



Productive Development Policies in Face of the New Imperatives of Global Value Chains

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January 2024



**Cataloging-in-Publication data provided by the
Inter-American Development Bank
Felipe Herrera Library**

Productive development policies in face of the new imperatives of global value chains. Edition 2024 / Agustín Filippo, Carlos Guaipatín, Lucas Navarro, Federico Wyss.

p. cm. — (IDB Monograph; 1185)
Includes bibliographical references.

1. Economic development-Latin America. 2. Economic development-Caribbean Area.
3. Production (Economic theory)-Latin America. 4. Production (Economic theory)-Caribbean Area.
5. Industries-Government policy-Latin America. 6. Industries-Government policy-Caribbean Area. I. Filippo, Agustín. II. Guaipatín, Carlos. III. Navarro, Lucas. IV. Wyss, Federico. V. Inter-American Development Bank. Country Office in Mexico. VI. Series.

IDB-MG-1185

JEL Codes: L38, F43, F63, O21

Keywords: Public Policy, Economic Growth of Open Economies, Economic Development, Planning Models, Planning Policy

Publication Code: IDB-MG-1185

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Executive Summary

The Information and Communication Technology (ICT) revolution and the advances in trade liberalization policies during the nineties facilitated the fragmentation of production processes across countries, consolidating what we call the Global Value Chain (GVC) model. The concept of value chain refers to the entire range of activities or stages involved from the conception and design of a product (good or service) to its distribution to end consumers. When these activities are distributed across borders, they are part of a GVC. In this model, big multinational companies distribute their activities around the world in search of efficiency gains.

Empirical evidence shows that the integration of firms in global networks has positive effects on overall productivity and productive transformation in developing countries, by allowing them to specialize in certain activities in supply chains in which they have a comparative advantage. These impacts include not only those of international trade —associated with greater exposure to competition, market expansion and better access to inputs— but also those resulting from the intense interaction and coordination between firms integrated into value chains. These relationships among GVC participants are a potential source of knowledge spillover and additional efficiency gains, which favors innovation and productivity growth. Because those considerations, since the beginning of the century, countries in the region started to design policies aimed at fostering the integration of local firms to GVCs.

The sustained growth process of GVCs that started in the nineties was interrupted by the 2008 global financial crisis. Since then, the model entered a stagnation phase that was later extended by other events, such as the COVID-19 pandemic and the Russia-Ukraine war. These events question the traditional logic, ruled by an imperative of productive efficiency, of the competitive strategies of firms and countries. In the new context, two additional imperatives are defined.

Increasing concerns about the environmental and social effects of GVCs have given rise to an imperative of **sustainability**, understood as the need to consider these impacts in firms' production decisions. This way, GVCs should now contribute to climate change mitigation and adaptation, and their activities should be compatible with the well-being of workers of different skills and population groups, such as women, youth and various minorities. While sustainability requires **recognition in a broad sense of the social costs** of production, it also opens up new **opportunities to generate greater value added**.

In addition, and in connection with the impact of the pandemic and geopolitical considerations, GVCs face an imperative of **resilience**, which refers to the ability of supply chains to recover quickly from shocks that affect their operation. This can be achieved through the adoption of new technologies and organizational changes. Production in supply chains is complex and requires the coordination of all the parties involved. A failure in one stage might have effects both upstream and downstream, affecting both producers and consumers, to the point that the latter may end up without access to the affected product or paying higher prices.

The considerations described shape a new economic and geopolitical operating environment for GVCs. Producing under this triple imperative of efficiency, sustainability and resilience is now a necessary condition for the progress of globalization to continue and for its benefits to reach society as a whole. Thus, the triple imperative unfolds new areas of interest for governments to implement **Sustainable Productive Development Policies (SPDPs)**.

This paper presents a **conceptual scheme for the design of SPDPs aimed at integrating the region's companies into GVCs**. From the methodological point of view, the study follows the approach developed by Gustavo Crespi, Eduardo Fernández Arias and Ernesto Stein (Crespi et al., 2014), as a basis for defining instruments to increase both insertion in GVCs and the dynamic capacity to upgrade to higher value-added activities within them.

The paper is structured in four parts. **Part 1** focuses on conceptual aspects of what value chains are and what dimensions should be considered to understand how they work. To simplify the analysis, it is presented a value chain mapping framework considering four basic dimensions:

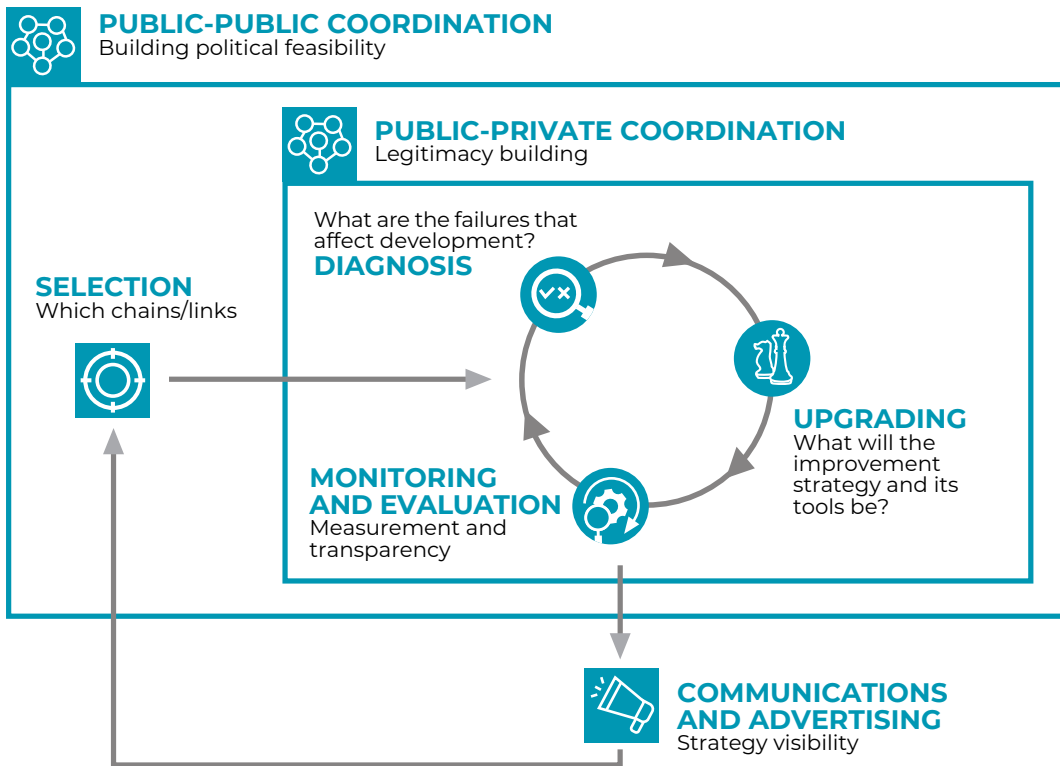
- **Input-Output Structure:** It allows to identify and connect the different stages in the chain in terms of their activities and associated products (goods and services). From this, it is possible to know which are the stages that generate the greatest value added.
- **Geographic Scope:** It allows to measure how global the chain is, and to identify the geographies where each activity is carried out and where the stages that generate the most value added are located.
- **Governance:** Considering all the relevant actors in the chain, there are identified the power relations governing the supply chain.
- **Context:** None of the above dimensions is static, so it is important to identify the drivers of change that may be affecting and determining new opportunities for productive development.

Part 3 analyzes the public policy challenges for the countries of the region to improve their integration into GVCs, in terms of obtaining static and dynamic productivity gains. First, SPDPs should focus on increasing firms' productivity, as a necessary prerequisite to join global chains. This can be achieved, for example, with policies improving access to credit and certifications to international standards. A second objective of SPDPs is to help firms to take the most advantage of participating in GVCs. On this matter, innovation and human capital policies can strengthen the local absorptive capacity of the knowledge spillovers of GVCs.

The new policy framework for productivity must pay attention to the new imperatives of sustainability and resilience. That is, increasing productivity is the main policy goal and desired outcome, but as long as it has a positive social and environmental impact. Rethinking productive development makes the task harder for policy makers, as they must be more careful than ever about the second order effects of their actions.

Based on these considerations, **Part 4** presents the main guidelines to be considered when defining an intervention framework for SPDP. The aim here is to systematize the lessons learned from the IDB's experience in more than twenty years of operations related to value chain development, with the relevant adaptations to the new scenario. To this end, **seven interdependent dimensions** are suggested to be considered in a productive development intervention framed within the logic of GVCs (Figure 0.1), which are briefly described as follows:

Figure 0.1. **Intervention Framework for a Productive Development Strategy Focused on GVCs**



Source: Prepared by the authors.

- **Public-Public Coordination.** This is a basic condition for any type of public intervention. It implies contemplating, on the part of the PDP coordinator, the overlapping and complementarity of competencies with other government agencies. Designing institutional mechanisms that allow for this articulation will help to make better use of public resources (avoiding overlapping, inconsistencies, or inactions) and to ensure the political viability of the intervention.

- **Selection.** In a world of scarce resources, the sectors to be prioritized must be chosen. While it is important to take into account the current productive structure to identify the sectors with the greatest probability of success, it will also be important to monitor sectors with the greatest potential to make the economy more complex and close production gaps more quickly.

- **Public-Private Coordination.** This sector selection and development diagnosis should always be done hand in hand with the non-governmental sector (which includes, in addition to firms, other actors such as academia and trade unions, taking into account the imperative of sustainability). It is important to achieve institutional arrangements that define the right incentives for cooperation, avoid the risk of capture, and allow building legitimacy.

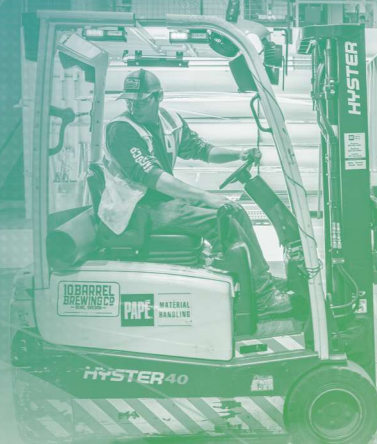
- **Diagnosis.** Following the principles of PDP, the diagnosis should seek to identify the market failures (presence of public goods, externalities, information, coordination, or government, among others) that hinder the productive development of a value chain. This involves implementing the approach of Part 1 (the "chain mapping") with a dynamic vision that takes into account the new GVC context in terms of both threats and opportunities.

- **Upgrading.** This dimension will be the backbone of any intervention. Development strategies in the GVC framework are associated with the concept of upgrading, which refers to "upgrading" processes for greater generation of value added. Although an intervention may include pre-insertion actions (typically associated with the business environment and trade facilities), three main types of specific strategies are defined: improvements at the stage level (reallocating resources within a stage), enhancements at the chain level (reallocating resources to stages with higher value added), and the development of new chains (which entails a certain degree of productive transformation). For this purpose, a series of typical policy tools and their relevance for each case are reviewed, without losing sight of the fact that there are no single recipes, and that the suggested instruments must be consistent with the stock of capacities that both the public and private sectors have.

- **Evaluation and Monitoring.** This is also a basic condition for any type of intervention, since it seeks transparency and the possibility of systematizing lessons learned and quantifying impacts. The evaluation of SPDP is often complicated by the fact that the nature of the target problem can often change, derailing monitoring indicators. It will be important to strike a balance between the rigidity needed to allow for transparent accountability and the flexibility needed for the design and implementation of useful policies.

- **Communication and Advertising.** This dimension interacts with the entire process: it generates commitment from the parties involved, contributes to the transparency of the policy, and encourages self-selection of sectors and the solution of certain information gaps.

In summary, the new context presents new opportunities and challenges for the region. This document argues that under these new conditions, GVCs continue to be a useful way for firms to solve their productivity problems, and describe the main policy strategies governments should consider to make the most of these opportunities.



Part 1.

A Simple Framework for Complex Relationships: The Value Chain Analysis



A distinctive feature of production processes in modern economies is their increasing geographical complexity. Producing food, textiles, furniture, automobiles, household appliances or semiconductors, among many other products, requires fragmenting production into different stages between firms located in different geographical areas, within a region, in different regions of a country or in different countries. When in this process there is an extensive international division of production, reference is made to the concept of Global Value Chains (GVC).

Integrating these production networks contributes to productivity growth and the productive transformation of countries (Blyde *et al.*, 2014; World Bank, 2020a; Xing *et al.*, 2021). An emerging literature in recent decades has contributed to the understanding of how value chains work (Antràs and Chor, 2021) from both a microeconomic and macroeconomic perspective. The microeconomic approach studies how companies form production networks, depending on the context in which they operate. On the other hand, the macroeconomic approach focuses on the analysis of how production in value chains impacts the development and welfare of countries.

Due to the great complexity involved in the operation and formation of value chains, and data limitations, there is no clear understanding of how their functioning affects trade flows and the welfare of countries and regions (Xing *et al.*, 2021; Arkolakis *et al.*, 2023). In view of this complexity, in what follows, we present basic conceptual aspects needed for the analysis of value chains, relevant for the definition of productive development policies.

What is a Value Chain and When Does it Become Global?

The concept of "value chain" refers to the entire range of activities involved from the conception of a product (good or service) to its distribution to end consumers. These activities are grouped into stages. Thus, although the number and type of stages can vary substantially between chains, a typical chain includes at least the stages of conception and design (usually intensive in R&D), production, logistics and marketing. The activities in these stages can be carried out by one or several companies, so the value chain approach places special emphasis on this distribution of tasks and its implications for the power relations within them. Naturally, these "chains" depend on other supporting actors who, although they may not be directly involved in the central stages, are crucial to the goal of getting the product into the hands of consumers.

Thus, it can be said that every company belongs to at least one value chain. The easiest way to see this is in the final stages of typical chains: logistics companies or supermarkets are involved in those stages in many value chains. However, depending on the production base, there may be companies in the production stage that also participate in more than one chain (for example, companies or conglomerates that produce automobiles, and also trucks). Finally, companies that are central participants in one chain can be suppliers of others (for example, a fertilizer producer is a supplier of the apple chain). This leads to the notion that *chains* actually form *value networks*, as will be seen below.

In addition, a company may belong to chains with different levels of geographic scope, and this makes it less likely to think of value chains that are purely "local". In this sense, for example, even self-consumption farmers may be consuming fertilizers produced in a region other than their own, which makes them part of a regional chain. If it also turns out that the fertilizer is imported from some other country, then that local producer is part of the final stage in the Global Value Chain of fertilizers (Box 1.1 presents an illustration of this aspect for the case of Chile).

BOX 1.1. VALUE CHAINS IN CHILE: MEASUREMENTS AND IMPACT ON WELL-BEING

A recent study for Chile provides an excellent example of the complexity of local and global value chain operations. Based on administrative data on domestic and international transactions of the universe of firms in Chile, Arkolakis *et al.* (2023) present interesting findings on how firms relate to each other in the different phases of their production processes according to their fundamentals and geographic location.

The authors find that i) firms with higher revenues have a greater number of buyers and suppliers; ii) firms located in more densely populated areas have a greater number of connections with buyers and suppliers; and iii) both the number of supplier-buyer connections (extensive margin) and the volume of transactions (intensive margin) decay with geographic distance between locations, with the effect on the extensive margin being more pronounced. Regarding policy aspects, the authors find that reversing the tariff reductions of Chile's recent trade agreements with the United States and China reduces the country's aggregate welfare by 0.67%, with more than half of the effect explained by a potential exit of firms from global value chains.

To account for the impact of geography and transportation costs on the formation of production networks, the authors estimate an increase of 0.25% in aggregate welfare following the construction of a bridge that will connect the island of Chiloé with mainland Chile, which will be operational as of 2025; more than 60% of the estimated effect is explained by integration into value chains.

In summary, there are several (not mutually exclusive) ways in which a firm can participate in a GVC: directly exporting the good or service it produces, as a supplier to an exporting company, and importing inputs and technologies for its production process.¹ In the next section we present a conceptual framework, based on four dimensions of analysis, useful for understanding how a GVC works.

