

Summary

Structural Change and Productivity Growth 20 Years Later

Old problems, new opportunities



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SIXTY YEARS WITH LATIN AMERICA AND THE CARIBBEAN

This summary of the document *Structural Change and Productivity Growth - 20 Years Later. Old problems, new opportunities*, presented by ECLAC at the thirty-second session of the Commission (Santo Domingo, Dominican Republic, 9-13 June 2008) was prepared by José Luis Machinea, Executive Secretary of ECLAC, in collaboration with René Hernández of the Division of Production, Productivity and Management and with contributions from Johan Mulder of the Division of International Trade and Integration.

Contents

Introduction	5
I. A long-term view.....	13
II. Lights and shadows in the region's recent performance	15
III. Changes in the global economy	21
IV. Techno-economic paradigms: diffusion and learning processes in Latin America and the Caribbean	25
Information and communications technologies (ICTs)	26
Biotechnology	27
V. Innovation and technological learning.....	31
An aggregate analysis	32
Innovation surveys	33
Quality and vertical differentiation of exports ...	34
VI. Sectoral learning patterns.....	39
The manufacturing and export industries.....	39
The agrifood complex.....	42
Mental mining	43
Services.....	44
Global value chains.....	46
VII. Public-private alliances for structural change and productivity growth	49
VIII. Summary remarks	55



Introduction

Nearly 20 years ago, ECLAC put forward a proposal for structural change and productivity growth with social equity. At the time, the countries of the region were emerging from the severe crisis of the 1980s, with all its associated difficulties in terms of internal stabilization and external adjustment, and heading into a decade of structural reform which heeded the call of the Washington Consensus. In the midst of perplexity and pessimism regarding the region's prospects, ECLAC espoused a view of the situation that ran counter to the orthodox line of thought that marked economic policy tenets of the time.

The *idée-force* underlying this view situated the region within the universe of developing countries and highlighted the deteriorating situation by using the metaphor of an “empty box” to symbolize the difficulties that the region was having in reconciling growth with social equity. This proposal for structural change and productivity growth was thus aimed at promoting economic expansion and social equity, not sequentially, but simultaneously. A reduction in inequity contributes to the cohesiveness of the various actors involved, either directly or indirectly, in the production process. Consequently, persistently high degrees of inequity will, over the medium term, erode an economy's competitiveness.

In addressing the issue of economic growth, ECLAC started out by taking stock of the major changes that were taking place at that time in the world and the way in which they were redefining a recurring theme in its thinking: the generation and diffusion of technical progress. This proposal assigned a key role to manufacturing because that was the sector

which offered the greatest potential in terms of technical progress and its diffusion. It also recognized the existence of significant complementarities with the agricultural and services sectors, however, and called for measures to strengthen these tie-ins as a crucial step towards generating technological spillovers and both backward and forward linkages.

It contended that, in order to achieve technical progress and boost productivity, the region's economies had to become more open, but it also drew a distinction between genuine and spurious competitiveness and emphasized the systemic nature of this phenomenon. At the same time, it emphasized that the transition to greater economic openness should be gradual, should place priority on exports, and should be underpinned by a stable competitive real exchange rate.

Throughout the 1990s and the early years of the following decade, ECLAC continued to develop various aspects of this integrated approach to structural change, at times focusing more on economic issues, at times highlighting social considerations, but at all times setting its proposals within the institutional context of the region. At no time did these shifts in emphasis detract from its integrated conceptualization of the development process. In fact, ECLAC has always approached economic, social and institutional issues as an integral set of interacting, mutually conditioning factors.

How the relevant measures are organized and how much time is devoted to each dimension are also important factors, however. In recent works, ECLAC has stressed the social dimension, which, all the same, has invariably entailed economic and institutional considerations. This has certainly been the case in some of the Commission's latest documents, such as *Shaping the Future of Social Protection* and *Social Cohesion: Inclusion and a sense of belonging*. In that publication, ECLAC is focusing on the issue of equality of opportunity as it relates to education, exclusionary labour-market dynamics, redistribution of assets via social expenditure, promotion of the full exercise of citizenship within a strengthened democratic framework and the consolidation of more inclusive societies.

The pace of the global changes that were discussed in the Commission's 1990 proposal has accelerated, and new actors have emerged which have significantly altered previous balances in the world economy in terms of both supply and demand. These events have triggered major structural

changes. The time has therefore come to re-examine the Commission's views on structural change and productivity growth in the light of new circumstances in order to determine if the new opportunities associated with emerging technological and economic paradigms and the growing hyper-segmentation of markets can help to overcome the region's old problems of structural heterogeneity and to identify new forms of competitiveness that are not being fully exploited.

The countries of Latin America and the Caribbean find themselves in varying positions in terms of competitiveness and learning. It is on the basis of these positions, in conjunction with their stock of resources and capabilities, that they take part in the global economy. Diversifying and developing these positions is the crux of any strategy for structural change and productivity growth. Although such strategies must clearly have national characteristics, closer coordination and greater economic integration among the countries of the region would be of enormous help in achieving greater economies of scale, complementarities and cumulative learning.

Moving forward with this task within the framework of each national reality will entail mobilizing a broad range of diffuse social energies, and public policy plays a key role in this respect. It is important, first of all, to organize each country's search for a medium- and long-term vision within the global context and to catalyse efforts to detect present and future opportunities. Second, it is also crucial to build lasting alliances with the private sector based on reciprocal benefits and commitments that will make it possible to formulate and implement strategies for gradually making that vision a reality and taking advantage of the opportunities that present themselves.

All of this requires the formation of a wide-ranging consensus capable of underpinning agreements in various spheres of national affairs. Viewed from this standpoint, the integrated approach to development that is so much a part of the Commission's thinking takes on renewed significance. Although proposals in given areas may be analytically separable, the type of broad national consensus that can make such proposals viable is necessarily multidimensional. In other words, in the fullest sense of the proposal for bringing about structural change and productivity growth with greater equity, social consensus-building must encompass an inseparable whole involving a unified array of agreements concerning growth, social equity and institutional development.

The objective of *Structural Change and Productivity Growth – 20 Years Later. Old problems, new opportunities* is therefore to determine exactly what opportunities and challenges the region is facing in this new international economic environment. It is an environment marked by changes in actors and in the nature and intensity of trade flows, shifting patterns of structural change and an ever more rapid pace of technical progress at a time when new technological paradigms that have a profound impact on many sectors' competitive dynamics are emerging and becoming consolidated.

Chapter I examines the region's performance in the world economy, along with the opportunities that are opening up for Latin America and the Caribbean in the new global economic environment. An analysis of long-term trends relating to convergence and disparities in per capita income is followed by an exploration of economic growth processes and structural change in the production sector. The discussion then turns to the main changes that have occurred in the world economy from the standpoint of both the organization of production and business models and the simultaneous shift towards the massification and stratification of demand at the international level. The final part of this chapter looks at the strengths of the region's economic performance in recent years and at basic lines of action for bringing about structural changes and productivity growth that will enable the countries to deepen and diversify the ways in which they position themselves within the international economy.

Chapter II reviews the region's economic and export performance in the past quarter century. It begins by examining macroeconomic trends in the region, with emphasis on the internal and external elements that played a role in the slow, volatile economic growth that characterized the region from 1980 until its performance began to improve in 2003. It then goes on to analyse productivity gains as a growth factor and their close relationship to the dynamics of the production structure. Emphasis is placed on a number of productivity determinants, such as the application of knowledge to economic activities, the diversification of the production structure and the efficiency of service delivery with respect to physical infrastructure. The chapter concludes with an analysis of the way in which exports have helped to promote structural change and drive growth since 1980 through their aggregate contribution, product and market diversification, incorporation of knowledge and the technological externalities generated by trade and foreign direct investment.

Technological dynamics in the region and opportunities for improving the performance of companies and the products they export are the main focus of chapter III. A comparison of national R&D efforts and their relative effectiveness is followed by an examination of private sector innovation in manufacturing in various countries of the region and an analysis of its impact on productivity, wages and exports. Obstacles to the further development of process and product innovations are also identified. The unit values of exports are then used to assess the region's capacity for positioning itself in the international economy more successfully by adding quality to its exports. To this end, the quality of its exports is evaluated by comparing the prices of goods exported by the region with those of similar goods from developed and developing regions. The region's share of world trade over the last decade, disaggregated by level of quality, is also analysed. Finally, in view of the importance of agricultural goods for Latin America and the Caribbean, a more extensive discussion is offered of the region's position in world (and especially developed-country) markets for these products. In the light of the evidence presented this analysis, a number of ways of improving that position in terms of export quality are explored.

Chapter IV looks at the emerging opportunities for the countries of the region that are associated with the new techno-economic paradigms. These employ the shared evolutionary path of technological changes and economic development as a basis for understanding how the region reacts to and engages in the diffusion of these technologies in the economic and social spheres. The implications of information and communications technologies (ICTs) are described, together with the elements that must be in place in order for society as a whole, the economic system, infrastructure and industry to adapt to the new processes and products that these technologies engender. The focus then turns to an analysis of the incipient diffusion of biotechnology and how this is shaping corporate strategies and forms of industrial organization. Consideration is also given to the efforts required to create a system capable of increasing and directing R&D and human resources in ways that will stimulate the adaptation and absorption of these new technologies.

Given the heterogeneity of the Latin American and Caribbean countries' production structures, any analysis of opportunities and

challenges requires a sector-by-sector evaluation. This assessment is undertaken in chapter V, which describes the learning processes and technological capacities found in four different sectors which are characteristic, on differing scales of relative importance, of the production structures and international economic integration of the countries of the region. These sectors are the agroindustrial complex, mining, manufacturing (both those industries created during the import-substitution industrialization (ISI) model and export-oriented manufacturing industries) and services. An analysis is then undertaken of the windows of opportunity that are being opened up in each of these areas by new cross-cutting technological paradigms. To take advantage of these opportunities, the countries will have to make considerable efforts to develop technology that can shift the profile of their production structures towards activities better suited to generating and propagating innovations. In the final section, the opportunities for achieving upgrading in the global value chains of various products are examined.

