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Connecting Local Producers in Developing Countries to Regional and Global Value Chains

UPDATE

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Abstract

Connecting Local Producers in Developing Countries to Regional and Global Value Chains - Update

This report analyzes the specific factors that affect the competitiveness of developing countries in global value chains (GVCs), and how these factors differ across four major economic sectors: agriculture, extractive industries, manufacturing and offshore services. Although integration into GVCs allows firms in developing countries to participate in international trade without developing the full range of capabilities required to produce a product or service, it will not automatically translate into positive development gains from trade without the appropriate policies to build productive capacity and ensure inclusive growth and upgrading capabilities. In order to inform these policies, it is necessary to identify the various local factors that affected the capacity of developing countries to meet GVC and RVC requirements, including their productive capacity, infrastructure and services, the business environment, trade and investment policies and industry institutionalization. The report identifies the need for further data and analysis in many areas, in particular the trade-related policy implications of TiVA-GVCs for developing countries, including emerging economies. This would provide a starting point for the discussion of the domestic policies and actions needed to promote and support developing countries' beneficial participation in value chains and inform aid for trade interventions promoting effective integration into markets via GVCs.

Keywords: Global and regional value chains, developing countries, competitiveness, productive capacity, inclusive growth, trade integration.

JEL classification: F13, F15, F16, F21, F23, F35, F63.

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Acronyms

AGOA	Africa Growth and Opportunity Act
CAFTA-DR	Central American Free Trade Agreement – Dominican Republic
EI	Enterprise Ireland
EU	European Union
FDI	Foreign Direct Investment
GATT	General Agreement on Tariffs and Trade
GVC	Global Value Chain
HPSU	High Potential Start-up
ICT	Information and Telecommunications Technology
IDE-JETRO	Institute of Developing Economies
MFA	Multi-Fibre Arrangement
MNC	Multinational Corporation
NAFTA	North American Free Trade Agreement
NSI	National Systems of Innovation
ODM	Original Design Manufacturer
OECD	Organisation for Economic Co-operation and Development
OEM	Original Equipment Manufacturer
R&D	Research and Development
SEZ	Special Economic Zone
SME	Small and Medium-sized Enterprise
SPS	Sanitary and Phytosanitary Standards
TPL	Tariff Preference Level
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
US	United States
WEF	World Economic Forum
WTO	World Trade Organization

EXECUTIVE SUMMARY

This report analyzes the specific factors that affect the competitiveness of developing countries in global value chains (GVCs), and how these factors differ across four major economic sectors: agriculture, extractive industries, manufacturing and offshore services. The fragmentation of production processes associated with the rise of GVCs allows firms in developing countries to participate in international trade without developing the full range of vertical capabilities across the value chain. By opening up access to new – and often higher value – markets, participation in GVCs offers emerging economies an opportunity to add more value within their local industries, expand employment and raise incomes. Yet, integration into GVCs does not automatically translate into positive development gains from trade without the appropriate policies to build productive capacity and ensure inclusive growth and upgrading capabilities. In order to more effectively harness GVCs to drive economic development, efforts must be extended in a number of areas to help developing countries to foster the ability to sustain and upgrade their participation in GVCs over time; mainstream GVC trade into their broader national economic development agenda; build internal capacity and generate linkages with the local economy; and create more and better jobs to reduce unemployment and improve working conditions. Towards this end, this report advances a "global-local" approach to understanding how governance and upgrading, two concepts central to GVC analysis, are relevant to promoting gainful participation in value chains.

The report shows that many developing countries have already identified the potential opportunities arising from the ability of their firms to participate in RVCs and GVCs and, at least to some extent, have put in place a number of trade and related domestic policies to facilitate this process. They also show that sustained participation in these value chains is challenging, requiring capacity to meet quality, cost and reliability requirements on an ongoing basis. This capacity is affected by various local factors.

Trade statistics only start to investigate the factors shaping the competitiveness of these countries and their participation in GVCs, so the report relied on an extensive review of case literature to uncover five key dimensions influencing the competitiveness of developing countries with respect to GVCs. These include: (1) productive capacity (including human capital, standards and certifications, and national systems of innovation); (2) infrastructure and services (transportation, energy, water, and ICT); (3) business environment (macroeconomic stability, ease of opening a business, and access to finance); (4) trade and investment policy (market access, import tariffs, export-import procedures, border transit times and industry-specific policies); and (5) industry institutionalization (industry maturity and public-private coordination). Though much has been written on these competitiveness factors, they take on new significance when viewed through the lens of GVCs and within specific industry contexts.

The relative importance of the factors listed above varies significantly across sectors, but four general points seem to stand out in the literature. First, human capital, national innovations systems, and standards and certifications systems – all related to the development of productive capabilities – are emphasized in the studies for all four industries. Second, the cost and quality of infrastructure seem to be important binding constraints on trade and economic growth, such as, for instance, land transportation, port infrastructure and energy for the manufacturing and extractive industries; transportation and water for agricultural chains; or telecommunications for offshore service exports. Third, the quality, availability and cost of border infrastructure and services appear essential for value chain activities which rely on rapid and inexpensive access to global trade flows, both for imports and exports. Fourth, policies to foster the development of local productive capacity in the

form of a trade and investment friendly environment and the promotion of technology dissemination, skill building and upgrading, play central roles in determining how developing countries can access and upgrade in GVCs as well as the net benefits that are accrued domestically.

A key insight of the work is that GVCs are constantly evolving and that further data and analysis are required in many areas, in particular the trade-related policy implications of TiVA-GVCs for developing countries, including emerging economies. Further research should seek to understand and measure the key factors which influence the ability of developing countries to participate in given GVC activities and under what conditions they retain significant returns or benefits. Moreover, metrics are required to understand why certain developing countries are able to participate more effectively in GVCs than others. Insights from this analysis would provide a starting point for the discussion of the domestic policies and actions needed to promote and support developing countries' beneficial participation in value chains. They would also inform aid for trade interventions promoting effective integration into markets via GVCs.

In investigating the ability of developing country firms to be competitive in regional and global value chains, a number of important questions could also be answered regarding the most effective policy environment to support that outcome. Some issues are directly of interest to the OECD Trade Committee, others may be of interest more broadly, including to those committees with an interest in investment, competitiveness, development assistance, SME and governance issues. An action plan for future research could include one or several of the proposed research areas described in the report.

I. Introduction[1]

International trade is increasingly structured around global value chains (GVCs), facilitated by improvements in transportation, the information and telecommunications (ICT) revolution and widespread liberalization of trade and investment. This fragmentation of production processes and the associated increase in vertical specialization in specific stages of the chain means that firms in developing countries can now participate in international trade without having to develop the full range of capabilities across the value chain, essentially "compressing" the development experience and making non-linear catch up possible (Sturgeon & Memedovic, 2010). By opening up access to new, and often higher value, markets, participation in GVCs offers emerging economies an opportunity to add more value within their local industries, drive employment and raise incomes (OECD, 2012a). Numerous developing countries, even some of the least developed ones, have responded positively to these opportunities (UNCTAD, 2013) and growth rates of intermediate goods exports from developing countries entering different stages of GVCs have outpaced those from developed economies (IDE-JETRO/WTO, 2011).

Countries participate in these chains to the extent that firms located within their borders engage in GVCs. As GVC participation is increasingly becoming synonymous with economic development, many developing countries are trying to design policies to reinforce the emergence and local presence of firms linked to these chains, as well as to attract foreign firms and improve border procedures to facilitate trade flows. Pointing to the significance of imported value for the domestic productive process, there have been recent calls for reductions on import tariffs to lower costs and facilitate access to world-class inputs (Cattaneo et al., 2013; OECD, 2012b). Sustained participation in these competitive chains, however, is challenging; GVCs in today's world are highly dynamic, place high demands on participating firms, and are increasingly consolidated around a small number of strong global suppliers. Regardless of a firm's position in the value chain, minimum quality, cost, and reliability requirements must be consistently met in order to participate on an on-going basis, and buyers' sourcing strategies are constantly revised to improve these elements of their supply chains.

The capacity of firms in developing countries to consistently meet these requirements is affected by the local institutional context in which they operate. These local-level aspects of value chains include the skill level of the available human capital, the establishment of local standards systems, specific infrastructure policies and the degree of industry institutionalization, amongst others. While extensive research has been undertaken to identify what constrains the competitiveness of developing countries in international trade, less focus has been placed on understanding the parameters of these constraints within the value chain setting specifically. This paper seeks to contribute to the existing literature by 'unpacking' the specific factors that affect the competitiveness of developing countries in the context of value chains, and how these factors may differ across industries.

Insertion into GVCs alone does not necessarily translate into positive development gains from trade, and in fact, can be adverse and exploitative for developing countries (Kaplinsky, 2005; Lee et al., 2011a). There is broad concern that polices to insert less developed nations into GVCs should include economic, social and environmental dimensions to reduce inequality and the potentially negative impacts of GVC participation (Barrientos et al., 2011; Gereffi & Lee, 2012; Gereffi & Sturgeon, 2013; OECD, 2012c). Focusing on trade and investment policy alone is not sufficient to connect developing countries to GVCs and simultaneously facilitate development gains for the domestic economy. In order to coherently support development goals, efforts must be broadened to help countries mainstream GVC trade into their broader national economic development agenda;

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build internal capacity and generate linkages with the local economy; and create more and better jobs to reduce unemployment and improve working conditions. Thus, it is not only a matter of how to link to these value chains, but how to do so in a manner that brings long-term sustainable welfare gains.

Two key approaches have dominated the practical application of GVC theory so far: (1) the first has focused on liberalizing the goods and services trade of developing countries and encouraging foreign direct investment (FDI) as a means to link with global industries (e.g. promoted by several multilateral organizations) (Neilsen, forthcoming); (2) the other has used the framework to examine how vulnerable and disadvantaged actors in developing countries can secure their entry into the chains (e.g. promoted by aid agencies). These two approaches have been considered mutually exclusive; both are limited in their scope and are easy targets for criticism. The first approach focused on trade and investment liberalization, for example, has been criticized as a thinly veiled attempt to help foreign direct investment (FDI) to take advantage of cheap resources and gain access to new markets without consideration about sustainability or the returns for local economic actors. On the other hand, by primarily focusing on poverty reduction, the 'developmentalist' approach often fails to fully appreciate the competitive global environment in which small, domestic actors must operate. As a result, sustaining actors' engagement with GVCs is often not successful once aid agencies withdraw.

To guide future Aid for Trade initiatives in facilitating gainful participation in this new context of international trade, while focusing principally on the economic dimension of GVC analysis, we introduce a more comprehensive 'global-local' approach based on the core concepts of value chain theory – governance and upgrading.[2] First, drawing on both global- and local-level analysis, we discuss the current role of developing countries in GVCs and identify factors that affect their ability to compete in these chains in a beneficial manner. This is followed by detailed sector analysis. The analysis covers four sector categories: agriculture, extractive industries, manufacturing and offshore services, accounting for all exports of goods and a large share of cross-border service exports.[3] We point out that these factors vary according to product, firm and country characteristics and emphasize that a 'one-size-fits-all' approach to GVC policies is inappropriate. Developing countries must adopt a policy framework that reflects the changing reality of global business and the fact that mercantilist assumptions are not relevant in the context of GVCs. Finally, we examine the policies required to support both trade and economic development objectives of linking developing countries with GVCs. This section also presents examples of good policies. We conclude with recommendations regarding future research.

2. Unpacking Developing Country Competitiveness in GVCs

The constantly evolving geographic footprint of GVCs has created new opportunities for developing countries to participate in the global economy. The integration and sustained engagement of these countries with GVCs depends on how competitive their firms are, relative to others, in terms of delivering a product or service at the right price and time with the quality and consistency required by the chain. As cheaper locations vie to join value chains, those already participating on the basis of a price advantage seek to develop strategies to sustain their inclusion, specializing in

2. While a fully comprehensive GVC approach would consider the economic, social and environmental dimensions of engaging in GVCs (Barrientos et al., 2011; Jeppesen & Hansen, 2004; Riisgaard et al., 2010; Staritz & Reis, 2013), in this paper, we focus primarily on the economic dimension in order to fully unpack how developing countries can enter and upgrade within GVCs.

3. These sectors also broadly coincide with the division of OECD/DAC Creditor Reporting system on aid disbursements (i.e. agriculture and fishing, industry, mining and tourism) (Cali & te Velde, 2011).

higher value operations or niche sectors that are more insulated from competition (Humphrey & Schmitz, 2002) – in other words, to upgrade.[4]

Developing countries often tend to be concentrated in low value segments of value chains.[5] In the agriculture and extractive industries, developing countries mostly export primary products with little processing. Similarly, in the case of manufacturing, many countries, in Africa and Latin America in particular, have languished in the lower-value segments, providing assembly activities with few substantive linkages to other processes. Upgrading experiences in emerging nations have more commonly consisted of process and product upgrading. However, this upgrading is typically associated with only marginal value increases (Hubert and Schmitz, 2002), and often consists of firms obtaining the necessary standards certification to remain within the chain.

Upgrading is affected, on one hand, by the changing global dynamics of the chains (e.g. consolidation by strategies to reduce the number of suppliers, incorporation of demanding quality and process standards, and geographic shifts in demand). On the other hand it is conditioned by limitations within developing countries, including the limited familiarity of firms accustomed to operating in traditional market environments with global value chain requirements (Gereffi & Kaplinsky, 2001; Henson & Humphrey, 2009; Kaplinsky, 2010; Kaplinsky et al., 2011; Lee, Gereffi, & Nathan, 2012).

4. Traditionally, economic upgrading included four distinct changes in the firm's participation in a production model: (1) product upgrading, describing the shift into the production of a higher value product; (2) process upgrading highlights improvements in efficiency in production systems; (3) functional upgrading refers to the movement to higher value activities in the chain; and finally (4) chain upgrading, which focuses on entry into a new value chain by leveraging the skills acquired in the current chain (Humphrey & Schmitz, 2004). Two further types of upgrading have since been identified: (1) entry into the chain, that is, when a new actor joins the value chain (Fernandez-Stark, Bamber, et al., 2011c); and, (2) end-market upgrading, which describes the incursion of firms into new end-market segments. This can include moving into more sophisticated markets that require compliance with new standards or to larger markets requiring scale and price accessibility (Fernandez-Stark et al., forthcoming).

