Global value chains and world trade
Prospects and challenges for Latin America

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Chapter II

Global value chains in Latin America: A development perspective for upgrading

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Introduction

This chapter presents an overview of the global value chains (GVC) framework, highlighting the benefits of applying this methodology for the future competitiveness and economic development of Latin America and the Caribbean. Examples are presented of the region’s progress to date in using this methodology to engage in a wide variety of global industries. Countries in the region participating in value chains have generally been confined to lower value segments of traditional sectors such as agriculture, manufacturing and extractive industries. As firms continue to globalize their production networks, Latin America is well positioned to leverage its experience in these sectors to move beyond basic production activities and add greater value in its export sectors. Upgrading into higher value segments in these global chains depends to a large extent on the quality and availability of human capital. The final section gives examples of workforce development strategies and innovation systems across the region that can drive this upgrading.
Global value chains (GVCs) are increasingly shaping international trade, with major repercussions for employment and gross domestic product (GDP) in developing countries around the world. The fragmentation of the production of goods and services across multiple firms and countries has provided an opportunity for developing countries to integrate into the global economy. Latin America has entered a variety of these GVCs, participating not only in low value-added segments providing raw materials, but also in new non-traditional sectors such as aerospace, medical device manufacturing and offshore services. The region's insertion into these chains has provided employment opportunities and has led to transfers of technology and upgrading into higher value services. In addition, there are emerging success stories of upgrading into high-value services in traditional sectors by helping countries leverage their expertise while reducing their dependence on primary products.

This introductory chapter offers a brief overview of the GVC framework. Understanding how these chains operate and breaking them down into their numerous segments and sectors is essential to identifying the challenges and taking advantage of the opportunities offered by global industries. Indeed, the GVC framework is increasingly being used by international development agencies to help new actors enter these chains, while those already operating within such chains are using the framework to uncover new opportunities to add value and increase the gains from their contributions to these global sectors. However, the long-term competitiveness of Latin American countries is contingent on a well-prepared workforce that can adapt to the challenges presented by the dynamic nature of these GVCs. While there continue to be mismatches between the supply of talent from universities and demand from the private sector, complex and innovative systems have emerged in several Latin American countries to help them upgrade in global value chains.

The chapter is structured into three sections. Section A presents an overview of the GVC framework and how it has been used to date to help developing countries enter sectors of the global economy. This is followed in section B by a discussion of several examples of how Latin American countries are participating in both traditional and non-traditional sectors, highlighting important opportunities for upgrading in the natural resource sector. Section C provides examples of how innovation systems in the region have responded to the need for a qualified workforce to drive competitiveness in these chains. Section D concludes.

A. The global value chains framework: a tool for driving economic development in the new global economy

The global economy is increasingly structured around GVCs, which account for an ever larger share of international trade, global GDP and employment. These chains have become prominent in sectors ranging from agriculture and electronics to business services and tourism. In 2009, it was estimated that intermediate goods and services accounted for approximately 56% and 73% of total trade, respectively. GVCs link firms, workers and consumers around the world through complex production and supply networks spanning multiple countries. This reorganization of international trade has created diverse opportunities for developing countries to integrate into the global economy. By providing access to developed-country markets, participation in GVCs enables emerging economies to add value to their local industries. Insertion into GVCs alone, however, does not necessarily translate into positive gains from trade. In order to benefit from participating in these global sectors, developing countries must be able to sustain and upgrade their competitiveness over time, mainstream trade into their broader national economic development agenda, build internal capacity and generate more and better jobs to reduce unemployment and poverty. Thus, it is not only a matter of whether to participate in the global economy, but how to do so gainfully.

1. What is value chain analysis?

The value chains framework helps explain how industries are organized by examining the structure and dynamics of the different actors involved. The value chain describes the full range of activities that firms and workers perform to bring a product from the design stage through to consumption and beyond. This includes both tangible and intangible value-adding activities, such as research and development, design, production, distribution, marketing and support to the final consumer. These activities can be carried out by a single firm or divided among different firms. In the context of globalization, these activities are increasingly being carried out in inter-firm networks on a global scale. Chain governance, that is, the nature of the relationships between the diverse actors in different countries within these chains, plays an

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1 These figures are based on Minouch and others (2009), using input-output tables to analyze trade between the countries of the Organization for Economic Cooperation and Development (OECD) and their main developing-country trading partners. This figure likely underestimates the share of trade that is engaged in GVCs because limited data are available on trade in intermediate goods between developing countries within GVCs.
important role in determining firms’ access to key markets. Generally, owing to their relative market power, lead firms based in key markets control the generation and distribution of knowledge and resources and determine which firms can participate in the chain (Gereffi, 1994; Humphrey and Schmitz, 2002).

