continues to take place. There is concern that many State-owned enterprises will not be able to respond to further liberalization without special support.

The planned opening-up to foreign competition, including membership in the World Trade Organization, commitments within the framework of the ASEAN Free Trade Area, as well as the steps already taken in the process of opening up, including the abolition of quantitative restrictions and the United States-Viet Nam bilateral trade agreement, may reinforce the need for increased productivity in the industrial sector. Again, the restructuring of the State sector appears particularly urgent. Viet Nam has liberalized the trade regime, favouring those industries dominated by State-owned enterprises. The effective rate of protection in 2002 (World Bank [80]) was 7.4 per cent in agriculture, 16.4 per cent in mining and 98 per cent in manufacturing. Low tariffs are predominantly on products used by the State sector as inputs. Within the manufacturing sector, foreign direct investment has been directed to subsectors with effective rates as high as 599 per cent for motor vehicles for the domestic market, 181 per cent for clothing, and 163 per cent for plastic products. Hence, industrial development will depend partly on whether State-owned enterprises can be reformed, keeping in mind the tightening budget constraints and liberalization of markets.

The mechanical engineering industry (UNIDO [66]) is one example of an industry dominated by State-owned enterprises and suffering from very low competitiveness. The industry used to be a priority industry, but has recently failed to invest in new technology. Moreover, firms have relied on in-house capacity for production at all stages in the value chain. Due to the absence of suppliers of specialized parts and the poor availability of high-quality supplies, they were unable to increase productivity. Know-how resources in the industry are limited to 12 research institutes, which are poorly funded and devoid of any contact with international counterparts from private firms. The industry was protected by high tariffs and enjoyed other benefits, thereby crowding out the private industrial sector. Other characteristics of the sector are its small scale, poor management and the absence of ISO 9000 quality certificates. By and large, the engineering industry of Viet Nam is internationally uncompetitive in virtually all stages of the supply/value chain, and is therefore unable to withstand the market forces of globalization (table 9), or participate in global value chains even to a limited extent.

TABLE 9.
INTERNATIONAL COMPETITIVENESS IN THE MECHANICAL ENGINEERING INDUSTRY

<i>Stage in value/supply chain and worker-related data</i>	<i>Viet Nam</i>	<i>China</i>	<i>Taiwan Province of China</i>	<i>Japan</i>
Raw material	Learning	Learning	Average	Sophisticated
Design		Learning		Sophisticated
Basic parts	Learning	Average	Average	Sophisticated
Subassembly	Learning	Learning	Average	Sophisticated
Critical components			Average	Sophisticated
Assembly and testing	Learning	Average	Average	Sophisticated
Distribution and marketing	Learning	Learning	Average	Sophisticated
Worker-related data				
Compensation per worker (dollars per year) 1998	960	800	13 780	..
Value added per worker (dollars per year) 1998	2 400	2 300	29 500	..

Source: UNIDO [66].

Globalization demands the restructuring of industry if industrial development is to take place. Foreign direct investment has been an important feature of the *doi moi* (process of economic reform and transition to the market economy), which started in the late 1980s (Freeman [18]). Initially, greater emphasis was placed on servicing domestic markets, but over time foreign direct investment relating to production for export has become apparent. However, there are concerns that Viet Nam is not conducive to the establishment of cross-border production networks, which have stimulated industrial development in many East Asian countries. Apart from the absence of appropriate and good-quality local capabilities, some blame current business legislation which requires foreign firms to obtain the approval of the Office of the Prime Minister to enter into a joint venture in a wide range of industries. In these industries, foreign investors may acquire only up to 30 per cent of the total capital. This has led to very few joint ventures with private firms (2 per cent) and some with State-owned enterprises (98 per cent). To a certain extent, foreign firms are forced to enter into public-private interactions that are inconsistent with the establishment of wholly owned foreign affiliates often found in production networks that are fragmented across borders.

For example, apart from the land, local partners had little to offer foreign automotive investors who flocked into the country in the mid-1990s. Foreign investors moved to the country to service the local market, which is one of the least motorized in the world (UNIDO [66]). Due to the complete lack of a local components supply industry and in the absence of strong local content rules despite being outside the World Trade Organization, automotive manufacturers decided to locate only the assembly line in Viet Nam. Assembly operations (less than 10 per cent of the value of a car) were only viable because they were shielded from competition by tariffs of more than 100 per cent on imported cars. In order to enhance the automotive industry, and industrial development in general, more attention must be paid to ensure an adequate supply of local components. However, it must be noted that the country may not have the basic comparative advantage nor skills, although increased regional integration may reap the benefits from economies of scale.

Sentiment towards foreign direct investment is improving and this may also benefit the domestic industrial sector. It is argued that foreign direct investment helped to modernize management, corporate governance and public-private dialogue. Le Dang Doanh [42] finds that managers of foreign companies, organizers of the Private Sector Forum, have worked as a channel for providing feedback to the Government on reforms required. The Forum is now a business forum and is one of the few formal mechanisms for public-private dialogue. In this way, foreign direct investment may have played "the role of an ersatz private sector for a transitional economy" (Freeman [18] and Mallon [44]). The domestic private sector is not yet well developed and continues to be dominated by small- and medium-sized enterprises. It is hoped that non-discriminatory improvements will encourage the development of both the private sector and small- and medium-sized enterprises. Some support, however, is provided to or affects industrial small- and medium-sized enterprises directly (UNIDO [68]). A current decree extends special support to small- and medium-sized enterprises, placing the domestic private sector higher on the agenda. Those involved in promoting an enabling environment for private sector development include the Ministry of Planning and Investment, the Ministries of Trade and Finance, the Central Institute for Economic Management, the Viet Nam Chamber of Commerce and Industry and the Institute of Economic Research.

The textile and clothing sectors, the main contributors to manufacturing exports, are examples of sectors in which State-owned enterprises appear to have carried out dramatic reforms (Thoburn and others [64]), with globalization reinforcing the reforms. Viet Nam has been able to raise productivity in both the textile and clothing sectors during the 1990s. The clothing sector has been much more successful in exporting than the textile sector, which is not internationally competitive compared with China, and is protected by high import tariffs. Despite the high tariffs, clothing firms run by foreign (Asian) investors import textiles. However, the former State-owned enterprises in textiles have transformed into garment exporters through restructuring and investment and have "spearheaded the textile and garment sectors' export drive" (Thoburn and others [64]). No direct cash subsidies were used, although indirectly the State-owned enterprises benefited from preferential access to export quotas (in the European Union and the United States), land and loans. While foreign-invested firms are linked to their own cross-border production networks, increasing the exports of textiles, State-owned enterprises have been approached by buyers in Hong Kong SAR and the European Union to be part of buyer-driven global value chains. This could be because Viet Nam enjoys preferential access, on a quota-free basis and with low duties, to the United States market following the bilateral deal between those two countries. However, it remains to be seen whether the sustainability of the position of Viet Nam in the global value chain could become problematic after the sectors are exposed to full competition due to the termination of the Agreement on Textiles and Clothing.

4. Implications of case studies

The main implications of the examples in Bolivia, the United Republic of Tanzania and Viet Nam can be summarized as follows:

- Generally speaking, there are many factors outside globalization that affect national industry, some of which can be crucial for determining the industrial performance in low-income countries. Poor infrastructure has considerably weakened the potential for industrial development in Bolivia.

Where restructuring of State-owned enterprises, private sector regulation and macroeconomic stability drove industrial development in Viet Nam, the same factors tended to deter manufacturing development in the United Republic of Tanzania. This is important contextual information particularly because the main focus of chapter I is to analyse how globalization affects industry;

- Globalization affects industry in all three countries in varying degrees. It has affected industry through import competition, specialization in manufacturing due to the emergence of cross-border production networks and global value chains, and of other export opportunities. Some industries were unable to withstand the forces of import competition, for example, wheat millers in Bolivia and garment firms in the United Republic of Tanzania. Foreign direct investment and cross-border production networks played an important role in manufacturing in Viet Nam, though the type of operations raised concern. Bolivia and the United Republic of Tanzania, on the other hand, received substantial foreign direct investment (some in the form of public-private partnerships) outside manufacturing, which could indirectly affect industrial development. There was also evidence that industrial firms in the three countries produce exports for firms in global value chains. However, the importance of this for industrial production on a national scale should not be exaggerated. It is likely that the emergence of buyer-driven global value chains have had a significant impact only on the textiles and clothing sector in Bolivia and Viet Nam. The United Republic of Tanzania appeared unable to forge links with those chains. A drive towards enhanced competitiveness is needed for further integration, focusing on efficient production, but increasingly on appropriate production as well. Efficient production alone is not sufficient, and the development of successful industrial activities depends also on factors normally falling outside industry;
- A significant proportion of firms in low-income countries are most concerned about competition with other local firms in the domestic market. Furthermore, only a small number of firms export manufactured goods, and exports rarely account for a large share of production. Thus, industrial development should also address the needs of local firms in local markets. This is especially important to maintain a vibrant substructure of the manufacturing industry;
- The process of globalization forces countries to rethink how the private sector operates vis-à-vis the public sector. The integration into globalized production networks requires firms to operate under market conditions. This raises questions on the extent to which the public sector can support private sector development generally. Public support for industrial development in the sample countries has frequently been inappropriate, partly because the support was not of the kind needed by the private sector. An example is the failure of the technology policy and institutions to transfer technologies to firms in the United Republic of Tanzania. In fact, a certain level of mistrust between the public and private sectors still exists in all three sample countries. Therefore, attempts to improve public-private dialogue may be an important step towards enhancing industrial development, determining what the private sector regards as appropriate industrial support and an enabling regulatory framework governing industrial production.

D. CONCLUSIONS

As already mentioned, the aim of this chapter is to examine the concept of industry by analysing the influence of globalization on industry in developing countries. The forces of globalization have led to increasing specialization within manufacturing, thus creating implications for industrial development policy.

The changing nature of industry stems from two major changes that globalization has brought to the forefront of industrial production: participating in cross-border industrial production networks; and participating in global value chains. Previously, most trade was in final goods, while currently most growth in world trade is attributed to specialization and trade in intermediate goods. Hence, if countries (or better firms in countries) wish to play a role amid these new industrial realities, they need to enhance their level of competitiveness and the appropriateness of their industrial base.

Fragmentation of production offers developing countries a wide range of possibilities for industrial development, but requires firms to produce efficiently. To participate in a global value chain, firms must not only ensure efficient production, but must also specialize in those stages of production that fit within the entire value chain, which is defined as appropriate production.

From the three examples of industrial development, it can be concluded that globalization has so far affected industrial production in low-income countries to a lesser extent than in countries such as Singapore, Mexico and Malaysia. The main implications of the examples of Bolivia, the United Republic of Tanzania and Viet Nam were the following:

- Globalization affects industry in low-income countries in varying degrees, through import competition, specialization in manufacturing caused by the emergence of cross-border production networks and global value chains, as well as other emerging export opportunities. Some industries are unable to withstand the forces of import competition; foreign direct investment and cross-border production networks played an important role in others; and there was also evidence that industrial firms in the sample countries produce exports for firms in global value chains, though the importance of this for industrial production on a national scale should not be exaggerated. Hence a drive towards enhanced competitiveness is necessary for further integration, focusing on efficient production, but increasingly also on appropriate production. Of particular relevance here is the necessity for industrial policy to promote the adoption of new technologies by firms;
- A significant proportion of firms in low-income countries is most concerned about competition with other local firms in the local market, and this is miles away from serving export markets in developed countries with high standards (as implied in the literature on global value chains and fragmentation). At the same time, local producers may be more concerned with imports: for most low-income countries, imports are much higher than exports and are characterized by an efficient network of importers. Furthermore, only a small number of firms export manufactures, and exports rarely account for a large share of production. Thus, industrial development should also address the needs of local firms in local markets;
- The process of globalization forces countries to rethink how the private sector operates vis-à-vis the public sector. The integration into globalized production networks requires firms to operate under market conditions, and hence raises questions as to how the public sector can support private sector development generally. Public support for industrial development in the sample countries has frequently been inappropriate, partly because such support was not in line with the needs of the private sector. In fact, a certain amount of mistrust between the public and private sectors still exists in all sample countries. Therefore, attempts towards promoting public-private dialogue may be an important step towards furthering industrial development and

towards a better understanding of what the private sector regards as appropriate industrial support and an enabling regulatory framework governing industrial production.

Support for industrial development in terms of technical assistance should focus on promoting both efficient and appropriate production. Knowledge generation facilitating the provision of assistance would need to be broadened to examine how national and international conditions and activities outside industry affect industrial development. Such knowledge would help better to assess at which stages of production support is necessary to create both efficient and appropriate production.

Having specified the focus of support for industrial development, there are several other issues related to implementation of support programmes, as follows:

- Support programmes would need to be assessed according to some predefined criteria;
- Support programmes should be demand-driven. Involvement in industrial development is usually on the supply side (skills, technology etc.), and the challenge is not to distort the market, potentially compromising sustainability;
- Finally, it is desirable for support programmes on industrial development to focus as much as possible on the delivery of public goods, especially those relating to technology, for two reasons: first, if private goods are provided, there is no guarantee of additionality regarding what firms intend to do; and, secondly, the provision of public goods implies that all firms benefit, which excludes the harmful crowding out of other firms or unfair competition with private service providers.

The final point on the provision of public goods in industrial development is dealt with in chapter II of the present report. In particular, the role of the provision of public goods in overcoming market failures in industrial development is explored, paying due attention to the position of low-income countries amid the new industrial realities.



II. MARKET FAILURES IN INDUSTRIAL DEVELOPMENT AND THE PROVISION OF PUBLIC GOODS

A INTRODUCTION

Chapter II identifies the appropriate role for public policy in supporting and promoting industrial development. It must be recognized that public policy is necessary to address market failures and externalities and ensure the provision of public goods. The concepts and their interrelationships, as well as the public policy implications for industrial development at the national and international levels, are here discussed. Industrial development is an important component of an economic growth strategy, which can make an important contribution to the broad aim of reducing poverty. An effective industrial development strategy, to achieve the aims of growth and poverty reduction, requires coherent industrial policy and coordination of the activities of both public and private agents. Given the breadth and complexity of issues to be addressed, it is not surprising that so many poor countries lack the capacity to design and implement effective industrial policies. The core role for international public policy through agencies, such as UNIDO, is to support and build up the national capacity in developing countries for policy-making and implementation. The present report offers suggestions and recommendations on how this can be achieved with regard to industrial development. Chapter II is concerned with general principles and activities, providing limited comments on institutions. The discussions of the types of institutions required for industrial development is more properly treated in chapter III, which addresses implementation.

Some of the concepts discussed in chapter II have rather precise meanings in economics. Parts of the chapter may therefore appear technical, although the concepts have general interpretations. The market itself can be considered as a particular type of institution where resources are allocated, that is, goods and services are produced and exchanged with payments between parties. Sometimes the market institution fails: from the perspective of what is best for society, the market does not always allocate resources in the best way, or provide the most appropriate levels of goods and services. One specific example is the case of public goods, that is, goods or services which, once provided, can benefit everybody without necessitating direct payment. Another example is externalities, when market transactions (production and exchange) have effects on others who are not party to the transaction. These notions of public goods and externalities are central to the discussion in this chapter, specifically because in both cases the market institution fails, implying that non-market institutions are necessary to ensure the best outcome for society.

The present report is particularly concerned with market failures relating to industrial development. By its very nature, industrial development relates to the functioning of markets, as firms and industries operate in markets at both national and international levels. The concept of the market refers to an institution in which agents make decisions in response to information received and incentives provided. In principle, if rational unconstrained agents have access to full and complete information,

such that the correct incentives are fully known, the market institution will deliver the optimal outcome, that is, the best decision will be made. Unfortunately, the market institution rarely operates according to this abstract ideal. In practice, agents are constrained, information is incomplete or even missing, and incentives are distorted. In such cases, the market institution is bound to fail, to the extent that the market alone is deterred from delivering the best outcome for society. It is also possible that individual agents behave in a manner intended to circumvent the market outcome. In such cases, the market may also fail. Thus, there are two general sources of market failure: imperfections in the information or incentives available to agents, including constraints on behaviour of agents and weakly defined property rights; and intentional inappropriate actions by agents.

The principal concern here is with the former source, as most discussion of market failures relates to information or incentive failures and constrained behaviour. The latter becomes important especially if some agents with specific market powers, for example, dominant firms in a highly concentrated industry or cartel, distort the market outcome through their intentional actions. That gives rise to arguments for regulation of markets. Although this is related to the market failures and public goods discussed in the present report, regulation is a distinctive issue. As already discussed in chapter I, the changing nature of global industry has implications. For example, value chains and the fragmentation of production imply that the efficient flow of information is of increasing importance. There is, therefore, more scope for information failures to give rise to market failures. Furthermore, in so far as globalization of industry is associated with increasing concentration and allows greater market power to dominant firms, the scope for anti-competitive business practices (inappropriate actions) is greater.

If the market institution fails, the outcome for society is below optimum and welfare is lower than would have otherwise been the case. There is thus a role for non-market institutions. Typically, governments will intervene to rectify the failure so as to increase welfare. Public intervention will be most effective if it is targeted at the specific source of market failure. For example, governments may support research and development investment if individual agents face constraints, such as the lack of finance or information on appropriate technology, or if information imperfections undermine the coordination of investments. This is very important for developing countries, where the market failures involved in building basic technological mastery are a fundamental issue to be addressed in industrial development. Non-market institutions play a vital role in building technological capabilities, in addition to addressing market failures more generally, as elaborated in the evolutionary approach to industrial development (Lall and Pietrobelli [39], chap. I). The ability to select and deploy technologies efficiently cannot be taken for granted. Policy intervention is necessary to overcome market failures. To this end, public agents can help to overcome market failures by improving the flow of information and supporting the actions of market agents. Public intervention, namely, laws and regulation, is also appropriate to address inappropriate actions of agents. For example, antitrust laws are directed against agents who intentionally try to distort the market.

Prices are the principal source of information in a market. The price mechanism often delivers incomplete information on the true value (or cost) of an activity, such that the market either under-supplies or oversupplies the activity. An external good is generated if the actions of one agent, for example, undertaking research, provides a benefit (research knowledge) that is available to others. However, if an agent undertakes research for his or her own purposes and does not allow others to

benefit from it, the activity is both undervalued and underprovided from the perspective of society. In contrast, an activity that produces pollution generates an external "bad" for those affected by the pollution. The agent does not take account of the external costs, and therefore oversupplies the activity from the perspective of society.