5. Some interesting exceptions include the Kenyan fruit and vegetables production and the Indian pharmaceutical research. In Kenya, agri-food producers upgraded into the provision of sophisticated packaged products (e.g. ready to eat: washed, and mixed) in the 1990s and today, some local exporters even control distributors in target markets (Fernandez-Stark et al, 2011). Although R&D is usually one of the last activities to be offshored, Indian operations already perform these activities for global pharmaceutical companies (Wadhwa et al., 2008).

Table 1. Functional Upgrading Opportunities for Developing Countries in GVCs

Agriculture	Extractive Industries	Offshore Services	Manufacturing
• Mainly concentrated in primary products. • Possibilities to upgrade, especially in high value agriculture. • Some countries are exporting packaged and processed goods. • A few countries are in marketing and branding.	• Concentrated in mineral extraction without adding extra value. • Usually high value added activities of the chain are performed abroad.	• Entry achieved by exporting routine services. • Tendency to stagnate in low-medium value added services. • BUT: a few have begun exporting higher value added services (R&D, legal, business analytics & engineering services, etc.)	• Frequently limited to assembly and low-value components production. • Some upgrading into design and branding, within less concentrated chains, (e.g. apparel). • Limited functional upgrading in Africa and Latin America. • Asian countries have had more success upgrading into design in medium- and high-tech GVCs.

Source: Authors.

Geographically, the emergence of 'southern' end-markets with rising south-to-south trade has become increasingly important for developing countries and offers them different opportunities (Cattaneo et al., 2010; Gereffi & Sturgeon, 2013; Kaplinsky & Farooki, 2010; Staritz et al., 2011). These new end-markets place a greater emphasis on price competitiveness rather than standards, and they may also exhibit lower requirements with respect to quality and product sophistication (Kaplinsky et al., 2011). Lead firms and powerful global suppliers from developing countries have emerged, such as Foxconn (Chinese Taipei), Infosys (India), SAB Miller (South Africa) and Vale (Brazil). The elaboration of regional manufacturing chains by these firms in Asia (IDE-JETRO/WTO, 2011; Sturgeon & Kawakami, 2010) and the alternate global delivery and regional 'nearshoring' models of Indian service providers (Fernandez-Stark et al., 2013b) have facilitated the competitive participation of a host of developing country locations to the global market.

Within developing countries, upgrading trajectories are affected by the institutional context in which firms operate and the engagement and influence of relevant stakeholders in transforming that context (Fernandez-Stark et al., 2010a, 2013a; Gereffi & Fernandez-Stark, 2011). In order to link to GVCs and move into higher value segments of the chains, developing countries must continually improve their competitiveness along multiple dimensions. Based on an extensive review of the GVC literature, five dimensions affecting the competitiveness of developing countries with respect to GVCs can be identified: productive capacity, infrastructure & services, business environment, trade and investment policy, and industry institutionalization. These dimensions, detailed in Table 2, together encompass 14 factors for engaging competitively in GVCs. Many of these factors, such as promoting an effective business environment and developing adequate infrastructure, have been the target of a numerous aid programs in the past.

More interesting is that these factors take on a new significance when viewed through the lens of GVCs and that their relative importance differs by industry category (see Section 3). GVC-oriented trade policy, for example, must now consider the role of imports as importantly as exports, as well as the impact of border delays, since participation in geographically fragmented GVCs frequently requires quick and inexpensive movement of goods over borders; human capital development can and should be specifically tailored to meeting the needs of a particular segment of the value chain; and national systems of innovation are required not only for participation in R&D activities but also to sustain participation in assembly and intermediate production stages of the chain by driving process upgrading. Furthermore, a GVC focus brings new elements and actors to the fore: standards and certifications previously played marginal roles in international trade, but they are now front and center to competitiveness; educational institutions become core partners; and there is increased

emphasis on directly engaging the private sector (both foreign and domestic), 'the engine that powers international trade', in creating a competitive environment (World Bank, 2011).

Identifying these factors and using them for comprehensive value chain analysis of how developing countries participate in GVCs is not as straightforward as it may seem. Indeed, to date, what is known about how developing countries engage in GVCs – and their potential constraints to doing so – has primarily been drawn from a series of qualitative industry and country case studies. These studies are based on interviews with individual firms, industry associations, relevant ministry representatives, and educational institutions, and industry experts among others and supported by extensive analysis of the United Nations COMTRADE Database (comtrade.un.org). This type of research is costly, researchers use disparate interview approaches and most databases are not disaggregated at the industry level, making it difficult to provide useful or precise assessments of value chain participation. These limits undermine the potential for accurate and comparative cross-country analysis. GVC researchers and policy makers alike are aware of the limitations of this approach and the challenges of drawing generalizations from these types of studies.

Yet, the empirical databases available, even newly released ones with a focus on GVCs, are currently insufficient to the task at hand. Understanding how developing countries participate in GVCs and crafting effective policies to support sustainable engagement requires an understanding of a large number of different variables: which functions developing countries perform, products they manufacture, their trading partners by product, and how the range of factors listed in Table 2 impact those outcomes in each country and industry. Databases covering GVC-specific trade are still in their infancy, and lack detail regarding important variables related to intangible activities, intermediate versus final goods, and firm ownership (Box 1).[6] Databases covering competitiveness factors (Appendix Table 1) reflect earlier 'hands off' trade paradigms and have mostly focused on the general socio-economic conditions of different countries without disaggregating information to the industry level. Furthermore, certain key value chain competitiveness factors are not reflected in any of these databases and indices. These include specific characteristics of the human capital stock and the national innovation system, standards and certifications, characteristics of sector policies, industry maturity and coordination, and the quality of public-private coordination. Additional data collection and the development of indicators are still necessary to provide a dynamic understanding of the position of countries – especially developing countries – within GVCs. GVC analysis inevitably still relies on a mix of quantitative and qualitative analysis.

6. For a detailed analysis of gaps in existing datasets and how these may be overcome, see Sturgeon (forthcoming).

Table 2. Factors Affecting Developing Country Competitiveness in GVCs

Factor		Description
Productive Capacity	Human capital	• The cost and availability of labor is essential for lower-value labor-intensive functions. As cheaper locations join value chains, those already participating must increase their capabilities or specialize in particular market segments. • Upgrading worker skills becomes essential to remaining competitive (Gereffi et al., 2011).
	Standards & certification	• Codified public and private product and process requirements used to standardize supply across multiple suppliers (Kaplinsky, 2010). • Standards can drive upgrading by disseminating information on improving quality and productivity (Diaz Rios & Jaffee, 2008); yet, developing country firms often lack the capital and expertise to master multiple certification requirements (OECD, 2008).
	National system of innovation [a]	• Flows of technology and information among people, companies and institutions that contribute to innovation and technology development (OECD, 1997). • This is important for closing technological gap to support upgrading of domestic and foreign firms (Farfan, 2005). Required at all stages of the value chain to drive efficiency and quality improvements.
Infrastructure & services	Transportation, ICT, Energy & Water	• Impact of the cost and quality of these factors is compounded as fragmented production means inputs and intermediate goods must be transported between multiple locations. • ICT facilitates the transmission of codified design specifications between actors in product-based chains and is the main medium for participation in cross-border service exports. Energy drives cost competitiveness in capital-intensive assembly and processing segments of the chain.
Business environment	Macro-economic stability & public governance	• Macroeconomic stability exists when key economic relationships are in balance. Exchange rate volatility affects costs paid for inputs and price netted for exports. • Governance includes traditions and institutions by which authority is exercised (e.g. rule of law, corruption, government effectiveness) (World Bank, 2013). Volatility can affect the timely delivery of goods and raise risk of inventory theft (WEF et al., 2013).
	Ease of opening a business & Permitting/ Licensing	• The procedures, time and cost for a new business to start up and operate formally and the process to obtain construction permits, water and mineral extraction permits, etc. • Comparatively lengthy procedures can deter FDI due to other potential country alternatives, while undermining the development of domestic firms.
	Access to finance	• The possibility individuals or enterprises can access financial resources based on use and accuracy of credit registries and effectiveness of collateral and bankruptcy laws. • Essential for investments required to meet standards and other demands of GVCs. Lack of capital undermines potential of small and medium enterprises (SMEs) to engage in GVCs.
Trade and investment policy [b]	Market access	• Extent of tariffs and import restrictions in potential target markets affect potential to engage with different end-markets.
	Import tariffs	• Tariffs charged on imported components, services and capital equipment required for the production or provision of exports become taxes on exports in GVCs.
	Export-import procedures	• Complexity of and time taken to complete customs procedures managing imports and exports of products and services reduces reliability and timeliness of delivery.
	Border transit times	• Time taken to move products and services through border crossings. Inefficient border crossings affect timeliness of product delivery to next stage of GVC or end-market.
	Industry-specific policies	• Investment & export promotion policies designed to support specific industry participation and upgrading in specific segments of different value chains (Gereffi & Sturgeon, 2013).
Industry Institutionalization	Industry maturity & coordination	• Experience of firms in participating in GVCs, presence of key chain actors such as input and service providers and the establishment, influence and representativeness of an industry association to reduce transaction costs for meeting requirements.
	Public-private coordination	• Linkages and cooperation among private sector, government, educational institutions and others industry stakeholders. • Essential to rapidly identify and overcome challenges to chain participation.

[a]GVC scholars have mostly identified individual components of these innovation systems, such as technological development, innovation and R&D spending. We group these factors together under the broad label "national innovation systems".
[b] Moise et al. (2013) identify 16 different indicators related to trade policy and facilitation. For simplicity sake, we focus on the key trade variables highlighted in the GVC literature.
Source: Authors, based on literature review.

Box 1. Measuring the Participation of Developing Countries in GVCs

As GVCs gain prominence in international trade, with significant implications for the global distribution of employment and profits, there is an urgent need for better information to allow policy makers to make the necessary decisions in order to facilitate gainful participation in GVCs. Three important challenges for measuring how developing countries participate in regional and global chains must be overcome.

- Data regarding both tangible and intangible activities in value chains is required to understand which upgrading trajectories developing countries can and should pursue. National accounts and trade statistics record to some extent the value of services produced and traded but certain intangible activities such as internal R&D or marketing activities, however, are more elusive and GVC researchers rely principally on business surveys (Sturgeon, forthcoming) and engineering "tear-down reports" to impute the value of these services (Xing & Detert, 2010). In general, measuring the contribution of value-added from services to trade in goods is a difficult undertaking (Grover Goswami et al., 2010; Sturgeon & Gereffi, 2009) but value-added trade statistics such as the ones produced by the OECD and WTO cover services activities as reported in national accounts. International sourcing surveys can complement this work to have more disaggregated information at the firm level.

- Similarly, existing trade statistics do not adequately differentiate between trade in intermediate goods versus in final goods, such that it is impossible to disaggregate between the domestic and foreign shares of value-added embedded within exports (Gereffi & Lee, 2012). This has resulted in gross misinterpretations of countries' technological capabilities and the position within GVCs, with important implications for trade policy and multilateral trade negotiations (IDE-JETRO/WTO, 2011; Sturgeon & Gereffi, 2009).

- Identifying the actors that capture the value generated from GVC participation is important for understanding the contribution of GVC engagement to development goals (Escaith & Timmer, 2012; Linden et al., 2009). Even if high-tech or high-value inputs are produced locally, and even if final assembly processes are truly technology-intensive, these activities may be carried out by firms with few meaningful linkages to the domestic economy (Gereffi & Sturgeon, 2013). A number of foreign-owned exporters make use of transfer pricing (Azemar & Corcos, 2009) and advantageous tax treatment and organizational arrangements to repatriate most profits to home countries, leaving few gains beyond labor compensation, limited raw material use and tax income.

There are several initiatives underway attempting to resolve these challenges including linking trade statistics to enterprise-level statistics contained in business registers, developing international input-output (I/O) and trade in value added (TiVA) databases, and formulating and collecting entirely new GVC-oriented economic statistics (Sturgeon & Memedovic, 2010; United Nations Statistical Division, 2011). These I/O and TiVA databases measure the trade in value-added by tracking the input-output dimensions of the value chain. These include regional Input-Output tables (IDE-JETRO), the Global Trade Analysis Project (Purdue University) as well as the OECD/WTO TiVA database. These analyses are primarily focused on determining the value of domestic versus foreign content embedded within a country's net trade.

While such databases are important advances for understanding new international trade patterns, these initiatives are still in their infancy. Some improvements will be needed to better cover trade in services and intangible activities, or to provide information about the ownership characteristics of domestic value creation. Moreover, relying on value-added trade statistics to interpret the participation of developing countries in value chains only partially meets existing measurement needs. For example, the measurement of domestic value added, covers only "parts of exports created domestically"; breaking this category down further into labor, capital, profits and taxes according to firm origin and analyzing the domestic treatment of foreign firms' profits will be an essential next step to measuring the degree to which domestic value added translates to substantial gains for the national economy. These new tools allow researchers to address some analytical challenges, but it is safe to say that the available quantitative data still falls short of enabling rigorous evaluations of the impact of GVCs and the role that firms and industries play within them.

3. What Drives Developing Country Upgrading in GVCs?

This section examines the existing GVC literature to identify how these different factors influence a country's potential to participate in GVCs and how these may differ according to industry type. As GVC studies track the changing way global businesses are structured, they generally focus on specific products or product groups rather than analyzing country-level detail. Although this degree of specificity is an essential aspect of precise GVC analysis, to identify useful generalizations for developing country policies it is necessary to group product-level GVC analyses across multiple developing country contexts. We do so under the categories of agriculture, extractive industries, manufacturing and services. For each sector, a brief overview of the GVC in the context

of developing countries is presented, including opportunities, industry trends and main barriers to entry and upgrading in these chains. These analyses are followed by an explanation of the most important factors affecting GVC participation at the national level.