Value chain analysis examines the labour inputs, technologies, standards, regulations, products, processes and markets in specific industries and locations in order to provide a holistic view of these global industries (Gereffi and Fernandez-Stark, 2011). The factors are examined from four perspectives: (1) the input-output structure, which describes the process of transforming raw materials into final products; (2) geographical distribution, which identifies the firms and countries participating in the chain; (3) the governance structure, which explains how access to and upgrading in the value chain is controlled; and (4) the local institutional context of the countries in which the value chain is embedded (Gereffi, 1994, 1995 and 1999). The input-output structure, geographical distribution and governance structure provide a top-down perspective of how these chains are structured and how they operate at a global level. Local conditions, such as economic and political stability, industrial policies, infrastructure, the ease of doing business, human capital and coordination and collaboration among industry stakeholders, influence how firms based in a specific country compete within the chain (Fernandez-Stark, Bamberand Gereffi, 2010a, 2010c and 2012b).

Value chains are generally dynamic and firms can join, or move between, different links of the chain in order to gain higher returns on their participation. This movement is referred to as “upgrading” (Gereffi, 2005) and is a central element in value chain analysis. Traditionally, a firm could upgrade its participation in a production model in four distinct ways: (1) product upgrading, namely the shift into the production of a higher value product; (2) process upgrading, namely improving the efficiency of production systems, for example, by incorporating more sophisticated technology; (3) functional upgrading, namely moving into higher value stages in the chain that require additional skills; and (4) chain or sectoral upgrading, namely entry into a new value chain by leveraging the knowledge and skills acquired in the current chain (Humphrey and Schmitz, 2004). In addition to these four strands, two additional types of upgrading can be identified: (1) entry into a value chain by a new actor (Fernandez-Stark, Bamber and Gereffi, 2011); and (2) end-market upgrading, which can include moving into more sophisticated markets that require compliance with new, more rigorous standards or into larger markets that call for production on a larger scale and price accessibility.

Early use of GVC methodology focused principally on economic and competitiveness issues, but more recently social and environmental dimensions have also been incorporated. GVC research is now exploring new topics such as labour regulation issues, workforce development, the greening of value chains and gender. Today, GVC analysis is one of the preferred methodologies for examination of global industries, international trade dynamics and how vulnerable economic actors engage in chains (Barrientos, Gereffi and Rossi, 2011; Gereffi and Lee, 2012).

2. What is the role of value chain analysis in economic development?

GVC analysis is also increasingly being adopted by the economic development community, and almost all international development agencies have devised a GVC strategy (Henriksen and others, 2010; Humphrey and Navas-Alemán, 2010; Stamm and von Drakenfels, 2011). In this field, the GVC framework is used in efforts to achieve two key objectives: to embed new actors in chains and to improve the position of actors already in chains.

In the first case, the framework is applied to understand how to embed new economic actors in regional and global value chains at both the country and firm levels. New actors typically include developing countries that have not yet engaged in global industries and various types of firms, including small and medium-sized companies, which often lag behind larger organizations in joining chains. Specifically, the methodology is used to identify key opportunities within the chain for new actors and the major constraints inhibiting their participation. The Aid for Trade initiative led by the Organization for Economic Cooperation and Development (OECD) and World Trade Organization (WTO), which accounts for approximately one third of all sector-allocable official development assistance flows to developing countries (OECD/WTO, 2011), for example, is employing GVC analysis to understand and overcome the barriers to these emerging economies’ participation in global trade (Bamber, Fernandez-Stark and Gereffi, forthcoming). Similarly, major development agencies, including the Department for International Development (United Kingdom), the German Agency for International Cooperation, the United States Agency for International Development (USAID) and the United Nations Industrial Development Organization (UNIDO), have adopted the GVC methodology to devise initiatives to help small and medium-sized firms from developing countries upgrade in these chains, add value to their production and allow them to make the most of their participation (Barrientos, Gereffi and Rossi, 2011; Fernandez-

The framework is also used to provide insights for countries that already participate in global industries on how to upgrade within these chains by identifying opportunities to add value to products and services for export, finding niche sectors in which to compete, and devising strategies to maximize gains in terms of fostering good-quality employment and the use of domestic components in exports. By breaking down the industry into its key segments, GVC analysis helps countries identify the specific activities in the chain currently performed by their firms, as well as potential opportunities for these firms in the future (Gereffi and Fernandez-Stark, 2011). This analysis can also provide insightful findings to guide policymakers. The governments of Chile and Costa Rica have used the GVC methodology to shape policy to promote upgrading in strategic industries with high growth potential. Chile’s economic development agency CORFO has applied this framework to drive upgrading in the offshore services industry. The framework allowed the country to better understand the industry at the global level, to identify Chile’s position in the value chain and to pursue industry opportunities aligned with the country’s capabilities. Similarly, the Costa Rican Foreign Trade Ministry recently used this framework to analyse four selected industries of growing importance for the country: medical devices, electronics, aerospace and offshore services. The objective was to examine the changing dynamics of these industries at the global level, identify Costa Rica’s position in these chains and highlight potential opportunities for the country to perform more competitively and move up the value chains.