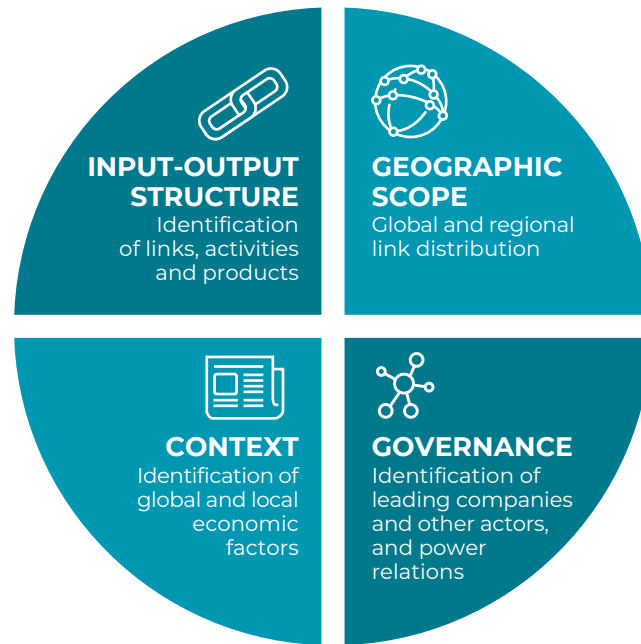
“Chain Mapping”: Four Dimensions of GVC Analysis

According to Gereffi and Fernández-Stark (2019), GVC analysis allows for a holistic view of global industries, both "top-down" (how the global firms that lead the market structure the chain) and "bottom-up" (what is the local reality of the chain, from which policy strategies can be posited). Value chain mapping makes it possible to address these visions in a schematic way. Here we will focus on four major dimensions of analysis: input-output structure, geographic scope, governance, and context (Figure 1.1). Through the input-output structure, the cycle of a product can be outlined in different stages, from its conception to its final consumption, without losing sight of the multiple (and non-linear) interactions that may exist between these stages. The geographic scope focuses on the analysis of the distribution of these stages around the world. In this global distribution, leaders and power relations are identified in the mapping when analyzing the governance dimension. Finally, the dimension of context (global and local) is relevant for contemplating trends that affect not only the current situation of the chain, but also its long-term structure.

The IDB has conducted a great deal of research on GVCs with a focus on the region's productive insertion in them (Blyde, 2014) which, even without a strict correspondence with the dimensions presented here, follow a similar analytical framework. More recent examples along these lines are the studies of GVCs in mining (Nenci and Catraro, 2021; Penny and Fernández-Stark, 2022), textiles (Fernández-Stark *et al.*, 2022), cattle (Bisang *et al.*, 2022), coffee and cocoa with a focus on Venezuela (Clemente-Rincón, 2022), and high purity cocoa from the perspective of Ecuador (Villacis *et al.*, 2022), among others.

¹ Additionally, the firm can also integrate to a GVC by partnering with a multinational corporation or establishing in other countries, becoming multinational (OECD, 2019).

Figure 1.1. Dimensions of Analysis for Mapping the GVCs



Source: Prepared by the authors based on Gereffi and Fernández-Stark (2019)

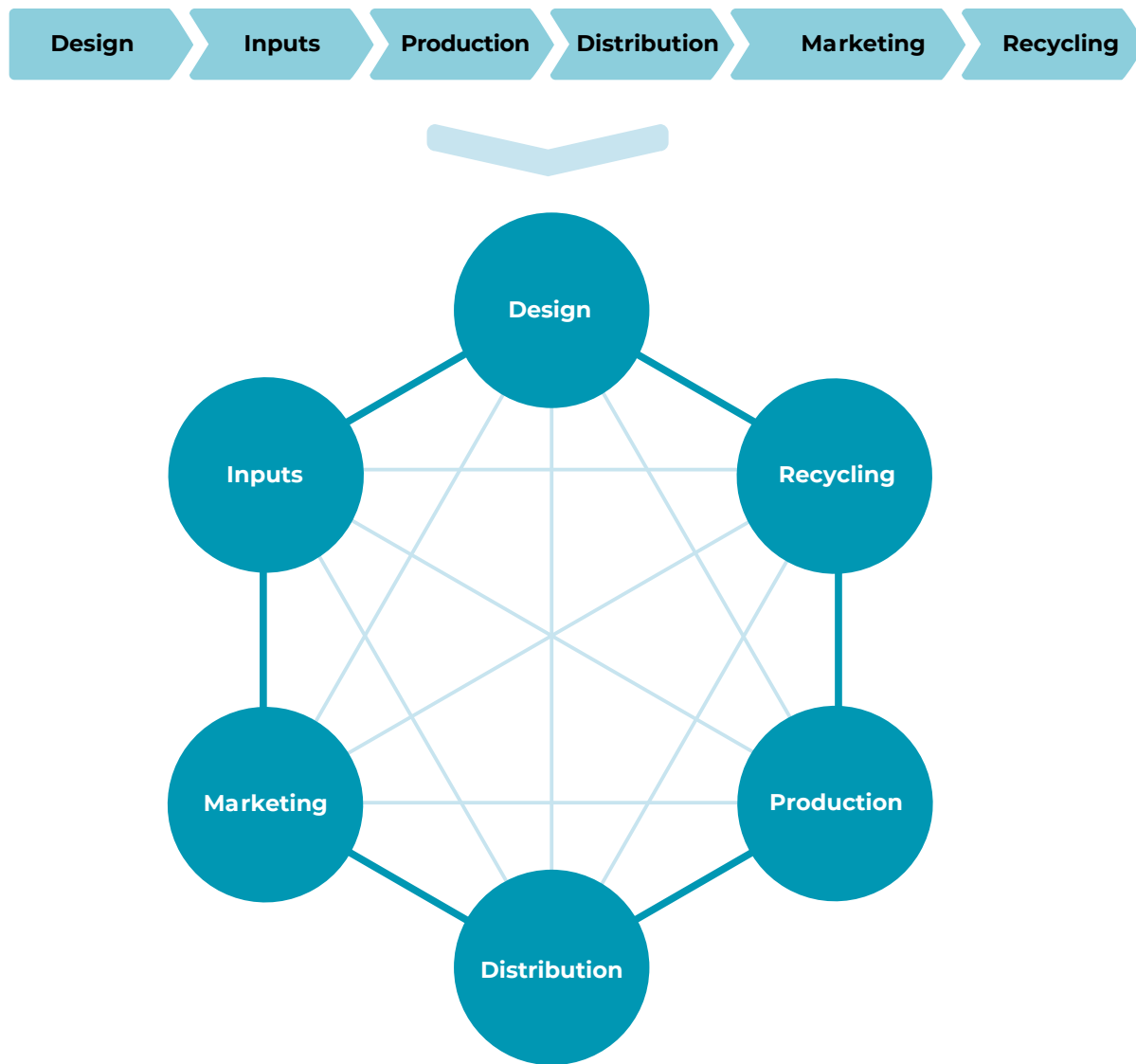
Input-Output Structure

As mentioned, a chain structures activities in stages that make up the process from the conception of a product to its delivery to the end consumer. These stages might differ across industries, but a typical structure might include design, inputs, production, distribution and marketing.² Their representation is usually in the style shown in the upper part of Figure 1.2, where these activities appear as boxes with arrows denoting the sequential nature of a value chain. As discussed in Box 1.2, this representation is a schematic simplification, but does not necessarily reflect how the chains operate in practice. Thus, and in view of the growing complexity of the relationships between companies, some authors suggest a network representation of the value chain (see Filippo and Stankovic, 2021, for a discussion of this subject), as shown in the lower part of Figure 1.2, typical of "datified" chains, which will be referred to in Part 2 of this document. Thus, this form mainly responds

² Finally, and increasingly necessary, the process can be completed with a recycling stage that feeds back into the chain or acts as a link with others. Part 2 will discuss the sustainability of GVCs and, in particular Box 2.4, deals with the implications of the circular economy on the different dimensions that make up GVCs.

to the new possibilities of interaction that digital services allow to different actors in the chain, which brings improvements in decision-making, coordination and productivity gains.³

Figure 1.2. Representations of a GVC



Source: Prepared by the authors.

³ As will be seen in Part 4 of the paper, this implies a greater return on process innovations within GVCs, enabling productivity improvements without disruptive changes in the product base.

BOX 1.2. BETWEEN SNAKES AND SPIDERS: THE SHAPE OF THE CGV

The global division of production is determined by international cost differences and frictions related to the costs of spatially fragmenting the stages of production. The interaction of these forces depends on the engineering details of the production process where two extremes are the "snake" and "spider" models (Baldwin and Venables, 2013).

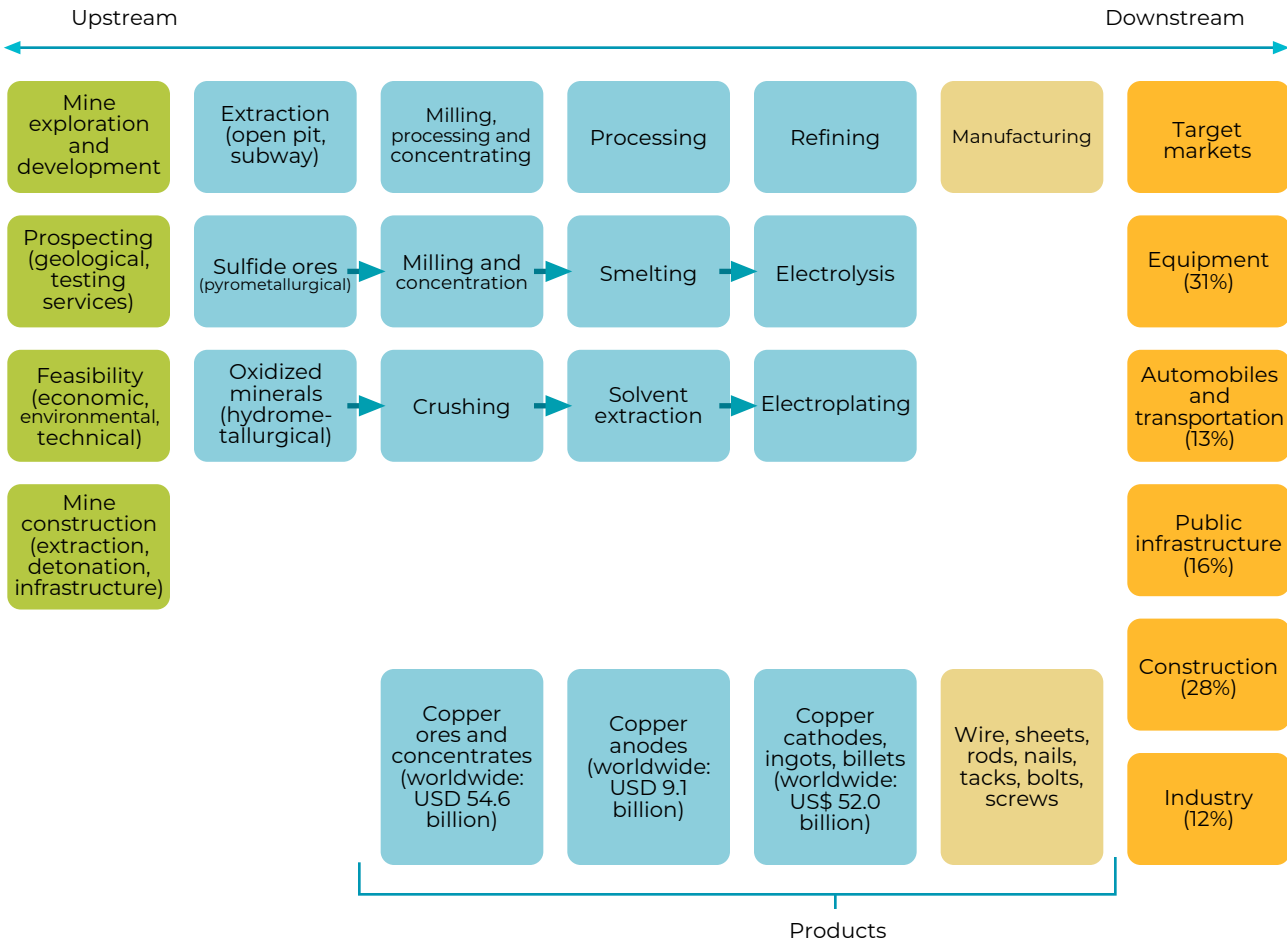
Snakes are processes where the sequence of each stage is dictated by engineering; spiders are related to the assembly of parts without necessarily having to respect an order. An example of spiders is the assembly of an airplane, where in the case of the Boeing 787, inputs from different parts of the world are sent to the United States for assembly; with the spider system, inputs cross borders at most twice.

Snakes are more complex, trade increases as frictions are reduced, and the volume of trade and the (endogenous) number of stages is limited only by the technical possibilities of fragmentation. The case of semiconductor production is a typical case of a snake, where a chip is first designed, and then sequentially followed by the manufacturing, assembly and testing stages, which are carried out in different parts of the world (see Box 1.5). In the case of snakes, an intermediate product may cross borders multiple times before being transformed into a final product.

A hybrid model of snakes and spiders is that of automobiles, where both modes of production are involved; for example, one snake line produces the engine, another produces the chassis, and these intermediate goods are then assembled.

This analysis should be complemented with secondary data sources and interviews with chain actors to complete the description of the chain and arrive at a scheme such as the one shown in Figure 1.3, which represents the actors, products and activities of the copper mining value chain, extracted from Penny and Fernández-Stark (2022). As will be seen in the following dimensions, each activity has its own operating and organizational structure, with a certain composition of relevant companies, standards and production strategies.

Figure 1.3. Copper Mining Value Chain



Source: Extracted from Penny and Fernández-Stark (2022).

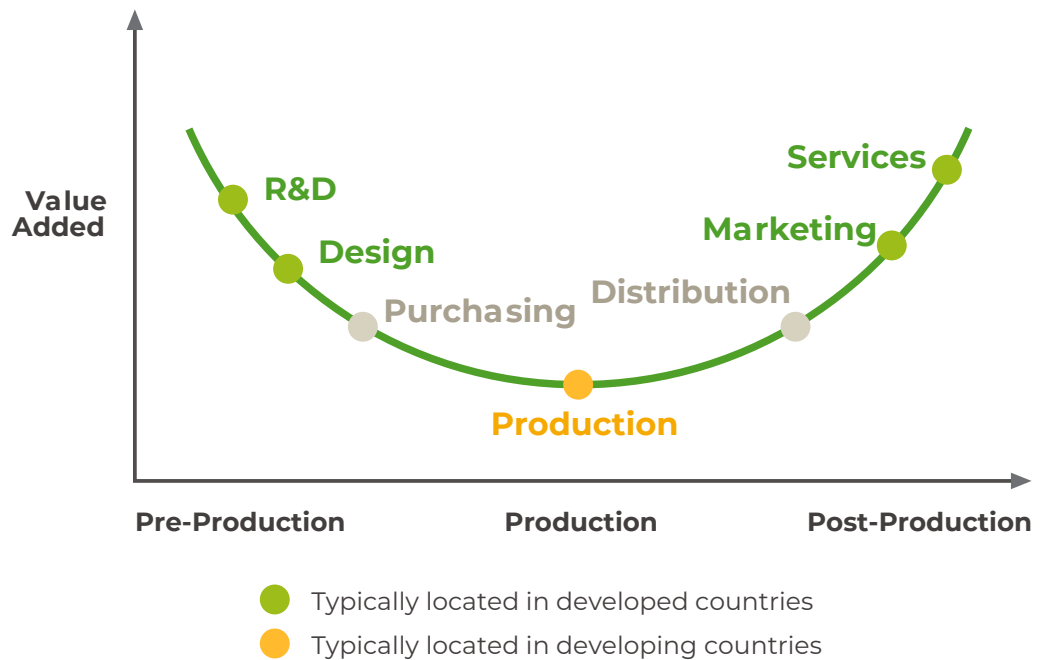
Geographic Scope

Once the input-output structure of a value chain has been outlined, the geographical dimension is the step that allows us to begin to have a global vision of it. This involves identifying in which countries or regions the main activities of the stages are developed, how these interactions work and how they have evolved over time.

As shown in Box 1.3, the globalization of value chains led to a distribution of stages such that the higher value-added activities, such as design and R&D, were located in developed countries (where skilled human capital was abundant) and the production and assembly phases were located in developing countries, where raw materials and low-skilled labor were plentiful and cheap. In a simplified form, this geographic division of GVC steps is presented in Figure 1.4 through the "smile curve",

which shows the level of value added related to the different stages in a typical chain. As will be seen below, well-designed productive development policies can help change this basic distribution, allowing developing countries to take advantage of their participation in GVCs and move toward higher value-added activities. All actions aimed at improving integration in GVCs are defined here as upgrading strategies, a term that will be used extensively throughout this paper.