3.1 Agricultural Value Chains

Rising global demand, driven by urbanization, population growth and an expanding global middle class, has created an important opportunity for developing countries to leverage their comparative advantages in land and labor to enter and upgrade in agricultural GVCs. The international trade of fruit and vegetables alone reached USD 139.6 billion in 2008 (UNComtrade). Motivated by this growing global demand as well as the potential to contribute to poverty alleviation through enhanced incomes and additional rural jobs, developing countries have actively sought to increase production and exports within high-value agricultural subsectors (Weinberger & Lumpkin, 2007). The importance of this sector to developing and developed countries alike is highlighted by the fact that aid agencies, already heavily engaged in agricultural projects, are allocating a growing percentage of their funds to this sector.

Participation in the global agricultural industry, particularly for high-value agricultural products, has changed substantially over the past two decades.[7] Traditionally, agro-food sectors included producers of all sizes that participated in spot markets, where the forces of demand and supply prevailed and the highest bidder purchased the available product. Individual farmers determined the crop varieties grown, their desired quality levels and the production processes used. Today, this simple arrangement has been replaced by a highly complex agro-foods system. Traditional markets organized around local sourcing have been exchanged in both developed and developing countries for vertically coordinated, buyer-driven chains led by large supermarket brands operating in national, regional or international markets. Furthermore, in an effort to meet increasingly discerning consumers, abide by strict food safety standards, and at the same time reduce transaction costs, buyers have tended towards a consolidation of their supply chains, reducing their overall number of preferred suppliers. Preferred suppliers now must demonstrate a strong capacity to consistently supply high quality products, based on established product and process specifications, on schedule and at a competitive cost. Competition is fierce for these limited positions, and suppliers must consistently meet these requirements to retain their position within the chains. [8]

Despite strong demand, the increased consolidation of agricultural GVCs makes it difficult for many developing country firms – especially small producers - to participate and upgrade in these industries. The most important barrier to GVC participation, which has gained the attention of both researchers and policy makers, is the strict set of public and private standards that must be met to gain and sustain access to these chains (Henson & Humphrey, 2009, 2010; Humphrey, 2006; Jaffee et al., 2011; Lee, Gereffi, & Beauvais, 2012; Maertens & Swinnen, 2009; Reardon et al., 2009; van der Meer, 2006). Upgrading into packing and processing is governed by numerous quality and food safety standards, which makes it challenging for developing countries to increase the value earned from their products. Nonetheless, there are several examples of significant upgrading by developing

7. See Reardon et al. (2009) for an overview of changes in international agricultural trade and the emergence of agro-food GVCs.

8. These barriers to entry differ with regional and south-to-south markets. First, a growing number of regional trade blocks provide tariff free movement of goods into regional markets, although developing countries tend to have higher tariff barriers for agricultural products than other sectors (IDE-JETRO/WTO, 2011). Second, regional markets tend to have less rigorous standards, and thus represent lower barriers to entry for developing countries (Diaz Rios & Jaffee, 2008; Kaplinsky et al., 2011). Third, regional chains tend to be less consolidated than global chains, allowing for a larger number of suppliers to participate. Nonetheless, this is beginning to change with a growing number of supermarkets in emerging markets (Reardon et al., 2003).

country firms into these areas, such as in the coffee and cocoa sectors (Fernandez-Stark et al., 2012a).

The rich literature on agricultural GVCs, trade, international business and development covers a wide range of national- and firm-level factors that affect the chain participation of developing countries. Five factors stand out as most relevant: labor costs, availability and skill level; local sanitary and phytosanitary (SPS) standards and their implementation; transportation cost, quality and regulation, industry maturity including the presence of upstream and downstream chain actors; and access to finance. These factors are discussed in detail in Table 3. Other factors that are cited, although less prominently include macro-economic stability (e.g. exchange rate fluctuations (Huchet-Bourdon & Korinek, 2011); business environment (e.g. registration, permits and licensing) (Diaz Rios & Jaffee, 2008); import and export restrictions, such as those that require processing of products prior to export (Henriksen et al., 2010); trade policy (Aksoy & Beghin 2005; Diop et al., 2005; Wilkinson & Rochanson, 2008); and vulnerability to climate, disease and natural disasters (Angelucci & Conforti, 2010; Diaz Rios & Jaffee, 2008; Fernandez-Stark et al., 2012a).

Table 3. Key Factors Affecting Developing Country Competitiveness in Agricultural GVCs

Factor	Description
Productive Capacity: Human capital	• Participation in high-value agriculture GVCs requires large amounts of available, low-cost labor. • SPS regulations and supply chain planning require training for producers. Government extension programs are often inadequate due to understaffing and a bias towards production techniques rather than management tools (Fernandez-Stark et al., 2012a). • Upgrading into higher-value segments of the chain, such as packaging and processing, requires a supply of well-trained management staff, agronomists, quality assurance technicians and biologists (Fernandez-Stark, Bamber, et al., 2011a).
Productive Capacity: Standards & certifications	• Access to end-markets is premised on the establishment and enforcement of strict SPS standards. A recent survey of agri-food importers revealed that 60% of firms cite quality and safety standards compliance as the main factor influencing sourcing and investment decisions (Cattaneo et al., 2013). • Functional upgrading requires the simultaneous upgrading of inspection procedures and regulatory capacity. Some researchers argue that the process of learning to comply with standards drives upgrading by fostering capability development (Diaz Rios & Jaffee, 2008).
Infrastructure: Transportation infrastructure & services	• Poor infrastructure and slow border crossing procedures increase the cost of moving the product from the farm to the pack house to the port/border and finally on to the final destination. • Extended transit time reduces the rate at which trucks can transport goods to ports. • Poor road conditions reduce truck life and increase maintenance costs. • Long and unpredictable customs delays for processing exports can lead to the deterioration of product quality or even the loss of perishable products (WEF et al., 2013). • Specific infrastructure requirements depend on value-to-weight ratio. Some products can easily be shipped by sea while others require air transportation.
Institutionalization: Industry Maturity	• The ability to meet exacting quality and safety standards requires R&D investments and the presence of advanced input suppliers and certified testing laboratories. These are frequently lacking in developing country industries. • R&D investments are necessary to maintain and expand a country's presence in global markets, even for agricultural commodities such as pineapples (Suzuki et al., 2011). • The presence of a local supply base, including as pesticide manufacturers and seedling suppliers, contributes to the ability of exporting firms to secure uninterrupted access to critical inputs (Fernandez-Stark & Bamber, 2013; Fernandez-Stark, Bamber, et al., 2011a). • When certified testing laboratories are not available locally, products must be sent to a third country for testing before they are finally shipped to the end-market. This adds to higher costs and transport delays (Diaz Rios & Jaffee, 2008).
Business environment: Access to finance	• Investment in irrigation systems, greenhouses, and cold storage, is necessary to achieve productivity improvements, quality requirements and satisfy foreign SPS standards (Fernandez-Stark et al., 2012a). In general, however, access to capital continues to be more restricted for agriculture than for other sectors due to a high perception of risk, asymmetrical information problems, lack of guarantees, dispersion in rural areas, and unfavorable economic policies (World Bank, 2008).

Source: Authors.

3.2 Extractive-Industries Value Chains

Extractive-industries have been regarded as a "resource curse" for developing countries for much of the past half century (Morris et al., 2012). Rather than being associated with strong economic growth, important mineral and oil reserves have, in many cases, undermined sustainable development, contributing little beyond fiscal and consumption linkages and giving rise to the widely adopted 'enclave' theory (Farfan, 2005; Morris et al., 2012). Today, high global demand for oil and gas and a strong demand for commodities, to a large degree led by China, offer important opportunities for resource-rich developing countries to enter and upgrade in these GVCs.[9] High commodity prices mean that even those reserves characterized by costly extraction are being seriously considered, and production firms are competing to access these reserves around the world. This high demand has given developing country economies the opportunity to reduce their dependence on primary products exports and increase the value they capture from participating in extractive GVCs by fostering linkages between local suppliers and large foreign extraction firms, improving training of local technicians and management and increasing the potential for knowledge and technology transfer (Morris et al., 2012).

The global mining and oil and gas industry has been a late-comer to the specialization and outsourcing trend (Morris et al., 2012). These have emerged as producer-driven chains; lead firms are those with either ownership or extraction rights to the reserves. The sector was previously characterized by three firm types: small, informal miners; mid-size, formal mining companies; and large, well-capitalized, vertically integrated operations with globally recognized brands such as Anglo American, BHP Billiton and Xstrata. However, it has undergone significant changes in the past decade, driven by the need to reduce costs and focus on core activities. Lead firms have developed lean supply chain management operations and have tended towards contracting fewer, bigger suppliers with highly detailed and demanding standards. The 2008-9 crisis further accelerated these changes. Today, numerous functions are outsourced in production, including engineering, design and project management and drilling operations (Urzúa, 2012). The oil and gas industry has followed a similar trajectory, catalyzed by low oil prices in the 1990s (Bridge, 2008), and today, even highly specialized exploration activities have been spun-off into independent firms (Bridge, 2008). Similar key production functions are being outsourced to global firms with the capacity to operate in multiple regions simultaneously, allowing these firms to secure dominant positions within the chain (Bridge, 2008; Farfan, 2005; Fessehaie, 2012).

The capital, knowledge and technology intensity of these sectors has put firms from emerging economies at a disadvantage and led to the emergence of extractive "enclaves" lacking linkages with the rest of the domestic economy. Domestic firms are mostly hired for lower value, site-specific operations such as construction, support services and non-productive functions (Morris et al., 2012). This is often done to meet local content requirements rather than leveraging comparative advantages. Though there are notable exceptions, such as South African equipment and services suppliers (Morris et al., 2012),10 developing country domestic firms have achieved little substantial upgrading in this sector.

The key factors affecting the sustainable inclusion of developing countries in extractive-industries GVCs can be identified as follows: human capital availability; national systems of innovation; energy infrastructure and services; public governance; and access to finance (Table 4). The last three are particularly important for smaller, domestic firms. These firms often have limited resources to compete for scarce, qualified human capital in developing countries or to invest in

9. The demand for copper in China, for example, grew on average 14.2% per annum between 1990 and 2010 (Fessehaie, 2012).

10. Bell Equipment is a frequently cited example (Morris, Kaplinsky, et al., 2011). This firm developed its capabilities serving the domestic sector and is now a global supplier in a number of markets, including the construction, sugar and forestry sectors.

developing new technologies. In addition to these factors, the lack of a national development policy is offered as an important reason why developing countries have not been able to adequately leverage their natural resources to upgrade in these chains (Farfan, 2005; Morris et al., 2012; Sigman & Garcia, 2012).

Table 4. Key Factors Affecting Developing Country Competitiveness in Extractive-Industries GVCs

Factor	Description
Productive capacity: Human capital	• The sector requires specialized and highly qualified workers at both the technical and professional levels. Strong education and workforce development programs are necessary for countries that wish to include local labor and management in extractive activities (Fernandez-Stark et al., 2012b). • Low-income countries experience difficulties in supplying adequate numbers of local workers in this sector and local training programs do not cover cutting-edge techniques required (Fessehaie, 2012) so these positions are usually filled by expatriates (Sigman & Garcia, 2012). • Upgrading skills and thus incorporating more local personnel in MNC activities presents an important opportunity to add depth to the domestic labor pool. This can contribute to future upgrading, as demonstrated by the case of Chilean engineering services firms (Fernandez-Stark et al., forthcoming).
Productive capacity: National innovation systems	• Extraction technologies have changed rapidly during the last two decades, making the capacity for innovation critical for sustained GVC-participation and upgrading. The high technological intensity presents significant barriers to domestic firms (Farfan, 2005). Oftentimes, lead firms must turn to foreign suppliers to meet technology specifications (Bloch & Owusu, 2012; Morris et al., 2012). • The technology gap is heightened by a tendency among domestic firms to underinvest in R&D (Farfan, 2005).
Infrastructure: Energy infrastructure & services	• Infrastructure needs differ according to the commodity. In general, however, electricity and transportation infrastructure and services are particularly important across the sector. • Extraction often occurs in remote areas beyond established electrical grids. Thus, new infrastructure is often required to support entry and upgrading in extractive GVCs. Given large sunk costs, this is often beyond the fiscal capacity of developing country governments (Hallaert & Kang, 2011). • Transportation infrastructure, on the other hand, is typically financed by firms and thus is not considered a binding constraint for participation in extractive GVCs (Farfan, 2005). • Infrastructure for extractive activities is typically built with only two goals in mind: to maximize the efficiency of extraction and to directly connect extraction points to key ports. Other infrastructure uses are rarely considered. This tendency limits the potential for infrastructure spillovers that might boost intraregional trade or create connections with domestic firms (Sigman & Garcia, 2012).
Business environment: Public governance	• Developing countries' ability to attract and benefit from FDI is contingent upon strong contract enforcement, licensing regulations, utilities pricing mechanisms and institutions for dispute resolution (Sigman & Garcia, 2012). However, bureaucrats in resource-rich countries are notoriously prone to rent seeking, which often results in weakly institutionalized legal and regulatory regimes (Sigman & Garcia, 2012). • Corruption affects permit and licensing processes and can result in significant delays for both production and export activities. The capital intensity of the sector amplifies the cost of these delays. The launch of the Extractive Industries Transparency Initiative in 2002 is meant to address this important problem (Sigman & Garcia, 2012).
Business environment: Access to finance	• The capital, knowledge and technology intensity as well as massive economies of scale require enormous financial commitments (Sigman & Garcia, 2012). Where developing countries do not have fully developed capital markets to finance these investments, opportunities for backward and forward linkages with the host economy are weakened (Bridge, 2008; Fessehaie, 2012).

Source: Authors.

3.3 Manufacturing Value Chains

Since the late 1980s, a number of trends in manufacturing industries have created new opportunities for developing countries to participate in GVCs and upgrade their capabilities over time. First, manufacturing industries have experienced rapid growth in FDI, global production and cross-border trade (Sturgeon et al., 2009). In addition, large firms have become comfortable outsourcing a growing number of "non-core" activities, particularly production and assembly, to suppliers (Gereffi & Sturgeon, 2013). As a result, more and more developing countries are finding opportunities to insert themselves within manufacturing GVCs and, in some cases, develop capabilities for upgrading. Manufacturing GVCs encompass a broad range of governance types (including producer-driven, buyer-driven and modular), geographic scales (global and regional) and production technologies (broadly, labor- versus capital-intensive). Due to such variation, useful analysis requires further disaggregation at the industry-level to understand opportunities and obstacles for developing countries wishing to upgrade (Giuliani et al., 2005; Lee, Gereffi, & Nathan, 2012). Furthermore, it should be kept in mind that manufacturing GVCs embody significant services content (around 42% for G20 economies in 2009), which is difficult to isolate within the chains. In this section, we will briefly highlight important characteristics in three different manufacturing GVCs: apparel, automotive and mobile handsets. These industries conceptually correspond with low-, medium-, and high-tech manufacturing, respectively.