Drawing on the foregoing analysis of opportunities and challenges for bringing about a more dynamic process of structural change and productivity growth, chapter VI explores the strategic modalities that have been adopted by a number of countries outside the region that are regarded as being “success stories”. This analysis focuses on determining how these countries have organized public-sector institutional processes relating to the development and implementation of medium- and long-term national strategies within the framework of a public-private alliance. An examination of the various organizational procedures employed by the public sector and its support programmes for promoting structural change, productivity growth and international economic integration serves as the basis for the formulation of 12 “first principles” in this regard. The same parameters are then used to determine where the Latin American and Caribbean countries stand in terms of the creation of a strategic national vision, public-private alliances and consensus. This appraisal suggests that these principles are indeed relevant for a region which needs to deepen and diversify its production apparatus within the framework of today’s globalization process.

Chapter VII presents a number of concluding remarks and observations dealing with some of the central points made in the study, together with a discussion of opportunities for the region to move forward with a process of structural change and productivity growth that can accelerate the rate of economic expansion and help it to achieve greater social equity.



I. A long-term view

The current phase of globalization is yielding unprecedented opportunities, but it is also creating uncertainty and challenges in the economic, social, political and cultural life of millions of people. A striking expansion of world trade and dynamic technological changes have been taking place even as inequality within and between nations has been on the rise. Under these circumstances, what were once developing economies have been undergoing remarkable transformations, moving, in the space of just a few generations, from poverty to prosperity, thereby constituting a new group of emerging actors in the global economy.

The Latin American and Caribbean region was an early participant in the internationalization of the world economy, and this was especially true following the revolution in transportation that occurred in the second half of the nineteenth century, which paved the way for the globalization of natural resources. From the very earliest stages of this process on, Latin America and the Caribbean, along with the countries of Central and Eastern Europe, came to comprise the group of middle-income countries that were later to be joined by several Asian countries.

The gap in per capita income between the region and the United States widened between 1820 and 1870, but then stabilized at around 28%. Starting in 1980, however, the gap between Latin America and the Caribbean and the developed world began to widen again, mainly as a result of the debt crisis and the frustratingly slow recovery that followed. Indeed, low growth rates and a marked degree of volatility were characteristic features of the region's performance between 1990 and the start of the 2000s.

The region's overall long-term performance encompasses very large variations across different countries and periods. These episodes include periods of rapid growth in the three Southern Cone countries (Argentina, Chile and Uruguay) in the late nineteenth and early twentieth centuries, in Cuba during the first quarter of the twentieth century, and in Brazil, Colombia and Mexico over several decades in the second half of the twentieth century. Until the 1970s, the region's history might be summed up as one of stabilization at an intermediate position in the global economy and of individual cases of "incomplete convergence" rather than as one of sustained divergence from the developed countries and other developing ones. Some of the poorest countries have, however, displayed an earlier and more sustained decline in this respect.

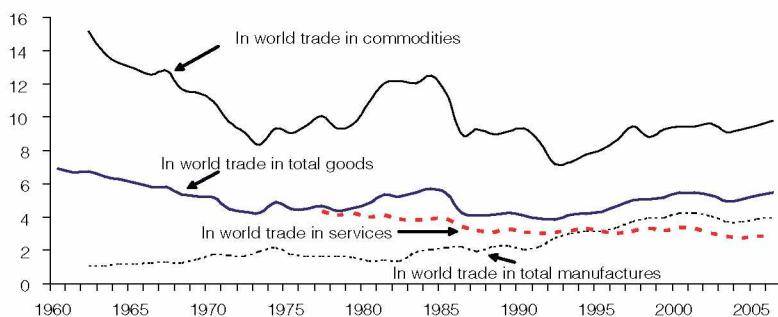
II. Lights and shadows in the region's recent performance

The Latin American and Caribbean region's recent development process bears witness to its success in taking advantage of favourable trends in the external economic environment which have been reflected in stronger demand, greater liquidity on financial markets, higher commodity prices and larger flows of remittances. Although the region has grown less than other developing economies, by the end of 2008 it will have completed a six-year growth cycle marked by an average annual increase in per capita GDP of 3.5%. In fact, these last six years have been the strongest, longest-lasting period of expansion since the second half of the 1960s.

The growth experienced during these years has also been of greater quality. The region has become less vulnerable to external shocks, as the improved management of fiscal and external accounts has resulted in lower public and external debt levels relative to GDP and higher international reserves. Foreign direct investment reached record levels in 2007, and both unemployment and poverty —although still too high— have decreased markedly. And last, but certainly not least, the region has strengthened its democracies and gained greater political autonomy, as witnessed by the existence of governments spanning a considerable range of the political spectrum.

Export growth over the past 20 years (9% per year in volume terms) has enabled the region to regain part of the share of global trade that it had lost during the three preceding decades (see figure 1). This reversal in trend is due mainly to developments in Mexico, although in the last few years Brazil and several Pacific South American countries have been the most dynamic.

Figure 1
**LATIN AMERICA AND THE CARIBBEAN: SHARE OF WORLD TRADE IN
 TOTAL GOODS, COMMODITIES, MANUFACTURES AND SERVICES,
 1960-2006**
 (Percentages)



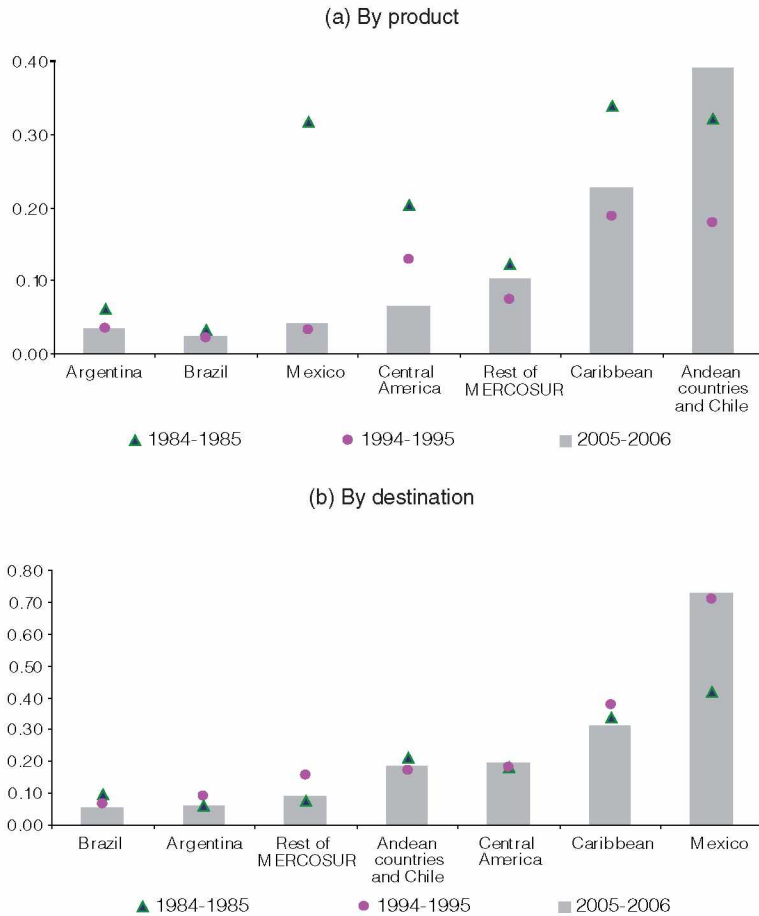
Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of World Bank, World Development Indicators [online database].

In the last twenty years, the region (with the exception of the Andean countries) has diversified its exports in terms of products, but not, on the whole, in terms of destination markets; indeed, Mexico's exports are becoming even more concentrated in the United States market (see figure 2). It should come as no surprise, therefore, that an examination at the product level shows that more than a third of the increase in exports during this period is attributable to product diversification and only a quarter to the diversification of destinations.

The region has yet to make significant progress in bringing about structural change, however. First of all, it is important to look at the way in which the benefits of growth have been distributed among the population. Inequity in income distribution and, more generally, in access to various types of assets remains, today, an undeniable part of the reality of Latin America and the Caribbean, just as it was 20 years ago when ECLAC developed its proposal for changing production patterns with social equity. Second, even though in the past few years investment has risen to its highest levels since 1980, it is still not high enough to sustain growth rates above 5% (see figure 3). Third, in terms of the restructuring of production, the region has not shown major changes in recent decades, except insofar as its share of the manufacturing industry has declined, especially in South America. In addition, engineering-intensive activities account for only a small proportion

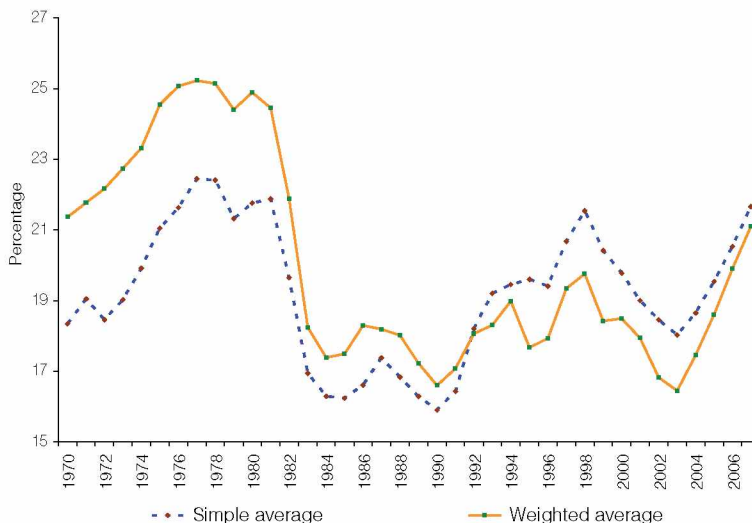
of manufacturing activities, especially in comparison with other countries outside the region that enjoy comparative advantages in natural resources. Moreover, several countries that have diversified their exports significantly have failed to diversify their production structures.