B. Latin America’s participation and opportunities in global value chains

Latin American countries have entered GVCs in a variety of industries, from high-value agriculture to aerospace and business services outsourcing (Casalet and others, 2011; Fernandez-Stark, Bamber and Gereffi, 2012a and 2013b; Giuliani, Pietrobelli and Rabellotti, 2005; Pietrobelli and Rabellotti, 2005). Much of this growth has been driven by the establishment of new export-oriented sectors, often supported by foreign direct investment (FDI) with a view to taking advantage of labour availability and cost, strategic locations and other specific comparative advantages. This section provides four short examples to illustrate how Latin American countries have thus far participated in these global industries: Honduras in fruit and vegetables, Nicaragua in apparel, the state of Baja California in Mexico and Costa Rica in medical device manufacturing and several countries in offshore services. These new sectors have brought considerable benefits to these developing countries in terms of employment, entry into high-tech fields and even upgrading into high-value products and activities. However, Latin American participation in global chains should not be considered exclusively within the realm of new export-oriented industries dependent on foreign firms and technology. The region abounds with experience in more traditional sectors such as natural resources and the extractive industries. This domestic experience can be leveraged to export high value services to other countries operating in the chain. Three short case studies presented in the second part of this section illustrate how capitalizing on this experience has facilitated value chain upgrading in primary product sectors in Chile, Costa Rica and Uruguay.

1. How Latin American countries participate in GVCs

(a) Nicaragua in the global apparel manufacturing value chain

The value of exports from the Nicaraguan apparel industry totalled approximately US$ 530 million in 2008, accounting for one fifth of the country’s reported exports that year (UN COMTRADE, 2012). Nicaragua mainly participates in the low-value cut-make-trim stage of the apparel value chain (see diagram II.1). Leveraging the country’s competitive wage advantage (Portocarrero Lacayo, 2010), the industry employed more than 51,300 people in 2010 (ILO/ILOC, 2010). In 2009, 89% of Nicaraguan apparel exports were to the United States. The country is still considered a small regional supplier, but since 2004 it has steadily gained market share in the United States in certain segments, such as woven trousers and cotton shirts, as a result of its preferential trade status through exceptions to the Dominican Republic-Central American Free Trade Agreement (Gereffi and Bair, 2013). Apparel manufacturers in Nicaragua focus on trousers, mainly denim jeans and twill trousers, and T-shirts.

The industry consists of a large proportion of foreign-owned firms and very few locally owned companies. Firms from Republic of Korea and the United States dominate the sector, with the remainder coming from El Salvador, Honduras, Mexico and Taiwan Province of China. A significant proportion of these firms are part of larger global or regional networks. This structure allows global firms to provide full-package services for their clients by leveraging the interactions of their multi-country operations,

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2 See Gereffi and Bair (2013).
3 The industry reached a peak in employment in 2007, with 88,700 employees. However, pressure from the economic crisis forced layoffs and closures during 2008 and 2009.
particularly in Central America. Knitwear firms sell to buyers such as Walmart, Target and Ralph Lauren. Woven apparel firms tend to have a more regional focus, with operations in neighboring countries such as Guatemala, Honduras and Mexico. Leading buyers in the sector include Levi Strauss, Cintas and Kohl's.

Diagram II.1  
Nicaragua: curve of value added stages in the global apparel value chain

Between 2005 and 2010, the volume of Nicaragua's apparel exports grew by 8.6%, yet Nicaragua has had limited success in moving up the apparel value chain and mainly offers production services. The country's apparel exporters have not achieved significant product upgrading either, as the value of exports increased by only 4.5% (PRONicaragua, 2010). Rather, this period was characterized by an increase in the production of T-shirts and knitwear, which are low value added products. Prior to the economic crisis, the value of Nicaragua's exports had risen on the back of a boost in exports of higher value woven trowsers, but the economic slowdown in the United States in 2009 caused exports to fall back to their 2006 levels. Nicaragua remains vulnerable in terms of economic upgrading because its apparel exports remain dependent on United States trade policy (specifically the tariff preference level (TPL) exception offered to Nicaragua that allows it to import textiles from East Asia). However, the country has shown advances in social upgrading, attributable in large part to the efforts of the tripartite National Free Trade Zones Commission to reconcile the interests of workers, the private sector and the government. The country also joined the Better Work programme established by the International Labour Organization (ILO) in partnership with the International Finance Corporation (IFC) (Gereffi and Bair, 2013).

(b) Mexico and Costa Rica in the global medical device manufacturing value chain

In the Americas, Baja California (Mexico), Costa Rica, Puerto Rico and the Dominican Republic—all strategically located close to the United States—are home to major export-oriented medical device clusters. There are around 67 medical device firms operating in Baja California, 67 in Costa Rica and more than 30 firms in Puerto Rico (MPO, 2011; Producen, 2007). Several of the top 10 global firms, including Johnson and Johnson, Cardinal Health, Baxter, B. Braun Melsungen and Hospira, have also established production facilities in the Dominican Republic. Exports from these countries include both lower and higher value product categories and are primarily destined for the United States. Brazil also plays a significant role in the manufacture of medical devices, but the bulk of multinational firms in the country, including Baxter and GE Healthcare, are more focused on producing for the domestic market than driving export growth.