3.3.1. The Apparel Industry

Apparel production is considered an important catalyst for national development, and has been a typical starter industry for countries engaging in export-oriented industrialization since the 1970s due to its low fixed costs and emphasis on labor-intensive manufacturing (Fernandez-Stark, Frederick, et al., 2011). Since the Multi-Fiber Arrangement (MFA) was phased out in 2005, new factors such as labor cost, productivity and firm capabilities, have been brought to the fore for countries wishing to participate in apparel GVCs. The apparel industry is global in scope and is the prototypical example of a buyer-driven GVC (Gereffi, 1994, 1999) meaning that GVCs are shaped by the strategies of retailers and branding firms in developed countries who set the terms by which developing country producers throughout the world participate in production.

Upgrading in apparel chains entails the movement from simple assembly (cutting and sewing) of imported textiles to sourcing fabrics and distributing finished products[11] to the design and branding of garments (Fernandez-Stark, Frederick, et al., 2011; Frederick & Gereffi, 2011). Those countries that have been most successful in upgrading efforts have managed to develop strong backward linkages into textile production and diversified forward linkages into multiple end-markets (Frederick & Gereffi, 2011; Goto et al., 2011; Staritz & Morris, 2013; Tokatli & Kizilgun, 2009). Upgrading generally requires a strong public and private commitment to developing the necessary human capital, as illustrated in Table 5.

11. In the GVC literature, this is referred to as full package supply or original equipment manufacturing (OEM).

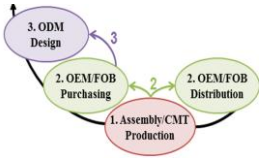
Table 5. Workforce Development and Functional Upgrading in the Apparel GVC

<table>
<tr><th colspan="2">Upgrading Trajectory</th><th colspan="2">Workforce Development Implications</th></tr>
<tr><td rowspan="2">Assembly (Entry in the value chain)</td><td rowspan="2"> 
</td><td colspan="2">Reliance on in-house training provided by supervisors to ramp up new machine operators. Technical staff, such as mechanics and engineers, may benefit from additional external training programs.</td></tr>
<tr><td>Skills Preparation

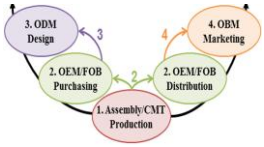
On-the-job training in operation of machines, cutting and pressing equipment.</td><td>Institutions

Private sector/ Industry associations
Donor agencies</td></tr>
<tr><td rowspan="2">OEM/ Full Package (Functional Upgrading)</td><td rowspan="2"> 
</td><td colspan="2">Firms learn buyer preferences, build relationships with textile suppliers and retail outlets. Recruit experienced employees from the textile industry. New staff hired for financial and logistics functions.</td></tr>
<tr><td>Skills Preparation

On the job training in textiles, sourcing, supply chain coordination, logistics & cost optimization.
Secondary and tertiary education</td><td>Institutions

Private sector
Educational institution</td></tr>
<tr><td rowspan="2">Product Design (ODM) (Functional Upgrading)</td><td rowspan="2"> 
</td><td colspan="2">In-house designers work in tandem with buyers' designers to gain deeper understanding of preferences. Design functions require innovative skills related to new product development, knowledge of global standards, processes and information technology.</td></tr>
<tr><td>Skills Preparation

Technical training in design.
Tertiary education</td><td>Institutions

Private sector/ industry association
Educational institutions
Government</td></tr>
<tr><td rowspan="2">Product Brand (OBM) (Functional Upgrading)</td><td rowspan="2"> 
</td><td colspan="2">The supplier develops know-how related to brand promotion from lead buyers. Firms hire employees with skills related to marketing and consumer research. Developed country consultants can provide important training for the firm.</td></tr>
<tr><td>Skills Preparation

Soft skills and managerial skills training
Tertiary education</td><td>Institutions

Private sector (in-house and external trainers)
Educational institutions (universities)</td></tr>
</table>

Source: Fernandez-Stark, Frederick et al., 2011.

For instance, one of the main impediments to upgrading among Latin American producers vis-à-vis Asian producers has been the lack of diversification among end-markets, which has limited the potential for economies of scale and left producers vulnerable to shocks in demand (Frederick & Gereffi, 2011; Staritz & Morris, 2013). Historically, government support has been a critical catalyst to developing firm capabilities and shaping access to end-markets, as in the recent example of Chinese "supply chain cities" (Gereffi, 2009).

3.3.2. The Automotive Industry

Global automotive production has more than doubled since 1975, from 33 to nearly 73 million vehicles in 2007 (Sturgeon et al., 2009), a trend that has been facilitated by growing middle classes in large, emerging economies such as China, India and Brazil. Automobile manufacturing – a typical producer-driven GVC (Gereffi & Korzeniewicz, 1994)– exhibits many characteristics which set it apart from apparel manufacturing and is thus associated with different upgrading trajectories. Whereas the globalization of production networks characterizes the apparel industry, regional production is the norm in automotive manufacturing; both final assembly and component-production take place close to end-markets (Miroudot & De Backer, 2012; Sturgeon & Biesebroeck, 2011; Sturgeon et al., 2010). This is due to several factors: components and final goods are heavy and

difficult to ship; product markets are country-specific; assembly is highly concentrated within a handful of lead firms; and product development requires close collaboration between suppliers and lead firms (Contreras & Carillo, 2010; Sturgeon et al., 2010).

These unique technology and governance characteristics imply that upgrading opportunities within the automotive industry will be very different from those for apparel. Case evidence from Asia and Africa suggests that careful attention to standards and certifications as well as the development of joint ventures between local firms and global suppliers has been tied with growth in exports and technology upgrading (Barnes & Morris, 2008; Black, 2009; Wad, 2009). The cost and availability of skilled human capital is another important factor for upgrading, placing the development of engineering and design skills at the fore (Contreras & Carillo, 2010). In addition, upgrading in the automotive industry is tied to public commitments to policies that both promote FDI and facilitate innovation among firms (Barnes & Morris, 2008; Ozatagan, 2011; Sturgeon & Biesebroeck, 2011; Wad, 2009).

3.3.3 The Mobile Phone Industry

The rise of well-organized GVCs combined with declines in transportation costs have also contributed to the offshoring of high-tech manufacturing from developed to developing countries (Xing & Detert, 2010). Understanding trends in global trade and country upgrading in electronics GVCs is extremely difficult, however, as currently available trade statistics do a poor job of capturing two important characteristics of electronics GVCs: the pervasiveness of re-exports and the embedding of IT services within manufactured electronics products (Sturgeon & Gereffi, 2009; Sturgeon & Kawakami, 2010). This brief section uses the example from the mobile handset industry in order to outline opportunities and challenges for upgrading among developing countries in electronics manufacturing.

In spite of globalized production, quantitative studies of mobile handset GVCs reveal that most value-added in this industry remains in developed countries, suggesting that upgrading among developing countries remains fairly limited, as production activities remain limited to assembly and the supply of low-value, commoditized inputs (Ali-Yrkko et al.; Dedrick et al., 2010; Xing & Detert, 2010). Moving into higher-value activities such as design and product development is difficult; the quick pace of innovation in the mobile handset industry (and within other product categories in the electronics industry) places enormous pressure on developing countries to keep up with rapidly changing technology frontiers and presents a substantial barrier to upgrading in countries with low R&D expenditures (T. Sturgeon & Kawakami, 2011 (Sturgeon & Lester, 2004). For example, in the early 2000s, Brazil played the role of a major regional producer of mobile feature phones, exporting 10 million units and importing only 1.3 million units. By 2010, the industry shift to smart phone technology left Brazilian manufacturers in an uncompetitive position; as imports skyrocketed to 15.7 million units, exports declined to 7.4 million units (Gereffi & Sturgeon, 2013).

Five central factors affecting developing country participation in manufacturing GVCs are described in Table 6. These include the cost, quality and availability of human capital; the ability to meet public and private standards and certifications; the national innovation system; cost and quality of transportation infrastructure and utilities; and trade policy and facilitation. These factors are relevant to upgrading within low-, medium- and high-tech manufacturing GVCs, yet the requirements within each category tend to be product- and industry-specific (e.g. engaging with automotive GVCs requires a different infrastructure and skills profile relative to apparel manufacturing).

Table 6. Key Factors Affecting Developing Country Competitiveness in Manufacturing GVCs

Factor	Description
Productive capacity: **Human capital**	• Labor cost is an important factor to participate in labor-intensive GVC processes. • Skilled workers are necessary to comply with standards and lead firms' quality requirements. The capacity of workforce development institutions, from vocational training centers through universities, to identify and quickly fill labor market gaps shapes prospects for upgrading (Fernandez-Stark, Frederick et al., 2011). • The ability of East Asian countries to mobilize large numbers of low-cost workers has been critical to the success of the region's apparel and electronics industries (Frederick & Gereffi, 2011; Gereffi & Sturgeon, 2013). Nonetheless, participation in these GVCs requires high levels of workforce skills in order to ensure firms' ability to comply with the technical requirements of lead firms.
Productive capacity: **Standards & certifications**	• Compliance with international standards is a pre-requisite for participating in manufacturing GVCs (Nadvi, 2008). Such standards include corporate codes of conduct issued by specific lead firms to their suppliers, as well as various types of more general process standards, such as ISO standards. • Some manufacturing chains, such as aerospace or medical devices requires strict adherence to product standards set by government agencies. • Multilateral public standards, such as the ILO's Better Work program, as well as hybrid public-private efforts, such as the Ethical Trade Initiative, offer new models of regulating manufacturing GVCs (Fernandez-Stark, Frederick et al., 2011).
Productive capacity: **National systems of innovation**	• Strong linkages between firms, universities, and public and private research organizations contribute to upgrading within manufacturing GVCs. • Public and private initiatives focusing on innovation systems have proven to be important facilitators of upgrading in the automotive industries in Turkey, Thailand and Mexico (Natsuda & Thoburn, 2011; Sturgeon et al., 2010; Tokatli & Kizilgun, 2009). • Likewise, emerging economies looking to participate in electronics manufacturing have found it necessary to develop (and maintain) the capacity for research, design and product innovation (Gereffi & Sturgeon, 2013; Sturgeon & Kawakami, 2010). • Even in lower-tech industries like apparel, firms' ability to move into design activities depends on institutional supports for innovation (Tokatli & Kizilgun, 2009).
Infrastructure: **Transportation, energy and water infrastructure & services**	• Transportation infrastructure, including roads, ports and airports, determine the cost and speed with which goods can be brought to manufacturing firms for processing and shipped out for further value-addition or delivery to end-markets. • The cost and reliability of water and electricity infrastructure contributes to the attractiveness of a location for manufacturing and shapes FDI inflows (Barnes & Morris, 2008; Tokatli & Kizilgun, 2009). IT infrastructure facilitates the transmission of codified design specifications and has come to play an unprecedented role in shaping the ability of firms to participate in GVCs across the technology spectrum (Barnes & Morris, 2008; Frederick & Gereffi, 2011; Lee, Gereffi, & Nathan, 2012; Miroudot & De Backer, 2012).
Trade & investment policy & facilitation	• As manufacturing GVCs have grown more globally fragmented, the cost and time associated with importing intermediate goods from abroad greatly impacts countries' attractiveness for specific GVC activities. • The rise of the regional trading blocs especially has implications for the development of manufacturing GVCs. Preferential market access through regional trade agreements has contributed to the consolidation of regional GVCs in manufacturing industries including automobiles and apparel (Frederick & Gereffi, 2011; Sturgeon et al., 2010). • Even the perceived threat of trade protectionism can profoundly influence the attractiveness of countries for FDI. For example, lead firms in the auto industry implement "voluntary" import limits in order to diffuse political pressure for protectionism (Sturgeon et al., 2010). • Beyond tariffs, "soft" aspects of trade policy, including onerous import-export procedures and long border transit times, can prove barriers to GVC insertion (Gereffi and Sturgeon, 2013).

Source: Authors.

3.4 Services Value Chains

Understanding the role of developing countries in service sectors presents several difficulties. First, measuring services trade is difficult (Sturgeon & Gereffi, 2009); today, many services are "delivered" to the client over the internet, and the reporting of these transactions is imperfect. While strides have been made to improve services trade measurements (Sturgeon, forthcoming), data remains incomplete and sometimes unreliable. The second problem in studying services is the difficulty of exactly defining the field of these economic activities (Tejada et al., 2011). Services are

often intangible and multi-sectoral in nature, and consumption and production can take place simultaneously. This challenge is exemplified in the different way services are discussed in the international trade and GVC literatures. The growing literature on international trade in services broadly considers services exports to include cross-border trade, consumption abroad, commercial presence abroad and the movement of natural persons, encompassing transportation, telecommunications, retail logistics, as well as professional services, and various forms of tourism (Bochert et al., 2012; Grover Goswami et al., 2010).