Figure 1.4. The Smile Curve and the Geographic Distribution of Activities of a GVC



Source: Extracted from Gereffi and Fernández-Stark (2019)

BOX 1.3. GLOBALIZATION OF VALUE CHAINS

Following Gereffi and Sturgeon (2014), the GVC paradigm begins in the original experiments of some retailers (such as JC Penny and Kmart) and industrial corporations (IBM, General Motors, Volkswagen), which started to establish production in East Asia, Mexico and some handful of locations around the world between the '70s and the '80s. The objective was explicit and clear: to reduce costs. The strategy was to produce where labor or access to certain critical resources was the cheapest, and then export the final goods back to the markets of origin.

Faced with the stagnation that was beginning to appear in the markets of origin and the emergence of a large mass of demand from the growing middle class in the BRICs (Brazil, Russia, India and China), by the 1990s multinationals found additional reasons to increasingly allocate their production capacity in these new markets where demand was growing and, in addition, labor and raw materials were cheap.

This process was characterized by the creation of new learnings and capacities: multinationals from developed countries professionalized in outsourcing and offshoring mechanisms, and in becoming "global"; while emerging economies thus gained new industrial capacities in response to increasingly complex production requirements. This was possible thanks to the withdrawal of the protectionist policies of the Import Substitution Industrialization (ISI) model and the consequent reduction of trade barriers between countries, as well as of transportation and communication costs in general. The emergence of the World Trade Organization in 1995 was a clear sign of the times.

By the 1990s, the GVC paradigm had spread to a wide variety of industries and had also reached services that until then had been considered non-tradable, such as call centers, accounting services, certain medical services, and even research and development (R&D) services. In this new context, Gereffi and Sturgeon (2014) present a simplified version of the new roles at the global level: China became the world's "factory", India its "back office", Brazil the major supplier of agricultural commodities, and Russia the source of natural gas and military technologies. For products requiring shorter production lines (with fewer steps), such as apparel and automobiles, Mexico, North Africa and some Eastern European countries were chosen.

The activities associated with each stage can be represented in codable goods and services (following the nomenclatures of activity or product classifiers, such as the harmonized system codes HS or the ISIC International Standard Industrial Classification). Using trade data sources such as UN Comtrade⁴ or WITS,⁵ it is possible to perform a quantitative analysis of flows that indicate the "shape" of the chain in terms of transaction volumes and the value added at each stage. This is useful not only to dimension the current geographic structure of the chain, but also to visualize its evolution and trends.

However, these traditional trade measures record flows of goods and services in "gross" terms, which means that the value of intermediate inputs is counted each time they cross a border for further processing. In a world dominated by GVC logic, where intermediate goods cross several borders before reaching the final consumer, this implies that gross exports may be subject to significant double counting. To address this problem, GVC analysis increasingly focused on the concept of "value-added trade" (Cigna *et al.*, 2022). As part of this, gross exports are broken down by country and industry of origin, and destination of value added. In other words, value added is tracked across borders and shared between the countries where it is produced and where it is consumed.

Based on this, there are more complex databases, adapted to this value-added approach, such as the World Input-Output Database Project,⁶ the Global Trade Analysis Project,⁷ the OECD Trade in Value Added Database⁸ or the UNCTAD-EORA Global Supply Chain Database.⁹ All these databases allow estimating the sources (domestic or foreign) of value added in the production of goods and services for export (and thus knowing a country's position in GVCs), as well as they can be used to develop measures of the importance of global value chains in countries and industries (Gereffi *et al.*, 2013). These indicators will be discussed in more detail in Part 4, and in particular in Box 4.8. Nevertheless, Box 1.4 uses two of the most common indicators to approximate the position of the region's countries in the GVCs.

⁴ www.comtradeplus.un.org

⁵ www.wits.worldbank.org

⁶ www.wiod.org

⁷ www.gtap.agecon.purdue.edu

⁸ www.oecd.org/sti/ind/measuring-trade-in-value-added.htm

⁹ www.worldmrio.com/unctadgvc/

BOX 1.4. THE COUNTRIES OF THE REGION AND THEIR PARTICIPATION IN GVCs

Among the indicators that emerge from value added, there are two widely used that make it possible to infer the "upstream" and "downstream" position of countries in GVCs.

Foreign value added as a percentage of gross exports measures the proportion of a country's exports that include imported components or intermediate goods, giving an idea of the country's **"upstream"** links in GVCs. A high value for this indicator suggests that a country has many upstream or backward linkages, as it is importing components and intermediate goods from other countries and incorporating them into its exports. Conversely, a low value of this indicator suggests that a country's exports depend mainly on domestic inputs.

On the other hand, the **domestic value added in the exports of business partners, as a percentage of its own gross exports** gives an idea of the "downstream" linkages that a country may have in the GVCs. A high value for this indicator suggests a strong forward linkage of the country, in the sense that its products are used as inputs and components for the production of its trading partners. A low value would indicate that the exported production is rather linked to final consumption.

The chart below shows these indicators for selected countries and regions, obtained from the latest available data from the OECD's Trade in Value Added Database. For the case of Latin America, the only countries with data are Chile, Colombia, Costa Rica, Mexico, Argentina, Brazil and Peru. Among these countries, it can be seen that Peru and Chile have strong forward linkages (forward or downstream), surpassing even the record of the United States. Typically, this type of linkage is the one most desired by policymakers, since it implies that the country is a supplier of large chains and can thus incorporate better production practices, with a corresponding impact on productivity. However, it should be noted that this is an indicator that can be strongly influenced by the country's position as an exporter of raw materials, which is the case of Peru and Chile, due to their mining exports.

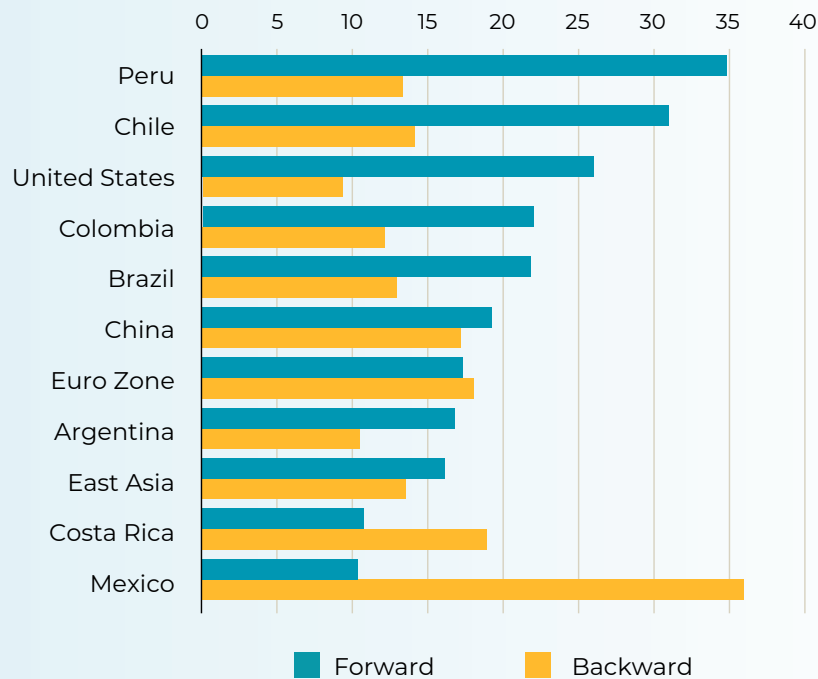
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In contrast, Mexico and Costa Rica appear as the countries with the highest incidence of backward linkages. This type of linkage is associated with a strong dependence on imported inputs, with competitiveness gains of a rather static nature. However, it is precisely this strategy that has earned Mexico and Costa Rica an important position in terms of the productivity of their manufacturing sectors.

Thus, it can be concluded that the "position" indicators of countries in the GVCs should be complemented with others that allow for a more complete understanding of where their business linkages have taken them in terms of productivity.

Figure Box 1.4. “Downstream” (forward) and “upstream” (backward) linkages of selected countries and regions (2018)



Source: Prepared by the authors based on TiVA-OECD.

Finally, and in view of the limitations mentioned in Box 1.4, the geographical scope dimension increasingly draws on other methodological tools that enrich it, such as the economic complexity approach proposed by Hausmann and Hidalgo (2009). According to the authors, economic complexity is a measure of a society's knowledge expressed in the products or sectors in which it participates (generally approximated from its exports). This approach analyzes the dynamics of economic activities and geography, seeking to identify which capabilities or factors drive the growth of an economy through the use of data on the geography of economic activities (Filippo *et al.*, 2022). Part 4 will show that this complexity methodology can be an effective tool for selecting the chains with the greatest potential, and for defining a strategy for upgrading in a productive development policy.

Governance

The concept of governance is central to the analysis of GVCs, since it is precisely what defines the macro-structure of the chain and conceptualizes the power relations between companies. Understanding the governance of value chains is essential for a proper diagnosis of the possibilities of integrating new companies into them.

In practice, governance analysis involves identifying the firms that lead the chain, their geographic location and operational structure, the way in which they interact with other firms, and the source of power that allows them to influence these firms (Gereffi and Fernández-Stark, 2019). Governance analysis allows us to understand not only the relationships between firms in the chain, but also between them and other relevant actors, such as the government and academia, among others. This is particularly important when proposing a particular development policy, since the structure of relations between companies is a fundamental determinant of the effectiveness of the policy.

Gereffi, Humphrey and Sturgeon (2005) propose three main attributes to define the types of governance that can be found in value chains. First, there is the complexity of the transactions involved. Second, the possibility or ability of leading companies to codify and systematize these operations, so that requirements can be efficiently transmitted to suppliers. Third, the capacities in the supplier base (current and potential) to honor these transactions.

Taking these three aspects into account, five main types of governance are defined (Table 1.1). The level of explicit coordination and power asymmetries between buyers and suppliers in the chain are described below:

- **Market:** It involves the simplest type of transactions, with generic goods and where interactions between companies are practically limited to buying and selling operations. The coordination mechanism is the price system, so it cannot be said that there is leadership on the part of the buying firms. Indeed, this governance means that it is easy to change suppliers or customers.






- **Modular:** Here the transactions are complex, but relatively easy to code. This implies that suppliers are able to meet their customers' orders with the same machinery with which they meet other requirements (i.e., no specific investments are necessary for the transaction). So, the costs of switching trading partners remain relatively low, despite the fact that there is a closer relationship than in the market mechanism.

- **Relational:** This governance involves trusting relationships between suppliers and customers that take time to build, so switching costs are higher. Indeed, transactions are complex and not easy to code; while the leading companies are the ones that set the requirements for their orders. This governance demands a certain degree of collaboration and knowledge sharing with suppliers in order to achieve effective results.

- **Captive:** Under this configuration there are one or a few buyers who exercise a significant degree of control over a relatively large base of small suppliers who must meet strict standards in their product specifications. The transactions have a certain degree of complexity, and require efforts to train these suppliers. In other words, it is in the interest of leaders to build capabilities in their suppliers. This establishes a "captive" relationship, in the sense that it is difficult to break the business relationship.

- **Hierarchical:** In this extreme case, the chain is vertically integrated: the leading companies carry out both design, production and marketing activities. There are several reasons for this to occur, such as transaction specifications that are too complicated to code, or vendors with insufficient capacity to handle them. This type of governance was more common in the past, but still exists in some cases.

Table 1.1. Types of Governance in a GVC

		Market-based	Modular	Relational	Captive	Hierarchical
						
		It is coordinated through prices, so it is easy to make and break relationships.	No supplier-specific investments, so it is still relatively easy to undo relationships.	Long-term relationships where there is collaboration between leader and suppliers.	There is a single (or few) leader for whom suppliers must make specific investments, making it difficult to undo relationships.	The leader is vertically integrated because it is difficult to partner with external suppliers.
Transactions	Complexity	Low	Medium	High	High	High
	Ease of coding	High	High	Low	High	Low
	Supplier capabilities	High	High	High	Low	Low
Leader-supplier relationship	Explicit coordination	Low	Medium	High	High	High
	Power asymmetries	Low	Medium	Medium	High	

Source: Prepared by the authors based on ECLAC (2014)

Two final thoughts on governance are in order. The first is that governance is not static, but tends to mutate (Box 1.5 presents the example of the semiconductor GVC). The second is that there can be several types of governance within a chain, especially if they are highly complex, taking into account the particular dynamics within each stage of the GVC.

In order to carry out an adequate analysis of the governance(s) of a GVC, the first step is to survey all relevant stakeholders, both globally and locally.¹⁰ This includes not only companies, but also government agencies (at different levels), academic institutions, labor unions, etc.

¹⁰ This identification is part of the value chain mapping, and their voices will be key to outlining policy actions: they will be the first source to consult for problems and possible causes, as well as visions of the chain at the local and global levels. Part 4 highlights the relevance of this mapping in order to institutionalize spaces for dialogue that will allow, among other aspects, to make accurate diagnoses and validate possible policy tools.

Different data sources, such as company registers and stock market reports, can allow us to size up the number of players, as well as to obtain notions on variables such as profitability margins. These sources can be complemented with in-depth interviews and other sources of data to characterize the ways in which power relations in the chain are sustained. In this regard, it is particularly relevant to have a complete assessment of the standards and certification requirements that the leaders impose on their suppliers.

BOX 1.5. THE SEMICONDUCTOR VALUE CHAIN AND CHANGES IN GOVERNANCE¹¹

The semiconductor value chain originated in the 1950s with the invention of the transistor. Since then, its advances have been key to the development of almost every other sector of the economy. Today, semiconductors (often referred to simply as "chips") are present in almost every object in our daily lives: the alarm clock, the dishwasher, the cellphone, the laptop, the car, etc. Every electronic device needs semiconductors, and our reality of the internet of things, *big data* and teleconferencing would not be possible without these microscopic inputs. In fact, the chain disruptions caused by the effects of the COVID-19 pandemic paralyzed global chains such as automobiles and other electronics such as laptops and video game consoles.

How is this chain organized? The chain has essentially three steps: design (R&D-intensive), production (capital-intensive), and assembly and testing (labor-intensive). Born in the United States, the governance of the chain was marked by the business model prevailing at the beginning, which was that of complete vertical integration of the few companies that dominated the market (a model identified by the acronym IDM, Integrated Device Manufacturers). Subsequently, pioneering U.S. companies, such as Texas Instruments and Intel, early on shifted their lower value-added activities (assembly and testing first, and gradually manufacturing activities) to Asian countries with low labor costs. In countries such as Taiwan and South Korea, these actions were the seed of the value chain in their territories, and they were able to project themselves as leaders in the future, with their own companies. Thus, today Taiwan boasts the largest

(Continued)

¹¹A detailed analysis of the semiconductor GVC can be found in Filippo *et al.* (2022a).

(Continued)

semiconductor production capacity in the world (primarily TSMC, Taiwan Semiconductor Manufacturing Company) and South Korea is the leader in memory devices production (Samsung).

The semiconductor GVC is highly concentrated due to the high investments required, especially in its first two stages (it is a chain that invests almost as much in design R&D as in *capital* for manufacturing). However, the growth in demand for semiconductors due to their ubiquitous production led to changes in business models. Today, there are fewer fully integrated firms, and new companies have appeared that specialize in one of the three stages. These new models are identified as: fabless (companies such as Qualcomm and Nvidia, specialized in the Design stage, and outsourcing the manufacturing stage), foundries (the aforementioned TSMC is the main example of companies that are exclusively dedicated to chip manufacturing, for both fabless and IDMs that need additional production capacity), and OSAT (the Outsourced Semiconductor Assembly and Test is responsible for carrying out the activities of the third stage in the chain).

This way, the governance of the chain changed to a relational structure, where a high degree of joint work is *necessary*, especially between the companies in the first two stages. To illustrate the case, it can be pointed out that fabless companies such as Qualcomm work with designs involving 5-nanometer nodes (a human hair is 60,000 thick); for foundries to materialize these nanoscopic designs on the real plane requires a high degree of joint work in the instances prior to the actual fabrication which, it is worth noting, is a process that can take up to 20 weeks for the most complex semiconductors. The increasing complexity of these processes means that even integrated companies have to work with specialized companies for certain product lines, which consolidates the relational structure of governance.

Global and Local Context

This dimension has to do with general factors that affect the chains' performance. The countries' trade policy, geopolitics, macroeconomic circumstances and labor laws are examples of contextual factors. This way, these conditions must be considered from both the global and local levels.