In such cases of positive or negative externalities, governments can correct market failures by intervening in the provision of the good concerned, usually through some form of regulation to account for the externalities. In some cases, governments can actually supply the good, but more often they only regulate the effective price faced by market agents. In more general terms, public agents can play a constructive role in accounting for externalities and providing public goods. Various types of public agents could be envisaged. The principal distinction here is between national or government agents and agents that are international or external (to the government). It must be acknowledged that although roles for public agents are defined, governments or other public agents might fail to respond appropriately and effectively. In other words, public intervention, even where required, does not necessarily provide the required solution to market failures.

The present report considers how public agents can address market failures in the case of the industrial development in developing countries. A public agent within a country is referred to as the government, and the term "external agents" is used for global bodies, such as UNIDO, that fulfil the functions of international public agents. As such, the report only considers some of the types of non-market institutions that could address market failures. In section B, the various types and sources of market failure in industrial development are presented, distinguishing between the possible failures due to the behaviour of agents and those due to imperfect information, especially with regard to externalities. This is followed by a brief discussion of the concept of public goods in section C, and of the relationship between public goods and market failures in section D. Finally, in section E, various aspects of industrial policy to address market failures are dealt with using the public goods framework. Throughout the report, industrial policy refers collectively to those aspects of public policy that contribute to the industrial development strategy of a country. The conclusion in section F draws some preliminary implications for the role of UNIDO in terms of providing public goods and overcoming market failures.

B. MARKET FAILURES IN INDUSTRIAL DEVELOPMENT

There are numerous examples where markets have failed to allocate resources efficiently, generally termed as "market failures" (Gravelle and Rees [20]). The early literature tended to focus on incomplete markets (that is, situations where not every possible future delivery will have a market) or on actions that have had effects outside the market price mechanism (which can be interpreted as a form of incompleteness of markets). Actions of individuals, which could have effects (externalities) on others, may not be incorporated in the prices of associated products or services. If these bring about beneficial effects, they are described as external goods or positive externalities. For example, a person who gets vaccinated prior to proceeding to an infected area provides a benefit to others, as such preventive action reduces the risk of others contracting the disease. This positive externality is, however, not included in the market price of the vaccine. On the other hand, negative externalities or external bads include cases where the effects on others are adverse; pollution is one common example where the external cost is not incorporated in the market price of the good being produced. As discussed

below, the notion of externalities is closely related to the notion of public goods and provides a case for public intervention to address market failures. Some would describe as “old” market failures those associated with externalities and public goods, or the incompleteness of markets.

More recent literature attaches greater emphasis to imperfect information and problems relating to the flow of information are frequently stressed as sources of market failure (Arrow [1]). For example, imperfect information constrains behaviour and limits the ability of agents to make the best decision, giving rise to coordination problems. Stiglitz [61] extends this to argue that imperfect and asymmetric information is the cause of “new” market failures that characterize the whole market system. Not only are information flows imperfect, but also the information of agents differs. These asymmetries cause market failures, for example, in insurance markets. This distinction between new and old concepts of market failure is not particularly useful as they are so closely interconnected. It could be argued that imperfect information gives rise to incomplete markets, especially since agents, unaware of the full costs and benefits of each other’s actions, fail to take these externalities into account. Alternatively, it could be argued that the market for information is incomplete because of the absence of certain types of information, limited access to information and costs of acquiring information. The important issue when discussing market failures in industrial development is to detect where the imperfections in information exist and where markets are incomplete. Most often there is an element of both.

As the specific concern relates to market failures associated with industrial development, the discussion here concentrates on the causes of market failures, distinguishing those primarily related to incompleteness of markets from those more clearly related to imperfections in information. This is followed by a description of the types of market failure that are closely related to the causes. For example, imperfect information, which is a root cause, gives rise to problems of coordination. The latter can be considered both as secondary causes and types of market failure. The final subsection discusses the case for government intervention, and ways in which such intervention could fail.

1. Causes of market failure

Perfect markets permit individuals to trade assets, commodities and rights in order to become better off. Trade will be “good for society” (Pareto optimal) if it makes at least one individual better off while not making others worse off. There are, however, several reasons why such trade may not occur, that is, why markets fail to allocate resources efficiently, or why it may not result in the optimal outcome (for society). Markets can be imperfect, and hence fail, because they are incomplete and/or because information is imperfect—these are the root or fundamental causes. These root causes manifest themselves in different ways, giving rise to a number of what can be termed secondary causes. From the many causes of market failure, all of which bear evidence of some incompleteness or imperfection, five such causes of these market failures have been identified below. Nevertheless, all reveal some incompleteness or imperfection at the root.

First, property rights define the control over assets and the rights of ownership or use of property. Property rights are often incomplete, in the sense that rights cannot always be assigned to individuals, or it is impossible to exclude other individuals from enjoying the benefits or costs, which is a specific case of an incomplete market. Individuals will not appropriate all the benefits and costs of their decisions because markets for certain rights are missing. For example, if innovators cannot exclude

others from using a new technology that has been developed, they cannot derive the full benefits of their innovation. Owing to the absence of property rights over the technology, innovators lack the incentive to develop new technologies. However, if a technology is patented, the innovator is granted property rights over the technology and can exclude others from using it. Thus, the institution that establishes property rights, in this case a patent, overcomes a market failure and encourages a more efficient allocation of resources, in this case, incentives to undertake innovation are increased.

Secondly, information and transaction costs can be too high or dispersed for individuals to engage in trade that would lead to higher efficiency. The root cause is often some information imperfection, making it costly to produce or acquire. In addition, there are other costs involved relating to search, observation and negotiation, which may or may not be higher than the benefits of engaging in trade. For example, producers in developing countries may not be aware of the most appropriate technologies available, or may not have access to the information required to link into a global value chain. The lack or high cost of access to information constrains the behaviour of agents and therefore creates a market failure. External agents could intervene to improve the flow of information. More generally, non-market institutions could be established to address information problems and transactions costs.

In addition to the costs mentioned above, there are costs related to establishing a market, implying incompleteness of the market. Examples include the costs of creating markets for financial instruments to provide credit to firms, or for innovation to provide technology. Markets are efficient if there is a market for all goods and services, including that for future deliveries, and if that market is in equilibrium. The non-existence of a complete market for futures, for instance, due to high transaction costs, constitutes a market failure. Individual firms do not possess all the relevant information related to the future. As a result, current decisions are constrained by inconsistent expectations for the future. A related example is the investment coordination failure (Ray [51], pp. 136-143), which combines incompleteness, imperfect information and coordination. The best outcome is if all (linked) enterprises invest and produce. Hence, decisions will be taken by an enterprise only if it is confident of the forthcoming investments by other firms. Incomplete information on other investors thus leads to market failure.

There is an economy-wide notion of market failure, or what could be considered as development failure. Two aspects are relevant to the failure of industrial development in many poor countries. The first is the coordination problem mentioned above: for any particular activity to be successful, for example, for private agents to be willing to invest, other activities must be present (completeness) and sufficient information about them must be available. An obvious example is that export producers need a good transport and distribution system. As an example from the case studies presented in chapter I, the need to coordinate trade policy with domestic capabilities was discussed extensively for Bolivia. Equally important is the need to coordinate trade opportunities, for example, by providing facilities to test exports for compliance with technical or health standards. Less obvious is that producers in a particular sector would benefit if local technical capacity (in related sectors) is available, for example, to produce spare parts or adapt technology to local conditions. In such cases, the linkages represent externalities, and government intervention by providing the least profitable links would help to overcome coordination failures (Ray [51], p. 141).

The second, and related, aspect is when there are complementarities in decisions or activities:

“A *particular* type of externality, which can coexist with both positive and negative effects, relates not to the *level* of utility, or monetary reward, that others experience when an action is taken, but to the *ranking* of the alternatives that they have.” (Ray [51], p. 114, original emphasis)

A simple way of interpreting this is that “history matters”—certain decisions or actions are currently favoured or disfavoured because past decisions determined the relative attractiveness of the alternatives now faced. Another way of expressing this is as a specific form of incompleteness. This can be interpreted as the dynamics of coordination as actions affect expectations. For example, if the public sector invests in improving the quality of human capital, through health and education, this increases expectations of the quality of the future labour force, and that can encourage a particular type of investment now. A similar argument would relate to investment in public research and development, such as a national technology centre, for example, the Tanzania Industrial Research and Development Organisation, as discussed in chapter I. As the complementarity is an externality, incomplete information is provided to agents by the market, but intervention by external agents can help to overcome such market failure.

2. Types of market failures in industrial development

Incomplete property rights, transaction costs and costs related to establishing a market, as well as coordination problems and the existence of complementarities, lead to market failures that can be attributed to incomplete or imperfect information. Examples of each of these can be found in respect of industrial development, and are discussed below. However, constraints on actions of agents can also lead to market failure. One example is limited access to finance for investment, as in the case of the United Republic of Tanzania discussed in chapter I. Similarly, firms may face constraints in access to skilled labour or adequate infrastructure, the latter associated with the coordination and complementarities issues discussed above. In many cases, the constraints facing agents relate to imperfect information, namely on technology, market opportunities or requirements. Evidence of these types of market failure is provided in all of the case studies presented in chapter I.

Traditional market failures are (static) externalities. Externalities can be seen as direct interactions among economic agents that are not mediated through the market mechanism. There are many such externalities among consumers and producers. The literature distinguishes between technological and pecuniary externalities. The entrance of a new firm may reduce the profits of others without affecting the efficiency of the market (in the case of perfect competition and no indivisibilities throughout the economy), a pecuniary externality. Technological externalities affect the efficiency of allocation of resources. The greater the number of agents involved, the more difficult it is to reach an efficient allocation by agreement. For example, in developing countries where there are usually many individual small firms, collective action is difficult to coordinate (Coase [52]). In low-income countries where industry typically comprises many small firms, coordination (and information transfer) is difficult, increasing the likelihood of market failures.

Common property resources are used by many and owned by everybody. Unrestricted access leads to market failures (and market inefficiency), because individuals tend to overuse the resource and have little incentive to upgrade it. The problem is often a failure to assign property rights and/or a

failure to restrict access. In general, the environment is a common resource and will be over-exploited, through degradation or pollution, if decisions are left to market agents only.

There may be specific market imperfections in low-income countries that block investment and entrepreneurship in non-traditional activities. Countries can get stuck in a low-level equilibrium due to the nature of technology and markets, even when government policy does not penalize entrepreneurship (Rodrik [52] and [53]). If information failures are so pervasive and virtually all markets are incomplete, almost all actions of firms and individuals create externalities, which are not taken into account, with repercussions for the direction and dynamics of the entire economy. The negative externalities that lead a country to settle for a low-growth equilibrium are in part based on learning spillovers, as in technological development, and on market-size externalities and associated coordination failures, induced by scale economies (Ray [51]).

Market failures in industrial development are pervasive in all countries, and probably more so in poorer countries. Although the dimensions of market failures are not known, as they are inherently difficult to quantify, it is likely that developing countries with under-developed markets suffer from greater market failures. Stewart and Ghani [60] argue that dynamic externalities are more important for development than static externalities. They also point out that in addition to the market failures in education and training, environment-related externalities are likely to be significant. Of the five types of market failures identified, although they are all important for low-income countries, coordination and technology development could be considered most important.

Coordination failures. Failure in coordinating the actions and decisions of economic agents constrain growth and development. As discussed above, these may arise due to incomplete markets, for example, when complementary actions are absent, or due to imperfect information, for example, on investment decisions of others. Coordination failures may be static, relating to current actions, or dynamic, linking to actions in the future or past. Despite long-term awareness of such coordination failures, they have not always been considered in the traditional market failure literature. They are based on the notion that moving out of a low-development steady state requires a coordinated and simultaneous investment effort in more than one sector. In literature on development planning and industrialization conducted in the 1960s, such issues were often referred to as forward and backward linkages. Modern models use the term complementarities rather than linkages (Ray [51] and Rodrik [53]). The activities in different sectors are complementary if there are demand spillovers across final goods produced under scale economies, or if there are bulky infrastructure investments that support many sectors. Activities will also be complementary where there are vertical industry relationships and specialized intermediate inputs, which are more relevant given the changing nature of industry (see chapter I).

Coordination failures lead to the failure to address externalities in terms of linkages among industries. Stewart and Ghani (2001) discuss the cases of Silicon Valley in the United States and the Punjab in India, where technological change was associated with significant externalities and inter-industry linkages. In both cases, coordination failures associated with adopting new technology and creating the demand for new industries appear to have been more significant than static market failures. Coordination failures operate at different levels. Stewart and Ghani [60] consider two interlinked firms; Schmitz [56] discusses external economies and coordination failures in clusters of firms; while Rodrik [52] discusses the specialization of the economy as a whole. The fundamen-

tal issue relevant to the discussion of market failures is that coordination failures require actions to improve efficiency and the transfer of information. These depend on inputs in more than one sector or firm, while more traditional market failures, such as those associated with pollution externalities, can be addressed in a piecemeal or firm-specific manner, through, for example, subsidies to a firm to install an efficient and energy-saving technique.

Coordination failures also affect education and training systems, technological development and the interaction between them. Many skills relevant for industrial upgrading and competitiveness arise from learning-by-doing and specialization in skill- and technology-intensive activities. Lall and Teubal [40] argue that a market for setting priorities in technology development does not and cannot exist. Technological development is based on learning, and stimulating this process requires the setting of priorities, identification of linkages and selection of technological promotion. This, in turn, requires an overall vision of where the economy should be or could be heading (see Hausman and Rodrik [25] on learning about costs of industrial policy), in addition to an analysis of the more traditional market failures, for example, in relation to the adoption of individual technologies. A coordination failure between skill formation policies and industrial or technological policy can prevent an economy from pursuing a higher development path. This is because moving into new activities and adopting new technology demands sufficient numbers of good-quality and appropriate skilled workers (Bartel and Lichtenberg [3] and Stewart and Ghani [60]), while working with new technologies involves learning, acquiring practical experience and informal skills.

Technological development. The process of technological development entails innovative activity, most of which is undertaken in developed countries, including the identification and adoption of appropriate new technology. While the latter is most relevant to developing countries, especially the poorest countries where very little innovative activity exists, knowledge appears to be lacking. Market failures in technological development involve information failures, externalities of the learning process and the public good aspects of knowledge. Coordination problems can also give rise to failures in technology markets, illustrating how coordination is both a cause and a type of market failure. Externalities pervade the process of technological development (Evenson and Westphal [15]) and cause incomplete appropriation of returns to technological investments (Pack and Westphal [49]). The case studies presented in chapter I show that such externalities relate especially to local circumstances surrounding the technology.

The market failures involving the building of basic technological mastery in developing countries are some of the most important market failures in industrial development. Technological capabilities and the related market failures are discussed in the evolutionary approach to industrial development. The evolutionary approach (Lall and Pietrobelli [39]) recognizes the existence of externalities and complex learning processes, and argues that the ability to select and deploy technologies efficiently cannot be taken for granted (UNIDO [73] and Lall [37]).

Justman and Teubal [30] identified several instances of market failures in the development of technological infrastructure and the learning process surrounding technological development, including the following:

- There may be uncertainty and externalities among early users learning about the application of the new technology. New users are uncertain about the costs of using new technology. Besides,

new information is costly to obtain and assimilate. In principle, a group of potential users can come together to share information, but such groups are not always easily forthcoming;

- Codification and standardization requires experience, and knowledge about the product is summarized in a codified body of knowledge. Standardization offers social benefits in that it permits rapid diffusion of the technology as well as knowledge about it among users and other producers. However, individual firms would not be able to appropriate all benefits of developing a new standard, owing to externalities;
- Network externalities arise when new users of technology depend on the existence of a large user base. Early adopters of new telephone equipment may need to be subsidized in order to stimulate further demand for telephones;
- The development of a support infrastructure for new technologies also depends on a large number of support staff that may not be available initially. Education and training are essential to enhance the labour skills that will be needed in the future, and this requires both planning and coordination.

Capital market imperfections. Ideal capital and credit markets will lead to surpluses of savings for those with skills, talents and ideas who want to invest in profitable projects. In practice, credit constraints are pervasive throughout the economy. Interest rates are high and access to credit is tightened, making it impossible for the very poor to borrow, irrespective of the interest rate, at least in formal markets. High transactions costs arising from screening, monitoring and enforcement in the credit market create obstacles to lenders. The use of collateral could reduce such transactions costs. However, informal firms, microenterprises and start-ups need capital, but are often unable to pledge collateral and often lack formal title rights to land and houses. This prevents them from adopting new and efficient technologies or investing in education and training. Hence, the market failures associated with capital markets affect skill formation and technological development relevant for industrial development.

Skill formation. Good quality and appropriate human capabilities are among the main drivers of industrial development. Good-quality education provides the best basis for training and the acquisition of skills. It is widely acknowledged that there are market failures in providing education, and the market for training is also characterized by market failures. On-the-job training may be too low, as firms do not have sufficient incentives to invest in worker skills; once trained, workers can decide to work for other firms that can use their skills. Becker [5] argued that workers have incentives to pay for general training as they can transfer these skills to other firms, while firms can recoup investment in firm-specific training and therefore have an incentive to pay for training useful in that particular firm. However, some would argue that credit constraints arising from market failures in the capital market mean that employees are unable to finance training. On the basis of the empirical evidence, firms do invest in general training. However, employees do not reap all the benefits from training, but firms manage to reap some benefits by raising productivity more than wages. Standards and regulations in education and training are aimed at overcoming market failures associated with the public goods aspects of education and training. Public intervention, on its part, can address externalities and coordination problems.

Most market failures relate to the presence of externalities in training. Some market failures, such as the development of certificates and national standards, have public goods characteristics, while

information costs and coordination are underlying problems. Lall [37] provides a good overview of instances of market failures in the education and training system relevant for industrial development, which may be summarized as follows:

- The trainee may not recover all the benefits of educational investments; may not be aware of future value or needs for certain educational investments; may be excessively risk-averse; and may lack access to certified training and capital markets;
- Firms may lack knowledge of best practice in training, and may also be unable to avail themselves of the full benefits thereof;
- The education and training system itself may lack information on educational needs in industry (coordination and complementarities problem), and may also lack access to capital markets to fund the development of better standards.