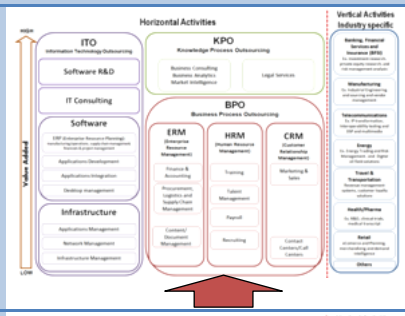
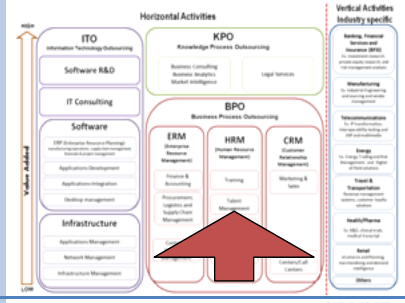
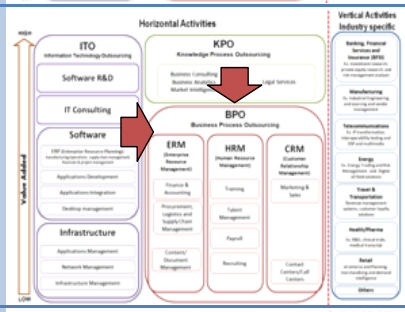
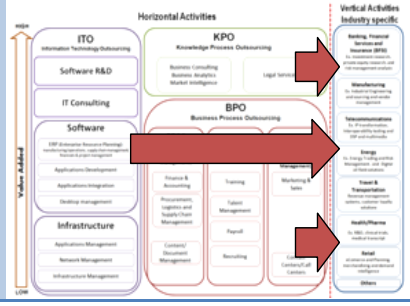
The GVC literature to date, on the other hand, has mostly treated transportation, telecommunications and other utilities and logistics as services that facilitate the production and movement of goods (IDE-JETRO/WTO, 2011). Few attempts have been made to study the value chains of these services.[12] The two key areas which have received attention from GVC researchers are offshore services and tourism (Christian, 2010, 2012, 2013; Fernandez-Stark, Bamber, et al., 2011b, 2011c; Fernandez-Stark et al., 2013b; Tejada et al., 2011). In this paper, due to its similarities with cross-border trade in the other sectors discussed, we will concentrate on offshore services.

3.4.1 The Offshore Services Industry

The offshore services industry has been identified as a major opportunity to engage developing countries in the global knowledge economy. The separation of the provision and consumption of services has been facilitated by the ICT revolution. Offshore services have grown exponentially in the past two decades, offering high quality jobs and career development alternatives with plentiful opportunities for workforce development (Fernandez-Stark, Bamber, et al., 2011b). Drawn by these potential benefits, developing countries offer attractive incentive packages to companies to use their territory as a services export platform (Fernandez-Stark et al., 2013b; Gereffi et al., 2009). While the industry initially expanded based on low-cost, yet educated labor forces around the world, more sophisticated, knowledge-intensive work is now being performed abroad. This has increased the importance of the supply of scientific, engineering and analytical talent offered by developing countries (Couto et al., 2007). Table 7 illustrates how developing countries have upgraded in this sector.

12. The trade literature, which has primarily used gravity models and the GVC literature based on company and country analysis coincide in their findings on the factors that affect competitiveness in service exports.

Table 7. Examples of Select Upgrading Trajectories in the Offshore Services GVC

Type	Diagram	Description
Entry into the Value Chain		• Common way to enter the offshore services value chain is through the establishment of call center operations. • Opportunity for low-income countries to enter into the knowledge economy. **Examples** of countries entering the value chain through call centers include **El Salvador** (Dell, Sykes and Teleperformance), **Nicaragua** (Sitel), **Panama** (HP and Caterpillar) and **Guatemala** (Exxon Mobil, ACS and 24/7 Customer) (Gereffi et al., 2009).
Upgrading within the BPO Segment (Functional Upgrading)		• Companies expand their BPO services within the segment. • Improving and expanding call centers operations or specialization in certain areas. **South Africa** has been an important destination for BPO services employing around 87 000 people in 2010 and growing at 33% per year. South Africa is actively working in expanding their BPO activities (Everest Group and Letsema Consulting, 2008; Sykes, 2010) .
Broad Spectrum Services (Functional Upgrading)		• Companies positioned in the ITO and KPO segments may opt to provide a more comprehensive range of activities and include BPO services. • Acquisitions of smaller BPO firms and/or creating a new business unit within the company. **India** has seen a number of firms in the IT and consulting (KPO) segment expand to the BPO sector. This is true for both big domestic firms like Infosys, Wipro and also foreign firms located in India like IBM and Accenture.
Industry Specialization (Intersectoral Upgrading)		• Companies offering some ITO, BPO and KPO services for a wide range of industries start specializing and focus on key industries to develop expertise. The **Czech Republic**, which entered into the industry through the establishment of BPO shared services activities, quickly upgraded into R&D segments of vertical industries, particularly in the automotive, aerospace and IT areas (Business and Innovation Center- Brno, 2009).

Source: Fernandez-Stark, Bamber, et al., 2011b.

This rapid spread of the industry to a wide range of low- and middle-income countries highlights the low nature of the barriers to entry in this industry, although lack of harmonization on professional certifications and requirements for local presence can create potential hurdles in the short-term (Bochert et al., 2012). Competitiveness in this chain is affected by a number of factors. Drawing on both the academic research as well as several consulting firm indices that have been broadly adopted for understanding location attractiveness in offshore services (AT Kearney, Garner and McKinsey Location Readiness Index), five key factors driving participation in the sector can be identified: the cost, availability and quality of human capital; standards and certification; the national system of innovation; telecommunications infrastructure; and geographic location (e.g. time zones). These five factors are discussed in further detail in Table 8. Other factors cited in the literature

include industry maturity (Dossani & Kenney, 2007), trade agreements (Athreye, 2005), and the presence of a diaspora in the target market (Sudan et al., 2010).

Table 8. Key Factors Affecting Developing Country Participation in the Offshore Services GVC

Factor	Description
Productive capacity: Human capital	• Human capital is by far the most important factor for linking to this GVC (Fernandez-Stark et al., 2010b; Fernandez-Stark, Bamber, et al., 2011b; Grover Goswami et al., 2010; Sudan et al., 2010; Wadhwa et al., 2008). • Labor quality encompasses several workforce characteristics: education level, language skills, cultural affinity and internationally recognized qualifications. • The cost and availability of labor are also important drivers of competitiveness. Low value services such as call centers require abundant, low-cost labor, while higher value services depend more on quality than quantity – relying on smaller pools of highly skilled individuals. • Rapid growth in the offshore services sector, especially within small countries like Costa Rica can lead to upward pressure on wages (Fernandez-Stark, Bamber, et al., 2011c).
Productive capacity: Standards & certifications	• Due to the sensitive nature of the information contained within offshore services transactions, such as human resources and financial records, data protection is fundamental to participation in the industry. • Participation in financial and accounting services chains requires compliance with especially demanding standards. National regulation of data protection must be in place, and third party providers must comply with private information security standards, such as ISO 27001 Information Security Management System.
Productive capacity: National systems of innovation	• National systems of innovation play a very important role in driving the knowledge and technology advances associated with upgrading in this sector. • Relevant players include the private sector, the government and educational institutions. In countries that have successfully upgraded, it is common to observe third party services providers working in partnership with local universities and with the support of the government. This type of coordination is mandatory for developing nations seeking to move beyond call centers operations.
Infrastructure: Telecommunications infrastructure & services	• A country's telecommunications infrastructure plays a key role in facilitating entry into the global offshore services industry. Telecommunications readiness is premised upon broadband internet availability rather than internet penetration, though other characteristics of the telecommunications infrastructure, including quality, cost and reliability, are also critical (Grover Goswami et al., 2010). • Many companies require redundancy, and thus prefer countries with multiple telecom providers and multiple international gateways (Sudan et al., 2010). • Relevant infrastructure may be improved through liberalization of the telecommunications sector, which allows for competitive pricing and technological upgrading.
Other: Geographic location	• Geographic location affects potential participation in the chain. Similar time zones to key markets have been found to offer important advantages (ECLAC, 2008). • Latin America as a region has benefitted from its proximity to the US market, as its relative costs versus the US and Canada favors its inclusion (Fernandez-Stark et al., 2013b). Similarly, Egypt and South Africa have benefited from their locations with respect to the EU market (Ahmed, 2013; Grover Goswami et al., 2010).

Source: Authors.

3.5 Comparison of Competitiveness Factors Across Sectors

The varying importance of these different factors across sectors is highlighted in Table 9 below. Four key points deserve special mention. First, human capital, national innovations systems and standards and certifications systems – all related to developing capabilities – are emphasized in all of the industry studies. This indicates the multiple ways in which these factors especially shape prospects for GVC participation and upgrading. Second, infrastructure needs differ substantially across different sectors and thus should clearly not be seen in aggregate.

Table 9. Differences in Factors Affecting Developing Country Competitiveness by Industry

	Agriculture	Extractive Industries	Manufacturing	Offshore Services
Productive capacity	**Human capital**			
	New technical & business administration skills required to meet quality and on-time delivery needs of buyers. Specific skills for upgrading.	Knowledge and capital intensity means that fewer but more highly trained technical and professional staff are required.	Lead firms need more skill in technical positions. Upgrading beyond assembly requires sourcing professionals.	Human capital is the main input for business; upgrading depends completely on skill and qualification levels.
	National innovation systems			
	Innovation needed in various stages: seedling production, advances in irrigation and greenhouse productivity, processing, marketing, etc.	Technology-intensive sector; domestic firms must be on cutting edge.	Particularly important for high-tech product segments; also for upgrading into product development, design & marketing.	Important for software development & human capital development in general.
	Standards & certifications			
	Requirements for entry to high-value markets e.g. GlobalGap (production), HAACP (packing & processing), etc. Buyers also have own standards (e.g., Tesco's Nature's Choice).	Less emphasis, but emerging in areas of social & environmental protection (e.g., Kimberley Process Certification on blood diamonds).	Quality (ISO) certifications key in modular production; even more important for consumer safety, e.g., medical devices (1SO 13845). Buyers have own standards (e.g., Ralph Lauren).	Particularly important to data protection (ISO 27001) standards and legislation. Employee qualifications must align with target market (e.g., Accounting CPA qualifications).
Infrastructure & services	**Transportation & water** Quality of perishable goods is time-sensitive. Commodities require bulk transportation. Water essential for irrigation.	**Energy** Operating costs for extraction and processing; transportation infrastructure usually built by firm.	**Transportation, energy and water** Essential for movement of inputs & outputs, and operating costs	**ICT** Main medium for cross-border service exports; all transactions depend on its reliability & speed.
Business environment	**Access to finance** Vital for investments to meet standards; agriculture in developing countries has large proportion of small and medium-sized producers; heightened difficulty accessing credit due to information asymmetry.	**Access to finance** Capital and technology intensity & economies of scale require enormous financial commitments. **Public governance:** Corruption affects permit processes and can result in significant operational delays. Rent-seeking prominent in resource-rich countries.	SEZs largely used to insulate foreign manufacturing operations from poor business & investment environment. Domestic firms face greater challenges.	Industry-specific investment policies frequently used to overcome challenges to attract investment. Domestic firms would benefit from revision of "collateral" requirements to access credit due to emphasis on human capital inputs rather than equipment.
Trade & investment policy	**Trade Policy (TP) & Trade Facilitation (TF)**			
	TF: Important for exports of perishables; products cannot be delayed in customs. TP: Mostly problematic on upgrading with tariff escalation.	Domestic firms often do not have access to tariff free imports secured by foreign firms. Equal treatment in trade policy is required to support development of local firms.	For sectors with highly fragmented production, cost & time associated with intermediate goods trade (TF) greatly impact location attractiveness for specific GVC activities.	TP related to services still limited, unless services are embedded with manufacturing (e.g. software). TF often irrelevant – services are emailed/ performed online & not always reported.
	Investment Policy			
	Sector generally defined by domestic firms due to land policy. FDI growing in importance -- e.g., Starbucks recently purchased a coffee farm in Costa Rica for R&D.	Sector dominated by FDI, but growing presence of national producers, processors and suppliers in developing world. More emphasis needed on domestic linkages.	In Asia, more balance between FDI and domestic firms than other regions. FDI often faces attractive conditions through SEZs.	Sector led by FDI from industrialized economies and India, although potential for local firms in niche areas.
Institutional-ization	Presence of input suppliers & certified testing laboratories depend on scale economies; often beyond developing country producer size.; Associations/cooperatives can help meet supply needs.	Weak local institutions & industry replaced easily by vertical integration or foreign companies. This limits developing countries from capturing higher value from their natural resources.	The diversity of industries and workforce requirements in this sector place a premium on multistakeholder partnerships, especially for social and environmental upgrading.	Not required but useful to engage educational institutions in supporting skills development for upgrading.

Source: Authors based on literature review.

Third, trade facilitation efforts of reducing border crossing complexity are a 'win-win' in product-based value chain segments,[13] as they reduce wasted resources. Improving border administration and infrastructure quality, availability and cost, for example, eliminates resource waste and could increase global exports by 9.4% and global GDP by 3% (WEF et al., 2013). The impact of other trade policies is less clear. Fourth, investment policies and policies to foster the development of local suppliers play central roles in determining how developing countries can access and upgrade in GVCs as well as the net benefits that are accrued domestically. Across the sectors, perhaps with the exception of agriculture, emphasis has traditionally been placed on attracting MNCs alone, and insufficient attention has been paid to fostering the growth of local firms.

Productive Capacity: Human Capital, National Systems of Innovation and Standards Compliance

Tailoring skills training and other human capital development initiatives is essential for developing countries to enter and upgrade within industries. Developing countries often face bottlenecks in filling key technical positions to meet the process upgrading requirements of GVCs. Human capital is especially a constraint for developing countries in which limited educational resources have been targeted towards professional and university education rather than technical and vocational education (Fernandez-Stark et al., 2012b). Technical workers are often central to ensuring standards compliance, be it ensuring traceability of foodstuffs, operating large drilling equipment or ensuring each product run in the factory meets quality requirements. Skills-training in developing countries is often undertaken by the government alone – particularly in the agricultural and mining sector. However, these programs tend to be understaffed and are based on outdated methodologies. Leveraging buyers to train local staff can be a more efficient means of knowledge transfer in the context of GVCs because information is up-to-date and corresponds to the needs of the lead firms.

By fostering linkages between people, companies (domestic and foreign) and institutions, national systems of innovation (NSI) support the kinds of human capital formation, related to engineering and product development, that promote knowledge dissemination, innovation, and upgrading (Pietrobelli & Rabellotti, 2011). These are particularly important for both improving the position of local firms and attracting FDI in the manufacturing, offshore services and mining value chains, given the rapid pace at which technology requirements evolve in these sectors. However, NSI are often absent or weak in developing countries, and there is a tendency to relegate their importance to only high-value product development stages of the chain. The limited R&D that is performed is typically underutilized as a result of poor coordination and collaboration between different actors (Farfan, 2005; Gereffi et al., 2011).