(c) Baja California, Mexico

The medical device sector in Baja California has built up over the past 25 years. During this time, medical device manufacturers, primarily from the United States, have established operations in the region to take advantage of low-cost opportunities for labour-intensive processes in very close proximity to the Californian medical device clusters (Producen, 2007). The maquila import-export regime and Mexico's accession to the North American Free Trade Agreement have also been important drivers of the sector. Despite Mexico's large internal demand for medical devices, this is an export-oriented industry. In 2005, 95% of medical devices produced in the region were covered by the preferential tax regime for assembly operations and, in 2011, 92% of production was exported. By 2012, the 67 plants operating in the medical device sector employed approximately 42,000 people.

The plants in the region focus principally on manufacturing and assembly and little progress has been made towards upgrading to research and development beyond some process engineering at the manufacturing level (Carillo, 2009). Products made in the region are predominantly disposables, such as surgical bandages, catheters, and drug delivery systems and surgical instruments. These are mature products; that is, they have been on the market for a considerable time and safeguarding intellectual property is thus less of a concern (Producen, 2007). Exports from these plants account for over 50% of Mexico's total medical device exports (PROMEXICO, 2011).

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4 In 2007, 28 of the plants operating in Baja California had corporate offices or operations in southern California (Producen, 2007).
(c) Costa Rica

The Costa Rican medical device industry is relatively young: the first device company to establish operations in the country did so in 1985. The most significant growth in the number and variety of firms and the value of their key products took place between 2009 and 2012. In 2012, approximately 50 firms were participating in the medical device supply chain in Costa Rica, with an additional 16 companies providing packaging and support services. Over half (60%) of these firms were from the United States and less than 30% were Costa Rican. The remaining firms came from five countries: one each from Colombia, Germany, Ireland, Japan and Puerto Rico. Companies in the sector are concentrated in the production segments of the value chain, with 70% of them manufacturing components or assembling final goods.

A small number of original equipment manufacturing firms perform additional manufacturing research and development with a view to improving the production process (sustaining engineering) and establishing production processes for new products (process development) to be launched directly from Costa Rica. Costa Rican-owned firms are principally active in the labelling and packaging segments of the value chain and in support services. There has been a general increase in the complexity of products manufactured in Costa Rica since 2005, with the country shifting from mainly disposable products, such as intravenous catheters, to more sophisticated products, such as bovine heart valves. In addition, there has been an increase in the number of highly regulated life-supporting or life-sustaining devices produced in the country, indicating a growing confidence in the ability of Costa Rican plants to follow strict regulatory protocols.

Figure II.1 illustrates Costa Rica and Mexico’s respective product exports in the medical device sector. Products range in value from disposables, such as simple plastic catheter tubing to surgical instruments to therapeutic products, such as heart valves and orthopaedic implants, and to high value, single-purchase capital equipment items such as magnetic resonance imaging equipment.

Baja California and Costa Rica are positioned in similar stages of the medical device value chain, that is, in the components production and assembly segments. These stages leverage the lower cost workforce relative to their principal market, the United States. However, while the two countries continue to operate in lower value segments of this value chain, they have both engaged in product upgrading since entering the medical device manufacturing GVC. Costa Rica has expanded from disposables into both surgical instruments and therapeutic products, such as heart valves, and Mexico has concentrated more on surgical instruments with a steady supply of medical electronic capital equipment since 2005 (see diagram II.2). In industries in which a developing country has limited experience, product upgrading can be a more feasible way of increasing value added trade than functional upgrading. Functional upgrading requires significant investment in skills development and training of human capital, often at the postgraduate and doctoral level (Gereffi, Fernandez-Stark and Psilos, 2012).

Figure II.1
Costa Rica and Mexico: medical exports by product category, 1998-2011
(Millions of dollars)

A. Costa Rica

B. Mexico


Note: This figure is intended to illustrate export composition in the sector and not relative exports. The scale differs on the two figures.

Baja California and Costa Rica are positioned in similar stages of the medical device value chain, that is, in the components production and assembly segments. These stages leverage the lower cost workforce relative to their principal market, the United States. However, while the two countries continue to operate in lower value segments of this value
a key region in the provision of physical labor costs. The growth of this sector due to biomedical device manufacturing, since 2005 (see diagram 12). In industries where product upgrading, requires significant investment in skill development and upgrading, Mexico's production is expected to grow at a postgraduate level.

(b) Offshore services in selected Latin American countries

While a relative newcomer to the industry, Latin America has emerged as an important player in the offshore services sector. The region has potential to become a key player in the global supply chain, attracting significant investment and creating jobs. The growth of this sector has been driven by a variety of factors, including the region's strong presence in the offshore services sector.