Preservation of the environment. Industrial development has externalities relating to environmental quality. There are missing markets for global and local resources, such as oceans, rivers and clean air. These are usually regarded as public goods or common resources, for which no property rights have been or can be assigned. Frequently, such externalities are negative, for example, if industry pollutes the air or water. These issues are treated in detail as they have national and global public good features.

Furthermore, market failures that relate to imperfect information surrounding investment in preserving the environment, such as encouraging energy efficiency (Koopmans and Te Velde [35]), are the same market failures that characterize technological development. Firms may not have full knowledge of the existence of best practices in environment-friendly techniques, even though they may be profitable. Similarly, implementation itself creates a positive externality by providing useful information to other adopters. For instance, it may turn out that realized returns of investments fall short of the returns promised by engineers (Hassett and Metcalf [24]), possibly because engineers fail to acknowledge (local) adaptation costs.

3. Need for public intervention

It would seem that the long list of market failures would be sufficient to justify government involvement in many aspects of industrial development. However, this is not necessarily the case. The different types of government interventions, including taxes and subsidies, provision of public goods and setting of rules and standards, together with the difficulties involved, are discussed here. Considering the focus of the present report, it is important to note that many market failures are most appropriately addressed through tax and subsidy policies—"correcting" incentive distortions—or specific regulatory measures. It is rarely the case that providing a public good is necessary to address a specific market failure. On the contrary, providing public goods addresses a variety of problems and helps to overcome various market failures.

The traditional market failures associated with public goods and externalities are easily identified. As they are usually limited in scope, government intervention is circumscribed. For example, when there are pollution externalities involving many players, collective action often fails. A combination of taxes and subsidies is therefore necessary to encourage the internalization of externalities. In the case of public goods, it is frequently assumed that they should be provided at an appropriate level

by the public sector, or that rules and standards are set such that the appropriate quantity of public goods is provided. To some extent, the development of standards is a public good, although the certification process may not be, as firms can be excluded. Standard-setting is particularly relevant in education and training systems, and it could also facilitate technology adoption.

Information failures related to knowledge of new, best practice and environmentally sound technologies by firms requires the diffusion of knowledge about them. Due to the public goods nature of such knowledge, firms generally lack the incentives needed to generate it. The public sector could assume the responsibility to assemble and distribute information. Similarly, the adoption process itself generates externalities that cannot be appropriated due to missing markets. Hence, the knowledge generated by the adoption process could be seen as a public good.

In contrast to the old, largely static market failures, new market failures require a much more sophisticated and nuanced approach. Solving market failures associated with the dissemination of information, dynamic externalities and coordination failures are more complex. They also show more clearly the limits to what can be achieved through government intervention (or government failures that may impinge negatively on efficient operations of the private sector), which could in part also apply to static market failures. In that connection, the following points should be noted:

- Some questions arise over whether governments can have perfect, or even sufficient, information and foresight. For instance, Arrow [1] questioned the usefulness of national planning agencies that collect information, which may be too crude and disaggregated for firms to use. In low-income countries, effective decision-making and information-gathering structures may be lacking completely, implying a need for institutional capacity-building as a first-stage intervention;
- As market failures are pervasive throughout the economy, a full corrective policy would entail taxes and subsidies on virtually all commodities, on the basis of supply and demand elasticities. However, the costs of obtaining information and administering corrective taxation are likely to be significant (Stiglitz [61]). Priority areas need to be selected, where the benefits of intervention exceed the costs. This is one (practical) reason why taxes may not be the best intervention to account for externalities. Subsidies can be more effective for creating appropriate incentives for private agents, while regulation may often be more cost-effective, from the perspective of social welfare. In general, if the source of the problem were information failure, the optimal solution would be to improve the quality of information;
- Government intervention can also suffer from moral hazard problems (Stiglitz and Uy [63] and Hausman and Rodrik [25]). Technological development, including the development of new, and adoption of existing, technology, is characterized by externalities, which cannot be fully appropriated. A corrective subsidy would internalize the social benefits of one firm discovering the full costs of adopting the technology. However, due to the asymmetry of information, there are morally hazardous problems associated with this strategy. After having received the subsidy, the firm will have few incentives to engage in costly activities to recover costs. Hence, subsidies need to be combined with performance requirements. For example, East Asian countries directed credit to priority sectors conditional upon export performance;
- There can be private non-market means that can solve market failures. Joint action may raise collective efficiency by internalizing externalities. Schmitz [56] argues that coordination failures in local clusters have been more effectively solved by joint business associations (firm collusion)

than by independent government intervention. Any government involvement would need to be directed through such business associations, for instance, by supporting or initiating collective action;

- Addressing national coordination failures based on scale economies is probably the most far-reaching approach, but it entails the highest risks. These issues are probably most acute in developing countries whose underdeveloped markets and prices are unlikely to reflect future opportunities and development paths. One policy would be to stimulate various activities with directed credit. But the question is which activities and in what order. There are also choices regarding functional interventions in factor markets or through more selective and interventionist approaches, or through an appropriate combination of functional and selective approaches;
- Government intervention carries the risk of misallocation and rent-seeking behaviour. The reality in many, especially low-income, countries makes the assumption of an altruistic and non-rent-seeking public sector seem far-fetched. While the political economy in the Republic of Korea and Singapore allowed minimal rent-seeking behaviour, government intervention in countries, such as Bolivia, is possible. However, caution must be exercised against too much microintervention. Focusing on establishing favourable market conditions in general could in practice be socially optimal.

None of this undermines the rationale for government intervention, but it cautions against establishing a simple link between market failure, government intervention and inflexible institutions in any situation. Rule and standard setting, tax and subsidy systems and the provision of public goods are also required to address externalities. Stiglitz and Uy [63] discuss the experience of East Asian governments in addressing market failures in capital markets. This included creating markets and financial institutions, regulating them, and providing rewards to firms and industries in priority areas conditional upon performance. Stiglitz [62] argues that flexibility of policy interventions is also important for securing a positive outcome. Just as technological development requires learning on the part of firms, the implementation of industrial policy requires learning on the part of governments. Inflexible policies or institutions addressing market failures are unlikely to be relevant for industrial development in the long run.

4. Summary of review of market failures

Having reviewed the types of market failures that affect industrial development, it is clear that market failures can arise for a number of reasons, five of which have been identified. However, there are two general root causes, namely incompleteness of markets, of which ill-defined property rights are the clearest example, and imperfect information, especially with regard to coordination failures. If markets are incomplete, for example, property rights are not clearly defined; if information flows are imperfect, transactions costs are increased and incentives distorted or hidden, giving rise to market failures. Market failures therefore arise because of difficulties in coordinating the activities of many agents, or in allowing for the linked or complementary nature of these activities, or in accounting for externalities.

The most prevalent of the five types of market failure relevant to industrial policy, as identified above, involves the coordination problems that arise because of the need to integrate the related *actions of many agents, none of whom possess full information. These coordination failures are quite general, and feature both as a type of failure and a contributory cause of other types of failures,*

for example, in credit markets or training. The second type of market failure relates to technology for the simple reason that the market on its own cannot ensure the development, adaptation and adoption of the most appropriate technologies, including building technological capabilities (the latter also relates to specific skills). The third set of failures relates to capital markets, where constraints in access to credit are largely due to weak property rights, and the fourth relates to skills formation to ensure the optimal level of education and training for the workforce. The fifth type of market failure relates to the environment, arising mainly from negative externalities, such as pollution. While cases have been provided to show where public intervention could help, it must be acknowledged that such intervention could also fail, as public agents may not be effective in addressing market failures. The focus here is therefore to show how public interventions could be improved.

C. PUBLIC GOODS: BASIC CONCEPTS

A pure public good must exhibit two characteristics. First, the good is non-excludable: once it has been provided, no agents can be excluded from enjoying its benefits. As long as it is difficult or costly to exclude, private providers will not find the market attractive—they cannot exclude non-payers from deriving benefit, and therefore cannot recover the costs of production. Consequently, there is a role for the public sector in providing the good, as the public sector can use non-price mechanisms to finance its provision. Secondly, the good must be non-rival in consumption: consumption by one person does not diminish the amount available to others, therefore “extending consumption to more users creates benefits that cost society nothing” (Kanbur and others [31], p. 61). As the private sector would under-supply a non-rival good, there is a role for the public sector to increase its provision, for instance, by providing a subsidy for production.

In practice, goods are “impurely public”, as they exhibit neither characteristic completely. For example, a satellite television is, in principal, non-rival, but access to signals is excludable. Eradication of a contagious disease is another example. The benefit of eradication is both non-rival and non-excludable. However, the method of providing the public good may be both rival and excludable, for example, vaccinations. The knowledge on the technology used to make the vaccine is non-rival, to the extent that many firms could use the technology without preventing others from using it, but is excludable in so far as not all are able to use the technology. This is considered further below in the context of the distinction between core activities, or the provision of the public good, and complementary activities, those that are required to enable others to benefit from the public good. The discussion about public goods is thus one about degree of excludability and rivalry.

The fundamental point about public goods is that they will be undersupplied if provision is left to the market, leading to a market failure. This arises for two reasons. First, to an agent, the investment cost of provision could exceed the returns. This essentially follows from the inability to exclude potential beneficiaries, which implies that some or all of the beneficiaries will not pay for the benefits, that is, they will enjoy a free ride. Secondly, even if charging for the benefits raises the possibility of exclusion, it may not be desirable from a social point of view if the social benefit exceeds the private benefit. This will be the case if benefits are non-rival, or if there are significant external benefits.

In practice, it is very difficult to distinguish clearly between (impure) public goods and the concept of externalities. An externality refers to “an interdependence that occurs outside of the price

mechanism" (Cullis and Jones [12], p. 41), and is thus an example of market failure. The consumption or production by an agent has effects on others, either as consumers or producers. The fact that others are affected implies some degree of non-rivalry, while the fact that they cannot avoid being affected implies some element of non-excludability. Consequently, it is not particularly useful to make a distinction between externalities and public goods. In a general sense, providing positive externalities, or reducing negative externalities, is similar to providing a public good. Just as the market undersupplies public goods, externalities cause market failure. This is because private agents do not take social benefits and costs fully into account. As a result, activities yielding positive externalities are undersupplied, while those yielding negative externalities are oversupplied.

Traditional discussions of public goods were at the national (or State) or community level—the government would provide security within its borders, or a local community would provide its own street lighting or policing. However, the spillover or spatial range over which benefits (or costs) are meaningful can extend from the local to the truly global level. The approach of the United Nations Development Programme (UNDP) is quite broad, using the concept of global public goods to encompass a broad range of development activities (Kaul and others [33] and [34]). Other commentators typically use narrower definitions of what constitutes a global public good (Kanbur and others [31] and Ferroni and Mody [17]). For convenience, distinction is limited to national and international public goods. The term international public good (IPG) is used when the benefits of a good extend well beyond national boundaries, whether regional or truly global. A national public good (NPG) is one where the benefits are enjoyed within national borders. As the benefits are international in range, every international public good would represent a national public good to each country. Research knowledge that provides a cure for a disease is an international public good, but in effect is a national public good for the country in which the disease is present. However, national public goods may be needed to contribute to providing the associated international public good. For example, to provide the international public good for eliminating a contagious disease, each country must have a health system in place, or a national public good, to administer the cure or prevention.

The World Bank [81] draws a distinction between core and complementary activities associated with the provision of international public goods. "Core activities aim to produce international public goods. ... Complementary activities, in turn, prepare countries to consume the international public goods that core activities make available—while at the same time creating valuable national public goods" (World Bank [81], p. 110). Thus, core refers to the provision of the global benefit or, in other words, the production of the international public good. Similarly, a core activity is necessary for providing national public goods, which is complementary to providing international public goods. Complementary refers to helping in providing the good or assisting in the ability to derive a benefit from the presence of the public good. This is similar to a production-consumption distinction (Morrissey and others [48]). For example, eliminating malaria would be a core international public good. Knowledge, and the research conducted for generating such knowledge, would contribute directly to the core public good. However, individual countries would have to contribute to its provision through, for example, controlling the breeding of mosquitoes. Such control would be a complementary activity that is necessary to ensure the provision of the core activity, and typically would be associated with the provision of national public goods.

1. Types of public benefits and public goods

Morrissey and others [48] consider three types of benefits that give rise to public goods: directly providing utility, reducing risk or disutility, and enhancing capacity to increase welfare. A public good may provide all three types of benefits. In essence, all public goods provide a utility—they provide something that is potentially beneficial to all. In many cases, the benefit or utility lies simply in knowing that the public good is provided—preserving biodiversity or conserving rainforests are examples. Similarly, there is a benefit in the knowledge that a global institution exists to coordinate and monitor activities that relate to international public goods, such as the Kyoto Protocol for the environment, or the World Trade Organization for a global perspective on trade. Even if the institutions are imperfect, the fact that they exist is better than if they did not. The fact is that a benefit is provided for all (within the spillover range), even to individuals who do not actually gain from the utility. For example, there may be some people who have no notion of global warming, or are not concerned with preserving biodiversity. In other words, although the benefit of a public good, once provided, is available to all, not everybody may choose to consume the good.

Many public goods do more than provide a utility by their presence. In particular, they may provide a benefit that takes the form of reducing or eliminating a risk, where the risk becomes a disutility. Reducing global warming reduces the associated risks, such as preventing further damage to property or crops from extreme weather for everybody, and thus contributes to providing an international public good. However, reducing the risk, for instance of illness, associated with the pollution of a common property resource, such as a lake, provides a public good with a more limited spatial range (regional or national). Eliminating a disease, like malaria, would reduce the risk of contracting it globally, although the benefit is greater to those living in countries most afflicted with the disease. Nevertheless, it is an international public good.

Public goods can also confer a benefit by enhancing the capacity to produce goods, where the enhanced capacity is a benefit available to all. It is the enhanced capacity that constitutes the public good, not necessarily the goods that may be produced as a result. Knowledge is one such example. In principle, it is available to all, but some may be constrained in their ability to access or use the knowledge, implying the need for complementary public goods. Knowledge itself is nevertheless an international public good. Education enhances national capacity, including the capacity to use global knowledge, and creates positive externalities. It can therefore be considered a national public good. As education also enhances the capacity to produce global knowledge, it is a complementary activity that provides the international public good.

A final distinction is to identify types of public goods by sector of benefit. Typically, five sectors are considered—the environment, health, knowledge, security and governance (Kanbur and others [31] and Morrissey and others [48]). Three of these sectors, namely, environment, health and security, are largely associated with benefits derived from reducing risks. The other two, knowledge and governance, are primarily associated with enhancing capacity. The public goods associated with industrial policy relate primarily to three of these sectors—environment, knowledge and governance. In the present report, attention is devoted to those three sectors, as they are the ones in which market failures relevant to industrial development arise. This is not to imply that the other sectors are irrelevant. In so far as the provision of health public goods improves the health of the workforce, there is relevance to industry. However, it is the quality of life, rather than of the work-

force, that underlies the motives for health public goods. Similarly, security may benefit the economy and industry, but this specific benefit is not the motive for providing security public goods. A more important reason for their exclusion from the discussion is that industrial development itself does not contribute to health and security public goods, at least not in ways that cannot be encompassed by environment, knowledge or governance (for example, lower pollution contributes to better health, but is covered by contributing to a better quality of environment).

TABLE 10.
CLASSIFYING PUBLIC GOODS BY SECTOR AND TYPE OF BENEFIT

<i>Sector and Benefit</i>	<i>Risk reduction</i>	<i>Capacity</i>	<i>Utility</i>
Environment			
International	Reduce emissions	Research	Biodiversity
National	Reduce pollution	Agriculture systems	Conservation
Health			
International	Eliminate disease	Disease Research	Higher welfare
National	Reduce disease	Reduce illness	Healthy people
Knowledge			
International	Disease research	Research centres	Global networks
National	Green technologies	Universal education	Research capacity
Security			
International	Conflict prevention	Peace-keeping	Counter-terrorism
National	Crime reduction	Policing	Lower crime level
Governance			
International	UN Security Council	Global institutions	World Trade Organization
National	Environmental agency	Legal systems	Good government

Source: COMPID Research Programme and Morrissey and others [48].

By way of a summary, table 10 provides examples of public goods classified by type and sector of benefit. Considering a few cases regarding the environment and knowledge, a reduction in greenhouse gas emissions would reduce the potential risks (cost) associated with global warming. Such a benefit has an international (global) spatial range. However, reducing the pollution of particular activities, such as dumping effluent in rivers, reduces risks of disease or depleting fish stocks within a national range. Research enhances the capacity to provide public goods, and thus relates to most sectors at all spatial ranges. Nevertheless, it is possible to conceive of specific research with a limited spatial range, for example, agricultural systems to increase efficiency of water use in arid regions. Similarly, developing green technologies, to reduce pollution and thus preserve resources, is a form of knowledge that can reduce risks at a national level. In the same vein, at the national level, universal education increases capacity, as it creates an educated workforce. It also provides a utility, as the existence of national research capacity confers a utility in itself.

2. Issues in providing public goods

The central issue regarding public goods is their undersupply if left to the market. This does not mean that the public sector must supply the good itself, but it should intervene to "correct" market prices and conditions of provision. In general, if non-excludability is the core feature of the good, direct public provision may be the most effective intervention. If, however, non-rivalry is the core feature, public intervention would help to increase the level of private provision. Similarly, in the related case of externalities, the market would oversupply negative externalities and undersupply positive externalities. There is, therefore, a distinct role for government, namely, intervention to ensure that the optimal quantity (from the social perspective) is provided. This would rarely require

public provision; interventions to regulate activities or alter prices or production costs are all that is required. Finally, in the case of "simple" market failures, such as credit constraints due to an underdeveloped financial sector, where there is no evident public good and externalities are negligible, the intervention does not necessitate direct public provision.