Standards compliance is also related to capabilities development. While seemingly straightforward, the requirement of compliance with standards constrains developing countries for two key reasons. First, when developing country actors are seeking to enter or upgrade into a new segment of the value chain, demand for certifications is limited; due to these poor economies of scale, the private sector firms that offer training and certification services are generally absent from the market. Firms must perform market research in-house to determine the certification requirements and import auditors. Second, and perhaps more importantly, developing country firms often lack the available personnel and financial resources to undergo the certification process, and maintain the certification in time due to their relative size. The varying role of standards in different end-markets though offers developing country firms alternatives. Global markets, typically dominated by the European Union and the United States, tend to have strong standards at the public, private and civil society levels, so standards compliance has become a pre-requisite for entry in GVCs serving these markets. Yet in emerging markets, standards are often lower for a number of reasons: public

13. See WEF (2013) and Moise & Sorescu (2013) for a recent estimates of the cost savings and trade impacts of the implementation of trade facilitation measures.

institutions have not sufficiently developed to put in place rigorous health and safety standards; consumers are less educated, demanding less differentiated products (easing private standards); and civil society is often less active, reducing the role of environmental and social requirements.

Infrastructure

The cost and quality of infrastructure are important binding constraints on trade and economic growth (IDE-JETRO/WTO, 2011; OECD/WTO, 2011, p.13).[14] The specific infrastructure characteristics required for GVC participation vary substantially by industry. Land transportation, port infrastructure and energy are most important to manufacturing and extractive industries; transportation and water infrastructure are vital for agricultural chains; telecommunications infrastructure is essential to generating offshore service exports, while transportation services are not particularly relevant in this sector. Furthermore, the type of transportation infrastructure required for participation in particular GVC segments also depends on the value to weight ratio and/or perishability of the products. It is not uncommon for certain products with a high value-to-weight ratio, such as notebook computers and perishable agricultural products, to be air freighted, whereas heavier items such as automobiles are shipped by sea or overland by truck. Developing countries should strategically target infrastructure development that is specific to the GVC sectors which they seek to engage. Furthermore, infrastructure investments should be planned and implemented with a view to building backward and/or forward linkages in order to drive upgrading in upstream and downstream GVC segments.

Trade Policy and Facilitation

A number of generalizations can be drawn concerning the role of traditional trade policy and facilitation in promoting GVC upgrading. First, trade policy is a key factor for competitiveness in manufacturing GVCs because these chains feature a relatively large amount of processing trade (i.e. the supply of these chains is the most highly fragmented) (Miroudot & De Backer, 2012, p. 15). This trade frequently occurs between developing countries. High import tariffs add costs to the processing assembly of imported intermediate goods. Second, the countries with which bilateral or regional trade agreements are signed matter critically for upgrading opportunities. In the case of agricultural value chains, trade liberalization among developing countries can do little to remove constraints to upgrading if developed countries retain high tariff barriers. Finally, the substantive characteristics of trade agreements matter as well. Short-term trade agreements, such as the CAFTA-DR Trade Preference Levels (TPL) and the African Growth and Opportunities Act (AGOA) between Central America and Africa, respectively, and the US are crucial to the ability of small countries such as Nicaragua and Lesotho to continue to compete in the global apparel industry. However, these agreements are set to phase out before 2015 unless they are renewed. The temporary nature of these agreements provides short-term advantages for beneficiaries but also highlights the uncertain prospects for the future of the apparel industry in countries that still lack the infrastructure, scale and industrial maturity to compete internationally in the absence of preferential market access.

Along similar lines, the implementation of special economic zones (SEZs) can have ambiguous implications for GVC participation (Farole, 2011). Creating SEZs can help to attract GVC activities that are highly responsive to tariffs and thus may feature as a strategy for insertion. However, if participating firms engage in little more than processing activities, SEZs do not necessarily help to create the sorts of spillovers and linkages that facilitate upgrading among domestic firms (Cattaneo et al., 2013). Oftentimes, MNCs that locate facilities within SEZs do so as part of a cost-reduction strategy and may therefore be less likely than domestic firms to prioritize functional upgrading or R&D investments.

14. Hallaert and Kang (2011) find the reliability of electricity supply to be the most important constraint to trade for all developing countries.

Investment Policy

Prospects for upgrading among developing countries also depend on the linkages between firms that have engaged in GVCs, whether foreign or domestic, and the local economy. Patterns of value added in GVCs are shaped to a significant extent by the investment decisions of MNCs, which are estimated to account for 80% of global trade (UNCTAD, 2013, OECD/WTO/UNCTAD, 2013). The value added contribution of GVCs can be relatively small when imported contents of exports are high, GVC participation is limited to low-skilled and low-value parts of the chain or large parts of the value are generated by MNC affiliates and repatriated, leading to low "value capture" in domestic hands. However, GVC participation generally tends to lead to job creation and to higher employment growth, while reinvestment of GVC earnings by foreign affiliates is on average almost as significant as repatriation. Greater gains are felt when MNCs contribute to workforce development, forge linkages with local firms, and engage with local institutions, such as industry associations and universities, in the development of local industry (Gereffi et al., 2011). [15]

Indeed, the extent to which GVC participation impacts economic development hinges upon the depth of domestic integration into the international economy. The presence of domestic firms helps to ensure more sustainable participation in GVCs in the long term, even when increasing costs threaten sustained engagement in the chain. Domestic firms typically confront important challenges that limit their participation in GVCs, such as compliance with the multitude of regulatory standards and lead firm requirements (such as cost, lead-time and batch size) that characterize GVCs (OECD, 2008). Shortcomings in the local institutional context, such as poorly functioning financial markets, poor infrastructure, limited human capital and weak local industry networks, limit the ability of domestic firms to take advantage of opportunities for GVC participation (Fernandez-Stark et al., 2012a, 2013a; WEF et al., 2013). In this context, developing capabilities within niche activities characterized by low capital-intensity offers important opportunities for firms in developing countries. However, the opportunities for local firms to increase productivity and upgrade to higher value added activities depend not only on the type of GVCs in which they operate but also on the business and institutional environment in the economy and on their capacity to move towards increased technological sophistication and domestic value added creation (OECD/WTO/UNCTAD, 2013).

Table 9 and the discussion above illustrate that a more nuanced treatment of these competitiveness factors is required across sectors; the analysis also suggests that closer analysis of country differences is important. Factors such as size, level of development and geographic location all affect GVC competitiveness and developing countries thus vary in their approach and capacity to implement industry-specific upgrading strategies. Less developed countries are more resource-constrained to improve infrastructure and training, and small countries tend to have more difficulty then large countries in securing access to reliable supplies of strategic inputs, due to lack of

15. The apparel industry in Lesotho, where firms from Chinese Taipei and South Africa are the two predominant sources of FDI, provides an interesting example of how FDI can affect upgrading (Staritz & Morris, 2013). Subsidiaries from Chinese Taipei have set up operations in Lesotho to leverage competitive labor costs and the country's preferential trade agreement with the United States. Workforce development in factories in Chinese Taipei has been limited, and managers are mostly foreign nationals with no knowledge of the local language, which limits human capital spillovers (Gereffi et al., 2011; Morris, Staritz et al., 2011). This model has done little to contribute to Lesotho's medium to long term upgrading prospects. Indeed, observers suspect that increases in labor costs and the phasing out of the TPL will likely result in the exodus of Chinese Taipei manufacturers. South African operations, on the other hand, typically followed a different business model, focused on short production runs for the regional (rather than global) market. South African operations require multitasking and higher worker productivity. Thus, active engagement with and development of local skills is an important element of their approach (Morris, Staritz et al., 2011). South African firms are likely to remain, as Lesotho is the cheapest production location in the regional value chain.

economies of scale and access to finance. Countries with small labor markets soon experience upward pressure on wages when demand for manpower in GVC sectors grows (Fernandez-Stark et al., 2013a). In the case of small island states, geographic isolation and vulnerability to natural disasters present a further obstacle to GVC participation (Angelucci & Conforti, 2010).

4. Competitiveness Policies for Developing Countries in Regional and Global Value Chains

There is scope for policy interventions in several areas to foster growth in GVCs. Horizontal policies with economy-wide effects, such as a stable economic and political environment, human capital development, and a national infrastructure of roads, ports and telecommunications systems, have been widely embraced. Sector-specific policies, on the other hand, are viewed as "picking winners", and have thus been discouraged in the past (Gereffi & Sturgeon, 2013). Today, there is an emerging shift towards the idea that in order to engage in specific GVCs countries require policies that go beyond broad initiatives focused on fostering competitiveness and investments (Gereffi & Sturgeon, 2013; Milberg et al., Forthcoming; OECD, 2013; OECD/WTO, 2011). Policy approaches that facilitate the entry and upgrading of developing countries into regional and global value chains can be divided into two groups: economy-wide, horizontal policies which are important to providing the basic necessary conditions participate in international trade, and policies which are designed to support entry into specific segments of a GVC (Gereffi & Sturgeon, 2013). Today, in countries that have successfully engaged in linking to and upgrading in GVCs, several institutional actors including governments, businesses, industry associations, NGOs and international organizations have begun to address these constraints more actively (Gereffi et al., 2011).

4.1 A GVC-Oriented Policy Framework

GVC-oriented policies differ from industrial policies such as import substitution industrialization since they are focused on driving growth in particular segments of the value chain and not on developing fully vertically integrated industries. Furthermore, under GVC-oriented policies, local industries continue to engage with demand in the global economy, and they depend on, rather than avoid, imported content as a means of enhancing core competencies (Gereffi & Sturgeon, 2013).

The first stage of building a GVC oriented framework is for developing countries to determine where their trade profile and industrial capabilities stand and evaluate realistic GVC development paths Once this is understood, a strategy should be developed encompassing the following six areas of GVC-oriented policy: investment, trade, domestic firm development, workforce development, infrastructure, and industry institutionalization; that is, the interaction between the different stakeholders in the industry. In order to create effective and sustainable policies to engage countries in GVCs, it is imperative to adopt a holistic approach to these six areas.

***Investment Policy*:** In order to actively promote GVC participation, policymakers should seek to create a conducive investment environment and encourage entrepreneurship. Such an environment is shaped by a broad range of policy areas, starting with the improvement of public governance, increased predictability of the regulatory framework and the enhancement of the tax and corporate governance frameworks. The overall policy environment for businesses, including labor market regulation, intellectual property, access to land and trade facilitation, as well as policies addressing financial constraints by SMEs and start-ups, cutting red tape and ensuring there is no abuse of market power are also crucial. Specific measures to promote and facilitate investment in GVCs can be successful if they take place within the context of, not as a substitute for, broader policies for improving the investment environment.

Trade Policy: Broadly, trade policy affects the timeliness and cost with which firms can access inputs from abroad and export their products. Hence, reducing import tariffs and export procedures is often a critical step for competitively engaging in GVCs. More specifically, in the absence of global reduction in tariffs, developing countries should seek trade agreements on tariffs, tariff

escalation and standards harmonization with other developing countries. Previously, developing countries focused on consolidating trade agreements with developed country markets. Today, trade of intermediate goods in regional and global chains is often between different developing countries, and emerging economies are becoming important end-markets. Import and export tariffs between these countries continue to be high.

Country trade policies should also be tightly aligned with their investment strategies and policies for the development of domestic firms (Morris et al., 2012). To foster the development of linkages of domestic firms to GVCs, trade policy must ensure equal access to duty-free status or reduced tariff for both foreign and domestic firms. MNCs setting up operations in developing countries frequently qualify for SEZ status due to the size of their investments and the quantity of jobs that they generate. Domestic firms, however, typically do not meet these requirements, placing them at a disadvantage.

Box 2. Good Practice: Costa Rica South-to-South Trade Policy and the Medical Devices GVC

Costa Rica illustrates a potential approach to leveraging south-to-south trade policy for GVC upgrading. In addition to regional trade agreements, in recent years the country has established free trade agreements with the US (CAFTA-DR, 2009), China (2011), Singapore (2010) and the EU (signed 2012). The agreements with China and Singapore provide the country with preferential access to most of the regional production networks in Asia, while that with the US provides it access to a key end-market. These agreements could prove vital for the country to upgrade certain GVCs, such as the medical devices sector, a strong and growing industry employing over 12 000 people. Costa Rica is already home to numerous medical device manufacturers as well as the Food and Drug Administration (FDA) Headquarters for Latin America, US standards regulator for these products. Product exports have mostly been lower value disposable devices, and upgrading into high value capital equipment production, most of which is based on electronics, has been in part limited by the country's distance from the electronics value chain, based in Asia. The growing capabilities of the sector in Costa Rica to comply with extremely complex US regulatory standards, combined with increased trade flows with China and Singapore stemming from these agreements and its proximity and access to the US – the world's largest medical device market - positions the country well to access electronic inputs and pursue product upgrading to net significantly higher returns.

Source: Bamber & Gereffi, 2013.

Firm Development Policy:[16] GVCs provide important opportunities for firms from developing countries to engage in international trade. However, these opportunities are not always easy to grasp, as concerned firms often face extensive market failures and typically lack the technology, scale and experience of their counterparts in developed countries. This brings local firm development and entrepreneurship policies to the fore in GVC-oriented development strategy. These policies cannot be divorced from investment and trade policies. Building productive capacities in local firms and supporting their engagement in GVCs could take several forms, such as: facilitating compliance with international standards, contributing to the development of marketing platforms in key end-markets[17], or promoting access to finance by removing barriers to risk capital (See Box 1 for an example of good practices in this area).

16. This policy group would largely replace the export-promotion policies of the past.

17. See e.g. Maker's Row, www.makersrow.com, a website fostering the use of US manufacturing potential by providing a standardized, high quality marketing platform.

Box 3. Good Practices: Local Firm Development in Ireland

Access to finance: Enterprise Ireland (EI), the Irish organization supporting the growth of local firms and their exports, implements a multifaceted strategy to achieve export sales growth from Irish-owned companies, targeting High Potential Start-Up companies (HPSUs), SMEs and large companies of over 250 employees. EI offers a strategic combination of services, from providing various types of funding, to assisting with R&D collaboration, to facilitating introductions between Irish companies and experts, buyers and potential customers. EI has become the largest seed capital fund in Ireland, and works with four seed capital and seven venture capital funds, with combined resources of just under USD 1 billion, to invest in the commercialization of cutting edge research from early- through late-stage development.