Diagram II.2
Offshore services value chain

Industry-specific vertical activities

- Banking, Financial Services and Insurance (BFSI)
  - Ex. Investment research, private equity research, and risk management analysis
- Manufacturing
  - Ex. Industrial engineering and sourcing, and vendor management
- Telecommunications
  - Ex. IP transformation, interoperability testing, and DF and multimedia
- Energy
  - Ex. Power generation and risk management, and digital oil field solutions
- Travel and transportation
  - Revenue management systems, customer loyalty solutions
- Health/Pharma
  - Ex. R&D, clinical trials, and medical transcripts
- Retail
  - E-commerce and planning, merchandising, and demand for space

Source: Center on Globalization, Governance and Competitiveness (CGGC), Duke University.

* See Fernandez-Stark, Banerji, and Geere (2011) for an explanation of how value is measured in this services value chain.

This graphical depiction of vertical activities does not imply value levels. Each industry may include ITO, BPO and advanced activities.
Table II.1
Latin America (selected countries): economic and industry indicators for the offshore services industry, 2006

<table>
<thead>
<tr>
<th>Country</th>
<th>Offshore services revenue (billions of dollars)</th>
<th>Offshore services as a percentage of GDP</th>
<th>Labour force in offshore services</th>
<th>Offshore services labour force as a percentage of total labour force</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chile</td>
<td>0.86</td>
<td>0.5</td>
<td>20,000</td>
<td>0.28</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>1.39*</td>
<td>4.6</td>
<td>33,170</td>
<td>1.30</td>
</tr>
<tr>
<td>Dominican Republic</td>
<td>...</td>
<td>...</td>
<td>22,000</td>
<td>0.50</td>
</tr>
<tr>
<td>El Salvador</td>
<td>...</td>
<td>...</td>
<td>6,800</td>
<td>0.24</td>
</tr>
<tr>
<td>Guatemala</td>
<td>...</td>
<td>...</td>
<td>6,500</td>
<td>0.17</td>
</tr>
<tr>
<td>Mexico</td>
<td>5.0</td>
<td>0.45</td>
<td>6,500</td>
<td>0.17</td>
</tr>
<tr>
<td>Uruguay</td>
<td>0.786*</td>
<td>2.6</td>
<td>20,000</td>
<td>1.25</td>
</tr>
</tbody>
</table>

Year of entry into industry: 2000-2002, Late 1990s-early 2000s
Entry point: IT and call centre, BPO, Call centre, Call centre, Call centre, IT and BPO, IT
Highest value activity: High IT, KPO, R&D, F&A


Note: BPO, business process outsourcing; F&A, finance and accounting; IT, information technology; KPO, knowledge process outsourcing; R&D, research and development.

2. How Latin American countries can leverage local endowments to upgrade in global value chains

The region has not been particularly proactive in leveraging its long trajectory in traditional sectors, such as mining, forestry, and agriculture, to participate in higher value sectors of international trade. Despite significant natural resource endowments, many Latin American countries continue to be confined to the lower segments of numerous primary product value chains and thus do not add much value at the domestic level. Continued high commodity prices, owing in large part to China’s strong demand for raw materials, have provided no incentives to upgrade. These industries nonetheless offer considerable opportunities for adding value. Countries can leverage their wealth in natural resources and the related expertise to develop sophisticated, higher value services for export, as shown in the three examples presented below: the development of a computerized traceability system for the cattle industry in Uruguay, Chilean mining engineering service exports and environmental services in Costa Rica.

(a) Creating knowledge: a traceability system for the cattle industry in Uruguay

With over 12 million head of cattle in the country, cows outnumber people by four to one in Uruguay, whose main export is beef. In 2010, Uruguay exported US$ 1.1 billion in beef products (COMTRADE, 2012). The global beef industry, however, is extremely vulnerable to health and food safety problems. Uruguay has not been immune to these difficulties: a 2000 outbreak of foot-and-mouth disease led to a multi-year ban on exports to the European Union, the United States and numerous other countries including Chile, Israel and the Republic of Korea. In order to mitigate the impact on key export revenues, Uruguay embarked on the development of a sophisticated bovine traceability system to allow the country to quickly and efficiently track the source of and contain potential problems and maintain consumer and regulatory confidence in its products.

The livestock traceability system was developed through a collaborative multi-stakeholder initiative bringing together producers, local governments, transport staff, the private sector, IT companies and the central government (particularly the Ministry of Agriculture). Today, it is the only system in the world with real-time monitoring of 100% of the national cattle herd. A chip implanted in each cow’s ear at birth allows the system to keep centralized and accurate information regarding the animal, from birth through to sales and distribution points. Approximately 2.5 million new animals are registered each year (Crescioni, 2012; SONDA, 2012; World Bank, 2012). Uruguay has a great opportunity to capitalize on its knowledge and experience by exporting these services to other countries that face similar issues. Indeed, Colombia has already begun to roll out this information system for its cattle herd. This means that Uruguay can participate in different segments of the cattle value chain. In addition to continued beef exports,
Uruguay now has the potential to export advanced services not only for the beef industry, but for the wider livestock sector. As the industry must meet increasingly strict global food safety standards, this represents a tremendous competitive advantage for Uruguay.