It will be useful to distinguish three particularly relevant levels of intervention:

- The first involves direct provision, where the government finances and provides the good. Security public goods, such as military, police and judicial systems, are typically provided directly, with perhaps some private sector provision. Activities with significant positive externalities, where provision is excludable, and rival because of congestion, typically have public provision in conjunction with private providers. Health and education, including research, are the best examples. Governance public goods are by nature directly provided, as provision is embodied in an organization or institution (see table 10). Note also that institutions are required to oversee and coordinate the provision of public goods; such public organizations, international or national, could themselves be considered as governance public goods. It is however the activity or service, not the organization, that constitutes the public good. Where provision is direct, the public good is usually financed out of public revenues, for example, from general taxation. If the activity is not a pure public good, but has positive externalities, public-private partnerships may provide the financing, as in the case of toll roads and power generation, or users pay some of the cost, for example, for health or education. This is most feasible if exclusion is possible and there is non-rivalry only up to some level of use (congestion);
- The second involves provision by regulation or agency, at the national or international level. In practice, this is related to governance, as an agency or regulatory body undertakes the intervention. Environmental public goods are often provided by regulation, such as monitoring emissions or the discharge of effluents, including penalizing agents that produce excessive negative externalities. Many of the market failures associated with industrial development can be addressed through agencies that, in doing so, provide a public good. Competition policy is a form of regulation. Health and safety or product standards boards are examples, as well as agencies coordinating training or providing information on adopting technologies. As in the case of direct provision, the agency is usually publicly financed. Often, however, charges, at a subsidized rate, are levied for the service provided, so that costs are shared. The development of unique standards is mostly of a public goods nature;
- The third involves intervention by altering the price or cost of production, either through taxes or subsidies. The intervention could be made by an agency or a direct public provider. Thus, this level is related to the previous two. Activities with positive externalities will be encouraged through subsidies with regard to health or education, or for adopting cleaner technologies. Activities that generate negative externalities could be discouraged, by levying taxes, charges or penalties. For example, polluters could buy emissions permits and pay a penalty if they exceed the permitted level.

These levels of intervention apply to both international public goods and national public goods. There are few cases of international public goods where direct provision applies, but international peacekeeping is an example. Also, since international agencies play a coordination and monitoring role at the global level, one could consider such agencies as direct providers of governance, or providing an international public good. The "division of responsibilities" between providers of inter-

national public goods and national public goods may not always be clearly delineated, but there is a general rule. International bodies are required to coordinate the provision of the core international public good, and have a role in assisting national providers of complementary national public goods. It does not necessarily require an international body to provide the international public good. For example, national or international research centres are, in principle, equally competent to deliver knowledge, but the latter may be better able to benefit from research economies of scale.

There are no hard and fast rules about financing the provision of international public goods (Sandler [55]). Some countries will, in practice, derive more actual benefits from provision. For example, the country in conflict and its neighbours benefit most from peacekeeping measures that are taken. However, all countries benefit from it, in so far as it contributes to global security. Arguably, global security benefits countries in proportion to their wealth. A similar argument could be applicable for industrial development to the extent that it contributes to global economic stability. In many cases, countries that appear to benefit most are often those that are least able to pay. The poorest countries tend to be the most unstable, both politically and economically, and they have a high incidence of disease and relatively low levels of knowledge capacity. For these reasons, discussion of financing international public goods usually revolves around some form of contribution in accordance with the ability to pay. This justifies the reason why rich countries allocate some of their aid towards the provision of international and national public goods in poor countries (see Velde and others [77]).

The private sector can also play a part in financing public goods. The principal source of private sector contributions is charities, such as the Bill and Melinda Gates Foundation for health matters, the Ford Foundation for research, or the World Wildlife Fund on environmental issues. Another factor that can increase the role of the private sector is the focus on corporate social responsibility in companies, which initially included voluntary contributions and community investment. Proposals for putting corporate social responsibility into practice involve promoting socially and environmentally responsible behaviour by companies, including in the operation of their core activities. In part, being socially responsible, private agents would recognize and address any negative externalities associated with their activities. By assuming social responsibility, companies address market failures and even support the provision of public goods, such as education, health and a good-quality environment. The point is that private businesses can play a positive and constructive role in addressing market failures. The focus of the present report is, however, on the role of public agents.

While the benefits of the provision of public goods are available to everybody, different groups within a country can derive different benefits, that is, levels of consumption may not be the same for all. For example, those public goods associated with industrial policy are likely to benefit only certain firms or sectors, and some employees in those firms or sectors, directly. There may be a cumulative beneficial effect of industrial development, but this does not benefit everybody directly or in equal measure. Public goods provide a benefit that is, in principle, available to all, to the extent that everybody consumes the same amount, but not everybody derives an equal benefit from consumption. Some public goods are likely to benefit the poorest directly, such as research on medicines and vaccines relevant to the poor and universal access to primary education and primary health care, while others may have a more indirect impact, such as providing public goods to enhance the skills base. It is not clear a priori which public goods are best placed to lead to sustainable reductions in poverty in the long run. A detailed "poverty impact assessment" of particular public goods is beyond the scope of the present report.

The provision of public goods is beneficial to the poor and non-poor alike because, by definition, all should have access to public goods. Its provision and access enhances the welfare of the poor, even if it does not increase their monetary income. Thus, in addition to the benefit derived from the public good itself, such as health or education, it cannot be ignored that the welfare of the poor is increased. Furthermore, knowing that the level of poverty can be reduced confers a benefit, namely that of increasing the well-being of all, and therefore is a public good. In other words, the knowledge that poverty is reduced is a public good. Reducing poverty is a desirable policy objective, and industrial development should be considered as an integral element of a poverty reduction strategy. In general, if the provision of certain public goods helps to overcome market failures and promotes industrial development, this will contribute to economic growth which, in turn, offers the potential to reduce poverty.

3. Summary of review of public goods

The concept of a public good, in economic terms, has a clear meaning. A pure public good must exhibit two characteristics: (a) it must be non-excludable; and (b) it must be non-rival in consumption. Because of these characteristics, public goods, if left to the market, will be undersupplied.

Public goods are directly related to market failure. Non-excludability implies that private firms will fail to provide the public goods because they cannot ensure that consumers will pay for the benefits. Non-rivalry, on the other hand, implies that firms will fail to supply enough of the public good because they undervalue the social benefit. In effect, there is a positive externality that is not fully taken into account by the private sector. Public intervention can increase provision, and the provision of public goods is one way to address market failures.

The provision of public goods is desirable in its own right. Public goods, by definition, are available for the benefit of all, and their provision contributes to increasing the general well-being. In this way, public goods can be related to poverty reduction, although some public goods are more obviously of direct benefit to the poor than others. In so far as public goods help to overcome market failures and support industrial development to promote growth, they contribute to reducing poverty. The provision of public goods to support industrial development is discussed below.

D. ADDRESSING MARKET FAILURES IN INDUSTRIAL DEVELOPMENT THROUGH PUBLIC INTERVENTION

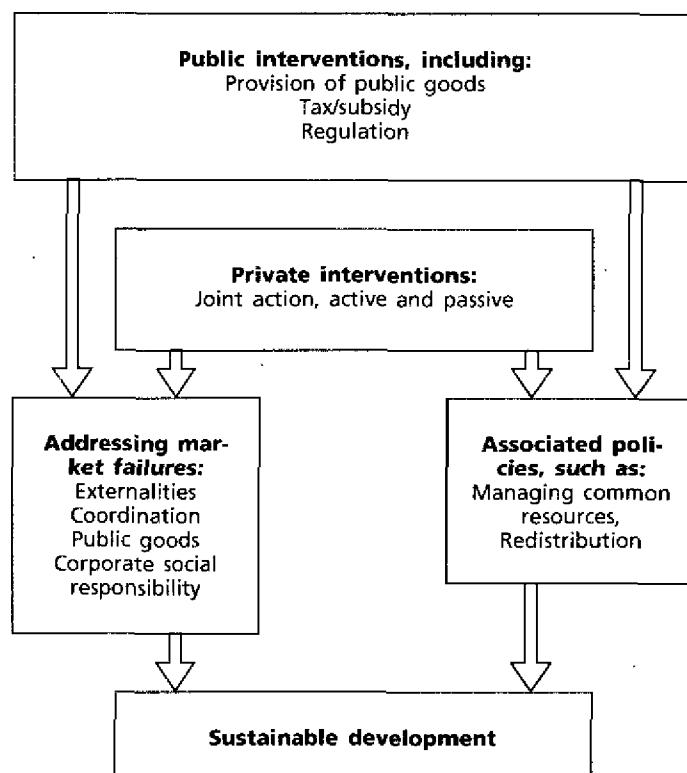
The main aim here is to bring together the discussion of market failures in section B and of public goods in section C. The provision of public goods, while desirable in itself, can help to overcome market failures. Keeping in mind the two characteristics of public goods, it is clear that public intervention could increase their supply. This is usually done by providing some form of subsidy. It does not necessarily need to be a direct production subsidy. For example, an indirect subsidy could take the form of disseminating information on the availability of a technology, for example, to promote energy efficiency, which has a social benefit.

Before discussing market failures in industrial development and public intervention in detail, it is useful to bear in mind that public intervention can provide private as well as public goods, mainly

because only a few goods are purely public, and is not limited to overcoming market failures. As shown in figure III, while the public sector can overcome market failures, it can also address other issues, and other actors can address market failures and other issues. The present report focuses on those public interventions that provide public goods to overcome market failures in industrial development (focusing primarily on the linkages listed in the left column of figure II).

Many of the market failures in industrial development discussed in section B arise because of the existence of externalities. For example, pollution generated as part of production of textiles is an externality, or an external bad. Because private providers will not take the externality into account, they will overprovide pollution, leading to a market failure. As pollution accumulates and spreads, this externality becomes a public bad. Reducing the externality, in this case pollution, transforms it into a public good; whether it is an international or a national public good depends on the spatial range of the pollution. While industrial policy itself is not a public good, it can be used to facilitate the adoption of more environmentally efficient technologies. Industrial policy can therefore be viewed as a complementary activity, which contributes to the provision of a public good. The point is that there are public goods that are related to industrial policy.

FIGURE III.
MARKET FAILURES AND INTERVENTIONS



Source: COMPID Research Programme.

Table 11 summarizes the market failures identified in section B and relates these to industrial development interventions. Some responses would relate to the provision of public goods, such as governance institutions for coordination or support for technology development, but others, such as subsidies, need not. The most extensive market failures, in terms of how they combine to undermine

industrial development, relate to coordination. These are likely to be particularly severe in poor countries. In particular, a national strategy, or an industrial policy, is required to identify complementarities and support the creation of linkages. Institutions, especially non-market institutions, are required to implement the strategy and ensure coordination (discussed in chapter III). Intervention is also required to ensure that positive and negative externalities are addressed. Owing to the existence of these failures, the market will not be in a position to facilitate coherent and coordinated industrial development.

Some market failures are quite specific and suggest concrete responses. For example, credit market imperfections can be addressed by extending support to microcredit institutions, or even providing subsidized credit under certain situations, such as for adopting technology. Similarly, public interventions can promote the optimal level of training and skills acquisition for society, either through subsidies or providing public goods. Other market failures influence strategy rather than demand concrete responses. For example, addressing coordination problems not only necessitates a government and institutions, but a policy must be in place and the means to implement it must be available.

TABLE 11.
INDUSTRIAL DEVELOPMENT, MARKET FAILURES AND RESPONSES

<i>Type (sources of failure)</i>	<i>Examples of market failures</i>	<i>Responses: policies and activities</i>
Coordination	Externalities ignored Linkages not exploited No policy coherence Complementarities	Capacity-building for industrial policy to identify linkages and externalities National strategy (industrial policy)
Technology Developing, adapting and adopting	Incomplete and imperfect information Network externalities	Promoting technology transfer and adoption Support for standardization and quality control
Skills formation	Externalities (In training workers) Imperfect information	Coordination and/or subsidies for training
Capital markets Access to finance	Rationing and/or high interest rates	Microcredit schemes or formal sector subsidy
Environment Protection, conservation, cleaner technologies	Negative externalities not accounted for	Product and process standards and regulations

Source: COMPID Research Programme.

A one-to-one mapping between the provision of public goods (table 10) and market failures in industrial development (table 11) is not possible. However, some general relationships exist. For instance, for the provision of knowledge, both international and national public goods can, in principle, address more than one type of market failure, including negative environmental externalities, credit rationing, externalities in technology adoption and coordination failures. Governance public goods would be particularly helpful for addressing coordination failures. On the other hand, beginning the relationship from the market failure side, market failures related to the adoption of new technology can be addressed by the provision of public goods as well as by (joint) private intervention (figure III).

To conclude this section, although addressing market failures and providing public goods are related in terms of how they can support industrial development, there is no direct relationship

between specific market failures and specific public goods. There is a range of public goods that should be provided merely because they are public goods. Similarly, there is a range of market failures that should be addressed because they constrain industrial development. Furthermore, providing public goods is only one way of addressing market failures. This section focused on identifying the market failures to be addressed. In section E below, the emphasis is on public goods related to industrial development.

E. PUBLIC GOOD ASPECTS OF INDUSTRIAL POLICY

Section D concentrated on how public intervention in general, and public goods specifically, can address and overcome the market failures that beset industrial development. This provided a justification for public intervention to support and promote industrial development. Some of the same issues are considered in this section, but from a broader perspective. Here, concern is on the ways in which industrial policy could influence the provision of public goods. Whereas section D was concerned with concrete measures to address market failures, this section is concerned with general measures and activities to provide industrial development.

Industrial policy, interpreted as devising and implementing a strategy for industrial development, has features characteristic of a public good. At an abstract level, the presence of a coherent policy confers widespread benefits to all. At a more concrete level, as discussed in section D, elements of industrial policy can be directed at overcoming market failures. Providing support to industry in the adoption of new and locally appropriate technology or standards is an example of how industrial policy (strictly, the institutions that implement the policy) plays the coordinating role which the market fails to perform. As time and expertise are necessary for obtaining information, it is possible to exclude some firms, and payment could be demanded for information provided. This possibility of excluding some firms from the benefit of an industrial policy means that such goods are not purely public. On the other hand, providing information or training is to some extent non-rival. For example, representatives of many firms could attend a seminar, and there are few limits to access to a website. In most aspects of industrial policy, it is the non-rival nature of benefits, rather than non-excludability, that is the relevant public good feature. As such, providing the public goods related to industrial policies is essentially about addressing externalities and market failures.

For example, access to a workshop presentation to make textile companies aware of the technologies that are available provides the highest public good benefit if all potential users are able to attend (none are excluded). This, in fact, should be provided as a national public good. However, because the technology itself is rival and excludable, its provision is left to the private sector. In simple terms, the public good element does not provide the technology, but provides the information and facilitates firms in gaining access to the technology. Similarly, the research knowledge that facilitates the development of new technologies is, in principle, non-rival, even if excludable in practice, and can therefore be considered an international public good.

Table 12 presents a number of activities related to industrial policy that can be treated as public goods. To provide a clear link to section C and table 10, these are classified by type of sector and benefit, and by spatial range (*international and national public goods*). In most cases, the root cause of the underlying market failure is an information imperfection, but sometimes the practical impli-

cation is to constrain agents from acting in a (socially) optimal manner. Research knowledge on efficient technologies is an international public good. However, the actual technologies, once developed, are essentially private goods, to the extent that information is not freely disseminated and the technology is underprovided. Potential users will be constrained by the lack of access to information, and perhaps by a limited capacity to use the information available. Industrial policy can provide the relevant public goods by increasing the capacity to benefit from knowledge—adapting the technology to local conditions, supporting the adoption of, and providing information on, the technology, and supporting training and skills acquisition. These are all examples of how industrial policy can provide a national public good in the form of knowledge that enhances capacity, leading to effective and appropriate industrial development.

Most of the benefits relating to risk reduction arise from measures taken to improve the environmental efficiency of production, such as reducing emissions and pollution, or conducting research and promoting technical knowledge on the development and adaptation of cleaner technologies. Such knowledge public goods are inputs that provide environmental public goods. Some activities classified under governance can be considered as reducing risks. At the international level, coordination of research activities, or priorities, can reduce the risk of wasted effort. At the national level, an effective industrial policy that promotes flexibility, in production and in factor markets, can reduce the risk and costs associated with economic instability.

It might be best to view the public good element of industrial policy as being able to increase capacity (see table 12), with the activities attributed to different sectors being linked and overlapping. For example, research centres and statistics provide knowledge capacity that can be directed at developing cleaner technologies that increase the capacity to provide environmental public goods. The important activities involved in increasing capacity are information, statistics and research capability, and skills and training. Institutions at the international level, such as UNIDO, or those at

TABLE 12.
PUBLIC GOODS RELATED TO INDUSTRIAL POLICY BY SECTOR AND BENEFIT

<i>Sector and spatial range</i>	<i>Types of benefits</i>		
	<i>Risk reduction</i>	<i>Capacity</i>	<i>Utility</i>
<i>Knowledge</i>			
International	Research to develop efficient technologies Technical knowledge	Research centres International statistics	Technical knowledge Policy knowledge
National	Research to adapt efficient technologies Technical knowledge	Support to adapt and adopt technology Information on markets and standards Skills and training	Efficient production methods Policy knowledge Product standards
<i>Environment</i>			
International	Reduce greenhouse gasses	Research on cleaner technologies	Global production efficiency
National	Reduce pollution	Support for adopting cleaner technologies	Efficient industrial sector
<i>Governance</i>			
International	Coordination of research activities	Global institutions (for example, UNIDO)	Coordination is being undertaken
National	Economic stability and efficiency	National institutions (for example, Standards Board)	Coordination of policy and technology

Source: COMPID Research Programme.

Note: Some examples, by their nature, appear in more than one cell.

the national level that coordinate and support industrial policy provide governance capacity. It must be noted that it is not the organizations themselves that are public goods, but the services they provide. Finally, there are a number of ways in which industrial policy provides a utility, or general benefit. The general contribution to environmentally efficient production is a benefit, as is the existence of institutions to coordinate and disseminate technology and policy knowledge. While many of these benefits are quite broad, some are relatively specific, such as having information on product standards, and the benefit of knowing that standards are monitored and indeed enforced.