In the global context, geopolitics is a central factor. For example, the US-China relationship has repercussions on global trade and the opportunities and challenges facing for developing countries. In addition, exogenous factors may reveal certain weaknesses in the way the chains are structured. An example of this is the recent COVID-19 shock, which caused disruptions in the production of key components and directly attacked the flows that feed supply chains, forcing large companies to adopt unprecedented strategies for their supply. On a more concentrated scale, earthquakes and other climatic disasters are situations that frequently test the resilience of GVCs.

Another aspect of context that also requires redefining the operating model of GVCs refers to the new sustainability requirements of production processes, which occur in the framework of the 2030 Development Agenda and other international agreements, and which are reinforced by changes in consumer preferences, increasingly aware of their environmental footprint. In this regard, Part 2 of this paper focuses on the analysis of resilience and sustainability as new imperatives for the operation of GVCs, analyzing the new trends in the strategies of large multinationals.

On the other hand, the local context is defined by Gereffi and Fernández-Stark (2019) according to three dynamics: economic, social and institutional. Economic dynamics are associated with variables such as labor costs, availability of quality infrastructure, and access to credit. Social dynamics refers to the characteristics of the labor force, both in terms of its availability (quantity and quality), as well as other characteristics, such as the female labor force participation. The institutional side includes the legal and regulatory framework (including tax policy), as well as the country's long-term policies and visions (education, science, among others).

These three groups can be evaluated and compared through classic business climate indicators. Most of them are associated with horizontal basic conditions for the development or improvement of any value chain, so that addressing weaknesses in any of these aspects responds more to a general development policy, which is unlikely to apply to a single chain. In any case, it is important to identify the chains that will benefit most from the resolution of these bottlenecks, both to find key support and to evaluate the results. The proposed intervention framework developed in Part 4 of the document will return to these particulars, specifically with regard to the Upgrading Dimension.

Conclusion

The analytical framework just presented is a starting tool necessary to define interventions for productive development. Knowing the productive relationships both at the local and international level is important to identify development opportunities hand by hand with the relevant stakeholders. Such opportunities arise, mainly from the changes that may happen in the Global and Local Context dimension of analysis. Indeed, events as the Covid-19 pandemics and the war between Ukraine and Russia, and the increasing global geopolitical tensions, are leading to a redefinition of the GVCs general operation model. Part 2 focuses on the main determinants of these changes and their implications for the future of GVCs.

Part 2.

The New Imperatives of Global Value Chains





One of the dimensions of analysis of GVCs raised in Part 1 is that of the context in which their participants operate, which is the focus of this part of the paper. Specifically, we will address the fact that, although globalization continues, the GVC model today faces new imperatives that go beyond the mere search for efficiency, and that the design of a productive development strategy must be consistent with the challenges and opportunities that appear on the near horizon in the new context (which will be discussed in more detail in Part 3).

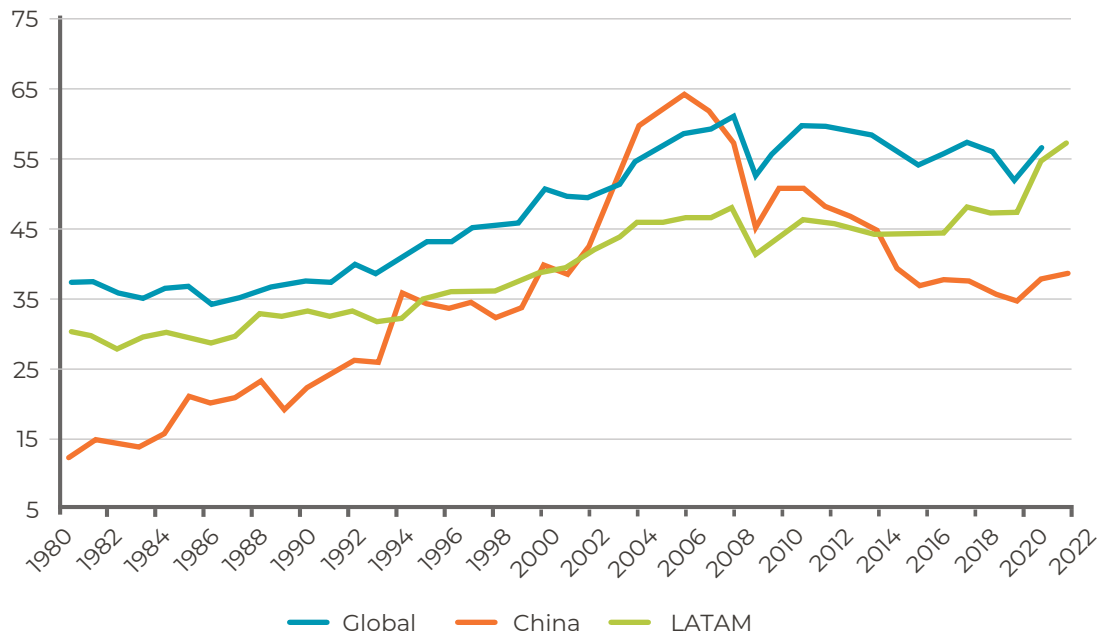
Changes in the Drivers of Globalization and their Effects on GVCs

In the midst of protectionist tendencies on the part of certain developed countries and challenges to the functioning of GVCs in the face of disruptive shocks such as the COVID-19 pandemic, which for some views constitute threats to globalization, this part of the paper analyzes in greater detail what has changed in GVCs, the causes of these changes, and the prospects these variations pose for the future.

Is the World Moving Towards "De-Globalization"?

What has been the evolution of GVCs over time and what is the current situation? Is the world entering a reversal phase in globalization? A traditional measure of globalization is the volume of world trade in goods and services expressed as a percentage of GDP (Figure 2.1). Considering the evolution of this indicator since the beginning of the 1970s, a strong growth can be observed from the end of the 1980s until the Great Recession of 2008. Thus, while in the 1980s international trade represented between 34% and 38% of global GDP, in the following two decades it jumped to levels that exceeded 60% in 2008. Thereafter, despite two sharp drops in trade, one with the Great Recession and the other with the pandemic, trade levels never fell below 52% of world GDP. Therefore, rather than a process of de-globalization, the data show a stagnation or slight fall in trade volumes at levels that are already high (Baldwin, 2022). Other measures of globalization, such as the share of GVC trade in total trade show a very similar pattern (World Bank, 2020a).

Figure 2.1. Total International Trade in Goods and Services, 1980-2022 (% of GDP)



Source: Prepared by the authors based on WDI.

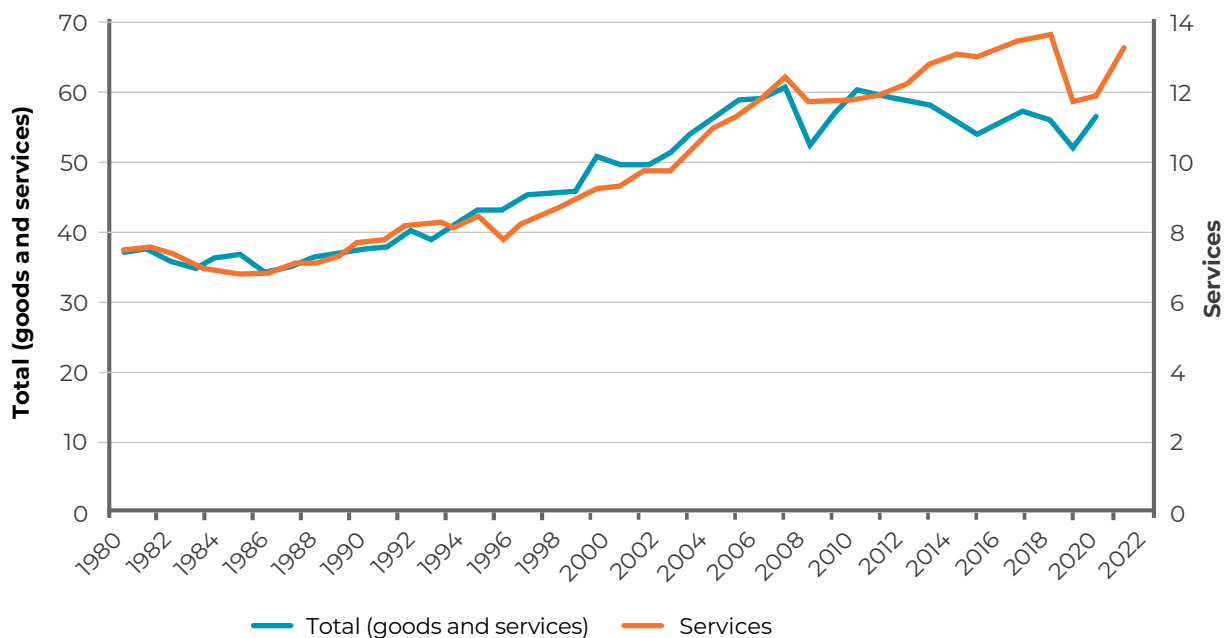
The data also show that trade dynamics over time differ across regions and that there are compositional effects that influence overall trends. In fact, in Latin America and the Caribbean, although trade levels as a percentage of GDP are lower than global levels, the trend is clearly upward (Figure 2.1). Rather, it can be seen that to a large extent the dynamics of world globalization are strongly influenced by what happens in China (Lund, 2020); according to Figure 2.1, trade as a percentage of GDP in that country peaked in 2006 and then had a marked downward trend.

The case presented from China is interesting for two main reasons (Baldwin, 2022). First, to account for the fact that the beginning of the apparent "de-globalization" phase occurred *before* the 2008 global financial crisis, so it is wrong to argue that globalization began to lose momentum as a result of the Great Recession. Something similar occurs when observing the dynamics of trade in other industrialized countries. On the other hand, China's data may reflect the progress of its industrialization and economic development process rather than less integration with the world. Lund (2020) shows that China consumes an increasing fraction of what it produces and therefore exports relatively less, and that, to supply the increased consumption, supply chains are growing in that country, while the percentage of total intermediate goods that are imported has fallen substantially over time. In addition, Baldwin

(2022) shows that the percentage of Chinese exports relative to gross production has grown steadily over the last two decades.

Another aspect that has not lost importance in the GVCs, on the contrary, is trade in services, which, as shown in Box 2.1, has a great potential for development, greater than trade in goods. Figure 2.2 shows the percentage of international trade in services in relation to global GDP in comparison with that of total trade in goods and services shown above. The data show that, although it has a much lower weight than trade in goods, global trade in services shows a clear upward trend, although affected by the recession caused by the COVID-19 pandemic.¹²

Figure 2.2. Total and Services Trade, 1980-2021 (% of GDP)



Source: Prepared by the authors based on WDI.

¹² It should be noted that services data are not entirely adequate to capture their impact on the overall economy, mainly because, unlike trade in goods, records of services transactions generally do not come from customs declarations (Baldwin, 2022). Therefore, trade in services is likely to be higher than reported here.

BOX 2.1. THE BOOM IN GLOBAL TRADE IN SERVICES

Although globalization in goods may have stopped advancing, globalization in services is increasing, and has much room to continue to do so, given that the weight of the services sector in the global economy is much greater than that of the goods-producing sectors. Baldwin (2022) argues that the future of globalization is trade in intermediate services for the following reasons:

- 1.** Although barriers to trade in services are two to three times higher than those for trade in goods, most barriers to trade in services are technological. This is because fiscal and regulatory barriers apply to final and not intermediate services. Since it is difficult to tax imported services, the main source of protection is regulation, but since most regulation applies to final services, the main barriers to international trade in intermediate services are the difficulties of coordinating work teams with dispersed members in different locations.
- 2.** Another relevant fact is that digital technologies are helping to reduce barriers to trade in intermediate services, and therefore it is likely that barriers to trade in services are being reduced at a faster rate than those in goods, and that this process will continue.
- 3.** The third finding is that the services export capacity of emerging markets is less of a limiting factor than their goods export capacity. This is because the production of services is less capital intensive, making it easier and faster to scale up exports than in the case of goods.
- 4.** Finally, the demand for intermediate services has a high growth potential, which is being facilitated by ICTs. These intermediate services include R&D activities, design, consulting, engineering, legal, accounting, marketing and financial services, as well as digital technologies for a wide variety of purposes such as transportation, logistics and distribution, among others. In fact, many services that are not traditionally traded internationally are gaining in importance. The experience of remote work during the pandemic is evidence of this (Aksoy *et al.*, 2022; Brinatti *et al.*, 2022).

The Drivers of Globalization: What Has Changed?

To understand why globalization has lost momentum, it is necessary to first review the causes that led to the previous expansion phase. Antràs (2020) identifies three main factors that contributed to the global fragmentation of production. First, the information and communications technology (ICT) revolution has made it possible for companies in industrialized countries to relocate certain parts of the production process to distant locations, while maintaining fluid communication between the different production stages. The ICT revolution also facilitated the adoption of efficient supply chain management practices (Baldwin, 2022). Secondly, Antràs (2020) highlights the strong reduction in trade costs, driven by trade liberalization processes and improvements in goods transportation techniques. The third factor relates to political changes that led to a substantial increase in the size of the global employable labor force in GVCs, in the face of the adoption of market economic systems in China, Eastern Europe, and East and Southeast Asian countries. This labor supply shock allowed Western companies to substantially increase the employment of labor from less developed parts of the world at lower costs than in their countries of origin.

Understanding the extent to which these drivers of globalization have lost steam can chart the prospects for GVCs going forward. In this regard, Antràs (2020) argues that, although the technological change associated with ICTs has not slowed down, sustaining such a pace of technological progress requires increasing levels of R&D expenditure.¹³ There are also signs of diminishing marginal returns in other technological developments that made the take-off of hyper-specialization possible (e.g., the number of internet users as a percentage of the global population is growing, but as a matter of course, at a much slower rate than in past decades).

Another concern about technological advances is about whether automation can be a substitute for offshoring (the model by which companies move part of their operations to other countries to reduce costs) and thus tend to induce the reverse process of relocation or reshoring; that is, of moving at least part of the operations back to the companies' home countries. However, both conceptually and in terms

¹³ An illustration of this is provided by the exhaustion of Moore's Law. This empirical law was proposed in the 1960s by Gordon Moore, one of the founders of Intel, and postulated that approximately every 20 years the number of transistors on a microchip would double. The point of this was to predict the rate at which industry would be able to reduce the size of transistors, usually measured in nanometers. These predictions held systematically, but today the Moore's law faces a physical barrier: the industry standard is at 3 nanometers (for reference, a coronavirus particle is about 100 nanometers in size). That is, these technological advances are too close to reach a limit, and the question now is what will come next. The challenges are not only about the ability to realize nanoscale circuit designs, but also to use them in real world applications (Filippo *et al.*, 2022).

of empirical evidence, the deglobalizing effect of these technological advances is not clear. This is mainly because the effects of automation are productivity gains, input demand and trade flows sustained by long-lasting contractual relationships effects that may prove stronger than trends towards reshoring.¹⁴

In this regard, another relevant point raised by Antràs (2020) relates to the costs of dismantling a GVC. In many sectors, building a GVC has high installation costs (finding suppliers, building plants, acquiring machinery, etc.). There are large economies of scale, which means that in general there are few players. These costs are largely sunk and therefore difficult to recover if a company leaves a country.¹⁵ This characteristic makes the dynamics of the GVCs rather rigid. In this sense, the COVID-19 pandemic was a major shock, but to the extent that it was temporary, large reallocations would not be expected; the Great Recession and the Asian crisis are other examples. In summary, shocks of this type can generate effects on the intensive margin, but not on the extensive margin (it is more difficult to break relationships). It is perhaps because of these high fixed and sunk costs that, both after the great recession and after the pandemic, the trade flows had quickly recovered to pre-crisis levels (Figure 2.1).

Based on the above, only if the global economy were affected by persistent and large shocks would major changes in the geography of GVCs to be expected. To what extent has the COVID-19 pandemic induced GVC relocations? The answer to this question is not obvious. According to a McKinsey report (2021), a survey of leading executives of the main GVCs revealed that while in May 2020 approximately 40% were planning to regionalize chains and/or nearshoring, one year later no more than a quarter of those surveyed stated that they had begun to take such actions.¹⁶ We will return to this point later.