(b) Leveraging success in mining for offshore services in engineering

With significant reserves of copper and other metals, mining is a major industry in Chile. By 2010, the country had successfully translated its experience in the field into an important source of services revenue, emerging as one of the leading global centres of mining engineering services (Fernandez-Stark, Bamber and Gereffi, 2010b). As international mining companies moved to Chile to tap the country’s tremendous mineral wealth, their large global engineering partners also began to set up operations in the country to support them (Arże, 2009; Sanchez and Boolan, 2009). These firms, including Hatch, Fluor, SNC-Lavalin, Bechtel, SKM-Minmetals and Ara Worley Parsons, established a significant presence in Chile in the 1990s (Arże, 2009). These companies started out by providing lower value design drawings for Chilean mining operations, but by the end of the 2000s five of these firms had established global centres of excellence for the copper industry in Chile. These centres serve as the lead offices for the development of all copper projects around the globe. Together, the firms employed over 3,500 engineers at the height of the copper boom in 2008 (Fernandez-Stark, Bamber and Gereffi, 2010b) and engineering service exports related to mining alone totalled an estimated US$ 275.3 million. At the time, this was the largest offshore service export sector in Chile, accounting for one third of service exports (IDC Latin America, 2009).

The government has placed significant emphasis on supporting the export of Chilean engineering services and has sponsored a variety of projects in this area. It was also able to leverage dramatic events such as the February 2010 earthquake—the fifth most powerful earthquake on record, in which just 10 buildings were severely damaged—and the rescue of 33 miners who were trapped 700 metres underground to promote and demonstrate the quality of local engineers (ABS-CBN News, 2010). The government has also invested close to US$ 1 million on a branding and promotional initiative for Chilean engineering services in Canada (Au, 2011). Continuing to support Chile’s position as a market leader in mining engineering exports will be important in the long term as natural reserves dwindle.

(c) Environmental services offshoring: an opportunity for Costa Rica

Costa Rica is recognized worldwide for its unique approach to environmental protection and is a leader in the field among developing and developed countries alike. As a result of conservation incentives put in place in the 1980s, today tropical forest covers more than half of the country. Illegal logging has decreased from 82% to 15% in the past 20 years and farmers are paid to manage and protect their natural surroundings (Conservation International, 2012). This know-how has, however, thus far been used principally in support of domestic priorities; experts work for national non-governmental organizations and foundations, and the country has not yet seized the opportunity of finding a commercial use for the significant expertise it has built over many years. As climate change gains prominence on the global development agenda, there is significant demand for services in these areas. The global environmental services and technology market is estimated to be worth US$ 782 billion (OEEL, 2012).

Owing to its critical mass of qualified human capital sustaining this market niche (Chassot, 2012; Rodriguez, 2012), Costa Rica is in an excellent position to export high-demand environmental services, including natural resources management, environmental impact studies, assessments of threatened and endangered species and protected areas and environmental education and training. More than 18 other countries, including China, have consulted Costa Rica on their conservation policies (Conservation International, 2017). As with many developing countries, however, limited knowledge of potential markets and undeveloped entrepreneurship skills undermine the potential for translating these consulting opportunities into profitable service exports (Chassot, 2012). Promoting this industry will require support to help local firms internationalize, on one hand, and to convince foreign environmental firms to use the country as platform for the export of services, on the other. Linkages between these two types of firms will be critical for the development of this niche activity that is in great demand at the global level.

C. Skills for upgrading in global value chains: workforce development and national innovation systems

As shown in the previous sections, the global fragmentation of GVCs presents multiple opportunities for countries in Latin America to drive economic growth and add value to their industries. At the same time, however, intense international competition threatens to push many actors out of GVCs. Developing countries, including those in Latin America, can
no longer compete on the basis of cheap labour and natural resources alone—to upgrade they must enhance their capabilities or specialize in particular market segments. Skills and workforce development have been identified as essential elements for upgrading in GVCs (Gereffi, Fernandez-Stark and Psilos, 2011). Countries must therefore align their skills development policies with international labour requirements to maintain and upgrade their positions within GVCs.

Owing to their constantly changing sources of demand, GVCs require individuals who can continuously update and improve their skills rapidly and effectively. Yet, in developing countries, traditional workforce development systems often fail to provide the skills required by global industries. Greater coherence must therefore be sought between the skills imparted by education and training and the capabilities required by the private sector (Fernandez-Stark, Bamber and Gereffi, 2010b; Gereffi, Fernandez-Stark and Psilos, 2011; Wadhwa and others, 2008). Despite this mismatch, developing countries are nonetheless adding value to their sectors. As a result, complex local innovation systems have emerged in developing countries to support skills upgrading, encompassing a broad range of stakeholders both within and beyond the chain. These stakeholders include private firms, public and private institutions in education, governments, non-governmental organizations, industry associations and international donors. However, these local arrangements are reactive policies designed to fill skills gaps, and few coordinated efforts have been made to proactively improve the effectiveness of skills upgrading at the national level.