Table 13 provides an alternative classification for public goods related to industrial policy, by core and complementary activities. This is useful for designing an industrial policy and identifying the roles and responsibilities of organizations. One could consider the core activity as the aim of policy or the objective to which an organization contributes. Core activities are those that are directly required to provide the public good, whereas complementary activities are those that contribute to the production and facilitate the consumption of the public good. In general, the core consists of knowledge of industrial policy. Specifically, under knowledge, it is represented by policy research; under quality of environment, it is represented by cleaner technology; and, under governance, it is represented by policy coordination. The core activity is able to provide the public good only if the complementary activities are undertaken, ensuring that full benefits are derived from

TABLE 13.
PROVIDING PUBLIC GOODS AS PART OF INDUSTRIAL POLICY—BY ACTIVITY

<i>Public goods sector and spatial range</i>	<i>Core activity</i>	<i>Complementary activity</i>	
	<i>Provision of public goods</i>	<i>Production of public goods</i>	<i>Consumption and utilization of public goods</i>
1. KNOWLEDGE			
Research, transfer, dissemination, skills	Policy research	Research and transfer; training	Facilitating and disseminating; skills
International	Industrial policy research	Policy development Statistics, evidence Training provision	Transfer, advice and experience Skills acquisition
National	Industrial policy research (local)	Policy development National statistics Training	Disseminating local advice and providing support Education skills
2. QUALITY OF ENVIRONMENT			
Developing and applying technologies	Research on cleaner technology	Developing cleaner technology	Facilitate use of cleaner technology
International	Cleaner technology	Developing cleaner technologies	Promoting the use of cleaner technologies
National	Appropriate (local) technology	Research, adapting technologies to local conditions	Adopting appropriate technologies
3. GOVERNANCE			
Regulation and coordination	Policy coherence (good governance)	Institutions	Implementation
International	Coordinating research and policy	Research and policy networks	Support for adapting and adopting research and policy
National	Adapting and coordinating policy and research	Policy and research agencies, services Regulatory agencies	Support for adapting and adopting research and policy

Source: COMPID Research Programme.

the public good. Complementary activities that are needed to produce research include training, statistics and a conducive research environment, while complementary consumption activities include education and dissemination or transfer of information and experience, so that the research results can be used.

The literature classifies public goods by sectors, namely knowledge, environment, governance, health and security. The first three are interrelated and bear direct relevance to industrial policy (see above). Knowledge is a public good, but research, dissemination and skills are necessary for its provision. Governance can be important for monitoring the use of available knowledge. For example, coordinating research is a governance function, but good governance itself, which involves regulation and coordination, is a public good. Here the role of institutions is important for production. The quality of the environment is likewise a public good. Providing environmentally sound technologies is the core activity. Research on adapting the technologies is a complementary production activity, while measures that facilitate adopting the technology are complementary consumption activities. However, the benefits can be enjoyed only after the complementary activities are undertaken. In this way, knowledge and governance public goods are complementary activities that provide environmental public goods.

Dwelling on the example of knowledge, within the context of industrial development, the public good is knowledge about industrial policy. As such, knowledge is non-rival (knowledge of environmental policy, which relates to environment public goods, could also be considered). The core activity is the research undertaken to produce knowledge, which provides the public good. Complementary activities involve production and consumption, and these are not knowledge public goods themselves. However, activities such as collecting statistics, establishing research groups and facilitating networks to transfer research findings all contribute to producing the research that provides knowledge. Although knowledge public goods are in principle non-excludable, in practice complementary activities are needed to ensure that the public good can be consumed or utilized. Activities to support the consumption of industrial policy knowledge include dissemination and education to ensure that people have the requisite skills. Even though complementary activities are necessary for providing a public good, they could comprise public good elements, for example, education.

With regard to environment public goods, the core activity is cleaner technologies that provide the public good, namely that of enhancing the quality of the environment, which is non-rival and non-excludable. Complementary production activities include research undertaken to produce and adapt appropriate technologies. As already mentioned, research is a core activity undertaken to provide knowledge. However, it is a complementary activity to ensure the provision of a better environment. Complementary consumption activities are those that facilitate the adoption of the technologies and the promotion of their use.

At a practical level, the complementary activities provide the most guidance to the elements of public goods related to industrial policy. Table 13 illustrates the range of activities involved. It is not intended to be comprehensive, nor is it intended to cover very specific activities, such as particular project activities. It is nevertheless important to emphasize the following five broad activities: namely, policy research and transfer of policy knowledge; collection and dissemination of information, including statistics; provision of skills and training; development and adaptation of

technologies; and provision of support to regulatory and coordinating agencies. Each of these is discussed below in relation to the various market failures identified in section B.

Policy research and transfer. One of the most important activities at the government level is the design and implementation of policy. Individual agents, such as firms, cannot be expected to be aware of, let alone keep track of, all the effects of their behaviour on others, nor the cumulative effects of the actions of many agents. This is a role for the government. Moreover, it extends beyond accounting for externalities and market failures to having an overall strategy and providing coordination. However, individual governments, especially those in poor countries, have a limited capacity for policy analysis and design. In this context, there is a role for external agencies to undertake research, collate the results thereof, and facilitate the process of transferring knowledge on industrial policy-making in the current global context of multilateralism and regionalism. At the country level, the government must have the capacity to assimilate this knowledge and adapt it to national policy. Even though these activities are not directly related to specific market failures, they have a strong public good nature, and industrial policy is only one area of application. It is not advisable to think of a market for policy, even if private firms provide research and policy advice.

Collection and dissemination of information. The most common source of market failures arises from imperfect information, either because useful information is not available or because not all potential beneficiaries have access to such information. Information, including statistics, has public good features, providing a role for the public sector. Good policy depends on access and use of information and statistics, raising awareness of what is happening, and distilling lessons from what has happened, all of which relate to a research function. In terms of industrial policy, an important function is providing information to firms on available technologies, market opportunities and product standards.

Provision of skills and training. At a general level, education contributes to increasing the knowledge capacity of a country. As part of an industrial strategy, there will also be cases where the public sector is best placed to identify the types of general skills and training that will be required. The public sector need not engage directly in training, but it can support, coordinate and even subsidize such activities.

Development and adaptation of technologies. In the context of industrial policy, this is one of the major activities relating to production technology in general, and promotion of cleaner technologies in particular. The market failures involved in building basic technological mastery in developing countries are among the most important market failures in industrial development. Because research knowledge is a public good, and because there are some economies of scale in research and development, the public sector can play a constructive role. In some cases, international research centres are appropriate, and should be encouraged to contribute to the process of policy transfer. National research capacity is most beneficial for adopting available technologies to local requirements, and for promoting research on issues of specific interest to the country.

Support to regulatory and coordinating agencies. Regulatory agencies are required both to monitor anticompetitive activities, including restrictive business practices by firms, and to ensure that externalities are taken into account. The latter is most readily observed in the context on environmental

regulation, but includes adherence to product standards and health and safety. The former includes antitrust bodies and regulation of monopolies and utilities. The activities of various agencies should themselves be coordinated as part of an industrial policy. Most of these activities should be at the national level, reflecting national priorities, but external, or international, agencies can provide advice and support, especially in the context of policy transfer. The types of institution that can facilitate these activities, and the ways in which UNIDO can support the establishment of such institutions, are considered in chapter III.

A coherent industrial policy, or industrial development strategy, requires coherent and coordinated activities in all the areas mentioned. Given the magnitude of the issues to be covered, and the inherent complexity of many issues associated with technology, it is not surprising that so many poor countries lack the capacity to design and implement an effective industrial policy. As a global institution with the capacity for research and data collection, and dedicated capacity to provide advice and technical support, UNIDO as an agency can play a catalytic role in supporting policy learning and the transfer of knowledge on industrial policy. Preliminary implications for the form that this role could take are considered in section F.

F. CONCLUSIONS: ROLE FOR UNIDO IN PROVIDING PUBLIC GOODS

Some preliminary observations on a role for UNIDO are presented here. Two chapters by Lall in Margariños and others [43] present the arguments for policy interventions to address market failures and outline a role for UNIDO. Globalization has been associated with a concentration of foreign direct investment in a few developing countries, and because of globalization many poor countries have been marginalized from global production and value chains. Only a few countries have managed to engage in high technology and high value-added activities. The poorest countries, and their firms, are in dire need of support to adopt new technology and upgrade industrial capabilities. Unfortunately, they lack the vital information necessary for learning or benefiting from spillovers and externalities. UNIDO can address such market failures and provide the necessary global public goods by diffusing knowledge on industrial policy and assisting in the collection, analysis and dissemination of industrial data. UNIDO can also support the development of the institutions and enhance the industrial capabilities required, if the private sector is to respond by adopting technologies and availing itself of market opportunities.

Section E identified five broad categories of activity relating to the provision of public goods and addressing market failures in the context of industrial policy. The list was not intended to be exhaustive, but to capture the major issues. In particular, the aim was to identify the main public goods associated with industrial policy. As UNIDO is an external agency that can contribute to the provision of public goods for industrial policy, the role for UNIDO under each of the categories is defined below.

Policy research and transfer. Good policy-making entails the ability to learn from the experiences of others, and to tailor the lessons to local requirements. Governments in poor countries are severely limited in their capacity to analyse industrial policy and derive lessons from the experiences of other countries. In the past, they may have adopted policy on an ad hoc basis, following what was done elsewhere, or adopted an ideology, based on a belief about what should be done. Recently, they have been guided or influenced, and thus induced to adopt the economic policies proposed by international

agencies, especially the International Monetary Fund (IMF) and the World Bank. External agencies can play an important role in policy transfer, but this does not necessarily mean that governments will choose to adopt the best policies. It may indeed even reduce the probability that the best policy is identified (Morrissey and Nelson [47]). However, governments can benefit from being given information on what has worked, and what has not been successful, elsewhere. This information can help them in designing the industrial policy appropriate to their own circumstances.

UNIDO, for its part, can support and promote knowledge dissemination and policy-learning for industrial development in developing countries. To fulfil that role, UNIDO must have a solid research capacity of its own, so that it can distill the lessons from a wide range of experiences, including policy experiments. To ensure the transfer of appropriate policies, UNIDO must also work in close cooperation with governments to assist them in tailoring policy to local conditions. The UNIDO methodology for strategic industrial diagnosis is an example of a tool that aims at assisting governments in analysing the industrial system and designing policies and strategies. A related area in which UNIDO can assist is advice and support in establishing the institutions and technological capabilities required to implement a coherent and coordinated industrial development policy.

Collection and dissemination of information. This is a core activity in policy research and an important means of engaging in effective policy transfer. A major practical function of UNIDO is in collecting, publishing and disseminating comparative international statistics on industrial production and performance. As this is a service to the research community, it provides a knowledge international public good to support industrial policy. Other examples are the *Industrial Development Report* for the years 2002/03 and 2004, which contain information and analysis that contribute to developing industrial policy. There is an institutional dimension to this, in terms of identifying appropriate structures for disseminating information, an area in which organizations, such as UNIDO, can provide assistance.

Provision of skills and training. In terms of the workforce and supporting a skilled labour base for local industry, training and education are national activities. UNIDO could assist in helping to identify the types of skills and training needed and how to provide them. Any role for UNIDO would be limited, for example, to providing advice on how training can be integrated with industrial policy. In the context of technology, however, UNIDO could provide support services in the form of training for the adoption of technology.

Development and adaptation of technologies. Market failures in research and technology transfer occur in a number of ways. While only large firms have the capacity to undertake extensive research and development, small firms may not even be aware of the technologies that are available. To make optimal use of technologies, it is necessary to adapt them to local conditions. Because there are economies of scale in research and development, the public sector can play a constructive role by providing subsidies and general support, rather than direct provision of technologies. Furthermore, research knowledge is a public good. Just as poor countries have limited policy-making capacity, local firms also have limited research capacity. Thus, technological support must include advice and assistance aimed at building technological capabilities, an area in which UNIDO is well equipped to contribute. UNIDO could help governments to identify the technologies appropriate for their industrial policy, and support the process of adapting and adopting appropriate technology. This is especially relevant in the case of environmentally sound technologies.

Support to regulatory and coordinating agencies. There is no evident role for UNIDO itself as a regulatory agency, but, in conjunction with its policy knowledge transfer function, it could provide advice on the types of regulatory authorities required and how to establish them. There is a more obvious coordination role for UNIDO in thinking and practice with regard to industrial policy. This is in addition to the more practical coordination activity regarding international industrial statistics.

It has been argued throughout the present report that effective industrial policy is a public good, or more strictly that effective industrial policy exhibits public good features. An industrial development strategy is beset by many instances of market failures. At the broadest (macro) level, national policy has to be cognizant of linkages and complementarities in investment and production activities that private market agents fail to recognize. At the firm (micro) level, there are market failures relating to access to credit, appropriate technology and skilled labour. Furthermore, the activities of agents and firms generate positive and negative externalities, for which public interventions are needed to ensure that the best outcome for society is achieved. It is therefore important to emphasize that optimal industrial development necessitates public intervention.

Achieving the best industrial policy is a national priority. Industrial development strengthens an economy, ensures increased productivity, promotes the more efficient use of resources and enhances growth. Industrial development promotes a stronger and more flexible economy, thus reducing the extent, if not the likelihood, of economic instability. It is beneficial for the global economy that all countries are stable and can achieve sustainable economic development, as instability in one country tends to have a contagious spillover effect on other surrounding countries. Consequently, there is an international benefit if individual countries have effective industrial policies. This endows industrial policy with an international public good element. It follows that an international benefit can be derived from coordinating industrial policies and promoting the transfer of good policy.

Having identified a role for UNIDO in developing good practice and the transfer of industrial policy knowledge to developing countries, the implications for UNIDO, as an international industrial development agency, have been elaborated in a general manner. Chapter III develops these arguments at a more practical level by identifying the types of activities that UNIDO can and should engage in, taking into account the rapidly evolving global conditions as well as other external agents and private actors. The latter group of actors is included because public interventions can fail, just as markets can fail. Relevant activities include those that would be undertaken by UNIDO, as an international agency, as well as those activities to be undertaken by individual countries as UNIDO interacts with client governments.



Supporting industrial development:
overcoming market failures and providing public goods

III. PUBLIC GOODS AND UNIDO SUPPORT FOR INDUSTRIAL DEVELOPMENT

A. INTRODUCTION

Industrial development and the policies supporting it have witnessed dramatic changes for some time. While developed countries dominated the industrialization process in the eighteenth, nineteenth and early twentieth centuries, the forces of globalization and policy liberalization allowed a shift of industrial production to developing countries, first to newly industrializing countries, such as the Republic of Korea from the 1960s, and later to the second-phase newly industrializing countries, such as Mexico and China. However, the benefits of industrial production to low-income countries are not as many as those derived by the middle-income countries. Hence, a major challenge is whether, and how, public intervention can support industrial production in low-income countries, within the context of globalization.

This is neither a new nor straightforward challenge, and policy interventions and prescriptions have differed markedly across time and country. The last few decades have witnessed various types of market interventions, some successful, and some not. The import substitution policy, adopted by many Latin American and other countries between the 1960s and late 1980s, led to a decline in competitiveness, as public intervention steered economic development in a way that did not permit production to work in line with market forces. In sub-Saharan Africa, many countries liberalized their markets in the 1980s and 1990s in such a way that local firms were unable to deal with foreign competition. On the other hand, some Asian countries, notably newly industrializing countries, such as the Republic of Korea, were able to build up a competitive private sector on the basis of appropriate domestic policies and export promotion, founded on clear performance targets. The success of public intervention is not guaranteed in countries with higher income status. For example, the United Kingdom Department of Trade and Industry, recognizing that having many support schemes makes it difficult to achieve its goals, has announced that it will consolidate its current 185 support schemes into just 10.

A major challenge is to provide appropriate support to the private sector in the low-income countries so that they can participate in, and benefit from, the process of globalization, such as fragmentation of production and the emergence of global value chains, as described in chapter I. A more competitive private sector has better chances of surviving foreign competition and breaking into new markets. Similarly, firms become more competitive when they learn to use existing technologies more efficiently, when they acquire new skills, and when they invest in new and more efficient techniques. In turn, this is more likely to occur in an enabling environment that is appropriate in macroeconomic terms, and which includes efficient product and factor markets.

Some of the determinants of a competitive private sector fall under the responsibility of the public sector, such as maintaining a stable macroeconomic environment with low inflation. However, this

is less clear for firm-specific interventions. For instance, a firm will invest in a new technique, or change the production process, because it can derive a profit from it, and public intervention is not required. Sometimes assistance from external public organizations and/or private sector consultancies is required to realize such profitable opportunities fully, or to capture the externalities of such activities. As the provision of information, for example, on new technologies, is potentially both non-rival and non-excludable, allowing all firms to benefit from the information without depriving others from enjoying that benefit, it has elements of a public good. Consequently, to avoid the risk of the private sector undersupplying the information, and causing a market failure, the public sector can step in to ensure that this does not occur (see chapter II).

Ongoing discussions have focused on the relationship between the private and public sectors, leading to some sort of consensus. The guiding principles of the Committee of Donor Agencies for Small Enterprise Development [11] include a "fundamental belief in the principles of a market economy, where the State has a role in providing an enabling environment, in correcting or compensating for market failures, and in the provision of public goods, but not in the direct provision of private goods that can be more efficiently provided by the market." The new market-based paradigm reflects a shift away from direct intervention at the level of business development services towards the State facilitating private providers of such services. For example, the United Kingdom Department for International Development institutional strategy paper for 2001-2005 questions whether some of the advice provided and activities conducted by UNIDO might be better provided by the private sector. However, no examples were cited.

As the central aim of the present report is to define the role of UNIDO amid new industrial realities and to assist developing countries, especially the low-income and marginalized countries, it is important to discuss to what extent UNIDO can provide public goods, and identify and assist countries in overcoming market failures. Section B will identify the public good aspects of UNIDO services, on the basis of a mapping of services into the public goods framework introduced in chapter II. Recognizing the importance of a competitive private sector for income generation, employment creation, economic growth and development more broadly, several public organizations aim to support private sector performance. Therefore, section C identifies the role of UNIDO vis-à-vis other international organizations, donor agencies, national governments and the private sector in terms of providing public goods. Finally, section D provides suggestions on how the activities of UNIDO could be modified and/or refocused on the basis of the findings.

B. PUBLIC GOODS FRAMEWORK AND UNIDO ACTIVITIES

1. Public goods framework

As discussed in chapter II, a pure public good must exhibit two characteristics. First, the good is non-excludable. This implies that once it has been provided, no agents can be excluded from enjoying its benefits. Secondly, the good must be non-rival in consumption, to the extent that consumption by one person does not diminish the amount available to others. Thus, the fundamental point about public goods is that they will be undersupplied if their provision is left to the market. This is because the market fails to achieve an optimal allocation of resources caused mainly by imperfect information or incomplete property rights. This implies that the private sector is not crowded out when public actors provide the difference between the optimal level of the good and the level that

the market is willing to supply. Conversely, public provision of private goods, whose benefits can be fully appropriated by private actors, may, in theory, crowd out private sector activities. In extreme cases, the benefits would be inefficient, ineffective and unproductive. In reality, there are only a few pure public goods. In chapter II, the activities that have elements of a public good, namely, significant degrees of non-rivalness and/or non-excludability, have been discussed.