Figure 2
EXPORT CONCENTRATION MEASURED BY THE HERFINDAHL-HIRSCHMAN INDEX, 1984-1985 TO 2005-2006



Source: United Nations Commodity Trade Database (COMTRADE), on the basis of the Standard International Trade Classification, Revision 2 (SITC, Rev. 2), except in the cases of 1984-1985 for Mexico and Central America, for which Revision 1 was used.

Figure 3
LATIN AMERICA AND THE CARIBBEAN (19 COUNTRIES): GROSS FIXED CAPITAL FORMATION AS A PERCENTAGE OF GDP, 1970-2007^a
(Based on figures in dollars at 2000 prices)



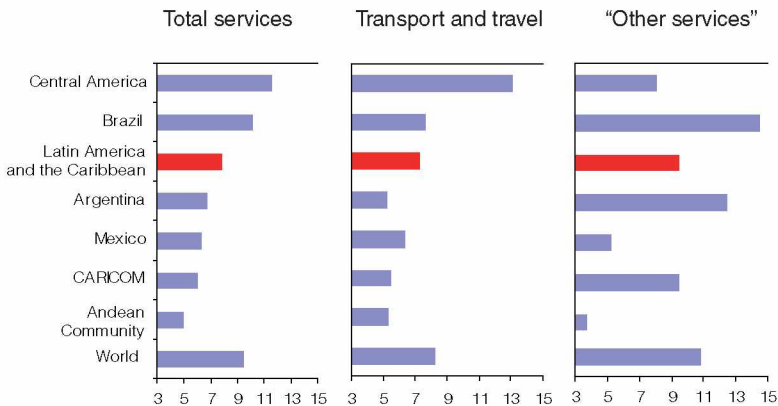
Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of official figures.

^a The figures for 2007 are preliminary.

Fourth, increased export diversification has not reduced the region's excessive dependence on traditional exports, nor has it resulted, on the whole, in the incorporation of more knowledge or more value added into economic activities or production chains. By the same token, increased exports of manufactures, particularly those covered by special regimes, have not enabled the region to upgrade to production activities and sectors that would deepen, diffuse and accelerate technological learning processes or generate technological and productive capacities. Fifth, with the exception of Mexico and Brazil, the region's share of more buoyant sectors of world merchandise trade has been trending downwards. For the most part, Mexico's growing share of more robust sectors of trade does not correspond to the "more sophisticated" products being traded on the world market, that is, those exported basically by high-income countries. In other words, Mexico's exports (like those of China) are products that are increasingly being exported by developing countries as a result of the deconcentration and outsourcing

of the activities of the major transnational firms and which, usually, represent the last link in the value chain. Sixth, the region's share of the world market for services has been shrinking, in particular in the most dynamic sector, which deals basically with computer science, engineering, R&D and telecommunications ("Other services" in figure 4). Seventh, innovation efforts remain scant and largely ineffectual. The gaps are increasingly wide bearing in mind the growing public and private initiatives adopted by Asian countries, especially China, in the area of R&D (basic and applied sciences) and access to knowledge markets.

Figure 4
**EXPORTS OF SERVICES, LATIN AMERICA AND THE CARIBBEAN
 AND THE WORLD, 1985-2005**
(Annual average growth rates)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), 2007, on the basis of International Monetary Fund (IMF), "Balance of Payments Statistics (BOP) database" [on line] <http://www.imfstatistics.org/bop/>, 2007.

Lastly, although some spontaneous regional integration can be observed, formal processes (with some exceptions in Central America and the Caribbean) continue to exhibit shortcomings and a lack of dynamism. The list goes on, but the important point is that, even during the remarkable external boom now being experienced and despite substantial achievements on the domestic front, the region does not seem to be making sufficient progress in dealing with the challenges associated with the far-reaching changes being brought about by the globalization process.

Limited progress in a number of these areas at the level of the region as a whole does not, however, necessarily signal the absence of advances in some countries, activities and businesses. Indeed, there have been a number of outstanding cases and success stories, and some of the achievements that are analysed in this study constitute a platform for efforts to overcome certain sources of inertia and lay the foundations for sustainable development in conjunction with increased competitiveness and social equity.

III. Changes in the global economy

Given these circumstances, the first consideration is whether the region will be able to build on the achievements of recent years in order to overcome certain long-standing challenges and lay the foundations for sustainable growth over the long term. To this end, it is important to examine the incentives and barriers arising from the new international context, which set the stage for the future. First of all, globally speaking, three development hubs of remarkable economic, financial, technological and commercial significance have become consolidated, namely, Asia-Pacific, Europe and North America. These have developed strong ties and complementarities with each other. Notwithstanding the contrasts and contradictions within these hubs, their very existence and the centrifugal force that they exert pose a dilemma for those that remain outside.

Second, in the manufacturing and business services sectors, production activities have become much more functionally and geographically fragmented. Modularization, even at the stage of conception and design, has revolutionized manufacturing tasks, standardizing many components and hugely increasing trade in intermediate goods and the integration of production between countries in an ever-increasing number of global value chains and international production networks, interwoven into an infinite number of variations. This functional and geographical fragmentation has gone hand-in-hand with increasing concentration at the global level, as a consequence of major economies of scale not only at the production level but also in marketing and R&D. On the face of it, becoming part of these value chains is, in itself, no small challenge, although the really

difficult task is to move up within them, which depends on the mode of governance within the chains and the technological capacities that countries manage to develop in different production sectors.

Third, the economic boom occurring in China, India, some Eastern European countries and other countries of the former Soviet Union generates a huge demand for natural resources. At the same time, these countries offer an almost unlimited supply of low-cost labour for the global market and a growing number of highly skilled scientists and engineers; moreover, they offer other significant advantages in terms of location for manufacturing and business services. As a result, the profitability margins of globalization diminish, especially for producers in the most technology- and skills-intensive sectors of the manufacturing and services industries and in labour-intensive and low-cost sectors (for example, export-oriented manufacturing, such as maquila).

Fourth, consumers in China, India and the former Soviet Union, who were once out of reach for Western firms owing to political and trade barriers, are now not only accessible but are facing good prospects of increasing their income. This has gradually been reflected in mass demand of astounding proportions, whose composition shifts as the per capita income of these countries increases. The outcome today is a growing demand for protein-rich foods and for commodities and, in the medium and long terms, for intermediate goods and final manufactured products.

Fifth, high income levels in the developed world and increasing personal income concentration in the developed and developing countries alike, together with the greater diversity of lifestyles, tastes and preferences, are leading to a diversification and stratification of consumer patterns. This will increasingly drive the emergence of highly specialized niches for high-end personalized consumption.

Lastly, changes have occurred in the techno-economic paradigm—a term used to capture the evolution from technological change to economic development—and sweeping transformations associated with the broader diffusion of the ICT paradigm and with the development and spread of biotechnology are in the offing, which will inevitably bring about profound modifications in production and services. Other multi-purpose technologies, such as nanotechnology, together with new materials and new renewable energy sources, can also be expected to trigger major innovations in processes, products and business models.

Changes in techno-economic paradigms may be said to redefine the trajectory not only of the technological and economic spheres but also of the social sphere (Pérez, 2008). In order for innovation of this type to exist, some conditions need to converge, such as ample and low-cost availability of a key input (for example, oil during the metal/mechanical paradigm and chips and semi-conductors in the information technology paradigm), the possibility of using the new technologies in a broad range of sectors (pervasiveness), and an adjustment to the social and institutional context to allow barriers to innovation to be removed and the new paradigm to be spread. As this study will argue, this process is already happening in the case of ICTs and is still embryonic in biotechnology.



IV. Techno-economic paradigms: diffusion and learning processes in Latin America and the Caribbean

In order for growth to be sustainable, it must be underpinned by an ongoing accumulation of innovation and technological capacities. The questions that arise are therefore what paths the region can take to build up such capacities and which of those paths are actually viable, given the windows of opportunity created by today's technological paradigms in the fields of information and communications and biotechnology. These techno-economic paradigms are reshaping business enterprises' technological and production capacities, their competitiveness profiles in the external sector and the ways that the various economic sectors relate to one another. These are converging technologies whose pervasiveness endows them with the ability to influence or redefine the development paths of a very broad spectrum of sectors. This is why each country's future performance will increasingly depend on this ability to absorb these new paradigms in a creative way, regardless of the type of position that it has managed to establish for itself in the international economy. The adoption and adaptation of such paradigms play a critical role once they have been established and have spread around the world and when, as in the case of biotechnology, they are at an incipient stage in their development. Thus, if the technological frontier is not expanding too rapidly, a systematic effort to invest in education and technology can help a country to gain ground.

Information and communications technologies (ICTs)

If the ICT paradigm is to spread throughout Latin America and the Caribbean, then society as a whole, its infrastructure and its production system must all be adapted to the new processes and products that are being introduced in order to generate a substantial gain in productivity and well-being.