The four Latin American workforce development systems described below emerged to help firms enter, or upgrade within, GVCs. These case studies illustrate the involvement of a variety of stakeholders and underscore the importance of collaboration and coordination between actors in value chains in moving up the value chain. The examples include the finishing school project implemented by the Inter-American Development Bank (IDB) in several countries in the region, the Chilean Public-Private Strategic Council for Offshore Services, workforce development initiatives led by the local government in collaboration with industry to develop the aeronautical cluster in Querétaro, Mexico, and the human capital development model adopted in Costa Rica to serve the business services sector in the country.

1. **Finishing schools in India and Latin America**

Finishing schools show promise as a tool for narrowing the gap between the human capital needs of GVCs and the skills supplied by national education systems. The finishing school model has been tested in India and the Philippines, and was recently applied in Latin America with the support of the IDB. These schools help recent graduates and workers develop skills that are in high demand, thus making them more employable. By increasing workforce employability, finishing schools can, in turn, help a country improve its position in the value chain.

Finishing schools build on the fundamental skills acquired in academic institutions, filling in specific gaps in knowledge and soft skills. These gaps are determined on the basis of a comparison between the skill sets needed by a particular industry and the skills currently offered by the workforce. In India, the most effective finishing schools are those that collaborate with companies to identify the desired skill sets, and adapt training accordingly (Tholons, 2012). In the global services industry, the priorities often include technical IT skills, proficiency in English and soft skills that focus on interpersonal relations, confidence and presentation skills. Programmes at finishing schools to train workers for careers in IT services can run from five weeks to one year (Tholons, 2012, p. 14). These schools often target young people who have recently graduated from high school or university, but they can also play a role in retraining adult workers (IDB, 2012).

Public-private partnerships are central to creating effective financing and governance mechanisms to support finishing school programmes in developing countries. Although finishing schools in India may be run by either the government or a private institution, in Latin America there is increasing recognition that collaborative policies and institutions provide the most effective support to finishing school initiatives. The IDB replicated the public-private partnership models developed in India in its first pilot projects in Uruguay and Colombia. The pilot finishing schools project in Colombia is a partnership between Fundación Universitaria Empresarial (a private, non-profit higher education institution) and the Colombian Ministry for Trade, Industry and Tourism. This project will train 40 software professionals over 6 months, combining classroom-based training and an internship at one of the 26 companies participating in the project. The public-private model offers two key advantages: firstly such partnerships create opportunities for co-financing, reducing the cost burden borne by any one sector and, secondly, the content of the programmes is determined by the employers themselves, ensuring that the skills developed match industry needs (IDB, 2012). Thus, the finishing-school model recognizes the role of all stakeholders, the State, academia and industry in shaping the capabilities of the labour pool towards delivering information technology and business process outsourcing services (Tholons, 2012, p. 14).
2. The Chilean Public-Private Strategic Council for the Offshore Services Sector

In 2007, the Chilean Committee of Ministries for Innovation created a public-private coalition for the offshore services industry with the goal of increasing the size of the industry fivefold in four years. The coalition is composed of 13 public and private institutions, including multinational corporations, domestic companies, industry associations, educational institutions, ministries and Chile’s economic development agency CORFO. It is managed by CORFO and financed from the Chilean Innovation and Competitiveness Fund. Workforce development was defined as one of four strategic areas for action and is the sector that receives the most funding (the other areas were developing an international promotion strategy, improving infrastructure and the regulatory framework and developing domestic firms). Annual investment in this strategic plan was estimated at US$ 27 million per year in 2008, 2009 and 2010, of which 83% was earmarked for human capital development (Government of Chile, 2008). The majority of these funds were allocated to workforce development initiatives, illustrating the importance afforded to improving skills in the workforce in efforts to continue moving up in the value chain.

In addition, CORFO has funded several studies on the workforce requirements of the offshore services industry and on the readiness of the Chilean labour force to meet those demands (Fernandez-Stark, Bamber and Gereffi, 2010d; Mercer, 2008). One of the principal shortcomings identified in the Chilean labour force was a lack of workers fluent in English. In response, CORFO offered English-language scholarships for potential industry employees, with 3,000 such scholarships awarded between 2008 and 2010 (Gereffi, Fernandez-Stark and Psilos, 2011).

3. The aerospace industry in Querétaro, Mexico

The aerospace industry in Querétaro has grown rapidly since Bombardier—one of the leading companies in the sector—set up in the area in 2006, marking Querétaro’s entry into the aerospace GVC. The French group Safran and Spanish airframe manufacturer Aernnova quickly followed suit, establishing operations in 2007. Under the leadership of the Secretariat for Sustainable Development, Querétaro’s aerospace cluster has since become one of the four leading clusters in Mexico. By 2012, there were over 30 foreign firms operating in the state, employing an estimated 6,000 staff, approximately 20% of the country’s aerospace workforce. Mexico’s exports in the sector had reached US$ 4.5 billion by 2011, up from US$ 1.3 billion in 2004.