Some of the terminology used helps to elaborate the understanding of public goods provided in industrial policy. First, the spillover range, reflecting the national or international range of the public good, can be determined. For example, knowledge about industrial technology is, in principle, an international public good, as the knowledge is potentially available to all. Research on adapting the technology to an industry in a particular country is national in range. Secondly, a distinction can be made between core and complementary activities. Core activities are those directly required to provide the public good, whereas complementary activities are those that contribute to the production of the core activities and facilitate the consumption of the public good. Core activities can provide the public good only if the complementary activities are undertaken, ensuring that the most benefits are derived from the public good. Continuing with the example above, pure research is the core activity that provides the public good of knowledge. Complementary activities that help to produce research include training, producing statistics and a research environment. Complementary consumption activities include education and dissemination or transfer of experience, so that the research can be used.

Finally, it is useful to distinguish different sectors of public goods. The main sectors identified in the literature are knowledge, governance, environment, health and security. However, only the first three, which are interrelated, are relevant to industrial policy, even though health and security affect industrial development in a different way. The example above is one of knowledge, of industrial policy or of technologies. Knowledge is a public good, but research is required for its provision. Governance can be important in using knowledge. For example, coordinating research is a governance function, but good governance itself, which entails regulation and coordination, is a public good, requiring good-quality and appropriate institutions for its production. A good-quality environment is again a public good, and generating environmentally sound technologies is the core activity required to provide this. The fact that these technologies have not yet been introduced suggests the existence of policies that provide disincentives. For example, internalizing pollution costs may provide new incentives to adopt technologies, making it a complementary activity for providing the public good. Research on adapting the technologies is a complementary production activity, while measures taken to facilitate adopting the technology are complementary consumption activities. Complementary activities are vitally important if benefits of core activities are to be realized. It may be seen, for example, that knowledge and governance public goods are complementary to providing environmental public goods. The public goods in industrial policy can thus be classified in those sectors.

Table 14 classifies public goods in industrial policy and associated activities into core and complementary activities, respectively. This is useful for designing an industrial policy and identifying the roles and responsibilities of organizations. The activities are also classified according to sector (environment, knowledge and governance) and spatial range, national or international in effects. Contributions of international organizations, such as UNIDO, should be focused on providing the core activities that constitute the aim or objective of policy, including research designed to enhance knowledge of industrial policy and to develop cleaner technology for the provision of environmental

public goods, in the context of coordination to achieve effective governance. Table 14 is intended to illustrate the range of activities involved. It is not intended to be comprehensive, nor to cover very specific activities, for example, particular project activities.

TABLE 14.
PROVIDING PUBLIC GOODS AS PART OF INDUSTRIAL POLICY—BY ACTIVITY

<i>Public goods sector and spatial range</i>	<i>Core activity</i>	<i>Complementary activity</i>	
	<i>Provision of public goods</i>	<i>Production of public goods</i>	<i>Consumption and utilization of public goods</i>
1. Knowledge Research, transfer, dissemination, skills	Policy research	Research and transfer; training	Facilitating and disseminating; skills
International	Industrial policy research	Policy development Statistics, evidence Training provision	Transfer, advice and experience Skills acquisition
National	Industrial policy research (local)	National statistics Training	Disseminating local advice and providing support Education skills
2. Quality of environment Developing and applying technologies	Research on cleaner technology	Developing cleaner technology	Facilitate use of cleaner technology
International	Cleaner technology	Developing cleaner technologies	Promoting the use of cleaner technologies
National	Appropriate (local) technology	Research, adapting technologies to local conditions	Adopting appropriate technologies
3. Governance Regulation and coordination	Policy coherence (good governance)	Institutions	Implementation
International	Coordinating research and policy	Research and policy networks	Support for adapting and adopting research and policy
National	Adapting and coordinating policy and research	Policy and research agencies, services Regulatory agencies	Support for adapting and adopting research and policy

Source: COMPID Research Programme.

2. UNIDO activities

UNIDO activities can be broadly divided into two categories: global forum activities, and technical assistance activities. Global forum activities, which include research, are designed to generate and disseminate knowledge of industrial development processes and associated issues, and to initiate and conduct debates and discussions on industrial development and related matters, in order to influence the development agenda in the area concerned. As stated in the UNIDO corporate strategy (UNIDO [75]) technical cooperation services are aimed at enhancing skills, technology and related capacities.

A description of UNIDO technical cooperation activities is necessary in order to map these into a public goods framework. This is done on the basis of selected interviews and official documents, as no country field studies were undertaken for the present report. A more detailed description of the service modules can be found in UNIDO [75]. A brief summary consistent with that document is provided in this section. In connection with the provision of technical assistance, the services

rendered to developing countries cover broad areas referred to as service modules. Recipient countries can choose one or a combination of various service modules, which are as follows:

- Industrial governance and statistics (service module 1);
- Investment and technology promotion (service module 2);
- Industrial competitiveness and trade (service module 3);
- Private sector development (service module 4);
- Agro-industries (service module 5);
- Sustainable energy and climate change (service module 6);
- Montreal Protocol (service module 7);
- Environmental management (service module 8).

Each service module is briefly described below, focusing on the level at which services are provided, that is, the policy, institutional or enterprise level. Moreover, the degree to which the service modules aim at generating knowledge is considered, as a way of identifying whether the activities are public goods.

An integrated programme is a programme implemented at the country level, and consists of a combination of components from different service modules. Some components within each service module have close linkages with other service modules, and as such they cannot be seen as mutually exclusive. In addition to integrated programmes, UNIDO also provides technical assistance in the form of regional programmes, country service frameworks and stand-alone projects.

Although a detailed description of each of the above service modules is beyond the scope of the present report, some indication of scale is given in table 15 below. It provides the expenditure on technical cooperation activities by service module. The biggest service modules, in terms of expenditure, are Montreal Protocol, accounting for more than a third of the expenditure, followed by investment and technology promotion, and environmental management. These three activities together account for 70 per cent of all expenditure effected on technical assistance. More than 60 per cent of all spending is related to the modules on the environment (service modules 6-8). It is important to bear in mind that while some activities require substantial investment in goods, other types of activities involve more human resources, such as staff time and expertise.

TABLE 15.
EXPENDITURE ON TECHNICAL COOPERATION ACTIVITIES BY SERVICE MODULE

<i>Item</i>	<i>Total 2001^a</i> <i>(millions of dollars)</i>	<i>Total-2002^b</i> <i>(millions of dollars)</i>
Service module 1	2.5	2.9
Service module 2	19.4	14.4
Service module 3		3.6
Service module 4	5.9	5.9
Service module 5	6.7	4.9
Service module 6	5.7	7.0
Service module 7	32.0	30.9
Service module 8	10.7	12.1
Total	84.9	81.6

Source: UNIDO annual reports.

^aOld classification.

^bNew classification.

Industrial governance and statistics

The focus of industrial government and statistics (service module 1) is on global forum activities, such as policy research, with relatively few technical cooperation activities. The global forum activities include implementation of the UNIDO international mandate in the field of industrial statistics and in research functions. Technical cooperation activities concentrate on capacity-building for industrial policies as well as for industrial statistics.

The services provided under this module thus comprise the following (UNIDO [75]):

Technical cooperation:

- Building capabilities in industrial statistics;
- Preparation of national and regional strategic industrial diagnoses;
- Capacity-building for the formulation and implementation of industrial policies and strategies.

Global forum and research:

- Statistics;
- Industrial development indicators and scoreboard;
- Economic research;
- Industrial development reports;
- Sectoral studies;
- Policy studies.

The activities in this module are primarily aimed at supporting other service modules and at participating in the international development debate. The service module thus contributes to internal knowledge generation within UNIDO and external knowledge generation in the form of production and dissemination of industrial statistics and research publications, as well as participation in the international debate on industrial development. The bulk of activities in this service module are global forum activities, which are widely disseminated. The technical cooperation activities are targeted at specific countries, focusing on the policy level. There has recently been an increasing focus on linking knowledge generation, global forum activities and translation into policy advice in developing countries. One example where research is used as an input to technical cooperation is a project aimed at capacity-building for competitiveness analysis and industrial diagnosis. A methodology for strategic industrial diagnosis has been developed on the basis of the *Industrial Development Report 2002/2003* and the industrial scoreboard. Knowledge gained from UNIDO research is transferred to developing countries through training courses and workshops where public and private stakeholders assess their industrial system. It was noted that the workshops on industrial diagnoses require an absorptive capacity in the recipient country, which does not always exist in low-income countries.

Investment and technology promotion

Investment and technology promotion (service module 2) is aimed at the provision of investment- and technology-related services, and as such is designed to address government and market failures. The module is divided into investment promotion and technology promotion and comprises the following services (UNIDO [75]):

Investment promotion:

- Strategy and policy advice on foreign direct investment;
- Institutional capacity-building;
- Promotion of foreign direct investment through business alliances..

Technology promotion:

- Support services for strengthening national technology management systems;
- Technology foresight for development;
- Capacity-building in emerging technologies.

Information and coordination failures in the investment process may lead a country to attract less foreign direct investment than its economic potential deserves. UNIDO therefore helps by providing services at the policy level to countries to benchmark and analyse their policies and strategies and competitive position in attracting foreign direct investment. Service module 2 is more at the operational policy level of investment promotion compared to organizations, such as the Multilateral Investment Guarantee Agency, the Foreign Investment Advisory Service and the United Nations Conference on Trade and Development (UNCTAD), as regards the policy environment and the legal regulatory framework. Services include support to investment promotion agencies and sector promotion strategies, as well as promotion of foreign direct investment. Service module 2 also provides services in developing institutional capacity for investment promotion. Moreover, through the UNIDO investment and technology promotion offices, such as the one based in the United Kingdom, and through industry associations, service module 2 provides assistance to enterprises.

Developing countries are usually technology followers, which makes technology management more important for them than fundamental scientific research and technology innovation. Development of a national technology management system as well as a national innovation system is thus crucial for industrial development. It involves tackling a number of market and government failures, and service module 2 provides support services for strengthening the system. The module provides assistance for the creation and strengthening of technology-related institutions and promotes networking between these institutions. It thus supports institutions, which in turn can support enterprises in developing their technological knowledge and capabilities. While service module 2 does generate some knowledge, for instance in the form of developing guidelines for investment promotion agencies as well as training manuals, most activities are engaged in transfer of knowledge.

Industrial competitiveness and trade

There are two broad categories of services in industrial competitiveness and trade (service module 3). The first focuses on building capacity in the area of standards, metrology, testing and accreditation to overcome constraints related to market access. The second group of services aims at enhancing the industrial competitiveness of enterprises through quality and productivity improvements, and at improving their access to global subcontracting and supply chain networks.

The specific services provided in this module comprise the following (UNIDO [75]):

- Strengthening the regulatory framework for conformity;
- Strengthening the operational components of the conformity infrastructure;
- Competitiveness enhancement through quality and productivity improvements;
- Accessing global subcontracting and supply chain networks.

Primarily focused on institutional strengthening, activities are also undertaken at policy levels and, in some instances, at enterprise levels when pilot schemes are needed.

The case of Cambodia provides one example of UNIDO assistance under this service module. The project rendered assistance at the policy and institutional levels, with the drafting of a new law for standardization activities, and physical and non-physical development of a new metrology laboratory that will primarily act as a support unit for the national laboratories. Moreover, competency enhancement through staff training, both domestic and international, in standards and standards development (International Organization for Standardization (ISO)—ISO 9001 and ISO 14001; Hazard Analysis and Critical Control Point; and Good Manufacturing Practice) was undertaken, and awareness was created on the topics among the respective government institutions, export associations and local enterprises in the export sector through seminars, workshops and domestic and international training.

The module further reinforces its activities at the enterprise level when this is necessary to strengthen the institutional capability. A good example is the case of Pakistan, where one of the components revolves around ensuring that the national accreditation body has the necessary capacity and know-how to provide accreditation services to the laboratories in the country. In doing so, the project assisted several private laboratories as part of a pilot scheme, in developing their quality manual and preparing them for an accreditation audit. The objective of the national accreditation body was then to perform an assessment of the laboratories while being observed and evaluated by an internationally recognized accreditation body.

The projects under this service module have a clear focus on capacity-building through dissemination of knowledge. Without strong training components within each project activity, the project will not be sustainable. In terms of knowledge distribution, this is primarily vested in the institutions as a general good for the public at large.

Private sector development

Service module 4 focuses on promoting an enabling environment for private sector development, with an emphasis on small and medium enterprises. Service module 4 consists of four support programmes (UNIDO [75]):

- Business information and development services;
- Business partnership programme;
- Cluster of small and medium enterprises and networking development;
- Rural and women entrepreneurship development.

The sector of small and medium enterprises suffers from market failures, for instance, in the provision of business information, and service module 4 assists in promoting providers of such

services, be it public institutions or private associations. The business partnership programme promotes multistakeholder partnerships, an approach that permits small and medium enterprises to benefit from the technological and managerial expertise of transnational corporations, needed for enhancing their productivity and competitiveness. Corporate social responsibility is becoming increasingly important, and UNIDO has developed a monitoring tool for small and medium enterprises that seek to comply with monitoring and reporting requirements. The organization is also member of the United Nations Global Compact. The cluster and network development programme assists small and medium enterprises in exploiting the advantages of clustering and networking, where a catalyst is often needed to help coordinate actions leading to collective efficiency. Apart from lending support to clusters of enterprises, the programme is also supporting capacity-building in local and national institutions. Support for rural and women entrepreneurship development is provided at the policy level, improving the regulatory environment, as well as at the institutional level, promoting business development services. Support to collective self-help initiatives is also provided.

While most projects start with intervention at the institutional level, some projects require policy-level inputs at a later stage. For example, in Viet Nam, UNIDO was first involved in a project with an emphasis on business development services, which later developed to address the needs at the policy level related to the promotion of small and medium enterprises. In this subsequent phase, the project supports improvement of national and provincial policy and institutional frameworks for the development of small and medium enterprises. This example illustrates a shift higher up, from services supporting market creation through business development services, towards providing policy advice on small and medium enterprises in Viet Nam (see discussion of rapid changes in the nature of industrial development and private sector policy in chapter 1).

Service module 4 has a number of global forum activities, for instance, organization of workshops with other United Nations agencies. It is also representing UNIDO in the Committee of Donor Agencies for Small Enterprise Development. Several activities in this module involve internal knowledge generation, for example, when methodologies and tools are developed for rural and women entrepreneurship development and for cluster development, based on studies and concrete experience from UNIDO projects.

Agro-industries

Most developing country economies are highly dependent on agriculture and the agro-industries sector. In service module 5, the services focus directly on specific subsectors: food, leather, textiles, wood and agro-machinery. Many other activities of UNIDO relate to the agro-industries sector, and there are close strategic linkages among the service modules.

The services provided cover the following functional areas (UNIDO [75]):

- Product design and development;
- Technology centres;
- Demonstration operations;
- Technoeconomic assessments.

Given the sectoral focus of the assistance provided under this module, an analysis in the form of a technoeconomic survey and assessment is first required to assess the type of support needed to obtain a commercial process. The main subsectors relate to basic development needs: food, clothing and shelter. Service module 5 supports the most affected groups in low-income countries to create a surplus income based on available agro resources, either by servicing a local market, or by catering for export markets. In that framework, dealing effectively with the consequences of international trade agreements and standards is an important service. A unique position is reserved for the equipment that enhances agricultural and post-harvest productivity in individual enterprises. These investment goods (contrary to the other subsectors dealing with consumer goods) require public support in the form of rural technology centres as a catalyst for enabling the other subsectors to become competitive and productive. Other preconditions, such as the functioning of value chains, are supported in cooperation with other service modules.

Within the framework of sustainability, an important aspect is the development of biodegradable raw materials for industrial inputs, for instance, packaging or biofuels, or newly developed applications of waste materials or crops, such as bamboo, now used in flooring. Within this innovation agenda of the service module, cooperation with other United Nations agencies in agriculture, science and technology is developed to ensuring a coordinated United Nations response. Equally, because of the importance of using local opportunities, it is required to build local innovation capacities for all the sectors concerned. In this respect, service module 5 is involved in local knowledge generation.

Support for enhanced product design and identification of appropriate market channels is given both to associations and to enterprises. At the institutional level, service module 5 assists in establishing and strengthening technology centres as well as other support institutions. The services in this module include direct technical support to enterprises for technology upgrading, as part of pilot and demonstration operations. While most activities are at the institutional level, some of these operations have an integrated policy component. The technology centres, and not least the institutions for food safety and food fortification, are often important elements of governmental policy implementation and development.

Sustainable energy and climate change

Access to affordable and sustainable energy is important for social and economic development. Service module 6 addresses the challenges related to energy, in terms of problems linked to lack of access to energy and the environmental effects of energy consumption.

The services provided in service module 6 include (UNIDO [75]):

- Rural energy for productive use, with emphasis on renewable energy;
- Energy efficiency;
- Climate change and the Kyoto Protocol.

Activities provided in relation to the rural energy component include the creation of a market for energy by building energy production units and sustainable energy-related, income-generating projects in rural areas. Projects start with an assessment of the market feasibility before rural energy systems are designed and implemented. Assistance is given to local entrepreneurs as well as the

target beneficiaries, who are the rural poor, so as to develop income-generating uses of the energy provided. Mechanisms for replication of demonstration projects are also designed.

Industrial energy consumption is a global environmental concern with the prospect of climate change. The barriers to introduction of energy-efficient technologies are political, financial and technical. Service module 6 addresses these at the national as well as at industrial plant levels. At the policy level, it assists recipient countries with energy efficiency programmes, and at the enterprise level, it conducts plant level energy audits. In the area of climate change, service module 6 supports developing countries in implementation of the Kyoto Protocol mechanisms, for instance, by publishing clean development mechanism guides based on project results.

Service module 6 is not engaged in substantial knowledge-generation activities, but is active in dissemination activities through various global forum activities, such as representing UNIDO in international committees, making presentations and submitting papers at international and regional conferences, as well as organizing such conferences.