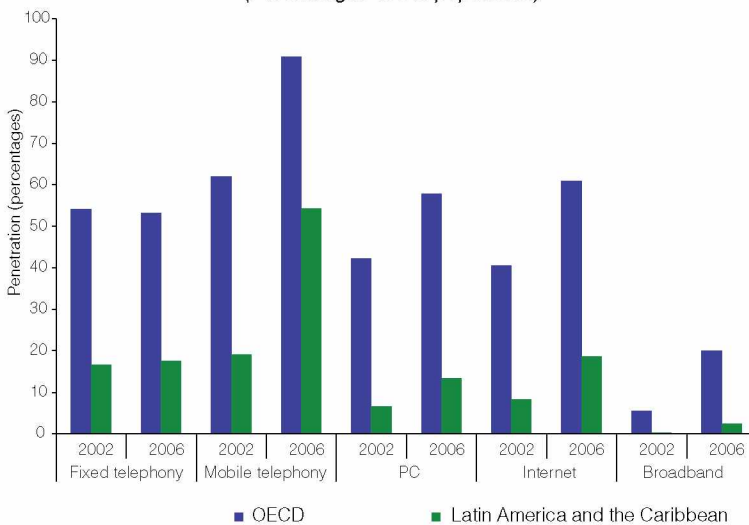
The difference between the speed of innovation in the leading countries (and the consequent expansion of the technological frontier) and the speed with which the less developed countries succeed in learning, imitating and adapting and thus reducing the technology divide from the frontier is crucial to redrawing the map of technology capacity and types of international insertion. Falling behind with regard to the new paradigm may have long-term consequences for competitiveness and growth. It should also be noted that the process of narrowing the divide is not necessarily the same in all sectors. While it is difficult for the countries of Latin America and the Caribbean to develop technology capacity and establish a competitive environment for hardware production, the adaptation and use of ICTs can create great opportunities in other areas, such as the production and adaptation of software.

However, in order to analyse the impact of these technologies, one must consider not only the international technological divide (separating the country's businesses from best international practices) but also the national divide. In fact, the two interact to determine the learning rate of a developing economy. ICTs must be widely diffused because of their ability to cross-cut the entire economy, in order to maximize their effects on systemic competitiveness and growth. If certain sectors or firms are operating under the old paradigm, the externalities and their ability to interact with those which have adopted the new paradigm are reduced. Similarly, much e-business depends on diffusion and knowledge of ICTs, which enable the public to access this emerging format.

In Latin America and the Caribbean, an unequal, heterogeneous rate of adaptation is found in the various population segments and production sectors, making it difficult to create such complementarities. Although in recent years the region has made considerable progress as regards ICT access, which has enabled it to narrow the divide in the case of fixed and particularly of mobile telephony, progress has been insufficient to

prevent this gap from widening in terms of access to computers and to the Internet. Moreover, this divide exists not only in terms of ICT access but also with respect to the quality of access. Broadband connections are just one example, since, despite the progress made by the region, the gap between broadband connections in the region and those of the countries of the Organisation for Economic Co-operation and Development (OECD) continues to widen (see figure 5).

Figure 5
**ICT PENETRATION IN LATIN AMERICA AND THE CARIBBEAN
 AND IN OECD COUNTRIES, 2002 AND 2006**
(Percentages of the population)



Source: Observatory for the Information Society in Latin America and the Caribbean (OSILAC), on the basis of information from International Telecommunication Union (ITU), "World Telecommunication/ICT Indicators Database 2007" [CD-ROM].

Biotechnology

Biotechnology has spread less than ICTs and has not yet matured. The ongoing scientific advances in the areas of molecular biology and the related sciences, as well as the opportunities arising in the medium and long term for the development of new products and processes, confirm that biotechnology is a new technological paradigm and one of the most powerful far-reaching technologies of the twenty-first century. There is

broad consensus on the diffusion of the biotechnology paradigm as a generic and multidisciplinary technology, which can affect a very large range of activities and sectors. In addition, biotechnology shows a strong convergence with other technologies, such as ICTs and nanotechnology. Thirty years after it was first used and despite the fact that it has yet to reveal its full potential, the biotechnology paradigm is already redefining the functioning and configuration of very diverse social and economic sectors, especially in the areas of medicine, human health and agrifood production.

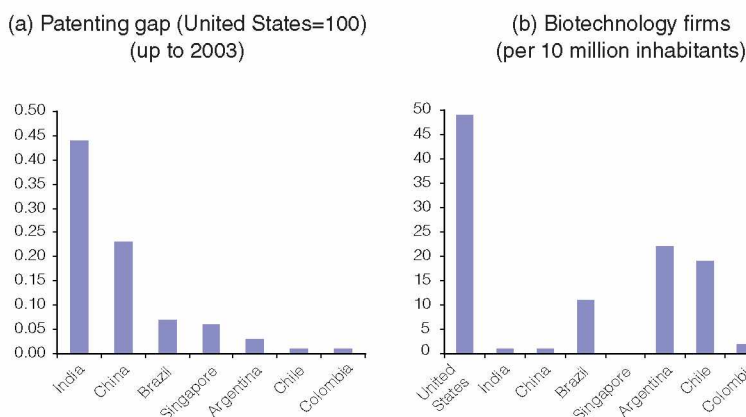
The fact that the changes and the creation of new competitive advantages accompanying this new paradigm have not been fully disseminated represents a source of opportunities for the region, but at the same time poses a threat if countries do not make the necessary efforts to create a system capable of increasing R&D activities and human resources and steering them towards the new technologies, and thus of stimulating competition in various sectors. The creation of a pre-competitive system for biotechnology may be viewed as a preliminary stage of knowledge-building, allowing countries to adapt the new technology and move on from less complex activities (such as molecular markers or plant micropropagation) that do not yet involve expansion of the knowledge frontier to other, more complex, activities.

The existing and potential areas of application of biotechnology cover a broad range of economic sectors and services: human health (biopharmaceuticals, therapeutics, in vitro diagnostics, recombinant vaccines and drugs); agriculture (genetically modified crops, inoculants, plant micropropagation, biological control and molecular markers); animal health (vaccines, diagnostics and livestock breeding); food industries (fermentation processes, functional foods, probiotics and prebiotics); environment (waste processing, bioremediation, water purification); industrial processing (bioprocessing in the textile, leather, pulp, paper and other industries; non-food uses of plants and crops); support services (product testing, quality control, technology consultancies; pilot production services), and exploitation of natural resources

The cross-cutting nature of the new paradigm, its complementarity with various scientific disciplines and the reformulation of intellectual property systems have created significant opportunities for the adoption of biotechnology, and these opportunities are reflected, inter alia, in

the trends seen in biotechnology patents. These opportunities are also paving the way for a restructuring of industrial sectors, the emergence of specialized firms and the creation of strategic alliances. The regulation of demand by health-care institutions, medical organizations and the health and food security system has played a key role in the diffusion of biotechnologies. The region must, under these circumstances, find a way to capitalize upon the opportunities associated with the biotechnological paradigm. And in fact, some countries of the region have fostered the development of incipient technological capacities that must now be strengthened (see figure 6).

Figure 6
BIOTECHNOLOGY CAPACITY AND PERFORMANCE INDICATORS
IN SELECTED COUNTRIES



Source: National Science Foundation, "Science and Engineering Indicators 2006" [online] http://www.nsf.gov/statistics/seind06/pdf_v2.htm#c5; J. Niosi, "La biotecnologie en Amérique Latine", *La chronique des Ameriques*, December 2006; L. Orozco and D. Olaya, "Indicadores del Programa Nacional de Biotecnología", Observatorio Colombiano de Ciencia y Tecnología, 2004; R Bisang and others (eds.), *Biotecnología y desarrollo. Un modelo para armar en la economía argentina*, Editorial Prometeo, 2006.

Monitoring these transformations, both in the case of countries with the capacity to generate and develop new knowledge and in the case of countries with the capacity to adapt the new paradigm, requires a determined R&D effort and a sufficient critical mass of human capital, given the speed at which scientific discoveries are being made and applied.



V. Innovation and technological learning

What kinds of opportunities are open to Latin America and the Caribbean in a global economy that is experiencing these types of changes? Diversifying and developing activities that combine technological learning with competitiveness are the core components of any plausible development strategy. Improvements can be made in almost all existing areas of activity, and new paths are always available to be explored. There seem to be two fundamental lines of action that need to be pursued. The first consists of fostering a culture of innovation capable of creating opportunities and capitalizing upon them in new ways, rather than simply travelling down the same roads already taken by many others. The second entails detecting and seizing the opportunities that the world offers while learning from the experiences and progress made by other regions. But becoming part of the world is not the same thing as just accepting whatever comes your way; the region must strive to distinguish between genuine and illusory opportunities and must construct long-term strategies for making use of those opportunities.

Essentially, it is a question of determining how the countries of the region can take advantage of the global economy's expansion to bring about structural changes in ways that will enable them to add knowledge and value and thus transform their traditional patterns of integration with the world economy. Through innovation they can create new learning patterns and new markets, thereby generating a close relationship between lengthy growth cycles and the emergence of clusters of linked innovations entailing numerous cross-sector spillovers and interconnections.

Countries' potential to drive development depends largely on their ability to participate in these types of cycles and to utilize the opportunities opened up by structural changes to ensure that businesses and sectors incorporate process and product innovations.