Finally, something requiring close attention are the recent changes in the orientation of countries' trade policies. This is evidenced, according to Antràs (2020), by the stagnation of the World Trade Organization (WTO) and regional multilateral

¹⁴ Empirical evidence tends to find a positive impact of automation on productivity, a negative effect on wages and employment of low-skilled labor, and ambiguous effects on total employment (Graetz and Michaels, 2018; Acemoglu and Restrepo, 2020; Webb, 2020; Dauth *et al.*, 2021). Acemoglu *et al.* (2020) find that the adoption of robots among French firms has the effect of reducing costs and gaining market share. Kochet *et al.* (2021) find evidence of complementarity between robots and exports to increase the productivity of Spanish manufacturing firms. Brambilla *et al.* (2023) show a negative effect of robots in the labor markets of Argentina, Brazil and Mexico, affecting mainly formal middle-skilled jobs, which tend to be displaced towards labor informality.

¹⁵ Sunk costs are those costs that have already been incurred. These costs become irrelevant for short-term economic decision making, as they cannot be changed or recovered.

¹⁶ Se incluyeron empresas de las CGV de farmacéuticas y productos médicos, automotores, electrónicos, semiconductores, químicos, metales, minería, y bienes de consumo envasados.

liberalization agenda, signs of deterioration in agreements such as Brexit and the North America Free Trade Agreement (NAFTA), and trade tensions between China and the United States. Why does all this happen? Without seeking to establish causality, the author shows that in the United States there was an increase in inequality, as measured by the Gini coefficient, concomitant with the increase in trade flows since the 1980s and, at the same time, a fall in the progressivity of the tax system, which indicates that economic agents who were harmed by globalization were not compensated for their losses. This generated discontent and an inclination to vote for politicians with ideas less favorable to globalization.

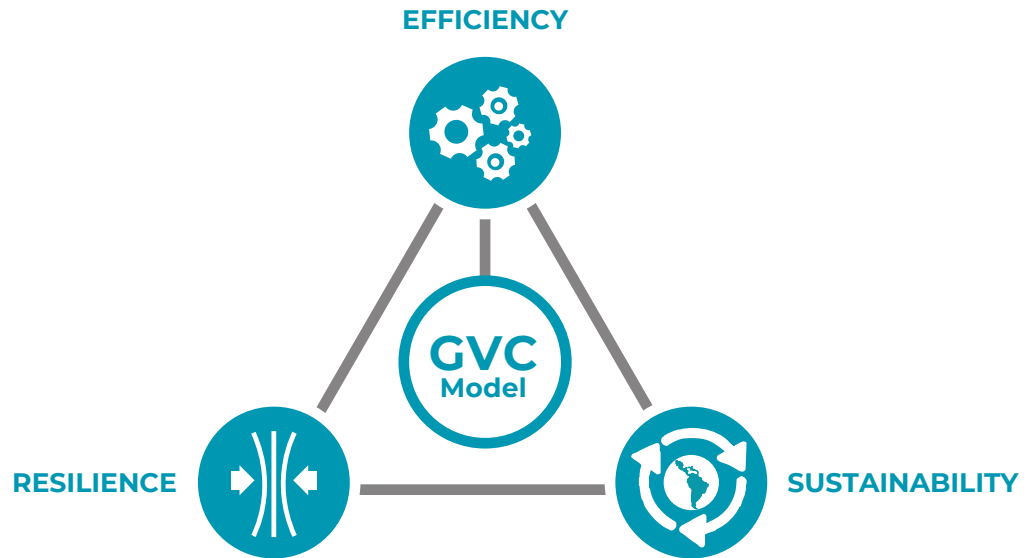
As for what to expect in the future, globalization-induced inequality is likely to continue for some time to come. However, as will be explored in Part 3 of the document, it is possible to promote, through public policy incentives, production models that limit or compensate for their impact on inequality.

Over time, globalization has taken different forms that have led to different responses in terms of productive development policies (see Box 3.1). The current context marks a new phase of the same process; rather than a reversal of globalization and protectionist tendencies, the data suggest that the world is moving towards a different globalization in a different environment.

The New Challenges for GVCs: The Importance of Resilience and Sustainability

Just as GVCs generate benefits in terms of efficiency gains, productivity, growth, and welfare (which will be discussed further in Part 3 of this paper), they also have associated costs that relate to increased exposure to risk and the difficulty of spreading those benefits in an acceptable way throughout society over time. These two areas of analysis refer to the resilience and sustainability of GVCs (Figure 2.3), which will be discussed below.

Figure 2.3. The Triple Imperative of the GVC Model



Source: Prepared by the authors.

A simple way to conceptualize resilience and sustainability is to incorporate both aspects as new conditions of the traditional model, where the objective of GVCs continues to be efficiency or, in other words, profit maximization. Although, as will be seen, some of these new restrictions are imposed by circumstances (greater exposure to shocks) and others by society (guaranteeing the supply of goods and services, greater environmental awareness), what is certain is that they require a redefinition of the GVC operating model. And while the traditional view is that resilience and sustainability are costly to implement and sacrifice efficiency, there is reason to believe that innovation and technological advances can make it easier to break that trade-off, increasing efficiency, sustainability, and resilience at the same time.

Resilience

Given that to a large extent the advance of GVCs has occurred hand in hand with greater globalization, greater complexity in their operation, and technological advances in transportation, communications, financial systems, among others, the stability of GVCs has come to depend on multiple factors and shocks affecting these systems (Ibrahim *et al.*, 2021). These shocks include plant fires, macroeconomic and financial crises, political instability, wars, cyber-attacks, quality logistics failures, natural disasters, among others. A McKinsey study (2020) shows that the magnitude and frequency of these shocks has increased since the beginning of the century

and that exposure to each type of shock varies greatly among chains, depending on their geographic distribution, length, complexity, and concentration of export and import destinations, among other factors.

There is evidence showing that, given increased globalization, the ability of different types of shocks to spread across different countries and regions that make up GVCs has also grown over time (Baldwin, 2016). These impacts occur both upstream and downstream, affecting customers and suppliers of directly affected firms (Barrot and Sauvagnat, 2016; Boehm *et al.*, 2019; Carvalho *et al.*, 2021; Kashiwagi *et al.*, 2021).

Concerns about these disruptions increased with the COVID-19 pandemic and, more recently, with Russia's invasion of Ukraine. The pandemic that affected the global economy in 2020 was the largest and most far-reaching shock ever to affect the functioning of GVCs in history. On that occasion, there was a strong disruption of the GVCs, as both the supply and demand for goods and services was reduced due to the confinement measures adopted by the countries, which massively restricted work and consumption activities. These measures reached their maximum scope around April 2020 and were gradually relaxed throughout that year and the following year, to practically disappear in 2022. Once again, given the propagation capacity of unexpected events, the impact was felt not only in the local economies directly affected by these restrictions but also in other economies indirectly linked to and affected by the resulting disruptions in the supply chains (Todo *et al.*, 2022). A fundamental pillar affected by this crisis was the international transportation of goods (see Box 2.2). The conflict between Russia and Ukraine caused severe problems in the supply of strategic products such as gas, oil, corn, wheat and sunflower, where both countries are major global players. As a result, energy and food prices rose sharply around the world.

BOX 2.2. THE MARITIME TRANSPORT CRISIS: AN ATTACK ON THE HEART OF CGVs

At the beginning of this Part 2 of the document, it was mentioned that the improvements in transportation networks (in terms of speed and monetary costs) were one of the fundamental pillars of globalization and GVCs. These advances made it possible to spread the different stages of GVCs throughout the world. Following the effects of the pandemic, this pillar was called into question.

In the first months of the COVID-19 pandemic, the strict lockdown and precautionary measures caused severe problems for the operation of shipping companies, with personnel partially out of work and ports interrupting operations, as new cases were detected among their payrolls. All this led to a sharp reduction in the supply of ships carrying more than 80% of the world's traded goods. The results were, first, a steep increase in lead times, but also in the reliability of delivery times. Secondly, the combination of stagnant supply and recovering demand led to large increases in freight rates, particularly on routes from Asia to the United States. To illustrate the case, in September 2020 the average freight cost from China to the United States was USD 4.5 thousand. One year later, this value had more than quadrupled, reaching a value of around USD 20.6 thousand. Thus, the situation directly attacked one of the engines of GVCs, affecting cost structures (efficiency) and the reliability of production flows (resilience). These problems would spread throughout supply networks and have repercussions on the prices of final goods paid by consumers.

At present, the situation seems to be returning to "normal". Although the indicators are still above their pre-pandemic values, there seems to be a convergence to these levels for freight rates, lead times, and reliability of delivery times.¹⁷

¹⁷ <https://www.xataka.com/movilidad/dos-anos-interminables-retrasos-sobrecostes-gran-crisis-contenedores-encarrila-su-fin>

These unforeseen events have made it clearer than ever that the traditional GVC operating model was not properly calibrated to respond to increasingly frequent shocks of magnitude. From the conceptual point of view set out in Part 1, resilience is compatible with the search for allocative efficiency, since the large multinationals that determine the global shape of the chains consider the probabilistic scenarios imposed by these shocks in their resource allocation decisions. That is, the decision is made on the basis of *expected* costs and benefits, resulting from assigning probabilities of occurrence to different events that affect the operation of the chain. On this basis, some authors suggest that it was problems of limited rationality and lags in the responsiveness of large firms that magnified the effects of the shocks mentioned above (Verbeke, 2020).¹⁸ Thus, the new context of greater exposure to risk has forced them to consider a new model, less vulnerable and more agile, that will allow them to ensure the supply of goods and services, which in many cases are essential for economic development and well-being.

Faced with this new context, firms can act in two main dimensions: one is by taking measures to minimize disruptions, and the other is by taking measures to recover quickly in the event that disruptions do occur.¹⁹ Some authors suggest that the first dimension refers to the robustness of GVCs, and the second to resilience (Miroudot, 2020a; Baldwin and Freeman, 2022; Todo *et al.*, 2022), while others unify the two dimensions under the umbrella of resilience (Schwellnus *et al.*, 2023). For most of this study, the latter criterion will be followed (a discussion of the interactions between robustness and resilience is presented in Box 2.3).

¹⁸ In other words, GVC operation optimization models may have assigned a low probability to disruptive events, and also a zero probability to other events they thought would never occur or were unaware of (such as the pandemic).

¹⁹ Calatayud *et al.* (2017) presents an IDB methodology for managing the different risks that can affect value chains.

BOX 2.3. ROBUSTNESS AND RESILIENCE OF GLOBAL VALUE CHAINS

The robustness of a value chain refers to its capacity to maintain operations during a crisis, and resilience to its capacity to return quickly to normal operation after being affected by a disruption. Building robustness typically requires having multiple, geographically dispersed production sources, which is easier in modular governance, where relatively standardized products are used and permanent monitoring of chain performance is followed. This can achieve robustness, but at the expense of higher costs and lower quality inputs, which is not always possible and depends on the characteristics of the sectors.

On the one hand, in chains with strong product customization, it is more efficient to produce based on long-term relationships with reduced groups of suppliers (relational governance), which according to the evidence favors resilience (Miroudot, 2020a; Baldwin and Freeman, 2022). On the other, in concentrated industries of strategic importance (such as energy, some minerals, essential medical equipment, pharmaceuticals and semiconductors) robustness is more relevant than resilience (Baldwin and Freeman, 2022). In any case, there are chains where robustness is impractical; such is the case of the semiconductor industry, which has capital-intensive stages of production that depend on one or only a few suppliers (Shih, 2020). In addition, concentrated strategic industries, where robustness is important, represent a smaller fraction of GVCs. In contrast, 96% of GVCs, which account for 98% of global trade, either have a diversified supplier and customer base, or are of limited strategic importance (Schwellnus *et al.*, 2023). The implication of this finding is that resilience is a more relevant objective than robustness for the vast majority of GVCs. Perhaps this is why some authors just refer to the resilience of the GVCs, without speaking of robustness, as in this paper.

How to build resilient GVCs? One of the first reactions to the disruptive effects of the COVID-19 pandemic was that GVCs needed to change their geographic structure to become more resilient. This meant moving towards the regionalization of the chains, relocating parts of the production process to the headquarter countries of the leading companies (reshoring), or to countries near them (nearshoring). In this context, even the governments of the central countries implemented strong incentive policies for production in their territories.²⁰ In this regard, it is worth noting that the relocation of some GVCs is likely to have efficiency costs, at least for a while, until they manage to develop an adequate customer and supplier structure for their normal operation (Baldwin and Freeman, 2022). As a consequence, some authors argue that reshoring and nearshoring may not necessarily be the most effective ways to build resilience (Miroudot, 2020b; Shih, 2020).

A McKinsey (2020) survey of leading companies in major GVCs conducted in 2020 shows that 93% of them planned to take measures to strengthen resilience that year. While a high percentage of respondents admitted that they considered **nearshoring** and **regionalization** of chains, other important measures contemplated were **inventory build-up**, **supplier diversification** and **unification of product standards** to facilitate substitution among suppliers. The survey was repeated by 2021, and the results were similar (McKinsey, 2021), noting in turn that many GVCs had already taken rapid resilience measures, such as stockpiling inventories, and were continuing to analyze moving towards regionalization of their activities in the future.

International empirical evidence shows that a shorter chain is not necessarily less complex (Miroudot, 2020a, Qiang *et al.*, 2021). The search for resilience does not mean reducing the complexity of the chain, but rather adopting technologies and organizational changes that make it possible to manage this complexity efficiently, with flexibility and the ability to adapt to changing environments. Along these lines, Schwelnus *et al.* (2023) find that supplier diversification has a substantial effect on the resilience of GVCs, while partial relocation of production has zero net additional benefits. On the other hand, the authors find that technological innovations have an important effect on resilience, but they take time to materialize. But while supplier diversification can contribute to resilience, this can bring with it higher transaction costs and even potential cost disadvantages relative to cases where sourcing comes from one or a few firms (Criscuolo and Timmis, 2017).

²⁰ The most notable case is the CHIPS and Science Act, enacted in August 2022 by the United States that provides for USD 52.7 billion in tax incentives to, among other objectives, recover the country's global position in semiconductor production capacity. The CHIPS Act also contemplates incentives for research and development in strategic sectors and new technologies (aerospace, biotechnology, artificial intelligence, robotics, quantum computing, among others) for more than USD 200 billion (Filippo *et al.*, 2022c).

In relation to technological innovations, digital transformation is a complementary tool to increase efficiency and reduce risks. A notable example is that of Toyota which, after being badly affected by the earthquake in Japan in 2011, adopted innovations that enabled it to gain resilience. Indeed, following the events of 2011, virtually all of the company's domestic operations were shut down for almost two months, also affecting the supply of inputs to the company's plants in other parts of the world. According to McKinsey (2020), the company adopted a combination of four types of actions: standardization of certain components to facilitate inventory availability and flexible production possibilities in different geographical locations; the construction of a database with thousands of suppliers and hundreds of thousands of parts available for purchase if necessary; the regionalization of its value chain; and the identification of critical parts from suppliers who were encouraged to geographically spread their production and/or increase inventories. These measures, facilitated by digital technologies, meant that in the face of subsequent disruptive events affecting the company, such as other natural disasters and the pandemic, its operations were little affected.

GVCs are just beginning to use artificial intelligence (AI), robotics, Internet of Things (IoT) and digital platforms (Antràs, 2020; McKinsey, 2020). These technologies can facilitate information flows for chain monitoring, the management of inventory policies, and the organization of relationships between customers and suppliers, among many other aspects that contribute to the resilience of GVCs. Most companies are in the early stages of connecting the entire GVC to a continuous stream of data. Digital technologies can therefore contribute to greater efficiency and transparency. For example, Procter & Gamble has a digital, company-wide, global control tower system with real-time inventory data and time and delay forecasts for both its own plants and those of suppliers and distributors. When a problem arises, the system projects scenarios and proposes the most effective solution. But this increased digitization also requires increased cybersecurity, which is a public policy objective (McKinsey, 2020). Box 2.4 elaborates on the implications of "datification" for GVCs.

BOX 2.4. DATA-INTENSIVE GLOBAL VALUE CHAINS²¹

It is no news that digital technologies have become increasingly relevant for different activities that make up a GVC. What is perhaps not so obvious is the "datification" of the GVCs. What does this mean? The increasing migration of activities from the physical to the digital world is nothing more than their translation into data. The Internet and every access device are virtually unlimited sources of data that have value in their own right. Thus, the productive use of this by-product of digitization (data) gives rise to the concept of Data-Intensive Global Value Chains.

According to Filippo and Stankovic (2021), this process is radically altering the structure of GVCs, adding flows, actors and articulations that did not exist before. The product research and design process cannot begin without a sufficient amount of data being accumulated, and this data comes from multiple sources, including automatic data streams from sensors distributed throughout production plants and the global production network, and also from consumers connected through their devices with many service providers, or from their virtual traces on the internet.