Montreal Protocol

Service module 7 assists in implementing programmes in developing countries to ensure compliance with the Montreal Protocol. The Montreal Protocol was adopted in 1987 to eliminate the production and consumption of ozone-depleting substances.* UNIDO is one of the four agencies (the United Nations Environment Programme (UNEP), UNDP, the World Bank and UNIDO) implementing programmes of the Multilateral Fund for the Implementation of the Montreal Protocol, which is the financing mechanism established to support developing countries and countries with economies in transition (article 5 countries) in eliminating ozone-depleting substances within the time schedule set out in the Montreal Protocol.

Service module 7 provides the following services (UNIDO [75]):

- Policy, strategy and programme design;
- Support to institutions;
- Support to enterprises during the compliance period;
- Generation of databases on the impact of Montreal Protocol activities.

The provisions of the Montreal Protocol allow for amendments based on periodic scientific and technical assessments. Until recently, the aim of the projects was to assist individual enterprises in the process of replacing technologies generating ozone-depleting substances with technologies that do not release ozone-depleting substances. Assistance was provided in the form of equipment investment and by providing training on how to use and maintain technology that does not release

*The Montreal Protocol on Substances that Deplete the Ozone Layer has been signed by over 180 countries. This international agreement aims to restore and protect the deteriorating stratospheric ozone layer. Developing countries and countries with economies in transition (the so-called article 5 countries) were given a 10-year grace period to comply with the Protocol. To cover the incremental costs incurred by developing countries in phasing out their consumption and production of ozone-depleting substances, the Multilateral Fund for the Implementation of the Montreal Protocol was established. Developed countries pay to the Fund, which finances projects in article 5 countries. The projects are implemented by, for instance, UNIDO in the countries concerned. (UNIDO [72]; see also www.unep.org/ozone)

ozone-depleting substances, through the transfer of technology and know-how. In accordance with the revised modalities of the Montreal Protocol, UNIDO services have been broadened to include assistance to governments in developing and implementing national and sectoral phase-out plans, as well as refrigerant management plans. Assistance is also provided to strengthen the institutional capacity through the establishment of national ozone units. Hence, while most activities of service module 7 are still technical assistance projects at the enterprise level, the module also provides technical assistance at institutional and policy levels.

UNIDO has successfully implemented projects under the Montreal Protocol and gained an in-depth knowledge of industrial processes utilizing ozone-depleting substances and alternative technologies that do not release ozone-depleting substances. Although the module itself does not engage in substantial research on new technologies, publications are produced and UNIDO participates in the regular meetings and international conferences related to the Montreal Protocol.

Environmental management

Service module 8 seeks to minimize the environmental risks of industrial development by promoting prevention of wastes and pollution and their proper management where generated. Service module 8 focuses on the following three integrated areas (UNIDO [75]):

- Cleaner and sustainable production;
- Water management;
- Persistent organic pollutants and persistent toxic substances.

The cleaner production programmes focus on establishing and strengthening national cleaner production centres, which are a joint UNIDO/UNEP effort. Currently there are 25 centres around the world. The national cleaner production centres are industry support institutions that work with enterprises and the government, raising awareness of the benefits of cleaner production and adoption of environmentally sound technologies. In the context of cleaner and sustainable production, service module 8 also promotes "eco-effective" products as well as waste management focused on waste recycling.

As part of its water management services, service module 8 addresses the issue of sustainable use of water resources, artisanal gold mining, transboundary projects involving large marine ecosystems and industrial fisheries projects. In relation to persistent organic pollutants, assistance is provided to countries in preparing and implementing their national implementation plans and in undertaking pilot projects on best available techniques for the elimination of persistent organic pollutants. While activities related to cleaner production are at the institutional level, some activities undertaken within service module 8 address enterprises directly, whereas others are at the policy level providing advice on legal frameworks and assisting in policy formulation.

Service module 8 is only engaged to a limited extent in substantial knowledge-generation activities, but is active in various global forum activities, such as representing UNIDO in international committees, organizing international and regional conferences, and presenting papers on such occasions.

Existing classification of modules by UNIDO

Any classification of activities as diverse as those found in the UNIDO service modules must be presented in general terms. One classification by UNIDO (www.unido.org/doc/3353) is provided in table 16. What is important for the purposes of the present report is that the main activities of most service modules include activities associated with implementing and devising an industrial policy. According to this classification, only in the case of the service module on the Montreal Protocol is the main activity directly aimed at enterprises.

TABLE 16.
CLASSIFICATION OF UNIDO'S TECHNICAL ASSISTANCE ACTIVITIES

<i>Item</i>	<i>Competitive economy (making industry more efficient)</i>	<i>Environment (environmentally-friendly industry)</i>	<i>Productive employment (promoting employment in industry)</i>
Policy	Industrial governance and statistics	Industrial energy and Kyoto Protocol	Private sector development
Institutional	Quality and productivity; investment and technology promotion	Environmental management	Agro-industries
Enterprise		Montreal Protocol	

Source: www.unido.org/doc/3353. Updated by UNIDO staff.

3. Mapping UNIDO technical assistance into the public goods framework

There are various ways to map UNIDO technical assistance into a public goods framework. This section attempts to map the service modules into the public goods framework discussed in table 14 above. This is not a straightforward task. Technical assistance activities and the service modules are not specifically designed to provide public goods only. They are more likely to provide activities that have both public and private good aspects. Whether and how certain module activities can be mapped into the public goods framework is indicated below. Various problems encountered in the process are as follows:

- Sometimes a single type of activity can be allocated to more than one cell. For instance, the activity under service module 4 "development and implementation of policies on small and medium enterprises" can be associated with the core activity for providing national governance public goods. Alternatively, it could be associated with activities that are complementary to knowledge public goods in order to "consume" and adopt the findings of research studies on the development of small and medium enterprises. In such cases, an arbitrary decision was taken on whether it was possible to allocate an activity to a core activity first;
- Sometimes, it was possible to place only part of a certain type of activity into a cell. For instance, most aspects of the activities associated with service module 7 (Montreal Protocol) provide support to individual firms, and therefore cannot be classified as knowledge public goods, although they may be complementary activities that allow the production of environmental public goods. However, a very small part would help in designing national phase-out programmes, and hence could relate to core national governance public goods. Finally, almost all these activities relate to providing a good-quality environmental public good. In this case, an activity was allocated to the cell involving the bulk of an activity (here complementary environmental public goods);
- Another problem arises with regard to the degree to which an activity is of a public nature. Very few activities are aimed at providing pure public goods, but a number of activities could contain

public good aspects. In such cases, it was necessary to make a decision on whether the activities contain sufficient public good aspects to be listed in the table;

- Finally, it must be noted that no attempts were made to map each individual UNIDO project or subprogramme into the framework, as this would require an excessively detailed and inherently arbitrary analysis.

Considering the above-mentioned important points, to provide a clear mapping would be a challenging task. Nevertheless, table 17 could be interpreted as an illustrative mapping. On the whole, it can be said that almost all service modules contain activities that provide public and private goods, with the possible exception of service module 1, where the activities seem to provide only public goods. Most modules include global forum activities, which could be classified as complementary knowledge public goods mainly because they facilitate the spread of international research findings.

Service modules 1, 2 and 3

Service module 1 primarily provides knowledge public goods, both national (economic policy studies) and international (*Industrial Development Report*). The provision of statistics is also a classic example of an international public good (UNIDO [67]), complementary to generating core industrial policy knowledge. Capacity-building for industrial policies and strategies provided by service module 1 is a core governance public good at the national level. Part of the activities of service module 2 also provides core knowledge public goods, for example, technology foresight studies. Other activities under service module 2 are complementary activities that provide governance public goods, such as support for building up the capacity of investment promotion agencies, which can act as one-stop shops for investors. However, some parts also provide tailor-made firm-level assistance, including through investment and technology promotion offices, but this should be categorized as providing private goods. The same holds for service module 3, where support to establish and strengthen standards institutions provides for complementary governance public goods. However, tailor-made interventions at the firm level provide a private good, unless such activities are used only for demonstration purposes with clear implications for all other firms.

Service modules 4 and 5

An important activity under service module 4 provides core governance public goods, namely, support for policy on small and medium enterprises. It is more difficult to classify its support for business development services as public goods. Creating an industrial supply capacity purely to supply private goods would not fit within a public goods framework, as these goods could be provided on a commercial basis. However, initial support to overcome market failures and secure capacity may have clear demonstration effects, and may thus include public goods aspects. The same applies to service module 5, of which some activities are aimed at individual firms, although demonstration projects and organizing workshops could be classified as complementary knowledge public goods as they facilitate the spread of knowledge and technologies. Building institutions for food safety and food fortification could be classified as complementary governance public goods at the national level, in so far as they are part of the industrial policy of a country.

Service modules 6, 7 and 8

Most activities associated with service module 7 (Montreal Protocol) provide support to individual firms, and while these cannot be classified as either core or complementary for knowledge public

goods, they can help to provide a quality environment public good, for example, by facilitating the use of environmentally sound technologies (UNIDO [67]). Some of the activities under service modules 6 and 8 are focused on the elaboration of national policy, and hence contribute to the provision of national governance public goods. Service module 8 establishes national cleaner production centres, which take part in the national policy debate, and this is a complementary activity for the provision of governance public goods. Service modules 6 and 8 both provide complementary knowledge public goods by building the capacity of environmental support institutions, but in table 4 they have been classified under governance public goods (see above).

As mentioned earlier, service modules 6, 7 and 8 account for more than 60 per cent of total UNIDO expenditure on technical assistance (particularly service module 7). A significant part is aimed at

TABLE 17.
MAPPING UNIDO TECHNICAL ACTIVITIES INTO A PUBLIC GOODS FRAMEWORK

Public goods sector and spatial range	Core activity	Complementary activity	
	Provision of public goods	Production of public goods	Consumption and utilization of public goods
1. Knowledge	<i>Policy research</i>	<i>Research and transfer; training</i>	<i>Facilitating and disseminating; skills</i>
International	SM1 (IDR ^a , new research approaches) SM4 (policy tool box for private sector development)	SM1 (statistics)	Global forum activities of several modules
National	SM1 (economic policy studies) SM2 (technology foresight studies, competitiveness analysis, investor surveys)	SM2 (market information, matchmaking)	SM4 (support for BDS ^b facilitators and workshops to enhance entrepreneurship skills) SM5 (support for facilitating institutions and workshops to enhance technical skills)
2. Quality of environment	<i>Research on cleaner technology</i>	<i>Developing cleaner technology</i>	<i>Facilitating use of cleaner technology</i>
International			
National			SM6 (assisting in the design and implementation of rural energy systems) SM7 (assisting in the implementation of the Montreal Protocol) SM8 (assisting private sector in adopting ESTs ^c through support institutions)
3. Governance	<i>Policy coherence (good governance)</i>	<i>Institutions</i>	<i>Implementation</i>
International			
National	SM1 (capacity-building for industrial policies) SM4 (capacity-building to develop and implement SME ^d policies) SM6 (enhancing capacity to apply Kyoto guidelines) SM8 (environmental planning and policy formulation)	SM3 (establishing standards institutions and testing laboratories) SM5 (institution-building for food safety) SM8 (establishing NCPCs ^e and assist local government)	SM2 (supporting activities of investment promotion agencies) SM3 (supporting activities of standards institutions)

Source: COMPID Research Programme and Montreal Protocol.

^aIndustrial Development Report.

^bBusiness development services.

^cEnvironmentally sound technologies.

^dSmall and medium enterprises.

^eNational cleaner production centres.

assisting individual firms, and while this may contribute to the provision of environment public goods, such support does not benefit all firms in principle, specifically because funds are limited.

C. ROLE OF UNIDO IN SUPPORTING INDUSTRIAL DEVELOPMENT

Before summarizing the implications of the public goods framework for UNIDO activities in detail in section D, it is necessary to explain that there are several frameworks that could be used to assess the appropriateness of support for industrial development. Unfortunately, there is no development theory literature on appropriate evaluation systems for organizations such as UNIDO. The inventory below has therefore been developed for the present assessment.

1. Assessing the appropriateness of support for industrial development

There are several ways of assessing the appropriateness of support for industrial development to determine who can do what best, as described below.

Minimal approach. In the minimal approach, it would be argued that government and institutional failures significantly inhibit industrial development; that the public sector does not have more or better information than the private sector; and that the State should withdraw from active support programmes for industrial development and should instead concentrate on creating an enabling environment setting the rules within which the private sector operates. In this context, Stern [59] suggests two pillars of development: first, create a good investment climate; and, secondly, empower and invest in poor people. While the minimal approach has clear implications for public and private responsibilities for industrial development, it seems to ignore the set of market and coordination failures identified in chapter II, failures that inhibit sustainable industrial development, and that organizations such as UNIDO are well placed to overcome.

Mandate-driven approach. International agencies are expected to provide support in accordance with their mandates, in the case of UNIDO for industrial development. However, there are always narrow and wide interpretations—many factors outside the industrial sector influence industrial development—causing an overlap of mandates, and possibly competition. In addition, this does not address the nature of relationships between international agencies and the private sector or possible changes through globalization processes, nor does it deal with effectiveness and efficiency of support.

Comparative advantage. International agencies could pursue those activities in which they have a comparative advantage. Agencies specialize in certain activities and build up valuable expertise and networks of researchers, private firms and civil society organizations. For instance, UNIDO has built up extensive and valuable knowledge while implementing the Montreal Protocol and also in research on industrial policy. The disadvantage of the comparative advantage approach is that while support may be provided by the right agency, it can be in the form of public or private goods, and this has implications for the nature of the relationship with the private sector. It is also not clear whether services supplied successfully in the past will continue to be in demand by the private sector in the future. Finally, this approach puts emphasis on efficiency, but there is not necessarily an immediate relationship between this emphasis and development objectives.

Allocation of support according to private sector (or demand-driven) needs. In this approach, support could be provided to those firms that are able to identify the obstacles faced for furthering development and can justify their urgent need of support. This could apply to the sector level as well. Support could be provided to sectors where justification for such support is due to an existing or future demand. While this is, to some extent, a market-based approach—the needs assessment is market-led—it is not clear whether support, based on this approach, is most effective and efficient in the long run. The current needs of firms do not necessarily address the coordination failures and overall industrial strategy issues higher up. In addition, support is limited to only a few. So some distortion of the market seems inevitable when some, but not all, firms receive support.

Allocation according to effectiveness in meeting development goals. In this approach, support would be provided for industrialization processes based on whether they meet the development objectives (for example, the Millennium Development Goals). For instance, much support to small and medium enterprises is given on the basis that it contributes directly to poverty reduction. Apart from whether a direct route is more efficient than an indirect one, direct support could compete directly with, and potentially crowd out, private sector providers of such support.

Public goods framework. The public goods framework would lead public organizations to support industrial development by providing public goods. This approach provides clear guidelines for fair competition with the private sector in providing support for sustainable industrial development, an issue discussed in detail later. However, it does not deal with priorities for providing certain types of public goods and at what level, nor does it provide clear guidelines as to which organizations need to provide what.

2. Identifying the actors

There are many actors whose aims are based on, or include, support for the private sector and industrial development. The following are noteworthy:

- Multilateral agencies include United Nations bodies (UNCTAD, UNEP, UNDP, the International Labour Organization and UNIDO), the Bretton Woods institutions, including the World Bank group, IMF, regional banks and other multilateral agencies, such as the World Trade Organization and the International Trade Centre. Of these, UNIDO is charged specifically with supporting sustainable industrial development. Multilateral agencies usually derive funding from both regular contributions and voluntary contributions for special projects;
- Of the bilateral donors, many, such as the United Kingdom Department for International Development and the Danish International Development Agency, support programmes for private sector development and/or enterprise development. The European Commission has also established its own agencies, which are independent from the bilateral programmes of its member states. Donor programmes are usually financed through aid programmes of developed countries;
- Governments of developing countries and the institutional framework set up by them can also be geared towards supporting both the private sector and industrial development. In particular, there are cleaner production centres, skill development centres, technology and standards institutes and other public schemes, including financial and technical assistance. Developing countries also form regions that can establish regional institutions for private sector support;

- The international and national private sector also supports industrial development in various ways, apart from being the obvious target group to support. The first way is to proceed unilaterally, when large companies set up support schemes for the development of local small and medium enterprises, under the heading of corporate social responsibility. Secondly, firms learn and transfer technology through normal business transactions with other firms, as in the case of supplier development programmes. Thirdly, private sector consultancies, specializing in technical assistance for firms, generate income by supporting industrial development. Fourthly, joint action, including setting up private sector intermediaries, such as chambers of commerce and industry, aims at enhancing the competitiveness and performance of the private sector and industry in particular—for example, in an industrial cluster.

At present there is no simple or clear distinction between the competencies and areas of work of each of these actors. Most actors have programmes at various levels of intervention, and it would require a much broader project to examine not only UNIDO, but also all the other activities. The private sector is committed to developing itself intentionally through commercial opportunities, and unintentionally through spillovers of normal business transactions. The challenge for international and national public actors is to support private sector efforts in an appropriate way, and not to distort or duplicate those efforts. One way to examine this question is to focus on the provision of public goods, the implications of which are discussed in the next section.

3. Role of UNIDO seen through various frameworks

Table 18 examines the roles of the various actors in light of the assessment criteria outlined above in subsection 1. For instance, United Nations agencies will have a limited role in supporting industrial development seen through a minimal approach or a private-sector-led approach. There are narrow and overlapping roles for UNIDO and other United Nations agencies in a mandate-driven approach. A comparative advantage approach should see UNIDO specialize in industrial development with the most support for industrial development channelled through UNIDO. While the picture is necessarily incomplete, the main message is that there are different roles for UNIDO, depending on the type of framework used to assess support for industrial development.

While the main objective of the present report is to examine UNIDO activities from the perspective of public goods, it is useful to briefly discuss the comparative advantage of UNIDO in providing public goods to support industrial development vis-à-vis other international organizations (that is, examining the intersection of what the public goods framework and what the comparative advantages framework would imply for appropriate support for industrial development). This is relevant in order to identify areas where UNIDO could focus its attention most effectively. It should be recognized that a public goods framework might suggest an increased focus on certain areas in which UNIDO does not have a comparative advantage, and would therefore have to build up additional capacity. It could also be that the comparative advantage of UNIDO is in providing private goods; hence, a refinement of services would be needed if a public goods framework is followed.