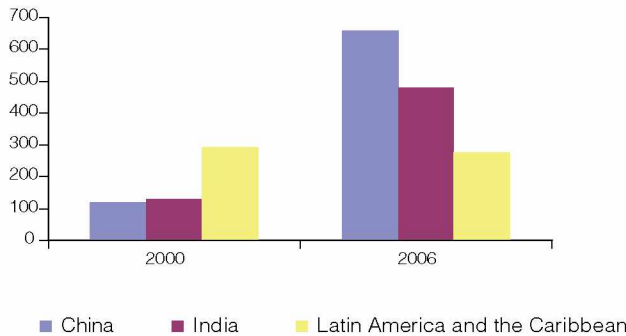
The main driving force for such efforts comes from the interaction between public and private R&D activities and firms that are able to generate, adopt and disseminate process and product innovations (Freeman and Pérez, 1998; Freeman, Clark and Soete, 1982). Public R&D activities provide a channel through which science can contribute and relate to production activities. Corporate R&D laboratories are geared towards innovations that will serve their ongoing objective of acquiring new competitive advantages. Innovations are often the outcome of systematic efforts undertaken by such laboratories, which have considerable financial and technological resources at their disposal. The systemic aspect of the emergence and diffusion of such innovations reinforces the externalities generated by interaction with public and private research centres

An aggregate analysis

What are the main features of R&D investment in Latin America and the Caribbean? Three indicators are particularly useful in answering this question. First, R&D spending in the region remains very low when compared with expenditure levels in the rest of the world, even when measured relative to those of the more dynamic developing countries; Brazil and, to a lesser extent, Chile are exceptions to this, up to a point. Second, governmental R&D levels are roughly twice as high as those of the private sector, whereas the ratio in the developed countries is more or less the opposite. Two factors should be borne in mind when interpreting these results, however: (i) governments tended to be the predominant source of expenditure when R&D was in its early stages in countries that now exhibit higher income levels; and (ii) the public sector accounts for a larger share of total R&D in developed countries engaged in natural-resource-intensive activities, such as Australia, New Zealand and Canada, than it does in the rest of the developed world. In addition, when the effectiveness of expenditure on science and technology in the region is compared with that of other developing countries, the region is in a fairly good position as regards the

publication of scientific and technological papers, although its expenditure is less effective than that of other countries in terms of patenting. The situation is particularly worrisome when trends in patenting in the region are compared with those observed in China and India (see figure 7).

Figure 7
NUMBER OF PATENTS GRANTED BY THE UNITED STATES PATENTS AND TRADEMARK OFFICE (USPTO), 2000 and 2006



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of figures from the United States Patents and Trademark Office (USPTO) [online] http://www.uspto.gov/go/taf/cst_utl.htm.

Innovation surveys

Since the analysis of aggregate trends captures only a small part of the relationship between innovation and growth, the study undertakes a more disaggregated assessment at the level of companies and sectors. This is crucial, because companies are the ones taking decisions that affect innovation and they take those decisions within a sector-specific strategic and technological context. It is important, too, because the opportunities available become clearer in the light of the range of different responses from firms and the capacities they already have.

Although R&D efforts are undeniably an important part of this process, microeconomic analysis suggests that the variables that affect firms' and sectors' progress on the learning curve and the way they adapt and diffuse new technological paradigms are also key to identifying and singling out the opportunities available to the region. Innovation surveys conducted in several countries show that innovation has significant effects on the performance of manufacturing firms, not only improving

productivity, but also increasing exports and wage levels. The effects on productivity extend to all firms, regardless of size, and are reflected in demand for more skilled labour. Latin American firms have shown little capacity to engage in innovation leading to major breakthroughs. Business innovation is closely associated with procurement of machinery and equipment (or intermediate inputs), but there have been few efforts to adapt and upgrade them. Typically, companies in the region continue to invest only small amounts in in-house R&D work and cooperate little with external research institutes. This affects their performance since, as the surveys show, firms that engage in such cooperation are better placed to innovate.

While some sectors are more innovation-intensive than others, there are also very significant differences between the manufacturing and resource-intensive sectors of the Latin American and Caribbean region and the developed economies. These differences point to opportunities that can be explored through vertical diversification (of products and markets).

Quality and vertical differentiation of exports

The capacity to add value depends crucially on the innovation effort, understood in the broad sense of the term. It is through vertical quality differentiation that virtuous linkages can be established with the rest of the economy, thereby contributing to diversification of the production structure. In developing countries, the upgrading of quality depends largely on the imitation of more efficient techniques or processes, the application of certain standards or quality certifications in production processes, improvements to corporate organization, better training of workers and the upgrading of marketing strategies.

Quality advances may be measured by comparing the unit values of the region's exports with those of similar products exported by other countries.

In this respect, the study shows that the region's performance in upgrading the quality of its exports has been mixed. First, the absolute gap between the quality of the region's exports and the quality of exports from advanced countries, using the price differences between products from each group as a proxy for the difference in quality, remains considerable. The differences in price are higher in the case of

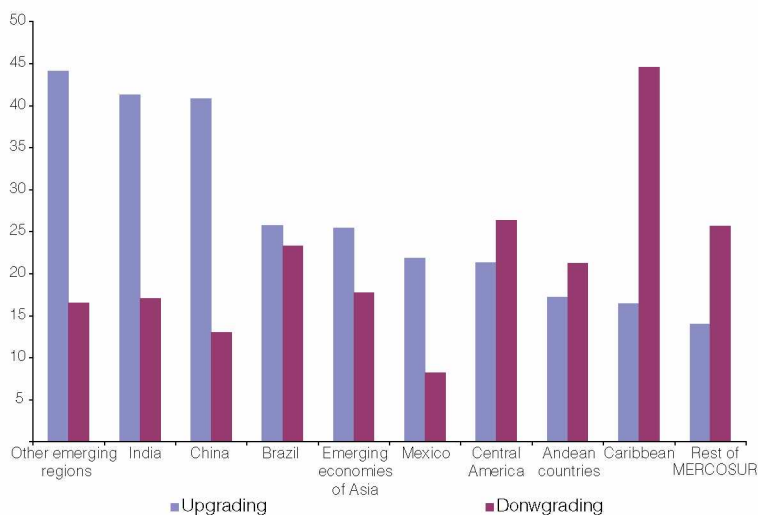
medium- and high-technology products than in the case of resource-based products, although still significant in the latter case (27%). These differences have persisted over time and are a reflection of the fact that the region's efforts at innovation have been limited. Moreover, they show that there is a real possibility to add value to existing exports; thus, the region has plenty of room for improving the quality of its products, including commodities.

Second, Latin America and the Caribbean (and Mexico, in particular) produce medium- and high-technology products of apparently superior quality to those exported by China, which suggests that the region does not have to compete directly with that country in the same quality segments. However, major capacity-building efforts in China mean that this competition could rapidly stiffen unless the region engages in a similar effort.

Third, compared with China, Latin America and the Caribbean has made much slower progress in increasing the price of its products (in relation to the average price of its competitors) and in terms of increasing its share of global markets. If a country advances in both areas, it is upgrading its exports. Between 2000 and 2004, China, India and other Asian countries succeeded in upgrading more than 40% of their exports, while the region upgraded only between 15% and 25% of its exports (see figure 8).

Following a series of innovations, special features have gradually been incorporated into agricultural products which up to quite recently were homogeneous; this process is referred to as the decommodification of agriculture. An analysis of agricultural product chains reveals that the region has forgone valuable opportunities that would have enabled it to manufacture higher-value-added products and thus upgrade its position within these chains. Some of these opportunities are related to fresh products, others to processed products. Latin America and the Caribbean has failed to take advantage of opportunities for differentiation of processed products in the cocoa, coffee, poultry, sugar, bovine and oleaginous chains. The main Latin American exporters of flowers, fruits and vegetables did achieve price differences in their favour, but in this case the higher value added is to be found precisely in fresh, not processed, products. This process is prompted by increasingly sophisticated consumer demand as well as by the prospects opened up by biotechnology.

Figure 8
**UPGRADING AND DOWNGRADING AS A PROPORTION OF TOTAL EXPORTS
 FROM LATIN AMERICA AND THE CARIBBEAN AND OTHER
 EMERGING REGIONS, 2000-2004 ^a**
(Percentages)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of information from the Centre for International Prospective Studies and Information (CEPII), world database for international trade analysis (BACI).

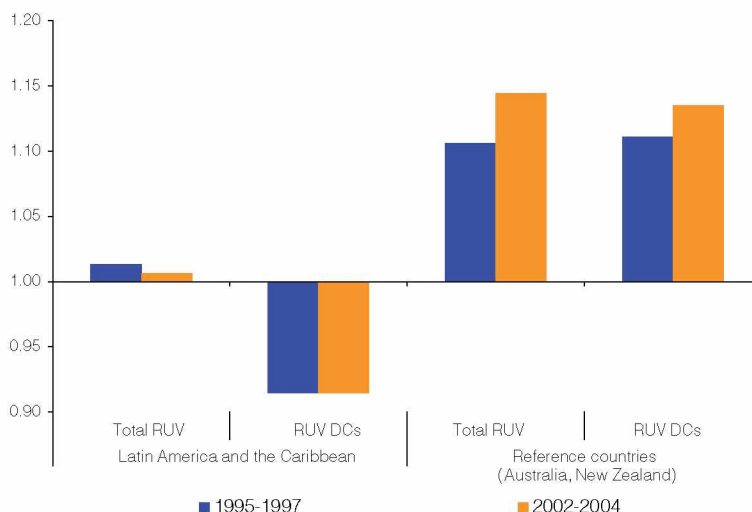
^a For example, the first bar corresponding to "Other emerging regions" indicates that this group increased both the relative unit value of its exports (compared to the market average) and the market share of 44% of its exports in 2000-2004 (upgrading). The second bar shows that in the same period, 17% of its exports suffered a decrease in their unit value (compared to the competition) and a loss of market share (downgrading). The percentages correspond to exports for which unit values can be calculated

A detailed analysis of the agricultural complex reveals a similar picture to the overall outlook. In other words, notwithstanding the significant comparative advantages that the region enjoys in this sector, it has not managed to upgrade the quality of its agricultural and agro-industrial exports in comparison with those of its competitors. For their overall exports of agricultural products and inputs, the Latin American and Caribbean countries suffer a price disadvantage of almost 10% compared with their developed competitors (RUV DC) (see figure 9). Conversely, in 2000-2004 the reference countries (Australia and New Zealand) sold the same products for a price almost 15% higher than the group of developed countries. What is worrying is that in recent years, the reference countries

have been able to increase the positive difference in the price of their products, so that the gap with the Latin American and Caribbean region as a whole has widened even further.