The implications of the above do not end with logical cost reductions and improvements in processes, such as quality control and monitoring. The datification of GVCs is particularly relevant for the redefinition of the way in which companies are linked to each other (see the lower part of Figure 1.2), which has a correlate in the governance of the chains. Thus, the data is usable and valuable to the network of companies willing to share it within and outside their own chains.

Filippo and Stankovic (2021) study how datification impact Mexico's automotive and electronics industry. In the case of the former, the authors point out that, until recently, data management and monetization were not among the main concerns of the chain, both for the companies involved and for the governments that must create and maintain the regulations required by these chains. Something similar could be said of the electronics chain. But

(Continued)

²¹ For a more detailed discussion, see Filippo and Stankovic (2021).

(Continued)

that seems to be changing in light of new products and processes where the use and management of data will make a difference. Thus, for example, electromobility, autonomous vehicles, wearables, products, and electronic devices connected to the cloud seem to mark the reality that data management is not limited to actions to improve company profits (greater productivity) but will become a basic requirement for the survival of companies and the associated jobs.

There are two main areas of action. On the one hand, there is the level of regulation. It is governments, in coordination with the private sector and the knowledge sector, that define the rules for the development of Data-Intensive Global Value Chains. On the other, the private sector must adopt data-driven business strategies. In this context, the needs are multiple and new. For example, at the level of regulation, a point must be set that is acceptable to all as to how data can be transferred and stored, especially when data must cross borders. Because of the very nature of new products (and consequent processes), data management policies have become more relevant than ever. And at the producer level, business models must be structured to take advantage of the new opportunities and challenges generated by Data-Intensive Global Value Chains. Respect for private data, for example, and any of the specifics associated with cybersecurity are routine issues for companies in Data-Intensive Global Value Chains and barely existed as a concern a few years ago. For those who are not immersed in these new needs, these worries may sound like eccentricities. But they are not: more and more people are talking about data safeguards, just as it is now common to hear about environmental and social safeguards; they all have the very specific ability to create or destroy business opportunities for companies and countries.

Another central aspect of building resilience is the agility of work teams (McKinsey 2021; Schwelnus et al., 2023). More qualified managers are better prepared to restructure production, have a better understanding of GVC operations, and implement more prudent inventory policies. The qualifications of workers are also important to facilitate a smooth transition to new production schemes and for this purpose, the ability to transfer skills between tasks is fundamental. All these aspects inherent to human capital are, key to enabling the digital transformation of GVCs.

Sustainability

Another concern inherent in the GVC model relates to the difficulty of ensuring that the benefits of participating in GVCs are shared in a socially acceptable way across different regions, workers from different demographic groups such as women, youth, and other minorities, workers with different skills and other actors in society (OECD, 2021). In this context, alarms have been ringing as to whether GVCs could increase social and environmental risks, such as greenhouse gas emissions, informality, child labor, gender discrimination, etc.

From the theoretical point of view of Part 1, sustainability is consistent with an efficient allocation of resources, as long as it refers to social and not merely market prices (i.e., prices that incorporate the effects —positive and negative— that GVC activities may have on their social and environmental surroundings).

Under the sustainability approach, in addition to considering the effect on productivity, exports and employment of GVCs, their effect on the quality of employment, wages and inclusion of vulnerable groups, as well as the environment, must also be taken into account (Ponte *et al.*, 2019). In this context, workers are considered not only as productive actors but also as social actors in the GVCs. This has strong implications for the value chain analysis, since the relationship between economic and social impacts can be ambiguous.

This can be illustrated by reflecting, for example, on the effects of GVC participation on gender gaps. In developing countries, women account for almost 37% of the payroll of firms that participate in GVCs; that is, about 10 percentage points above the share of firms that do not (World Bank, 2020b). Thus, if a company participates in international trade, women's share of total wages increases by an average of 5.8 percentage points, through a combination of increased employment and higher wages. Even so, gender gaps persist in GVCs, since chains linked to agriculture and clothing are those that tend to employ more women, in positions associated with low wages and possibilities for growth, imposing a "glass ceiling" on women participating in global networks (World Bank, 2020a). This is associated with the role that women have in their households, which conditions their labor planning (World Bank, 2020a). In any case, certain studies such as Heath and Mobarak (2015) find positive effects on years of schooling from the employment opportunities generated by GVCs.

Regarding environmental aspects, different phenomena that affect sustainability have direct impacts on productivity and resilience. For example, there is evidence that rising global temperatures have a negative impact on agricultural and livestock

productivity —particularly of smallholders (IPCC, 2018). In turn, the increase in the frequency, intensity and duration of heat waves increase exposure to forest fires and desertification processes, which generate a cost of between 8% and 14% of the region's gross agricultural product (IPCC, 2022).

In view of this worrying scenario, several countries in the world and the region are implementing decarbonization strategies, understood as the process of eliminating the consumption of fossil fuels, which are tools for sustainable economic development. At the international level, the Paris Agreement establishes a goal of zero net emissions by 2050, for which both governments and international organizations must align themselves, as the IDB is already doing in its operations.²² Sustainable GVCs then contribute to the fulfillment of the Sustainable Development Goals and the commitments made in the Paris Agreement. To achieve this, companies will have to adopt standards (energy efficiency, carbon footprint reduction throughout the value chain from design to avoidance of final disposal) and governments will have to generate policies consistent with the attainment of this objective.

The need for sustainable GVCs also responds to increased pressure from consumers and social organizations on multinationals to become aware of the social and environmental impact of production (Grumiller *et al.*, 2022). Following the COVID-19 pandemic, consumer preferences for brands with robust sustainability credentials intensified and companies are ramping up their environmental initiatives (McKinsey, 2022). This way, they seek to move towards modes of production that avoid or reduce environmental damage. Since adopting clean technologies is costly, these environmental improvements may conflict with economic profitability. However, there are cases of companies where environmental actions also yield good operational results, such as that of the German chemical company Henkel, which, having applied sustainable digital technologies, reduced energy consumption by 40% and waste by 20% in 10 years (McKinsey, 2022). Among the strategies to improve environmental sustainability of GVCs, the concept of the circular economy has recently emerged (Grumiller *et al.* 2022), which has an impact on both the shape and governance of GVCs, while allowing new global chains to exist (see Box 2.5).

²² To avoid the devastating effects of climate change at the global level, the Paris Agreement (PA) signed in 2015 by 196 countries, sets the ultimate goal of limiting the increase in global temperature to between 1.5°C and 2°C above pre-industrial levels by the end of this century. Scientific evidence has warned that, in order to stabilize the temperature at 1.5°C, it is required to reach zero net CO₂ emissions by 2050 and halve them by 2030 (IPCC, 2018). At the world summit on climate change in 2021 (COP 26 in Glasgow), commitments were made by governments and the private sector that influence GVCs. These include phasing out the use of fossil fuels (including the use of plastics), closing coal-fired power plants, reducing methane emissions by 30% by 2030, and accelerating the transition to electric vehicles (cars and vans) by 2035 in leading markets and by 2040 globally.

BOX 2.5. CIRCULAR ECONOMY: THE SHAPE OF SUSTAINABILITY

One of the ways in which companies can subscribe to climate resilience is through circular economy models, which involve activities such as reductions (savings), recycling, remanufacturing, and repair, among others. These actions can change the structure of value capture along the GVC stages, redefining efficiency and resilience models.

For example, in the case of the paper and cardboard value chain, the raw material for pulp can come both from renewable forests and from the recycling of the chain's own waste once its end products are discarded. Ultimately, recycling ends up functioning as a form of diversification of raw material sources, which contributes to the resilience of the chain. In addition, the very logic of recycling imposes new business models that are compatible with the companies' profit maximization (search for efficiency). Similar examples can be found in the textile, electronics, plastics and other chains.²³ While this defines a "closed-loop" model, there are also other strategies such as cycle slowing (extending the useful life of products) or intensification (e.g., the "Uber model", which exchanges a good for a service, encouraging consumers to consume cars as a service and not as a private good). A methodology for classifying circular economy projects, with applications for the case of Colombia, can be found in IDB Invest (2022).

Circular economy models not only redefine the form and governance of value chains, but also create new chains that function as connections between the links in the production processes of different goods and services.

Finally, the GVCs are a means by which the precepts of the circular economy can be disseminated in the economies of the region. This is because these models are adopted by multinational companies due to new pro-decarbonization legislation and new consumer demand profiles in high-income countries. Thus, companies in the region that seek to be (or continue to be) suppliers of these companies should incorporate circular economy practices that will be beneficial to the local ecosystem.

²³ Cifuentes *et al.* (2021) present several examples of waste management strategies for plastics


A McKinsey study (2022) revealed that seven out of nine areas, mentioned by executives of major GVCs, to be taken into account to improve the social and environmental context directly involve value chain structures. These seven areas are: packaging reduction, recycling, circular economy models, emissions reduction, changes in sourcing standards, changes in consumer preferences, and safety, hygiene, health and general welfare measures for the workforce. Specific actions contemplated for sustainability include the quantification of natural resources consumed and emissions generated by the activities of companies and participants in the value chains. Such quantifications would make it possible to identify opportunities for improvement and define realistic emission targets within a reasonable time horizon that can be made visible to society. Achieving these improvements requires organizational changes and the adoption of new technologies, both in existing and planned plants.

Thus, the incorporation of sustainability into the GVCs framework can increase the relevance of certain chains, generating opportunities for the region in terms of strengthening and diversifying production, in line with these new imperatives.

Conclusion

The experience of the impact of COVID-19 has accelerated the need for a comprehensive model of efficiency, resilience and sustainability, which has been gradually converging for more than a decade. This new context implies considering not only the relationships between companies (the classic approach to GVC analysis presented in Part 1), but also explicitly incorporating their effects and relations with workers, consumers, communities, the environment and society in general (OECD, 2021). Any disruption in any part of the ecosystem can have innumerable consequences. Therefore, it is also necessary to rethink the role of productive policy in this new context, which is addressed in Part 3 below.





Part 3.
**Productive
Development
Policies in the
New GVC
Context**

There is extensive empirical evidence showing that firms' participation in GVCs contributes to productivity growth and productive transformation in developing countries and the region, by allowing them to specialize in certain supply chain tasks in which they have a comparative advantage (UN, 2013; Blyde, 2014; World Bank, 2020a). These impacts include not only those of international trade, associated with increased exposure to competition, market expansion and improved access to inputs, but also those resulting from the intense interaction and coordination among firms participating in value chains (Xing *et al.*, 2021). These relationships among GVC participants are a source of knowledge spillover and additional efficiency gains, which favor innovation and productivity growth. By participating in GVCs, local suppliers can access new knowledge from international markets, and even from affiliates of multinationals, which opens up possibilities for improving and developing new products and embracing increasingly sophisticated activities.

However, the advantages described in the previous paragraph are not obvious, but depend on the existence of an adequate policy and institutional framework for local firms to make the most of their participation in GVCs. In this part of the document, emphasis will be placed on the challenges faced by firms in order to participate profitably in GVCs, highlighting the importance of learning and innovation. Thereafter, with the presentation of the Productive Development Policy framework, it is emphasized that these same concepts are also relevant, but in the scope of policy makers' management capabilities. The final section will present the concept of Sustainable Productive Development Policies, showing that the new imperatives facing GVCs (presented in Part 2) also affect development policies, not only as constraints, but also as objectives by themselves.

Capacities for Productive Development

The profitable participation of companies in GVCs requires certain minimum conditions, both in terms of their internal management and their context. This section will focus on the capabilities of firms, which will serve as a basis for understanding what public policy can do to enhance their performance in global value networks.

The fact that firms that participate in GVCs are more productive than those that do not reflects two effects. In the first instance, there is a "selection effect"; only firms that reach a minimum productivity threshold are able to enter GVCs. Second, there is a "learning effect" related to the firms' capacity to obtain further productivity gains from their participation in these networks. Each of these effects will be discussed in more detail below.

Selection Effect

Entering a global production chain requires a certain level of "formality". In this sense, Sabel and Ghezzi (2021) propose a definition of business formality that goes beyond the mere registration in the tax system. According to the authors, a very important dimension of formality has to do with the firms' ability to enter and remain in dynamic value chains, whether local or global.

This insertion requires not only complying with legal requirements (health, labor and environmental standards) but also with other "good practices" valued by customers (delivery times, traceability, etc.). All these requirements constitute what the authors call a "quality hurdle" that divides companies into different stages of their "formality", understood in the broad sense presented above.

Naturally, the quality hurdle is not the same across firms (Ghezzi and Carpio, 2022). Take the case of modern agri-food markets. At one extreme there are a few producers who have their own distribution channels to sell directly to a retailer in, for example, the United Kingdom (such as Walmart or TESCO). At the other end there are producers who can formally sell only in the domestic market. The quality hurdle in the first case is quite "higher" than that in the second one. In between, the hurdle is constituted as a "ladder" that includes (in increasing degree of requirements and complexity) local certifications of good agricultural practices, phytosanitary export certifications, and the European Global GAP certification, among others.

From a public policy perspective, interventions should focus on those Small and Medium Enterprises (SMEs) that are close to clear the quality hurdle, but for some

reasons are unable to do so. One challenge is to identify the obstacles to enter formal value chains. Those may have to do with difficulties firms face in making the necessary investments to comply with a certain certification, which may be due to issues of scale, access to credit or information failures, among others. The reason may also be associated with the provision of certain public goods, such as the lack of infrastructure or local regulations that allow meeting international standards.

Ultimately, clearing the quality hurdle implies acquiring new capabilities, as well as developing effective signaling mechanisms to break down information asymmetries.

Learning Effect

Once they are inserted in a GVC, these originally more productive companies, which have been able to clear the quality hurdle, can benefit from international knowledge spillover effects, both in terms of technologies and organizational practices. In this case, the learning capabilities of companies take center stage. In general terms, the capacity to learn is closely related to the capacity to innovate.

The above is directly linked to the fact that an economy can benefit from both its own R&D investment and that of its business partners (Criscuolo and Timmis, 2017; Xing *et al.*, 2021). That is, firms can benefit from the spillover effects of R&D investments, in an embedded or non-embedded form. Embedded knowledge is transferred through imports of goods and services that already have within the skills, resources and technologies used to produce them. On the other hand, non-embedded knowledge is intangible and is present in patents, prototypes, etc. Both ways to acquire knowledge are enhanced by participating in global value networks.

Notwithstanding, Xing *et al.* (2021) point out that it is more difficult to absorb knowledge generated abroad than that produced domestically. In the context of GVCs, the potential for incorporating knowledge from foreign partners depends essentially on two factors. The first is exogenous in nature (a policy maker can do little or nothing to influence it), and has to do with the governance structure of the chain or the stages in which the firms operate. As shown in Part 1, relational or modular governances are more prone to knowledge spillover than hierarchical or captive structures. The second factor is endogenous and enables further policy actions; it is the learning capacity of local firms.

Absorptive capacity represents the ability of firms to internalize the effect of foreign knowledge. Evidence presented by Xing *et al.* (2021) shows that countries with high educational level, ease of doing business and strong protection of intellectual property rights have higher absorptive capacity, which materializes in greater

spillover effects of foreign R&D. In other words, only to the extent that there are adequate qualifications, a minimum domestic innovation effort and an effort to acquire internationally generated knowledge, will local firms be able to take advantage of the stock of knowledge available as a result of belonging to a GVC.

One channel of knowledge transfer from GVCs occurs through multinational corporations (MNCs), which establish themselves in local markets through foreign direct investment (FDI).²⁴ As will be seen in Part 4, this channel is one of the "fast lanes" of access to the GVCs. The resulting spillover effects depend, as mentioned above, on governance and local absorptive capacity, and occur in three possible directions: forward, backward and horizontal. Backward spillovers occur when an MNC's suppliers adopt technologies and practices to obtain better quality products (which are used as inputs by the MNC). Forward spillovers occur when a domestic firm learns of the higher quality and variety of products from an MNC (upstream) that it can access as inputs. Horizontal spillover effects relate to knowledge transfers from multinationals to other companies in the sector, something the MNC may actually try to avoid if these beneficiary companies improve their market position. However, these horizontal spillover effects occur when the technological advantage of the MNC is not large or when they make agreements with local companies (Bloom *et al.*, 2013). On the other hand, these spillover effects may be limited when the knowledge invested is highly specific to the products that MNCs exchange with their suppliers and buyers (something typical of value chains with captive governances).