- In 2011, EI contributed USD 2.6m toward the launch of a USD 29m AIB Startup Accelerator Fund. That same year, EI approved USD 30 m in funding to support 93 new and 19 existing HPSUs, and over 160 support packages of more than UD S131k to established firms.
- EI attracted USD 13.1m in informal angel investments in 33 firms, and 30 international venture investments in client companies.
- The organization offers USD 6 550 Innovation Vouchers that can be used to assist companies in developing their business, either by exploring a market opportunity or addressing a unique problem or challenge.
- EI created a pilot leadership program for Chief Financial Officers to help strengthen their bargaining position vis-à-vis financial institutions.

Sources: Enterprise Ireland, 2011, 2012a, 2012b; Giarratana et al., 2003.

***Workforce Development*:** The comparative analysis above highlights the importance of human capital formation to GVC engagement across the four sectors analyzed. Given the speed with which production technologies evolve as well as the exacting requirements of quality and process standards that characterize GVCs, effective and responsive education and workforce development policies are critical to enabling gainful participation in GVCs. Fernandez-Stark et al., (2012) provide potential policy recommendations for workforce development focused on supporting developing country upgrading in the short-, medium- and long-term. In particular, they highlight that workforce development should focus on bottleneck positions, whose scarcity impedes upgrading into targeted GVC activities. For example, developing countries hoping to move into mid-value segments must typically focus on technical education, while upgrading into higher-value pre- and post-production services requires the development of managerial and design talent (Gereffi et al., 2011). Improving labor mobility, skills certifications and regulations governing the employment of foreign nationals can help to fill bottlenecks in the short term, keeping in mind that the long-term goal should be to upgrade the general skill level of the workforce. Developing countries should especially consider complementarities between national systems of innovation and workforce development institutions in devising strategies for industrial upgrading.

Box 4. Good Practices: Workforce Development in India

Wadhwa (2008) demonstrates how India has created effective workforce development initiatives targeted at the skill-intensive services industry, in spite of an underperforming national education system. The National Skill Development Corporation (NSDC) is a not-for-profit organization managed through a public and private partnership between the private sector (51%) and the Government of India (49%). NSDC was created in 2009 as part of a national skill development mission to fulfill the growing need in India for skilled labor across multiple sectors and to narrow the existing gap between the demand and supply of skills. The NSDC focuses on 21 key industries that show current and future skills gaps, including: textiles and clothing, select informal employment sectors, building and construction, auto and auto components, transportation, logistics, and packaging.

The organization aims to "skill" and "up-skill" 500 million people in India by 2022, mainly by fostering private sector initiatives and providing funding in skill development. The key strategies of the NSDC are:

- Upgrade skills to international standards through significant industry involvement and develop necessary frameworks for curricula, qualification standards and quality assurance
- Enhance, support and coordinate private sector initiatives for skill development through appropriate Public-Private Partnership (PPP) models; strive for significant operational and financial involvement from the private sector
- Focus on underprivileged segments of society and backward regions of the country, thereby enabling a move out of poverty; similarly, focus on the informal sector workforce
- Play the role of a "market-maker" by providing financing, particularly in sectors where market mechanisms are ineffective or missing
- Prioritize initiatives that can have a multiplier or catalytic effect as opposed to one-off impact.

Source: National Skill Development Corporation, 2012.

Infrastructure: Infrastructure development emerged as an important element in enabling developing countries to participate in GVCs. Reliable and cost-competitive infrastructure promotes both trade linkages and FDI attraction. However, developing countries face resource and capacity constraints to providing high quality and comprehensive infrastructure throughout the entire economy. Whereas telecommunications infrastructure is crucial for participation in offshore services GVCs, transportation and energy infrastructure play a more important role in manufacturing and extractive GVCs. Even when infrastructure projects are driven by the private sector, governments in developing countries should seek to direct investments in such a way that domestic firms are not excluded from the benefits associated with GVC participation.

***Industry institutionalization*:** Gainful participation in GVCs requires a high level of coordination and collaboration across industry stakeholders in the public, private and non-profit sectors in order to ensure that interests are aligned, skill gaps are closed and structural constraints are addressed. **Sustained** interaction among industry stakeholders can be promoted through a number of mechanisms. Strategic public and private councils for selected industries can help identify the most pressing constraints facing developing countries, as the case of Chile demonstrates (Box 3). Likewise, industry associations that include both MNCs and local firms can promote multiple forms of collaboration, such as certification initiatives and joint ventures. Intra-governmental coordination is extremely important to gainful GVC participation as well. Cooperation at the inter-ministerial level helps to ensure that infrastructure, education, investment and trade policies jointly contribute to development goals. More modestly, developing countries can do a lot to facilitate upgrading simply by coordinating the activities of export promotion and investment attraction agencies.

Box 5. Good Practices: Industry Institutionalization in Chile

In 2007, the Chilean Committee of Ministries for Innovation created a public-private coalition for the offshore services industry with the goal to quintuple the industry size in four years. This group is composed of 13 public and private institutions including: MNCs, domestic companies, industry associations, educational institutions, ministries and the Chilean Economic Development Agency (CORFO). The head of CORFO is the President of this public- private strategic council.

This group validates the action plan of the strategic agenda around four main activities: closing the human capital gap; developing an international promotion strategy; improving both infrastructure and the regulatory framework; and developing domestic firms. Working groups were formed based on these four key themes, with representation from industry stakeholders. Each group has elected their own leader organization. For example, Universidad Católica de Chile is the leader in the human capital working group, the Ministry of Economy is the head of the regulatory framework group, and the IT industry association is the leader of the domestic firms' development working group. Each working group has clear goals and objectives, with an implementing agenda to meet in a determined period of time.

This coalition is directed by CORFO and financed by the Chilean Innovation and Competitiveness Fund. The annual investment for this strategic plan is estimated at US$27 million per year during 2008, 2009 and 2010 and during which 83% of the funds are allocated to the human capital development goals; 3.4% to international promotion; 1.2% to improving the regulatory framework; and 12% to the local firms' development.

Source: Gobierno de Chile, 2008.

5. Conclusions and Possible Areas for Future Research

It is clear from this review that many developing countries have already identified the potential opportunities arising from the ability to participate in regional and global value chains and, at least to some extent, have put in place a number of trade and related domestic policies to facilitate this process. At the same time, the rise of several strong emerging markets and increased South-South trade has attracted attention to the emergence of new economic actors, bearing different characteristics from the traditional lead firms that have dominated GVCs in the past. This may offer new opportunities for countries that have not thus far been integrated in GVCs.

The success of developing countries seeking to participate and upgrade in GVCs depends on a series of factors. In this report, we have identified the following factors: productive capacity, infrastructure and services, business environment, trade and investment policy, and industry institutionalization. The relative importance of these factors, however, differs drastically by product and industry. For example, compliance with standards is key to participation in the agriculture and manufacturing sectors. In manufacturing industries, trade policy is a central factor for participation, especially in the apparel sector. Human capital is a factor that is relevant for all sectors analysed in this report. Ensuring global competitiveness within particular value chain segments requires that developing countries identify and implement specific policy configurations by industry, which address each of these elements.

GVCs are dynamic, and they offer new opportunities for developing countries to engage in the global economy. However, GVC participation will not automatically translate into development benefits without open, transparent and predictable trade and investment policies creating a conducive economic environment, as well as the appropriate complementary policies required for building productive capacities and ensuring inclusive and widespread growth.

Further detailed research is required to understand and measure the key factors which influence the ability of developing countries to participate in given GVC activities and under what conditions they retain significant returns or benefits. Furthermore, metrics are required to understand why certain developing countries are able to participate more effectively in GVCs than others in order to inform policy and aid for trade interventions meant to promote effective integration into markets via GVCs.

However, understanding and measuring the quality of developing country competitiveness in GVCs is challenging. The new OECD-WTO TiVA database is an important step forward, encompassing 57 countries and over 90% of global trade. However, available data remain aggregated at the level of 18 industries. More can be done to fully exploit the TiVA database, in particular as additional indicators are developed over the coming months. This quantitative analysis can also be supplemented and reinforced by selective use of other data sources and case studies at the regional and country level as well as at a more disaggregated industry and even product group level to explore the extent to which there are successful models that can be replicated elsewhere. Other existing data sources can be also be used to establish initial hypotheses regarding the most important factors that appear to impede successful participation in GVCs by various countries/categories of countries.

GVC-oriented policies should be designed to maximize benefits for developing countries by focusing on those segments of the value chain in which they command competitive advantage. Policies to enhance GVC competitiveness should typically be policies that are applied generally across the whole economy as GVCs integrate trade, services and investment and stretch across sectors. Furthermore, these policy responses must allow for the necessary participation of multiple stakeholders, including the private and the public sector, educational institutions and research centers, and non-governmental organizations. Aid for Trade has an important role to play helping these stakeholders to design, develop, finance and implement these policies and initiatives to achieve sustainable, gainful GVC participation in developing countries.

In investigating the ability of developing country firms to be competitive in regional and global value chains, a number of important questions could also be answered regarding the most effective policy environment to support that outcome. These are outlined below. Some issues are directly of interest to the OECD Trade Committee, others may be of interest more broadly, including to those committees with an interest in investment, competitiveness, development assistance, SME and governance issues. An action plan for future research could include one or several of the proposed research areas described below depending on the availability of voluntary contributions.

A. Binding Constraints to Domestic Firm Participation in GVCs, Including SMEs

Policy-makers in developing countries could better understand the constraints to competitive participation in GVCs that are currently facing domestic firms, by analyzing the strategies pursued by firms that have successfully entered GVCs and understanding the policies that have supported their growth. The findings of the analysis would assist policy-makers as they shape trade, investment and complementary policies with the goal of reducing the barriers facing domestic firms that might expand their business through engagement with regional and global value chains.

Domestic firms can participate in GVCs as suppliers to locally based FDI, or they may export and/or import directly via regional or global chains. Gaining the expertise to engage with global (or regional) chains, however, is no easy task for domestic firms – particularly SMEs – that have previously only catered to a local market.

Case-based evidence from the footwear and apparel chains, for example, indicates that serving the local and regional markets first is a viable strategy to learn how to compete better in the global market (Bazan & Navas-Aleman, 2004; Gereffi, 2013; Gibbon et al., 2008). These markets often have less demanding standards, and understanding consumer preferences may be easier due to geographic, cultural and regulatory proximity (Kaplinsky & Farooki, 2011). However no systematic research has addressed the question of how firms learn to compete in GVCs to date.

Empirical evidence about how individual firms and firm networks have successfully or unsuccessfully entered and become competitive in regional and global chains can usefully inform trade and development policies in developing countries and their donor partners. What are the most successful strategies and mechanisms through which domestic firms have developed capabilities to

successfully participate in GVCs? And, what policies have successfully fostered the upgrading of domestic firms through participation in value chains in the past?

Further analysis could be undertaken on specific issues facing SMEs, which in much of the developing world, represent approximately 80-90% of total employment. However, the expansion of SME participation in GVCs typically necessitates overcoming multiple challenges in developing countries, such as limited economies of scale; poor access to finance due to underdeveloped capital markets; limited access to product and labor markets arising from information asymmetries; the poor marketing skills of local firms; and deficiencies in the certification profiles and managerial capabilities necessary to meet the supply chain requirements of demanding MNCs. Case analysis of high-value agro chains in Latin America finds that limited access to training, finance, market information and networks and economies of scale are the most important factors that constrain small producers from joining local and global chains (Fernandez-Stark et al., 2012). In the manufacturing and services sectors, case evidence from the software, automobile and creative industries in developing countries finds that SMEs face important barriers to entry and upgrading, rooted in both the local institutional context as well as the characteristics of vertical GVC relationships, that larger firms can often avoid (UNCTAD, 2010).

While these case study analyses are indeed suggestive to policy-makers, it is necessary to further analyze the factors that promote SME competitiveness in GVCs and how such factors vary systematically across sectors. For example, what are the main constraints that SMEs in particular face to enter and upgrade in different chains? Which sectors and segments of chains are better suited for SME participation? Answering these questions would require an analysis of local competitiveness factors, institutional networks, and characteristics of SMEs in terms of capability and market access. Quantitative analysis in many cases will be limited by the lack of available data in developing countries (including a lack of firm-level export data and, in some cases, large informal sectors). For similar reasons, case selection must be purposeful, rather than random. Many SMEs are already participating in GVCs as subcontractors of larger firms co-located in the same countries, but their participation is not reflected in trade data. These constraints suggest a comparative country-level case study approach focusing on selected industry sectors.

B. Regional Value Chains

Regional trade agreements and regionally oriented bilateral trade agreements have proliferated in recent years. Learning about the dynamics of chain regionalization, from regionally based standards and certifications to the characteristics of regional lead firms and understanding which types of industries have benefited from these chains can aid the formation of future trade policies and guide the coordination of regional economic development strategies by national policy-makers.

Recent GVC research has identified the growing importance of value chains organized at the regional, rather than global, level in driving GVC participation and upgrading in a handful of industries (Staritz et al., 2011). While there are still comparatively fewer regional chains than global chains in operation, two trends in regionalization can be distinguished: those chains emerging focused on regional production for regional markets and functionally interconnected regional operations that supply global markets. Automobile manufacturing, for example, has emerged as an example of the former, due to the bulk of component goods and other institutional considerations. Now organized largely through regional value chains, this sector has relatively coherent production systems in North America, East Asia, Southern Africa, and Europe (Sturgeon & Biesebroeck, 2011). Thus, as demand for automobiles grows in emerging end-markets, suppliers throughout the surrounding region face new opportunities to participate in the provision of intermediate goods and services.

The Asian electronic value chains, on the other hand, offer an example of regionalization of supply for a global market (IDE-JETRO/WTO, 2011). These operations leverage labor costs, skills, trade agreements, shipping routes and economic incentives among other factors to distribute the

manufacture and assembly of components and final goods across the region even though final goods may be destined for markets in Europe and the US. This builds on complementary competitive advantages across the region and helps manufacturers to minimize costs and mitigate risk. The success of the Asian electronic model has led to some policy-makers suggesting that developing countries outside of Asia need to integrate regional supply chains to leverage economies of scale in trade with other regions. Such a regional strategy could facilitate upgrading into higher value segments of the chain which require large capital investments and inputs that are beyond the supply capabilities of any one developing country (Davies, 2012).