In short, the region has made only limited progress in terms of improving the quality of its exports. According to the same analysis, however, quality upgrades can be achieved in international markets for all categories of goods.

Figure 9
**LATIN AMERICA AND THE CARIBBEAN AND REFERENCE COUNTRIES:
 RELATIVE UNIT VALUES OF IMPORTS INTO THE MARKETS OF THE
 DEVELOPED COUNTRIES,^a 1995-1997 AND 2002-2004**
(Weighted average)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of information from the Centre for International Prospective Studies and Information (CEPII), world database for international trade analysis (BACI).

^a The bars "total RUV" and "RUV DC" are obtained by dividing the unit value of exports from Latin America and the Caribbean to the developed countries by the unit value of exports from all countries (total) to the developed countries (DC). For example, the first "total RUV" bar suggests that in the period 1995-1997, the UV of Latin American and Caribbean exports to the developed countries was just 1% higher than the unit value of exports from all countries that exported to these same markets.



VI. Sectoral learning patterns

The heterogeneity of learning patterns at the sector and company level must be taken into account when seeking to identify openings for improving competitiveness. An already-existing competitive base can be used to branch out into new products with higher value added and greater technological momentum. Four sectors were studied from this perspective: the traditional manufacturing industry and the export-oriented manufacturing industry (such as the maquila and the free zones), the agro-industrial complex, mining and services.

The manufacturing and export industries

The first opening for developing competitiveness arises within the medium- and high-technology manufacturing industry sectors and has two facets. First, the sectors created in the days of the import-substitution industrialization model, which were completely overhauled in the 1990s in the wake of economic opening. Many of these industries not only managed to survive but are now successfully penetrating international markets. Although their exports account for only a modest proportion of the region's total exports, these sectors have built up a combination of competitiveness and capacity that could be further expanded.

Industry's increasing external-market orientation has resulted from a combination of two factors: the strength of the previous learning processes which provided a basis on which to adjust and reorient the production apparatus; and the stimulus of economic signals arising from

the liberalization of external trade. Although this adjustment took place on a smaller scale in those manufacturing activities that were less competitive in terms of scale and product differentiation, they consolidated around a more internationally competitive nucleus.

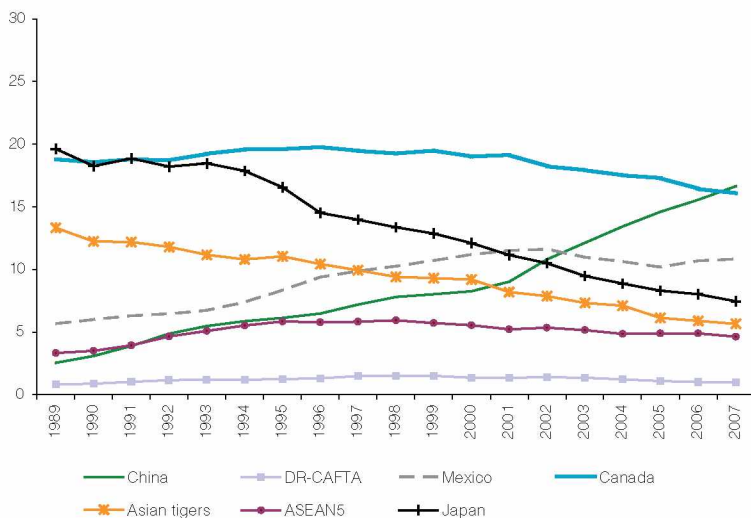
Although it is a difficult process to document, this adjustment followed a relatively common pattern in the more industrialized countries of the region. The essence of the adjustment process was to replace less efficient inputs, components and segments by their imported equivalents. This paved the way for the export on a much greater scale of industrial goods based on the combination of imported elements with competitive local components. This was very marked in the automotive industry, in which, though local content per production unit decreased, the scale was multiplied from a few hundred thousand vehicles to over 1 million units per year in both Brazil and Mexico.

In almost all the Latin American and Caribbean countries, the share of manufactures in total exports is significantly higher for exports to other countries of the region, showing how important intraregional trade is in increasing technological content of exports. Underlying this virtuous dynamic is the complementarity of domestic efforts with the results of long-standing trade integration processes, which have opened up opportunities for training and learning in order to increase the region's share in United States manufacturing imports including, in some cases, those with higher technological content.

A second opening for developing competitiveness lies in the export-oriented manufacturing industry in Mexico, Central America and some Caribbean countries such as the Dominican Republic, which build on their static comparative advantages in terms of their proximity to the United States market, abundance of low-cost labour, preferential access to the United States market (through membership in the North American Free Trade Agreement (NAFTA), the Dominican Republic-Central America Free Trade Agreement (DR-CAFTA) and the Caribbean Basin Trade Partnership Act (CBTPA)) and the existence of tax incentives for investment in production and export promotion, which enables them to operate under regimes such as maquila, free zones, inward processing or temporary admission. Notwithstanding these factors, China and the other Asian countries pose stiff competition for this window of opportunity, while upgrading within the relevant global value chains is slow and

advances limited in generating production processes that allow for greater value added and stronger production linkages (see figure 10).

Figure 10
UNITED STATES: MARKET SHARES OF SELECTED COUNTRIES, 1989-2007
(Percentages of total imports)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of information provided by the United States Department of Commerce.

In certain segments and niches of the textiles, automotive and autoparts, and electronics industries that operate under some kind of export promotion regime, together with other, more recent additions such as the manufacture of medical equipment and the aerospace sector, new organization models for production are being tried out, and concerted efforts are being made to develop and consolidate the supply base and increase interaction with the agencies that promote technology and productivity. Despite a certain number of notable successes in this respect, which indicate the considerable potential for development in this sector, in most instances, no long-term strategy has been drawn up to synchronize skills development and gradually transform labour-intensive manufacturing operations into manufacturing and related services clusters that incorporate engineering-intensive product redesign and process automation into their activities.

As the preceding paragraphs have suggested, it would be inaccurate to suggest that Latin American firms (especially those linked to the different maquila regimes) do not strive to create technological know-how and to build capacity in their productive tasks. This would be far from the truth. Firms improve products and processes, experiment with new organization models and create very substantial synergies and externalities. The problem is that since these efforts continue to be incipient, it is not possible to accrue a critical mass that can mobilize the prevailing production functions, so that 20 years on, the challenge to achieve structural change and productivity growth is as pressing as ever.

The agrifood complex

Another factor to bear in mind is that for many Latin American and Caribbean countries the agrifood complex is a highly competitive sector with considerable potential for technological learning to develop more complex production activities. It provides opportunities for forward linkages to integrate new products and activities into agrifood value chains, which are still largely unexplored in the region. Moreover, as the experience of several developed countries has shown, there are major opportunities for forming backward linkages in the generation of inputs for agriculture (machinery, seeds, agrochemicals and technical assistance services) by drawing upon state-of-the-art technologies. Working towards the production of higher-value-added goods does not necessarily imply a more complex industrial process, but it does require a greater knowledge and innovation content, not only with respect to agricultural raw materials, but also for the other stages of the agrifood complex, including logistical and marketing activities.

The technological potential of the agrifood complex has been substantially altered by the impact of the new technological paradigms, especially biotechnology and, as a complement to this, ICTs. The application of these advances to the growing of virus-free tissues, genetically modified seeds, molecular diagnosis of plant and animal diseases, embryo transfer in livestock, the use of genomes to identify and transfer genes that carry desirable traits (for example, resistance to pests and disease and to hydric and temperature stress) has been giving rise to major product and process innovations.

Most of these applications have arisen within a limited group of research centres, and large companies in developed countries, and the respective technologies are not spontaneously transferred. Complementary local learning efforts are needed for several reasons: one is that genetic modifications in plants and animals generate responses and performances that are highly sensitive to the particularities of soil and climate. As there is no single response, the adaptations made in each country are key complementary assets: without them, imported technology will simply not yield the desired results. Something similar happens when biotechnology is applied to food production and to the development of vaccines and livestock breeding. Also, importantly, local learning processes are driven and accelerated by complementary capacities that already exist thanks to the technological, productive and commercial base previously developed in the region.

Biotechnology is reshaping the technological trajectory of various primary activities and related manufactures which affect market structure, type of agent and competitive strategies in different ways. Broadly speaking, there is a marked trend towards convergence between sectors, as well as a move towards concentration and mergers among large transnational and trading companies seeking to strengthen their competitive position by controlling a combination of complementary assets. From the regional perspective, it is crucial to monitor this dynamic closely and, above all, to boost local technological skills in order to make the most of the region's endowment of key resources.

Metal mining

Several other countries in the region are major players in international metal mining markets and, in many cases, some local capacities have been generated, especially in certain niches. Technology learning in the sector is thus not limited to the large mining companies; there is a whole network of suppliers and service companies benefiting from technical stimulus and demand in the sector. In order to penetrate segments with a higher technology content, however, public strategies are needed to help companies increase their exploration and mining capacities using technologies such as satellite remote sensing, geophysical drilling, data processing and deposit imaging as well as sophisticated drilling equipment,

solvent extraction and bioleaching. Also noteworthy are the efforts being made by some of the region's mining companies to expand internationally to secure markets, participate in downstream activities that generate higher value added, and acquire marketing channels in developed countries and some emerging economies.