The discussion above has great implications for public policy: understanding the GVCs governance structures is fundamental to evaluate the possible channels for knowledge diffusion and the characteristics needed from local firms to take the most advantage from it.

Productive Development Policies

From the analysis presented in the previous section, it could be said that there is room for public policy both in the phase of incorporating companies into GVCs and in consolidating the benefits of participating in them. Put differently, policymakers will be interested in enhancing both the number of firms participating in global networks (working on the selection effect) and the intensity and quality of these participations (working on the learning effect).

²⁴ Several papers show that multinationals account for most of the trade associated with GVCs (see e.g., Criscuolo and Timmis, 2017 and Xing *et al.*, 2021).

The way in which governments can influence these effects is through Productive Development Policies (PDP). The PDP concept replaces that of traditional Industrial Policies (see Box 3.1), with profound changes in its logic and objectives. PDPs have the explicit objective of enhancing productivity in the economy. To this end they take a comprehensive view of value creation, considering not only manufacturing but all the economic sectors.

In his analysis of the determinants of firm productivity, Syverson (2011) distinguishes internal factors that are under the control of firms that make their production practices, and external factors that affect the environment in which firms perform, which are beyond their control. It is those factors over which firms have no influence that PDPs should be concerned with.

BOX 3.1. THE EVOLUTION OF CGVs AND PRODUCTIVE DEVELOPMENT POLICIES

The origins of economic globalization can be traced to the first industrial revolution (UNIDO, 2018). The emerging model allowed a fragmentation between production and consumption: vertically integrated factories in industrialized countries supplied products to their own and foreign markets. Thus, for the industrial revolution to become possible, not only major technological changes in factories were necessary, but also corresponding adaptations in the transport of goods and in the structure of international trade. Latin America occupied the role of consumer of these products until, faced with the effects of the Great Depression and the Second World War, it was immersed in a disorganized industrialization process that ended up being accommodated within the context of Import Substitution Industrialization (ISI). The ISI model was marked by a strong interference of the State, either by choosing the beneficiary sectors, or even by being part of the productive process through state-owned companies in sectors considered strategic (Crespi *et al.*, 2014). Unlike the Asian countries, which combined the ISI strategy with Export-Oriented Industrialization (EOI), the Latin American strategy focused too much on supplying their domestic markets, without demanding productivity or export compensations from

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the protected companies. Thus, the overall result was the generation of rents in certain sectors, whose expansion was frustrated by the insufficient size of domestic markets (with the exceptions of Brazil and Mexico).

Thus, the Latin American version of the ISI model became a generator of trade deficits, due to the strong demand for imported intermediate goods. In this context, the debt crisis of the 1980s and the emergence of the Washington Consensus marked the end of this model in the region (Crespi *et al.*, 2014).

Although the original version of the Consensus focused more on macro-economic aspects than on industrial policy issues, market liberalization put an end to cumbersome protectionist schemes. In this context, the new industrial policy for the countries of the region became “non-policy”.

This new policy vision corresponds to the rise of the modern globalization process, built on the foundation of new communication technologies, lower transportation costs and times, and the opening of governments to trade (Antràs, 2020; Baldwin, 2022). Just as in the first two industrial revolutions there was a fragmentation that made it possible to separate production and consumption geographically. This “third revolution” allowed fragmentation at the production level: the different stages of the production process of goods and services began to be located in different countries following a logic of efficiency, giving rise to the model of GVC. As a result, investments were directed towards developing countries with abundant natural resources, low relative labor costs and an emerging middle class that allowed for the expansion of markets (see Box 1.3).

Thus, the consolidation of GVCs occurred in conjunction with a phase of no industrial policy interventions in the region. This included not only the abandonment of strategies for selecting winners and promoting activities, but also the lack of plans to accompany local firms in the new context of trade openness after years of living in a protectionist bubble. After the failed ISI era, the total absence of public policies resulted in another failure in terms of productivity (Crespi *et al.*, 2014) in the countries of Latin America

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and the Caribbean (LAC). This brought back to the table the debate, no longer about the need for an industrial policy, but about the characteristics of a necessary strategy.

This gave rise to the concept of Productive Development Policy, with a much broader scope than that of traditional industrial policies, aiming at productivity growth as a fundamental objective, identifying market failures that hinder it and the relevant solutions to each problem. Today, the GVC model faces new challenges that must be taken into account by policy-makers when designing an effective and sustainable development strategy.

In the IDB book "Rethinking Productive Development", edited by Gustavo Crespi, Eduardo Fernández-Arias and Ernesto Stein (Crespi *et al.*, 2014), a conceptual framework is proposed to identify effective productive development policy tools. Following this reference, the first thing to do before considering any intervention is to identify the problem to be solved; an intervention is only justified in situations where there are failures that prevent markets from efficiently allocating resources. The next step is to select the best instrument to solve the detected problem and, in relation to this, the third step is to verify whether the country has adequate institutional capacities to adopt the proposed PDP effectively. Consequently, the best policy must be chosen from among those that can be implemented with the available institutional capacities. In summary, when proposing a policy action, the following questions should be answered favorably, as basic principles for an intervention:

- **Diagnosis:** What is the market failure that justifies the policy?
- **Correspondence:** Does the proposed policy address the diagnosed problem?
- **Feasibility:** Are institutional capacities adequate to design and implement the policy as intended?

A central element in the application of these three questions is that PDPs are varied, so it is useful to classify them in some way. To this end, the authors consider two dimensions: the scope (vertical or horizontal) and its nature (public inputs and market interventions). These dimensions define a 2x2 PDP matrix where each quadrant has different policy considerations (Figure 3.1).

Figure 3.1. Productive Development Policy Matrix

	Horizontal policies	Vertical policies
Public asset		
Market interventions		

Source: Crespi *et al.* (2014)

As an example, a national strategy to disseminate the opportunities and benefits of participating in GVCs can be categorized as a horizontal public good, since it is only the provision of information without targeting a specific sector. If, after this campaign, it happens that a cluster, for example, a textile one, requests governmental economic assistance (such as subsidies or credits) to certify the conformity of processes in order to become a GVC supplier, then this would be a vertical market intervention, always assuming that the three principles mentioned above are fulfilled.²⁵

In the GVC framework, PDPs are linked to the concept of upgrading, which defines the strategy to follow to move along the smile curve (Figure 1.4) in search of higher value-added activities and higher associated productivity gains (Gereffi, 2019; Gereffi and Fernández-Stark, 2019). As will be developed in the intervention framework proposed in Part 4, the upgrading strategy must take into account everything seen so far: the framework of analysis presented in Part 1, the changes in the global context discussed in Part 2, and the spaces that exist for public policy presented below.

²⁵ Part 4 develops the cluster concept as a useful strategy not only for coordination between private parties, but also between the private and the public sector.

The Space for PDPs in the GVCs Framework

Identify and Fix Failures

Taking into account the conceptual framework of the previous section, the question to be answered will be what are the failures that hinder the integration of local companies in GVCs. A starting point to bear in mind is that each chain, each stage within a chain, and each country has its own particularities; hence the importance of the four dimensions of analysis for mapping a GVC presented in Part 1.

Notwithstanding these specificities, according to Gereffi (2014) developing countries present some regularities in terms of the constraints their firms face to fully integrate into GVCs. Among them, the author mentions: (i) low levels of innovation and deficiencies in human capital; (ii) inadequate infrastructure and associated services; (iii) restrictive investment and trade policies; (iv) problems in the business environment; (v) industries with low institutional framework. The same factors are identified in other studies, as shown in Box 3.2 for the case of Mexico.

BOX 3.2. FACTORS HINDERING THE INTEGRATION OF SMES INTO GVC: THE CASE OF MEXICO

Mexico is one of the best positioned countries in the region in terms of its integration to GVCs. Its proximity to the United States and its policy of trade agreements (Mexico has 12 free trade agreements with 46 countries) are determining factors for the opportunities its companies have to integrate into the global economy. However, while its backward participation in GVCs (measured by the foreign value added embodied in its exports) is among the highest in the world, its forward participation (measured as the domestic value added embodied in the production of trading partners) is still low (Iacovone *et al.*, 2021).²⁶ To this must be added the fact that less than 5% of Mexican SMEs declare participating in GVCs (INEGI, 2018).

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²⁶ The maquila regime, which originated in the 1960s and was later strengthened by NAFTA, has a lot to do with this high backward participation.

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Why do Mexican SMEs not participate more and better in GVCs? Filippo and Guaipatín (2021) find several points to answer this question, focusing on five strategic chains with high development potential: automotive, electronics, electrical manufacturing, aerospace, and medical equipment. The common factor seems to be the lack of information: Mexican companies are unaware of the opportunities for insertion in GVCs, as they are uninformed about the needs of lead companies located in the country. On the other hand, lead companies themselves are unaware of the capacities of local firms and, therefore, of the possibilities of local sourcing. Ultimately, this results in a problem of private coordination where only some companies meet the requirements (such as investments and certifications) to participate in GVCs, but no collective initiatives are driven for scaling up these actions. In addition, there are problems of access to credit, not only to invest, but also to match the cash flows required to supply lead companies or export processes.

Another aspect where there are information failures is in the lack of knowledge of the local business community regarding trade rules. In 2020 the United States–Mexico–Canada Agreement (USMCA, also known as NAFTA 2.0, since it is a continuation of the previous treaty) came into force, but uncertainty about its scope, operation and effects was a common factor among those interviewed. The same was true even for the country's export promotion programs. This reveals problems of public coordination, both for the dissemination of policy actions and to avoid duplication of efforts between different levels and departments of government.

The above factors can be grouped according to their linkage to decisions made at the firm level. Thus, innovation, talent and the institutionalization of relationships are associated with decisions made by the firms, while those related to the business environment, investment policies and infrastructure are beyond the firm's decisions, but are fundamental for a successful insertion in global value networks. That is, even if the company subscribes to international standards and has links with its ecosystem (which theoretically contributes to its potential for insertion in GVCs), an adverse macroeconomic context may mean that its counterparts abroad may not consider it a reliable partner, since fruitful participation in GVCs entails building

long-term relationships between companies. In the framework proposed by Syverson (2011), all these factors are conditioned by a context outside the firm that PDPs must influence, resolving various types of failures.

Thus, policymakers should pay special attention to these factors, which, in general, respond to government failures and the insufficient supply of horizontal public goods. Ensuring this context is a basic condition for a productivity policy based on successful GVC insertions, as will be emphasized in the upgrading dimension of the framework proposed in Part 4. The factors that have to do directly with the companies may respond to a variety of failures, but in the end, the essential thing is a lack of coordination and information.

Coordination failures may appear at the sector level, denoting the insufficient institutionalization of some industries. In this case, when firms are too atomized and do not operate according to a logic of guaranteeing certain basic agreements, it will be difficult for a potential external partner to think of them as reliable counterparties. On the other hand, even if companies are organized by sector, there may be a lack of effective channels of dialogue with multinationals or potential GVC partners. In addition to these types of failures, there may also be difficulties in the interactions between the private sector and the public sector, and even more so between the public institutions in charge of a PDP. This gives rise to three main types of coordination problems: private-private, public-private and public-public, to which we will return in Part 4.

To a large extent these problems occur due to information failures: perhaps these connections do not exist because local companies are unaware of the opportunities of working in global production networks, or because multinationals do not find it easy to observe sectoral capabilities in countries where they do not yet have partners (Filippo and Guaipatín, 2021). In this sense, the promotion of certifications is a basic strategy for dealing with this type of failure.

Information failures can also appear at other levels, such as the financial level. Participating in GVCs requires both considerable investments in technology and certain cash flow conditions in order to be able to meet payment terms that are usually longer than those of domestic customers. Both situations converge in credit demands that may face coverage problems when companies are unable to account for their repayment capacity, either due to lack of collateral or lack of credit history.

Finally, sectoral public goods problems may arise. Certifications, for example, may constitute a sectoral public asset, which will require (beyond the willingness of companies to certify) that the national quality system has the necessary capacities

to be able to assess the conformity of local companies with international standards (for more details, see Box 4.5).

Thus, it can be seen that, although the failures affecting GVC insertion can be reduced to a few tags, they are unlikely to appear in isolation. That is, firms usually face a set of market and government failures that prevent them from successfully inserting themselves into GVCs. The combination and weighting of failures will depend on each specific case, and it is this diagnosis that should serve as the basis for proposing the most appropriate set of tools. However, as will be seen in Part 4, in addition to relevance, a feature of feasibility should also be required for any PDP intervention. This feasibility responds to local capacities, both private and public. In other words, policymakers must be clear about their own limitations, as well as those of the companies they wish to support, when setting their short- and medium-term objectives.

Public Capacities

The innovation and learning capacities that were highlighted earlier in the case of companies are also a key attribute for policy, although obviously from a different perspective. That is, policymakers should be aware of their stock of capacities when designing policies, and be able to learn and improve this stock from their own experience. To this end, the framework proposed in Part 4 will place special attention on the need for the institutional arrangements in which the PDP strategy is embedded to allow room for experimentation, among other desirable features such as high-level political support.

Crespi *et al.* (2014) group the capabilities of policymakers into technical, organizational and political, which together are known as "TOP capacities":

- **Technical Capacities:** They refer to the knowledge required to design, implement, evaluate and adjust PDPs. Thus, the scope of this group is broad, and includes legal, technological and scientific skills, where sectoral knowledge and knowledge of policy tools are highly valued.
- **Organizational and Operational Capacities:** They refer to the skills of convening, dialoguing and persuading different stakeholders, always with the ultimate goal of building trust in order to establish working partnerships. However, this group includes other skills such as administrative skills (in the sense of being able to do strategic planning, set clear objectives, and ultimately get things done in a timely manner) and human resource management skills (to have teams that attract and retain relevant and committed talent).

- **Political Capacities:** They refer to a variety of skills, including the ability to gain high-level political support, or to establish robust processes in the face of the risk of capture.²⁷ These types of skills are especially relevant for advancing policies with long-term horizons.

These capacities can be developed and trained, but they can also be acquired, for example, by hiring professionals who possess them. However, the importance of specific and tacit knowledge is highly relevant, so it is important that capacity building is based on the ability to build teams that can work with other teams. On these particulars, Cornick *et al.* (2018) present a theoretical framework and various case studies in the region.

Rethinking PDPs: Towards Sustainable Development

With the consolidation of GVCs as a global production model, PDPs became the response of governments to capture the greatest possible benefits from participation in these production networks. Through PDPs, governments seek to ensure that the efficiency gains pursued by large multinational companies translate into greater productivity in local businesses, thus creating symbiotic relationships.

However, in a context such as the one described in Part 2, in which the GVC model faces new challenges in terms of resilience and sustainability, the PDP strategy of the countries in the region will have to adapt accordingly. This adaptation not only responds to the fact that these imperatives are contextual conditions to be taken into account in order to design effective policies, but also because they are themselves policy objectives. In this case, we will move on to Sustainable Productive Development Policies (SPDPs). Next, the reasons for adding this 'S' at the beginning of the acronym are explored.

There is no doubt that in environmental matters, private returns differ from social returns, and therefore government intervention is justified with its various actions. In fact, it has been seen that, in part, the sustainability imperative of GVCs is established based on governments' own provisions for decarbonization agendas and new regulatory frameworks.

²⁷ Institutional capture refers to the circumstance in which an institution becomes an instrument to promote the interests of a particular group rather than an instrument to promote the public interest (Cornick *et al.*, 2018).

However, with regard to the social impact of productive development through GVCs, it has been shown that this is not always positive, and may even lead to short-term negative effects on variables such as employment (Gereffi, 2019). In this sense, it is the responsibility of governments to contemplate "exit plans" for these cases, including upskilling or reskilling programs in their interventions (Ons, 2018). Ultimately, these actions come to "close the cycle" of productivity, allowing the efficient allocation (from the social point of view) of the different factors of the economy. In short, we cannot speak of development that is not sustainable as a policy objective, which accommodates PDPs within the framework of the 2030 sustainable development agenda proposed by the UN, which includes goals on poverty, health, and gender inclusion, among others. For many of the issues on this agenda, not only is the sustainability imperative relevant, but also the resilience imperative, as explained below.

In the issues concerning the new resilience imperative, the perceived social costs of the shocks that have been described throughout this Part 2 are sufficient motivation to include this aspect as a policy objective. This mainly responds to externalities and information problems that ultimately make GVCs a powerful shock amplifier (Schwellnus *et al.*, 2023; Cigna *et al.*, 2022).