Growth was supported by a clear commitment to the development of the industry by the state government. Among the most important manifestations of this was the creation in 2007 of the National Aeronautics University of Querétaro (UNAQ), which offered several technical programmes developed as part of public-private initiatives and launched the first aerospace engineering programme in the country. State investment in UNAQ totalled US$ 21 million in 2009. In addition to recruiting teaching staff from both Canada and Spain, UNAQ drew teachers from aerospace firms working in the region. By 2012, there were 488 technical and professional students at UNAQ. The contribution made by UNAQ to human capital development in the state came in addition to an already strong engineering training base. In 2009, 41% of all undergraduate degrees were awarded in engineering, while 65% of the master’s degree programmes available in the state were in engineering fields (Casalet and others, 2011). Additionally, in 2007 an aircraft maintenance programme was established in Querétaro by the National Mexican Technical Training Institute, which sees 90 technicians graduate each year. This has stoked the ongoing development of the state’s aircraft maintenance and repair sector and helped attract large investments, including the 2012 deal between Delta and Aeroméxico to establish a US$ 50 million maintenance, repair and overhaul facility in Querétaro with seven production lines to serve both airlines.

4. Costa Rica’s offshore services talent-development pipeline

Costa Rica is one of Latin America’s leading exporters of business services to the wider world (Fernandez-Stark, Bamber and Gereffi, 2013a). Growing competition for the country’s human capital in the offshore services sector has led to the development of several public- and private-sector initiatives to expand the available workforce to sustain the country’s competitiveness in the chain.

The approach taken by the private sector is increasingly focused on developing a talent pipeline for generating human capital with a view to upgrading into higher segments of GVCs. Firms in the sector recruit high-school students to join the workforce in basic technical positions. Vocational training is provided to help them fulfill their entry-level functions. They are then actively encouraged to pursue further education, with time off for study and, in some cases, even the reimbursement of tuition fees for those studying towards university degrees. As these individuals progress in their education, they are given opportunities to move up to higher value services in the company. Firms work proactively with universities to design curricula to ensure that their long-term needs are met.

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Information for this case study is based on the following sources: Ayala, 2009; Casalet and others, 2011; Case, 2012; Johnson, 2012; Secretariat of Economic Affairs, 2012; Sorbie, 2009; The Business Year, 2012.
Concurrently, Costa Rica’s Ministry of Public Education has established bilingual public high schools with a focus on the call centre sector to meet strong demand for staff fluent in English in the offshore services industry, thus ensuring an ongoing supply of entry-level graduates for the industry. Finally, in 2008, the government launched Costa Rica Multilingüe, a not-for-profit organization focused on improving communication skills for greater personal and professional development. Central to the organization’s strategy is the National English Plan, which aims to ensure that all students graduating from high school have an intermediate or advanced level of proficiency in English by 2017.

This multi-stakeholder approach is helping both to bolster the country’s immediate competitiveness and to facilitate longer-term upgrading in the offshore services GVC. This provides technical talent for the sector in the short term and also ensures long-term career development for individuals.

D. Conclusions

Over the past three decades, Latin American countries have come to participate in GVCs in a variety of industries in the agriculture, manufacturing and service sectors. The examples highlighted in this chapter demonstrate the region’s capacity to engage in both traditional and non-traditional exports, including high-tech sectors such as aerospace, medical device equipment and advanced business services. The region now faces the challenge of upgrading into higher value added segments of these chains and reaping greater benefits from its participation. In particular, sectors where nations can leverage their natural-resource endowments to export sophisticated products and services represent significant opportunities for Latin American countries to drive upgrading. This upgrading requires a well-trained workforce to provide world-class products and services, and must therefore be supported by a strong focus on human capital development.

As Latin America becomes a more important player in international trade, it is time to analyse a new set of issues to determine how countries in the region can maximize the potential gains to be made from engaging in the global economy. Central to these issues is how countries can gainfully participate in GVCs by involving local firms, assimilating new knowledge and improving employment conditions, and how this participation can be enhanced by regional and national policies that simultaneously foster economic, social and environmental development.

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* The organization was established by decree to ensure its sustainability over time, regardless of the political party in power.


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Chapter III
Access to finance in value chains: New evidence from Latin America

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Introduction

The literature on financing for small and medium-sized enterprises (SMEs) highlights linkages with large firms in value chains as a possible way of enhancing access to credit. However, much of the literature on value chains emphasizes issues of coordination and governance of those linkages, along with their effects on industrial upgrading, with little mention of the financial implications for SMEs. This paper seeks to fill this gap by looking for evidence of the impact of inter-firm linkages and specifically

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