Services

Lastly, two segments of the services sector offer another opening for improving competitiveness and learning processes in the region: tourism and business services. Several countries have undertaken ambitious projects in the area of tourism, but the region harbours tremendous potential to diversify and personalize the product and thus increase the returns on its resources. Some Caribbean basin countries have been able to add value by moving beyond the mass tourism of resorts and cruises into niche tourism—for example, by taking advantage of Carnival, sporting events and cultural heritage and offering luxury yachting holidays and ecotourism—in part by attracting FDI from international hotel chains and tourism operators.

These changes have occurred even as the region's overall share in the world tourism trade has declined. Running counter to this general trend, the Bahamas, Cuba, the Dominican Republic, Jamaica and Puerto Rico have made gains in the world tourism market. Of the Central American countries, Costa Rica and Guatemala have also gained ground, in the case of Guatemala, thanks to a renewed appreciation of its cultural heritage. In order to make the most of these opportunities, the public and private sectors must make a concerted effort to constantly diversify and renew the tourism product and strengthen links with each local economy. For this, it is necessary to deepen linkages between this sector and the rest of the economy.

The region has made some tentative inroads in business services but has yet to capture a significant part of a sector that is experiencing rapid growth worldwide. The experiences of some of the companies in the region that have been relatively successful at penetrating the business services export market show that amassing the necessary capacity takes time, especially if the goal is to progress beyond simple operations that require little more than moderately-skilled labour (such as call centres and shared service centres). This has been the experience of engineering and

construction services which have drawn on their acquired knowledge to embark along a course based on catering first for the local market, then for demand from neighbouring countries and, lastly, for global markets. The same has occurred with newer firms operating in the software and computer services sectors, which have been in existence for several decades (see table 1). Clinical research activities are based on the existence of internationally recognized professionals and institutions in the area of biomedicine, and advertising services have been awarded prizes and distinctions in international competitions.

Table 1
SALES AND EXPORTS OF THE SOFTWARE AND SERVICES INDUSTRY, 2004
(Millions of dollars and percentages)

	Sales	Exports	Sales/total GDP (%)	Percentage exported	Percentage of total employment
Argentina	1 173	191.6	0.77	16.3	0.17
Brazil	8 213	314.0	1.36	3.8	0.23
Chile	1 385	68.8	1.46	5.0	0.44
Colombia	340 ^a	10.3 ^b	0.35	3.0	0.17
Costa Rica	173	80.0	0.91	46.0	0.28
Mexico	2 871	125.0	0.42	4.4	0.11
Uruguay	226	88.7	1.70	39.3	0.31
Total	14 381	878.4	0.85	6.1	0.19

Source: Andrés López and Daniela Ramos, "Oportunidades y desafíos de la industria de software en Argentina", Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), 2007, forthcoming; and "Complementación productiva en la industria del software en los países del Mercosur: impulsando la integración regional para participar en el mercado global", cap. 1, MERCOSUR Economic Research Network/Swiss Agency for Development and Cooperation [online] http://www.redmercosur.org.uy/uploads/cms_news_docs/Informe_Final_Regional_Complementariedad.doc, 2007; and for Costa Rica, Economic Commission for Latin America and the Caribbean (ECLAC), Statistical Yearbook of Latin America and the Caribbean, 2007 (LC/G.2356-P/B), Santiago, Chile, 2008. United Nations publication, Sales No. E/S.08.II.G.1.

^a Does not include local services firms. Estimated on the basis of sales by 561 firms: 542 local software designers (with sales of 150 million dollars) and 19 subsidiaries of multinational corporations (with sales of 190 million dollars).

^b Exports of 542 local software designers.

The countries of Latin America and the Caribbean are unlikely to become rising stars in the world services export market overnight, however. In addition to detecting areas in which they have relatively advanced capacities that could be successfully exploited, countries need

to explore new fields. A first step in the right direction is to include such efforts on the agenda of both the public and the private sector in the region. Although these strategies carry a higher level of risk than those based solely on existing, static comparative advantages, they are options that the countries (especially the larger ones) may have to take if they wish to take advantage of the potential of the global services market, both to generate hard currency and employment and to benefit from technology and knowledge spillovers. These are long-term strategies, but efforts to design them should start as soon as may be, since capacity-building in such areas is measured in decades, not years.

Global value chains

Many of these production activities form part of and depend on the organization of global value chains. The way these are governed shapes the possibilities and capacity for upgrading towards activities incorporating greater value added. Generally speaking, the entities governing the chains are unwilling to transfer the knowledge that would allow local firms to upgrade and gain access to new sources of income, although the possibilities of penetrating and moving up value chains also depend on the technological capacities that the countries are able to develop in the different sectors of production. This is why learning processes are so crucial. Four possible types of upgrading were identified in the sectors examined: in processes (by reorganizing the production process or introducing better technologies), in products (by developing products of higher unit value), in functions (by changing existing functions for others that require greater technological and management capacity) and across sectors (using and building on capacities acquired in a given value chain in others).

Although there can be no doubt that technical advances in the developed countries have broadened the supply of goods and thus benefited large swathes of the developing world, the dominant role of the large multinational corporations at the global level, as the main focus of innovation, production or acquisition, again raises the question of who is appropriating the rents generated by technical progress. As noted in the study in the discussion on value chains in the different sectors that make up the production fabric in the countries of the region, multinational corporations play a key role in channels of production, marketing and

financing. Since most of the firms have originated in developed countries, this part of the world—the economic centre— continues to appropriate most of the rents of technological progress today, just as Raúl Prebisch showed it did 60 years ago.

And, just as there were 60 years ago, there are many opportunities for the region today. These are associated with the expansion of global demand and the spread of techno-economic paradigms that have the potential to boost productivity and competitiveness in the different sectors. Technical progress and structural change do not occur spontaneously, however; as ECLAC has argued on many occasions, public policies and capacity-building are now needed to bring those objectives to fruition.



VII. Public-private alliances for structural change and productivity growth

Implementing structural changes that increase productivity and generate high levels of growth, as described in this analysis, is a major and complex task not only for the private sector, but for public policymakers as well. In an era of globalization, technological change and mounting international competition, it has become essential to frame public policies within a proactive medium- and long-term national strategy. This perspective extends the focus of public policy beyond the short term, making government action a more strategic exercise in which public policies are used as forward-looking, goal-oriented tools to specifically promote structural change and growth.

Such strategies, which have been a common feature of successful countries, have been mostly absent, at least in the last few decades, from the development agenda in Latin America and the Caribbean. The formulation and implementation of medium- and long-term strategies constitute the first of 12 principles analysed in the study regarding the operational aspects of proactive public policies that are oriented towards the future.

The formulation of the 12 principles was inspired by a study of 10 countries¹ outside the region that have either achieved positive results in terms of structural change, productivity growth, integration with the world economy and convergence of per capita income levels or, with resource endowments similar to those of the region, have recorded a performance that is better

¹ Australia, Czech Republic, Finland, Ireland, Malaysia, New Zealand, Republic of Korea, Singapore, Spain and Sweden. A study of an innovation strategy implemented in the province of Alberta, Canada, was also taken into account.

than that of Latin America and the Caribbean. The 10 countries analysed are small and medium-sized economies, each with very different characteristics that are generally impossible to replicate. However, 12 “first principles” or basic organizational issues that reveal successes or difficulties, were detected. The first principles are generic in nature and are illustrated by analysing the concrete cases of the countries in question. They are, moreover, very relevant to Latin America and the Caribbean, as may be appreciated through a review of stylized facts of the situation in the region.

The countries included in the study have formulated and implemented, in different ways, comprehensive national strategies for structural change and integration with the world economy, several of them within the framework of formal national plans. These strategies award priority to certain “fundamentals”, such as macroeconomic stability, fiscal soundness, investment, education and infrastructure, and combine them with proactive measures to induce the necessary structural changes, with special emphasis on innovation. They also: (i) include systematic efforts to anticipate and identify future opportunities for increasing and enhancing the knowledge content and value added of production and exports, as well as the main —internal and external— constraints that must be overcome in order to ensure that the country can take advantage of those opportunities; (ii) prioritize realistic objectives that reflect national “ambition”; (iii) implement public programmes and incentives at the macro-, meso- and microlevels to further these objectives; and (iv) incorporate sufficient flexibility to be able to change direction midcourse when problems arise or circumstances change within the country or abroad.

In addition to analysing the “what”, special attention was paid to “how” the public policies of these countries were implemented, in other words, to the underlying institutional processes. This relatively unexplored methodological approach was adopted because how policies are developed and implemented can be just as important as policy content for determining success, if not more so. The analysis focused especially on public efforts to stimulate integration with the world economy through programmes of structural change and productivity growth, in which the countries of Latin America and the Caribbean are lagging far behind many of their competitors.

The second principle is that, in an era of market economies and globalization, strategies need to be formulated within the framework of a

public-private alliance that can fully mobilize national capacities, maximize information flows and build the level of consensus needed to ensure that strategies remain consistent over political cycles. Intelligent and socially inclusive strategies can be more successfully implemented through public-private alliances that are based on the concept of the public good. The private sector (in the broadest sense of the term) is closer to the market and has greater practical, commercial and scientific knowledge. However, it has only a partial vision of the situation due to the different types of information- and coordination-related market failures that arise, and these, as the analysis shows, are particularly relevant to innovation.

Although the public sector is not always in the best position to discover and overcome these failures, it can offer political leadership for constructing a national vision for structural change and productivity growth and for improving the country's international position. It can also mobilize resources and build consensus for surmounting the obstacles that the private sector faces in its efforts to diversify production with a strong emphasis on innovation.

The extraregional success stories show that the structure and workings of public-private alliances depend heavily on the national political context and, consequently, vary considerably. These structures are classified into four categories according to the predominant structure(s) in each case: formally structured, ad hoc formal, informal/tacit and hybrid (which combines two or three of the previous categories). The scope of the alliance in each country is examined in terms of the breath of social representation and the extent of consensus it generates. The depth of each alliance is determined by the degree to which it penetrates the public apparatus responsible for formulating and implementing the national strategy.