While regional chains have captured significant interest by policy-makers in recent years, the empirical literature on the phenomenon remains scant; indeed, with few documented examples of regional chains, the precise definition of what constitutes regional chains remains ambiguous. Important questions include: How much, where, and why is regionalization of trade occurring? What are the key drivers and actors of the regionalization of value chains (e.g. skills availability, regional free trade agreements, intra-state cooperation, transportation costs, etc.)? What types of industries are developing regional rather than global or south-south chains? What opportunities exist for developing countries to pursue trade opportunities rough coordinated engagement with regional value chains, and how do these differ from opportunities surrounding global value chains?

As the emergence of regional chains is a relatively new trend, this project would require an exploratory research approach based primarily on an analysis of qualitative data and descriptive statistics. This would include an analysis of trade and investment flows, levels of regional trade policy integration, and engagement with key regional institutional actors such as regional economic organizations, government officials, and surveys of firms in the selected sectors.

C. The Role of Institutions

Governance and institutions have important implications for countries' capacity to reap the benefits of open markets and economic globalization. At the same time, governance and institutions are one of the critical aspects of the GVC framework over which policy-makers and other non-chain actors in developing countries have substantial influence (Gereffi, 1995; Gereffi & Fernandez-Stark, 2011). However, little work has been done to systematically specify the role of institutions in promoting participation in GVCs in a way that secures development. Therefore, a better understanding of the interplay between local institutions on the one hand and GVC entry and upgrading on the other would be of tremendous value to government actors and other stakeholders wishing to identify and promote high-potential industries.

Case study analysis highlights that successful GVC engagement requires the involvement of a broad array of stakeholders involved at the institutional level in areas including workforce development, national innovation systems and domestic industry coordination. Different chain stakeholders promote upgrading processes in a multitude of ways across developing countries. In their "Skills for Upgrading" study, Gereffi et al. (2011) examined the role of workforce development institutions in promoting upgrading across four value chains (apparel, fruits and vegetables, offshore services and tourism) in multiple countries. Pietrobelli and Rabellotti (2011) demonstrate the importance of national innovation systems to upgrading. Even as individual institutional elements have been highlighted as relevant to GVC-oriented development strategies, institutions are typically treated in an ad hoc fashion in the GVC literature; there has been little systematic research into the roles played by institutional stakeholders which are exogenous to the chain but nevertheless influence the conditions which enable or constrain upgrading. The task of specifying the role of institutions with respect to firms participating in GVCs is especially crucial in developing country contexts, where growth-promoting institutions are weak relative to those in developed countries.

Future research should cover important question such as: Which actors and institutions were behind upgrading success and what were the actions they took? To what extent and under what conditions are successful institutional models replicable in other countries? The sort of stakeholder

analysis implied by these research questions would call for a robust, mixed-methods approach to GVC analysis, combining qualitative and case-based research with quantitative measurements of competitiveness indicators and other relevant variables.

D. Competitiveness, Investment and Footloose MNCs

Some developing countries are the recipients of large amounts of FDI; however, at the same time, they are vulnerable to the volatility of MNC location decisions. Hard-fought upgrading successes can be quickly reversed when lead firms re-orient their sourcing strategies towards lower-cost or otherwise more competitive locations. For example, the shifting geography of trade preferences and labor costs has been shown to lead to boom-bust investment cycles in the apparel industry (Pickles & Godfrey, 2012). Mexican apparel manufacturers, for example, suffered heavily in the early 2000s as MNCs disinvested from local production activities and shifted their attention to the lower labor costs and tighter supply networks offered by East Asia (Frederick & Gereffi, 2011; Schrank, 2004). In the Latin American services sector, high employment call-centers have also tended to shift rapidly to lower cost countries as wages rise (Fernandez-Stark et al., 2013b). While the threat of job offshoring is a familiar one to both policy-makers and workers in poor countries and rich countries alike, developing countries typically have a relatively undiversified export base, and downgrading in any export sector can be especially damaging economically. Furthermore, developing countries have fewer physical and institutional resources from which to draw in order to counteract rising labor costs with higher productivity or the introduction of value-enhancing innovations.

Future GVC research should consider how institutional change at both the local and global levels influences the relative long-run competitiveness of particular countries and what drives the decisions of MNCs to engage with or divest from developing countries. How can developing countries remain attractive destinations for FDI over time in the context of GVCs? Which competitiveness factors are most important to focus on in order to avoid divestment by MNC-led GVCs, and how do the most relevant competitiveness factors show variation across different sectors? Potential research approaches should leverage the existing and emerging literature on export-oriented FDI, regional divestment patterns, and GVC 'disarticulations'. Such perspectives would be combined with buyer survey analysis of chain sourcing re-location considerations and quantitative analysis to identify relationships between, on the one hand, FDI flows and, on the other, sector-wide development trajectories and changes in competitiveness indicators.

Understanding the relative importance of competitiveness factors to firm decision-making across industries can be helpful for policy-makers to pre-emptively improve local conditions in the face of pending changes in global industries. It can also help them to prioritize these improvements around key industries that are important for the country economic growth and stability.

E. Changing Lead Firm Characteristics and the Potential for Enhanced GVC Participation in Developing Countries

Lead firms largely determine the location of high-value activities and the conditions under which other firms participate in GVCs. Thus, the characteristics of lead firms, including economic strategies and management style, matter in terms of the upgrading opportunities offered by GVC participation (Lee et al., 2011). In the past, GVCs were dominated by principally US, European and Japanese lead firms; however, the rise of several strong emerging economies and increased South-to-South trade has increased the importance of understanding the role played by lead firms from Africa, Asia and Latin America (Staritz et al., 2011). In the extractive industries, for example, new lead firms have emerged in resource-rich developing countries as a result of domestically owned firms exploiting their country's resource reserves. In addition, a number of powerful lead firms, intermediaries, and suppliers from developing countries have emerged in the manufacturing, construction and offshore services value chains. These emerging lead firms, intermediaries, and suppliers are themselves pursuing global strategies, establishing operations in different regions

around the world to leverage lower-cost labor and to be closer to their clients' end markets. Such strategies have facilitated the entry of suppliers from a host of new low-cost locations and the upgrading of existing developing country-based firms in these value chains. Thus, while traditional lead firms continue to heavily influence the geographic scope of GVCs, rapidly growing lead firms and global suppliers from the developing world are emerging as powerful actors in shaping GVC strategies and requirements for access, integration and upgrading.

While considerable research has been undertaken to understand how the governance structures promulgated by traditional lead firms influence the upgrading potential of their suppliers (Gereffi et al., 2005; Gibbon et al., 2008; Humphrey & Schmitz, 2002; Ponte & Gibbon, 2005), little systematic research has been carried out regarding the implications for developing countries as new lead firms emerge alongside growing end-markets in the South (Kaplinsky & Farooki, 2011). Do lead firms from emerging economies foster the same market access and upgrading opportunities through FDI and sourcing strategies as traditional lead firms? Isolated studies in Nicaragua (Bair & Gereffi, 2013) and Lesotho (Morris et al., 2011) in the apparel sector and in Zambia in the mining sector (Fessehaie, 2012) suggest that lead firms from Southern markets exhibit decidedly different strategies from their Northern counterparts, with much less emphasis typically placed on direct skills transfer to either their internal workforce or to local suppliers compared to traditional lead firms. Limited sample sizes, however, make it difficult to draw out any meaningful conclusions for policy development.

A more comprehensive approach to this research, entailing a larger sample, would thus be required to better understand the conditions under which engagement with GVCs led by firms from emerging economies leads to upgrading opportunities and how these may differ according to firm economic strategies and management characteristics. This type of analysis calls for a mixed-methods approach combining firm-level interviews at different segments within chains with analysis of investment and trade flows between developing countries and variations in competitiveness indicators and other relevant indicators. Generally, quantitative measures of upgrading are still limited, and understanding upgrading trends requires the collection and analysis of quantitative and qualitative information about the changes in product export values, production processes, firm activities, and employee profiles. However, the research questions posed in this proposal would provide an opportunity to use the range of new data and analytical frameworks that have emerged with the launching of new value-added databases and improved reporting of trade and employment data in some developing countries, to attempt, where possible, to identify proxies and indicators to map product, functional and market upgrading of developing countries through data analyses.

The proposed research would provide insights for policy-makers regarding the potential development and governance impacts of the growing engagement of different developing countries with GVCs and would analyze the upgrading – or downgrading – trajectories of locally based FDI and of suppliers engaging in GVCs within key sectors.

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Appendix

Appendix Table 1. Data Sources for Measuring Developing Country Potential to Participate in GVCs

Factor	Database	Organization	Description	No. of Countries
Multiple	World Development Indicators (http://data.worldbank.org/data-catalog/world-development-indicators)	The World Bank	The primary World Bank collection of development indicators.	214
Multiple (Business Environment, Infrastructure, Human Capital, Public Governance, National Innovation System)	WEF Executive Opinion Survey *(Primary)* (https://wefsurvey.org/index.php?sid=28226&intro=0)	World Economic Forum	The Survey gathers information on a broad range of variables for which hard data sources are scarce or non-existent.	142 (+13 000 firms) *2011
Multiple (Business Environment, Trade Policy, Infrastructure, Human Capital)	Enterprise Surveys *(Primary)* (http://www.enterprisesurveys.org/)	The World Bank	Enterprise Surveys provide company-level data in emerging markets and developing economies.	135 (130 000 firms)
Multiple (Trade Policy, Business Environment, Industry Specific Policies, Standards)	Market Analysis Tools & Trade Performance Index *(Primary & Secondary)* (http://legacy.intracen.org/marketanalysis/tradecompetitivenessmap.aspx)	International Trade Center (ITC)	ITC provides developing country actors with free access to trade, market access and other related data to help improve trade transparency and enable companies and trade support institutions to identify opportunities and compare market access requirements.	180
Multiple (Business Environment, Infrastructure, Human Capital, Public Governance, National Innovation System)	Global Competitiveness Index *(Secondary: Incl. WEF Enterprise Survey, the IMF World Economic Outlook Database, ITC)* (http://www.weforum.org/issues/global-competitiveness)	World Economic Forum	The index provides a structured, systematic and comprehensive approach to identifying and measuring the drivers of economic performance.	144 (2012)
Multiple (Trade Policy, Infrastructure, Business environment, Public Governance)	Global Enabling Trade Index *(Secondary: ITC, UNCTAD, ITU, UN E-Government Survey)* (http://www.weforum.org/s?s=global+enabling+trade+report)	World Economic Forum	This index focuses on measuring whether economies have in place the necessary attributes for enabling trade and where improvements are most needed.	132
Multiple (Public Governance, Business environment, Human capital, Trade Policy)	Economic Openness *(Secondary: Multiple secondary sources at regional and country level.)* (http://www.heritage.org/index/ranking)	Heritage Foundation	This index uses 10 benchmarks to gauge the economic success of countries around the world based on the concepts of liberty, prosperity and economic freedom to life.	185
Infrastructure (Telecommunications)	ICT Indicators *(Primary)* (http://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx)	International Telecommunications Union (ITU)	This database covers fixed telephone network, mobile-cellular telephone subscriptions, quality of service, Internet, traffic, staff, prices, revenue, investment and statistics on ICT access and use by households and individuals.	200
Business Environment	Worldwide Tax Summaries *(Primary)* (http://www.pwc.com/gx/en/tax/corporate-tax/worldwide-tax-summaries/taxsummaries.jhtml)	Pricewaterhouse Coopers	These tax summaries provide access to information about the corporate and individual tax systems around the world.	152
Public Governance	World Governance Indicators (WGI) *(Secondary)* (http://info.worldbank.org/governance/wgi/index.asp)	The World Bank	The WGI cover the set of traditions and institutions by which authority in a country is exercised.	215
Public Governance (Corruption)	Corruption Perception Index (CPI) *(Secondary: Economic Intelligence Unit, IMD World Competitiveness…)* (http://www.transparency.org/research/cpi/overview)	Transparency International	CPI 2012 is a single aggregate indicator that brings together data from a number of different sources on corruption.	174
Trade Policy (Market Access, Competitive Services)	Services Trade Restrictions Database (STRD) *(Primary)* (http://iresearch.worldbank.org/servicetrade/)	The World Bank	The STRD Database aims to facilitate dialogue about, and analysis of, services trade policies, providing comparable information on services trade policy measures and key modes of delivery.	103
Trade Policy (Tariffs, Standards, Transportation infrastructure and services, Distance from market)	Trade Costs (http://econ.worldbank.org/projects/trade_costs)	The World Bank and UNESCAP	The Trade Costs Dataset provides estimates of bilateral trade costs in agriculture and manufactured goods for the 1995-2010 period.	178

Source: Authors.

Appendix Table 2. Value-Added Trade Measurement Initiatives

Project	Institution	Data Sources	Countries	Industries	Years	Comments
Asian International I-O Tables	Institute of Developing Economies (IDE-JETRO)	National accounts and firm surveys	10	76	1975-2005, 5 year intervals	US-Asian tables, Also bilateral tables, including China-Japan
Global Trade Analysis Project (GTAP)	Purdue University (Koopman)	Contributions from individual researchers and organizations	129	57	1992-2007 intermittent years	Non-official data set. Includes data on areas such as energy volumes, land use, CO_2 emissions and international migration
TiVA Inter-Country Input-Output model	OECD/WTO	National I/O tables	57	37	1995, 2000, 2005,2008, 2009	Based on national input-output tables harmonized by OECD
UNCTAD-EORA Multi-Region Input-Output (MRIO) Data	UNCTAD/EORA	Primary data sources combined using interpolation and estimation	187	25-500 depending on the country	1990-2010	Based on Australian Research Council data
World Input-Output Database	Consortium of 11 institutions, including the OECD. EU funded	National Supply-use tables	40	35	1995-2009	Based on Official National Accounts Statistics. Uses end-use classification to allocate flows across partner countries.

Note: Initiatives ordered in alphabetical order.

Source: (UNCTAD, 2013; Cattaneo et al. 2013).