The opinion of experts and UNIDO staff offer a first and important assessment of the comparative advantage of UNIDO, showing that it falls into the field of building capacity for sustainable industrial production. The UNIDO corporate strategy (UNIDO [75]) identifies two areas of comparative advantage: technology diffusion; and trade capacity-building. Magariños and others [43] discuss the

Danish assessment of UNIDO in 1997, which argued that "no other international organization has the same comprehensive experience, technical knowledge and multidisciplinary expertise for continuing and linking industrial technical cooperation services targeted at both the policy and strategy level, the institutional framework level and the enterprise level". The United Kingdom Department for International Development [13] believes that the UNIDO environmental work for the Montreal Protocol and the Global Environment Facility is one of its key strengths and should represent part of a more focused niche, but it is concerned that UNIDO operates in a wide range of areas. The permanent representative of Japan to UNIDO thinks strengthening productive capacities and cleaner and sustainable industrial development are two areas of comparative advantage for UNIDO.

It may be useful to address the issue of comparative advantage on the basis of individual service modules as well. For instance, in the area of foreign direct investment, by supporting investment promotion agencies, sector promotion strategies and foreign direct investment, the UNIDO service module 2 is usually at lower policy levels of investment promotion in a field consisting of the

TABLE 18.
PROMOTING INDUSTRIAL DEVELOPMENT: ROLES OF ACTORS BASED ON DIFFERENT
ASSESSMENT FRAMEWORKS

<i>Approach</i>	<i>UNIDO</i>	<i>Other UN and multilateral agencies</i>	<i>Bilateral donor agencies</i>	<i>Private sector</i>
Minimal	No activity	Rules setting (e.g. WTO ^a), investment climate	Good governance	Substantial role
Mandate	Narrow and overlapping	Several overlapping	Mandates based on objectives set by taxpayers (for example, MDGs ^b)	No direct role; corporate social responsibility is not mandatory
Comparative advantage	Various including: implementing agency, Montreal Protocol, industrial policy knowledge	Various depending on specialized agency; trade issues for agencies such as UNCTAD and ITC ^c	Individual strengths (e.g. DFID ^d health) and flexibility compared to multilateral programmes	Flexible in adapting to changing environment
Private-sector-led	Limited role	Limited role	Few flexible programmes (e.g. challenge funds or PPIs ^e in Germany, the United Kingdom etc)	Important role
Objectives-led	MDGs ^b ; productivity enhancement	MDGs ^b and others	MDGs ^b	No principal development objectives, although development can be part of profit maximization in the short and long run
Public goods joint framework	Coordinating roles for knowledge on industrial development and related policy; governance; environment	Coordinating roles for environment, health, governance, knowledge and security public goods	Financing public goods	Limited role, but action can lead to provision of common/public goods

Source: COMPID Research Programme and Montreal Protocol.

Note: This table is for illustration purposes only. For instance, the precise identification of specific areas of comparative advantage requires much more elaborate analyses.

^aWorld Trade Organization.

^bMillennium development goals.

^cInternational Trade Centre.

^dDepartment for International Development.

^ePublic-private interactions.

Multilateral Investment Guarantee Agency, the Foreign Investment Advisory Service, UNCTAD and other organizations dealing with the policy environment and legal regulatory framework. This area is also occupied by private sector consultancies. The same service module is engaged in technology diffusion and promotion, and few other multilateral organizations are involved to the same extent. The combination of investment and technology promotion is a comparative advantage in a field where other actors tend to be restricted to investment promotion. For some other service modules, such as service module 7, most activities are part of a niche for UNIDO in which it has a comparative advantage.

In other instances, UNIDO would be well placed to build up a comparative advantage, but due to (financial) constraints may not have done so. For instance, building up industrial policy knowledge requires the generation of statistics (in which UNIDO already has the capacity and comparative advantage), as well as the analytical capacity to generate new policy knowledge on the basis of those statistics (where UNIDO does not have the necessary capacity). UNIDO could fill this apparent gap among international organizations.

D. IMPLICATIONS FOR UNIDO TECHNICAL ASSISTANCE

1. Implications of a public goods framework

When viewed through a public goods lens, how can the contribution of UNIDO technical assistance to the promotion of sustainable industrial development be evaluated? While difficult to assess in detail for all such activities undertaken, the UNIDO contribution can be discussed in general terms.

In order to avoid market distortion, public support for industrial development should seek to maximize the provision of (international) public goods. In chapter II, section E, five broad activities were identified as follows: policy research and transfer; collection and dissemination of information; provision of skills and training; development and adaptation of technologies; and support to regulatory and coordinating agencies. The role for UNIDO has been highlighted in each of these activities. The practical implications of a public goods framework implies that UNIDO would need to concentrate on the following type of activities:

- Steps should be taken to promote the creation and transfer of policy knowledge (involving policy research and transfer), including building up knowledge about what type of industrial policy works where (involving collection and dissemination of information) and under what circumstances (taking into account different external policy settings), and how to design a good industrial strategy (involving provision of skills and training). UNIDO is well placed to provide such a public good, since it is the specialized international agency for industrial development and could act as the point of coordination. Capacity levels in this area are inadequate elsewhere. Sufficient capabilities would be required within UNIDO both to generate knowledge and to facilitate the transfer of policy knowledge, thereby enabling developing countries to derive benefits from the public good. There would be little interest in the private sector to become involved in producing such knowledge, but public-private dialogue would help in designing appropriate policy interventions;
- There should be capacity-building in governments and institutions that promote sustainable industrial development. This includes cleaner production centres and technology and standards

institutions (involving support to regulatory and coordinating agencies). These institutes feature public goods aspects, such as development of standards, and could benefit from economies of scale, so that the private sector would not provide such governance public goods at an optimal level. Again, effective public-private dialogue would make support more relevant for the private sector. Costs of initialization (as opposed to normal operating) efforts would have public good aspects. Capacity-building at the intermediate level can also include support for private sector organizations, associations and intermediaries, as long as they are, in theory, open to all firms. In particular, support could focus on the institutional framework behind technological development (involving developing and adapting technologies);

- There should be some limited engagement with firms or private sector activities, but only when there are clear public good benefits from doing so. For instance, international agencies, such as UNIDO, could promote the provision of national and, above all, international public goods, specifically knowledge and environmental public goods, by interacting with individual firms. Creating an industrial supply capacity purely to supply private goods, such as energy services or capital equipment, would be inappropriate within a public goods framework, since those goods could be provided on a commercial basis. However, initial support to secure capacity can have clear demonstration effects, and thus includes public goods aspects. Facilitating the implementation of environmentally sound technologies at the firm level would nevertheless support the provision of a public good (a quality environment).

The latter point can be clarified on the basis of guidelines for technical assistance, including those by UNIDO, involving individual firms, which could feature the following public good aspects:

- The adoption of energy- or pollution-saving techniques, including management techniques, could be facilitated, if there are clear benefits to the environment, contributing to environmental international public goods, which should, in principle, benefit everybody. Firms with the greatest potential impact on the environment would be most appropriate;
- Technology adoption by individual firms could be facilitated, if this increases the availability of information about technology adoption, thereby contributing to knowledge, a national public good, and promoting the design of appropriate industrial policies that would, in principle, benefit all firms. Firms should be selected so that the dissemination of the newly acquired information is maximized to the largest extent possible;
- There should be support for certification of individual firms when that leads to training of staff of national certification bodies (contributing to governance national public goods) and development of improved standards that can benefit other firms;
- Business development services should be provided only when there are clear demonstration effects, while maintaining the emphasis on creating the market for such services. This would normally limit the business development services to facilitating providers of those services using various types of technical assistance. But it could occasionally include provision of the business development services if this has clear demonstration effects on the market for those services. The private sector, in general, could benefit from the demonstration effect. An initial lack of interest could be expected because of the inability of the private sector to appropriate the knowledge associated with creating a new market for business development services. It is, however, possible that private providers could follow public providers over time (UNIDO [74]). This is less strict than the guidelines by the Committee of Donor Agencies [11], which would involve facilitating

conditions for providers only—an approach which acknowledges that often there are no providers of business development services in underdeveloped and/or rural areas.

In a public goods approach, any engagement with individual firms would need to be: clearly defined on the basis of a pre-assessment of the relevant market and its failures, and of obstacles to enhancing firm performance; linked to a clear exit strategy involving, in particular, the kick-starting of certain processes or associations; and supported by clear evidence suggesting how benefits can be, or have been, transferred to firms other than the firm receiving direct support.

The main conclusions are that UNIDO would have to enhance its capabilities in the area of knowledge creation and transfer (international knowledge public goods). UNIDO is a specialized agency for industrial development and would need to strengthen its research capacity with a view to generating international knowledge public goods, for example, knowledge on the effectiveness of industrial policy in various settings, especially since sufficient capacity in this area is lacking elsewhere. On the other hand, it would need to adopt a more focused approach when dealing with individual firms, even though service modules 6, 7 and 8 provide support for environment public goods.

2. Public goods framework: one of several assessment methods

Sustainable industrial development can be promoted in different ways. The present report has highlighted, in particular, the relevance of the public goods framework to public support for such development, including the role of UNIDO technical assistance. The benefit of this framework is that it provides clear guidelines on fair competition between public support and private sector activities. As long as public support concentrates on providing public goods, distortion of the market is kept to a minimum.

In reality, technical assistance will not be decided on the basis of public goods contents alone. UNIDO thinks in terms of a triangle of constraints, consisting of: the UNIDO mandate vis-à-vis other organizations; demand in developing countries; and support by donors. There are various examples of support organizations, including donors, using a combination of the assessment frameworks discussed above, culminating in the use of rules of thumb. It is notable that bilateral donors have taken the lead in using new and flexible approaches to supporting the private sector. For instance, eligibility criteria for obtaining private sector grants from the Business Linkage Challenge Fund of the United Kingdom Department for International Development include the following:

- Improvement of the incomes and livelihoods of poor people;
- Extent of new private-sector resources mobilized;
- Likely sustainability of project;
- Enhancement of competitiveness; replicability;
- Degree of innovation.

The German GTZ initiated a fund to finance public-private partnerships. Projects for the period 1999-2002* involving European companies or their affiliates in developing countries and countries with economies in transition were judged on the following criteria:

*General Assembly resolution 55/2 of 8 September 2000.

- Development policy benefits;
- The contributions of the partners should complement each other efficiently;
- Without the support of GTZ the company would not be able or willing to implement the project;
- The contribution of the private company covers at least 50 per cent of the total project costs.

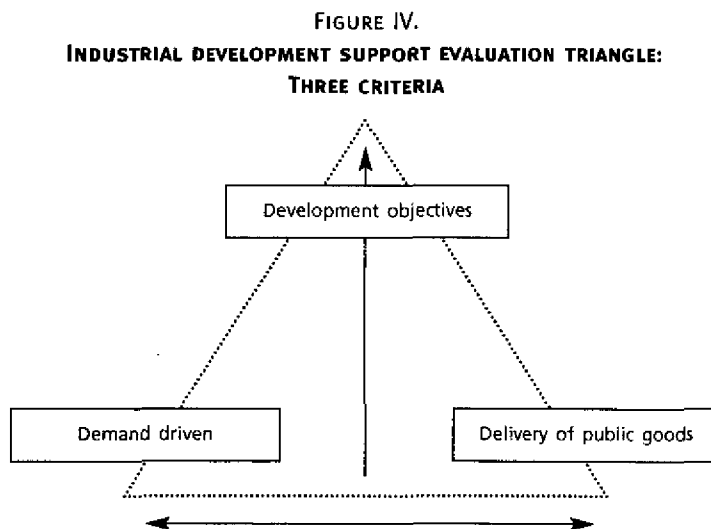
Public goods aspects are indeed unlikely to be the only criteria. When dealing with industrial development interventions, the criteria for assessing and evaluating support ultimately entails measuring the score according to the following three criteria: development objectives; delivery of public goods; and demand driven (see also chapter I).

Development objectives. Support for programmes would be assessed according to some pre-determined set of criteria, such as quality and type of employment, number of start-ups of small and medium enterprises, relevance to wider private sector development programmes, Millennium Development Goals etc.

Delivery of public goods. It is desirable for support to focus as much as possible on the delivery of public goods for two reasons: (a) if private goods are provided, there is no guarantee of additionality regarding what firms intend to do anyway; (b) the provision of public goods benefits all firms, without harmfully crowding out other firms or creating unfair competition with private service providers.

Demand driven: Involvement in industrial development is usually on the supply side (skills, technology etc.), and the challenge is to avoid distorting the market and potentially compromising sustainability. This distortion can be avoided by stimulating those activities/sectors that are, or will be, in demand, and could involve building on (dynamic) comparative advantages of the economy. This applies to support provided at both the micro and macro levels. This objective should be shared by all involved—donors, agencies and developing countries. In this respect, needs assessments for support for industrial development in developing countries are useful.

Those criteria are shown in figure IV below.



Source: Velde [78].

The three criteria correspond closely with the various frameworks identified above, except the minimal approach, which does not define a role for specific industrial support programmes.

The criterion "delivery of public goods" corresponds with a public goods framework. The criterion "development objectives" corresponds with allocation according to effectiveness in meeting development goals and the criterion "demand driven" corresponds with allocation of support according to private sector needs in developing countries, although the way the term demand driven is used here is broader as it includes considerations at the microeconomic and macroeconomic levels.

The comparative advantage and mandate-driven approaches are included in development objectives. The mandate sets the development objectives, according to which support will need to be assessed (for example, poverty reduction as called for by the United Nations). Some would argue that the best way in which these can be achieved is when support is based on what one is good at (comparative advantage framework), as this would lead to the best outcomes. Hence organizations should focus on activities in which they have a comparative advantage.

E. CONCLUSIONS

Chapter III was the third part of the report on overcoming market failures and providing public goods to promote industrial development. The report began by examining the implications of the changing environment of industrial development. Chapter I provided details of specialization in industrial development due to globalization processes, such as fragmentation and the emergence of value chains. These processes call for a more focused involvement of governments in industrial development (Lall [38]). One implication of globalization is that it puts a premium on quickly overcoming coordination and market failures. The issue of coordinating supply capacity with trade opportunities due to changes in trade policy, for example, in Bolivia, was discussed (see chapter I). This calls for coordination at higher policy levels, including the provision of governance public goods, to be able to respond quickly to new trade opportunities. It also raises the importance of the provision of international knowledge public goods related to industrial policy knowledge, as countries try to build up their supply capacity to take part in globalization processes. In the rapidly changing environment of industrial development, public intervention needs to concentrate on processes higher up, such as addressing coordination failures, as explained in chapter II, rather than on specific interventions at the firm level. This has implications for UNIDO, as it would be necessary to increase the capacity to create and disseminate international knowledge public goods and to address coordination failures.

Chapter II set out a public goods framework. It presented five broad industrial policy activities that include or relate to the provision of public goods. All five relate to overcoming market failures, as follows:

- *Policy research and transfer.* Individual agents, such as firms, cannot be expected to be aware of all the effects of their behaviour on others, nor the cumulative effects of the actions of many agents. This is a role for government, and extends beyond accounting for externalities and market failures to having an overall strategy. There is a role in industrial policy to undertake research and collate the results of research, in order to facilitate the process of policy transfer;

- *Collection and dissemination of information.* The most common source of market failures arises due to imperfect information, either because useful information is not available or because not all potential beneficiaries have access. In terms of industrial policy, an important function is providing information to firms on available technologies, market opportunities, product standards etc.;
- *Provision of skills and training.* General education contributes to increasing the knowledge capacity of a country. As part of an industrial strategy, there will also be cases where the public sector is best placed to identify the types of general skills and training required;
- *Development and adaptation of technologies.* Research knowledge is a public good, and the public sector can play a constructive role in promoting new technology in general, and promoting cleaner technologies in particular. National research capacity is most beneficial for adapting available technologies to local requirements, and for promoting research on issues of specific interest to the country;
- *Support to regulatory and coordinating agencies.* Regulatory agencies are required both to monitor anticompetitive activities (restrictive business practices) by firms, and to ensure that externalities are taken into account. The former includes antitrust bodies and regulation of monopolies and utilities. The latter is most readily observed in the context of environmental regulation, but includes adherence to product standards and health and safety regulations. The activities of various agencies should themselves be coordinated as part of an industrial policy.

Chapter III analysed UNIDO activities within the public goods framework set out in chapter II. The results are presented here in general terms, in part because of the general nature of the framework used. The framework highlights the following:

- UNIDO needs to emphasize its capabilities in the area of industrial policy coordination, transfer and knowledge creation (international knowledge public goods);
- UNIDO can contribute to building up governance structures, such as cleaner production centres, or kick-start technology and standards centres;
- UNIDO needs a more focused approach when dealing with individual firms.

The report also argued that a public goods framework is one of several frameworks that can be used to assess the appropriateness of UNIDO support (and indeed the support of other organizations) for industrial development. For instance, on the basis of (existing) comparative advantages, UNIDO needs to focus on building capacity for sustainable industrial production, including activities such as:

- Implementation of the Montreal Protocol (where there is already capacity);
- Technology diffusion;
- Generating industrial statistics.

Combining the two approaches yields the following general conclusions for possible changes in the way in which UNIDO operates:

- UNIDO may want to think about expanding its capacity in the area of generating industrial policy knowledge, as it is well placed for this, given its comparative advantage in statistics and

policy research on industrial development. This provides an important (international) public good, thereby solving market and coordination failures at national and international levels. With an enhanced capacity in this area, it could also try to build a stronger link between industrial policy knowledge and industrial policy transfer;

- UNIDO needs to think more closely about how it deals with individual firms. The reality of this is complex, and it is not clear (in broad terms) how it should affect UNIDO activities in practice. On the one hand, it risks providing private goods that arguably could be better provided by the private sector. On the other hand, dealing with individual firms, for example, in implementing the Montreal Protocol, an area in which UNIDO has carved out a niche, supports complementary activities that contribute to providing environmental public goods.

Bringing in other assessment frameworks, such as development objectives, would need further attention. For instance, it would refine industrial policy knowledge generation activities into those areas in which they best serve the stated development objectives. As the present report concentrated on public goods, application of alternative frameworks was not developed. Overall, UNIDO seems well placed to respond to the changing nature of industrial development by providing public goods, for example, helping to build up and transfer knowledge relating to effective industrial policy.

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