The countries that have forged the strongest and deepest public-private alliances are also those that have achieved the best results in terms of designing and implementing agile national strategies that promote structural change and export development. The strategies arising from such alliances also benefit from a level of public understanding and consensus that ensures their consistent application in the medium and long terms. Consensus-building is a process, however, and not an event, and in order to achieve consensus, countries must "tailor" institutional arrangements to fit national realities, undergo various processes of trial

and error and produce convincing evidence that the strategies work. An assessment of the situation in Latin America and the Caribbean shows that public-private alliances are nonexistent, incipient or fragmented in the region: those that exist lack continuity and tend to be captured by special interests or are paralysed by governance problems.

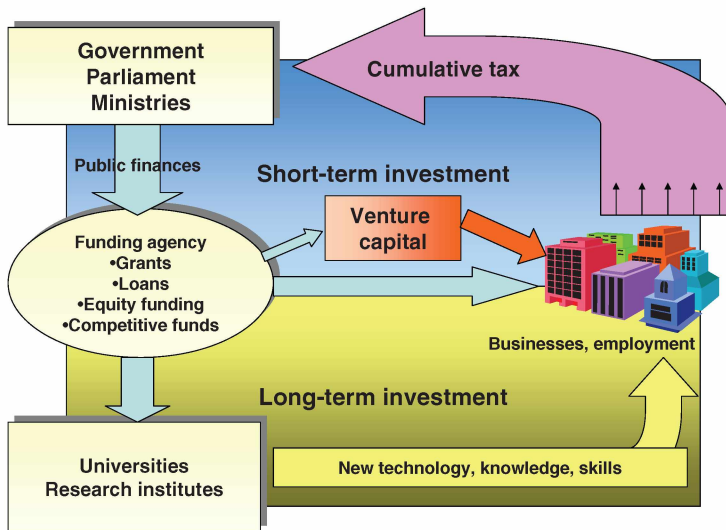
The other 10 principles regarding institutional governance inspired by experiences of countries outside the region include the principle that national strategies must be managed by the public ministries or agencies responsible for the real sector of the economy. These entities must receive adequate political support and top-level political oversight, especially in the case of priority initiatives. They must also be allocated sufficient resources in the national budget to be able to implement the national strategy. The more comprehensive and specific the nature of each strategy and the greater the number of stakeholders involved, the greater the importance of specialized public agencies and coordination mechanisms that function at multiple levels, such as crossed boards of directors for the executing agencies and “cascaded” inter-agency committees set up for each initiative. The cases studied show that the more successful countries outside the region tend to “rebrand” their constellation of specialized public agencies every so often to adapt them to the new emerging strategic priorities.

In Latin America and the Caribbean, support activities for industry and non-financial services are rarely awarded priority in public policies, which still tend to focus on short-term macroeconomic goals. Any such support is underfinanced and poorly coordinated and usually operates within a static institutional framework. The limited resources available for support programmes are therefore spread too thin, and the weaknesses in this system manifest themselves in duplicated efforts, gaps in the coverage of strategic private-sector activities, and a lack of continuity in the financing of activities that take time to come to fruition, such as innovation.

To develop and implement strategies with the credibility needed to work with the private sector, the ministries of the real sector of the economy must avoid politicization and employ a stable and highly competent technical and professional staff that can act with a certain degree of autonomy and draw effectively on international experiences. To achieve this and match the relatively high levels of competence already attained in many central banks and ministries of finance, recruitment and wage policies in the rest of the public sector will have to undergo major reforms.

Other principles refer to the efficient management of public incentive programmes to promote structural change and productivity growth. For example, incentive schemes have more chances of success when they target industries or activities in which the private sector has already developed a coordination capacity, albeit incipient. By insisting upon transparency and ensuring a rigorous and constant monitoring and assessment of the impact of incentive schemes, governments can improve the effectiveness of such schemes and avert the risk of capture by special interest groups. When public incentives are developed within a culture of effectiveness, they cease to be viewed as subsidies and begin to be looked upon as investments in the country's growth, which may even yield fiscal returns. Figure 11 shows the cycle and return on incentives in one of the countries included in the study that is known for its culture of evaluation and transparency.

Figure 11
THE CYCLE OF RETURN ON INCENTIVES IN FINLAND



Source: H. Kotilainen, "Building Long Term Strategies and Public-Private Alliances for Export Development: The Finnish Case" [online] http://www.cepal.org/comercio/noticias/paginas/7/29947/Kotilainen_Finland_Sevilla.pdf.

This analysis makes no attempt to establish causal links between the policies that the countries included in the study implemented within

the framework of strategically-oriented public-private alliances and the economic growth they recorded. Rather, it aims to report on the institutional processes involved and presents generic first principles drawn from, and illustrated by, concrete extraregional experiences, with a view to stimulating reflection in the region on the value of medium- and long-term national strategies, alliances and consensus-building. It is up to the countries of Latin America and the Caribbean to decide whether and how to fashion home-grown versions of these tools to further their own growth and development.

Summary remarks

Current conditions and prospects for Latin America and the Caribbean are the best they have been in decades. Opportunities for progress abound in a global economy marked by sweeping changes. The diversification of production and trade and the development of new spheres of endeavour that combine technological learning and greater competitiveness must clearly be at the core of any future development strategy.

Sixty years ago, technological changes were concentrated in the manufacturing sector and were not diffused from the centre to the periphery via lower prices. This, together with the existence of different demand elasticities for commodities and manufactures, resulted in a deterioration of the terms of trade which, among other things, generated constraints in the external sector. Consequently, the main economic policy recommendation that ECLAC made with a view to dealing with this state of affairs was that manufacturing industries should be set up in the periphery, first through import substitution and, later, through export promotion.

As indicated in the main study and this summary, the external environment is now quite different and will probably remain so for some time to come. The region is witnessing an unprecedented increase in consumer demand which will, among other things, help to keep raw material prices high (although perhaps not quite as high as at present) for some time. The hypersegmentation of markets has given rise to high-value, low-volume demand niches. These niches can be found mainly in primary products, but also in manufactures and services. The participation of almost half of the world's population in the globalization process has

generated an almost infinite supply of low-cost labour at a time when both R&D and the training of scientists and engineers are being stepped up in many developing countries, especially China. This limits the possibility of competing on the basis of low wages, as well as making the production of high-technology goods less accessible.

Thus, while access to certain portions of the manufacturing sector is more limited, some countries in the region nevertheless have strong advantages in terms of their location or the stock of technological capacities they have built up over decades or increased in recent years which will enable them to compete in this sector. At the same time, the chances of making inroads in many other sectors are growing thanks, in particular, to the development and diffusion of techno-economic paradigms which are opening up opportunities for innovation in different areas that did not exist just a few decades ago.

Therefore, today how a country produces is becoming more important than what it produces. The fact remains that a large part of technical change continues to be concentrated in a few industrial sectors, but it is also true that, now, more than ever, opportunities for technical progress are emerging in commodity and services industries. And services are the sector that is most expanding its share of world trade and that has the greatest capacity for job creation.

Technical change, structural change and productivity growth are not spontaneous processes, however. Consequently, today —just as Prebisch pointed out 60 years ago— appropriate public policies have to be designed, and local production and technological capacities have to be developed. Moreover, the nature of the region's current development phase and the importance of natural resources in its production structure point to the need for the public sector to play a leading role in national innovation efforts. First, while in most developed countries the private sector now accounts for about two thirds of the national innovation effort in this area, in a number of cases the public/private ratio used to be just the opposite, which indicates that public policies played a crucial part in reinforcing the innovation process. Second, although the possibility of incorporating technical process into natural-resource-based production, private incentives for innovation are not usually as great in this area as they are in the case of medium- and high-technology goods, where a lack of innovation may quickly trigger a significant reduction in market share. It is therefore hardly surprising that the public-sector innovation effort exceeds 50% of the total

in developed countries with natural-resource-intensive industries. Another significant point is that innovation within the technological frontier is not easily appropriated but must instead be preceded by an upgrading of the value chain. In short, the relevance of public policies in the region as a means of promoting innovation is reinforced by its stage of development and by the importance of natural resources in its production structure.

Strategies that pursue structural change, productivity growth and increased social equity require financing so that the necessary policies can be implemented. As has been stated repeatedly, the region needs to step up its efforts to increase fiscal resources. In some of the region's countries, the current international context has given rise to a strong conviction that the increase in rents associated with rising commodity prices can generate the financing needed to spur structural change, productivity growth and improvements in social equity. Two challenges need to be addressed, however: the first is to find a way of doing this without reducing incentives for technological change and private investment in the development of natural resources; the second consists in deciding not only where to invest additional public resources, but also how to do so. In order to deal with these challenges on a systematic basis, the corresponding policies must be part of a medium- and long-term strategy underpinned by consensus in the context of a public-private alliance and effective public-sector management. As a number of countries' success stories demonstrate, effective management requires the development of an appropriate institutional structure capable of generating public policies that fit in with a strategy for structural change, productivity growth and integration into the global economy. This strategy must be designed in such a way that it can be evaluated in terms of its established goals while averting or at least substantially reducing the risk of the process being "captured" by the private sector.

Moving forward with the process of structural change and productivity growth by combining economic and social policies based on the three pillars of technical progress, productive employment and the accumulation of human skills will almost certainly bring the region closer to attaining the goal of filling the "empty box" of growth in conjunction with social equity as outlined by ECLAC almost 20 years ago. Strategies for attaining structural change and productivity growth should therefore form part of the effort to build a broader consensus focused on combining growth with greater social equity and cohesion as a necessary step towards attaining full citizenship.