For a particular company, especially if it is downstream, the risk of supply chain disruption is associated with dependence on its suppliers. However, from a public policy perspective, the risk is the complete disruption of an industry or market, with its consequent impact on domestic social welfare (job losses, income reductions, price increases). Box 3.3 discusses the importance of resilience (and also sustainability) for a crucial issue such as food security.

BOX 3.3. RESILIENCE AND SUSTAINABILITY: THE KEYS TO FOOD SECURITY?

Recent shocks associated with COVID-19 and the conflict between Russia and Ukraine have had clear impacts on food prices, as well as on the stability of food supply. This renewed concerns about food security, a concept that has been formally on the public agenda since the 1943 United Nations Conference on Food and Agriculture. Already at that time, the "belief that the goal of freedom from food shortages, adequate and sufficient for the health and strength of all peoples can be achieved" was affirmed and the objective was defined as ensuring "an abundant supply of adequate food for all mankind" (Diaz-Bonilla, 2023).

But what are we talking about when it comes to food security? It is a multidimensional concept that involves at least four main components:

- **Availability**, which refers to domestic food supply and international trade;
- **Access**, which refers to the general income situation of a country (and its poverty and indigence levels);
- **Use**, which refers to the safety and nutritional qualities of food; and
- **Stability**, which refers to the possibility of accessing a stable flow of food.

To a greater or lesser extent, the GVC approach makes it possible to find links between PDPs and each of these dimensions. The case of food **Availability** may be associated more than anything else with a question of factor endowments, but the objective of promoting the productivity of food value chains would contribute to increasing food supply based on the same level of resource utilization.

Regarding **Access**, the scope of productive policy has to do with ensuring the greatest possible local spillovers of GVC development, particularly in terms of quality jobs (formal, with high salaries), but also providing "exit solutions" to those workers who could be replaced by the adoption of new technologies. The **Use** dimension can be influenced through the promotion

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of certain food chains with high nutritional value, or by incorporating as many producers as possible in certain good practices of traceability and responsible production.²⁸

Finally, the dimension of **Stability** has to do, first, with the concept of resilience: ensuring the responsiveness of food chains becomes a policy objective. Second, sustainability considerations are those that will make it possible to ensure this dimension over time: the responsible use of resources, sustainable management and climate change considerations (not only in food chains) have a clear impact on this dimension of food security.

In other words, companies do not internalize systemic disruptive effects, ignoring externalities upstream or downstream of their decisions. There are also information failures, associated with companies having limited material regarding the complexity of the value chains in which they participate, beyond their direct suppliers, which can lead them to underestimate the risks of disruptions (McKinsey, 2021). An example of this is provided by the semiconductor and automotive GVCs. Filippo *et al.* (2022b) detail how, faced with the large disruption in demand due to the pandemic, the automotive sector decided to suspend most of its semiconductor orders. After this, unexpectedly, the demand for vehicles increased, and the automakers realized that they were finally going to need the semiconductors they had cancelled. When they wanted to return to their suppliers, they found themselves at the end of a long line, swollen by other sectors whose demand had skyrocketed (producers of video game consoles or PCs, for example). This forecasting error (in the end, a severe coordination failure) led to major disruptions in automakers around the world that spread to their other suppliers, such as tire manufacturers. The consequences of this were both productive and social.

Thus, based on the above, the resilience of value chains can be considered a policy objective. But the quest for resilience by MNCs leading GVCs imposes both policy challenges and opportunities for governments (Verbeke, 2020).

²⁸ However, it should be kept in mind that here PDPs have an impact only on the supply side. It is up to other government agencies to influence demand, which ultimately determines the actual consumption of more nutritious and safer baskets.

On the one hand, governments should strive to maintain their positions in the GVCs: reshoring alternatives and the potential withdrawal of activities in certain locations could have harmful effects on employment and other social variables in the countries. This way, governments should seek to find ways to mitigate the impact of these actions. On the other, the new emerging chains may result in new business opportunities that governments must be able to take advantage of to improve their position in GVCs.

For example, the crisis in the semiconductor GVC referred to above led to a series of actions by the Mexican government to promote certain activities of the chain in the country (see Box 3.4). The same applies to the sustainability imperative and its environmental aspect: although no one is fully certain which technologies, skills and products will dominate the carbon-neutral world, it is important to be proactive about these possible scenarios (Hausmann, 2022). An example is the case of Chile, which has one of the largest lithium reserves in the world, and has therefore created a research center (Lithium I+D+i center) based at the Universidad Católica del Norte, in order to be at the forefront of new uses and technologies based on this source.²⁹ Besides, certain green energies, such as solar, are cost-efficient for on-site use (i.e., not cost-effective to convert for transportation), which gives an advantage to countries with abundant sunlight to attract operations of various GVCs, but needs to be complemented with other baseline conditions (as already mentioned, and will be repeated in the final part of this document).

²⁹ <https://www.americaeconomia.com/negocios-e-industrias/sqm-y-universidad-chilena-lanzan-un-centro-de-investigacion-del-litio>

BOX 3.4. SEMICONDUCTOR CRISIS: AN OPPORTUNITY FOR MEXICO?³⁰

As seen in Box 1.5, making the chips that are present in the main objects that shape our daily lives is a complex process that can take several weeks, or even months, depending on the technology of the circuit. Plus, putting a new semiconductor plant into operation can also take months, or even years, in addition to requiring huge investments.

These characteristics, which could ultimately be referred to as supply-side rigidities in the production stage, put several sectors of the global economy on the ropes during the pandemic, when their growing demand for semiconductors could not be met with the desired diligence. This way, we witnessed situations such as Sony paralyzing the production of the latest version of its PlayStation, and total shutdowns by major automakers due to the lack of semiconductor parts needed to put their vehicles on sale.

Concerns did not remain with the companies but escalated to the leaders of different governments. The semiconductor crisis also had implications on, for example, national security issues. But the key point was that the investments made in response to this crisis would be decisive for the new balance of global power in the chain. All governments wanted the chain's new production capacity to remain in their territories, so the main economies put substantial development plans on the table in an attempt to force the investment decisions of the chain's leaders in terms of production.

The United States, for example, launched a USD 52 billion plan to recover its global share of semiconductor production, which fell from almost 40% in 1990 to just over 10% today. For any Latin American country, it would be practically impossible to try to compete against similar programs, but the case of Mexico has its particularities: due to its long history of trade integration with the United States, Mexico may have a unique opportunity to take advantage of the spillovers from the relocation of semiconductor companies' activities to the United States.

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³⁰ This box is fundamentally inspired by Filippo *et al.* (2022b, 2022c).

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Due to the importance of its electronics and automotive industries, Mexico was particularly affected by semiconductor shortages. The effects on these chains, which are direct consumers of chips, have spread to other chains in the economy, making the issue a matter of public policy: what can the Mexican government do to reduce the exposure of national strategic sectors to the chip shortage? While this is more of a business issue, one policy response could be to leverage the relationship with the United States to enhance the country's position in the semiconductor GVC.

In this regard, Mexico starts from a fairly solid base. Four of the largest global companies have operations in the country: Skyworks, Texas Instruments and Infineon have assembly and test operations (backend); and Intel has a Design center. On the other hand, federal institutions such as the Instituto de Astrofísica, Óptica y Electrónica (INAOE) provides specialized services to global leading firms in the industry.

Mexico can follow the strategy of strengthening its position in the stages of the supply chain where it has local activity. The country can also consider achieving a greater presence in the frontend activities, although with investments in less advanced technology plants to meet the demands of strategic sectors such as the automotive and electronics sectors. In fact, Vishay Intertechnology has already begun the construction of a plant in Durango for the manufacture of chips with "legacy technologies". Another strategy may have to do with developing suppliers in segments that are not exclusive to the semiconductor GVC, such as certain chemicals: Mexico can reallocate resources to meet the potential demand by the increased production of semiconductors in North America.

Conclusion

Sustainable Productive Development Policies are essentially a refinement of the original PDP concept. Thus, there are no disruptive changes in the way of proceeding, but rather an explicit concern for the sustainability agendas that reflect the agreements of the international community, as well as the need to contemplate changes in the logic of the GVCs. The first element operates directly on the objectives of the PDPs, in the sense that the proposed productivity growth paths must be compatible with sustainable development. The second element relates to the means to achieve this development: the new GVC context can affect the effectiveness of instruments that once worked, as well as give greater power or new perspectives to other tools. Ultimately, the policy maker will need to consider how the changing environment affects the structure of the GVCs relevant to its economy, and how that affects its development strategy. Thus, decisions will have to be made on what to discard, what to keep and what to add to the strategy, in view of the new challenges and opportunities offered by the current context.

This results in greater complexity for the PDP formulation and implementation process. This complexity responds, first and foremost, to the difficulties involved in ensuring that policies are consistent with the triple objective of productivity, sustainability and resilience. Policymakers will need to be more careful than ever about the second-order effects of their actions, and carefully delineate transitions. Thus, plans should consider, for example, exit solutions for workers displaced by new technologies, or the effects on prices that these technologies may have in the short term, even considering their long-term benefits.³¹ On the other hand, this multiplicity of objectives adds new dimensions to the development discussion, and demands more and more voices saying and doing for this objective. This way, the problems of coordination and the challenges of achieving effective dialogues (at the public-public, public-private and private-private levels) are resized, giving a central place to learning and capacity building within the policy teams.

All these points are contemplated in the proposed intervention framework presented in Part 4 below, in order to provide a useful tool for achieving policies to take advantage of the new GVC context to achieve sustainable productive development.

³¹ An example of the latter is provided by green energy matrix strategies. Evidence suggests that countries with stricter climate policies tend to have higher electricity prices. Case studies from several European Union countries indicate that rising electricity prices have left between 5% and 40% of the country's population in energy poverty (Belaid, 2022). On the other hand, it is also true that today, with full sunlight, producing a megawatt from solar energy is less expensive than producing it with a thermal power plant, which was unthinkable just a decade ago (Hausmann, 2022).

Part 4.

A Sustainable Development Strategy in the GVC Context



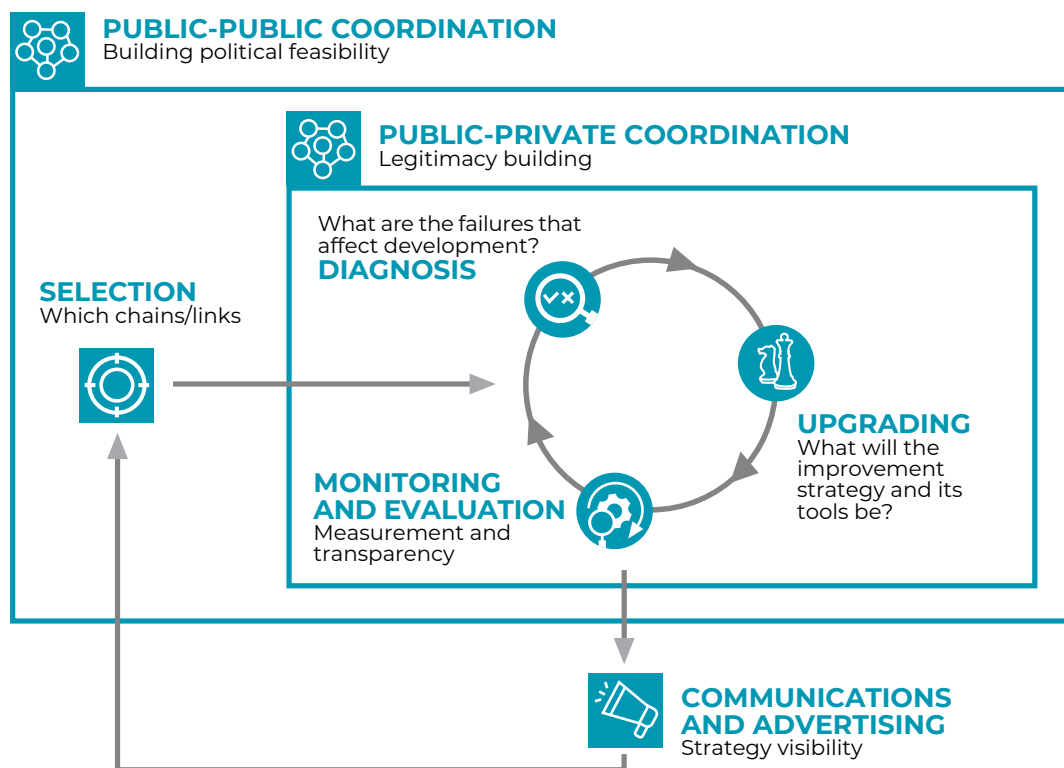
Part 1 presented a conceptual framework for the analysis of GVCs, which can be used as a basic tool for the design of productive development policies focused on value chains. Part 2 discussed the new context and the new imperatives that determine the current GVC operating model, which should be taken into account for the design of any policy intervention. This point was discussed in Part 3, where the concept of Sustainable Productive Development Policies was introduced.³² In this fourth and final part, all these elements are considered in order to propose a policy framework for sustainable productive development in the new GVC context.

Policy Framework

Figure 4.1 outlines a proposed policy framework for SPDP in the new GVC context, grouping seven interdependent dimensions that will be developed in the following sections. Ideally, a policy intervention should work on all these dimensions at the same time. In this sense, and based on the approach taken in Part 3, we emphasize that capacity building (public and private) must always be taken into account as an essential by-product of the policies put forward. This way, it will be possible to make progress, in an iterative process, towards increasingly complex policy objectives with higher expected returns in terms of productivity. This gives utter importance to the ability to learn, both in the public and private spheres.

³² Hereinafter, whenever reference is made to productive development, it shall be understood to refer to sustainable productive development.

Figure 4.1. Intervention Framework for a GVC Strategy



Source: Prepared by the authors.

In what follows, these dimensions will be reviewed one by one, first highlighting their **relevance**, and then presenting the related **actions** and tools to consider in each case.³³ Although these dimensions should not be considered sequentially, since there is almost always mutual feedback among them, their importance relates to questions about **what** sectors to support (selection), **why** (diagnosis) and **how**. The following discussion will pay more attention to the "how", where coordination of actors, the intervention strategy and monitoring, evaluation and communication are central. This is briefly the logic behind the seven dimensions shown in Figure 4.1.

To a large extent, the following analysis is based on the experience accumulated by the Bank over more than two decades of applying value chain development programs in the region, which is documented, in greater detail than here, in an extensive list of publications, that will be referred throughout the rest of the paper.³⁴

³³ The review of possible actions proposed in each case is not intended to be exhaustive, but merely illustrative and focused on what is considered most relevant.

³⁴ To a large extent, the conceptual framework underpinning this work follows Crespi *et al.* (2014), Fernández-Arias *et al.* (2016) and Cornick *et al.* (2018).

Public-Public Coordination

Relevance

Coordination within the public administration is key, to the point that in the diagram in Figure 4.1 it is the "box" that encompasses practically all the other dimensions: the effectiveness of everything else is compromised if there is no fluid and coordinated dialogue within the public sector (this is valid not only for productive development policies). And, precisely, this is often one of the most complicated challenges to achieve for governments in the region (Ons, 2018; Cornick *et al.*, 2018; Crespi *et al.*, 2014).

There are several reasons that justify the relevance of coordination within the public sector. The first has to do with the efficient use of public resources. Situations such as duplication of instruments in separate (and uncoordinated) units or, even worse, contradictory instruments, may not only waste resources, but also end up undermining the objectives of the programs in which such instruments are framed. A third scenario, also problematic, is the absence of policies in areas with needs, due to overlapping competencies between government divisions that do not want to assume responsibilities on those fronts (Ons, 2018).

This overlapping of competencies and responsibilities is not necessarily a bad thing, except for obvious design errors in the governance organization chart (Ons, 2018). In general, it is desirable and necessary for the different divisions of government to overlap, so that policies can have integral and comprehensive visions. At these intersections of competencies, each agency can propose complementary tools for the same policy goal. Consider, for example, a hypothetical intervention in the lemon value chain in Argentina. The integrated vision for its development requires involving, at least, the Ministry of Agriculture, with responsibilities for the primary phase; the Ministry of Industry or Production, with responsibilities for the development of the transformation phase; and, depending on the distribution of competencies among ministries, also the Ministry of Environment, due to the impacts that could occur on the environment, soil and water courses. Involving all these actors *within* the public administration is necessary both to develop a relevant policy, and also because of a feasibility aspect: there are agents that are enablers of certain actions, and not taking them into account may affect the execution schedules proposed.³⁵

³⁵ A concrete example is the Biotechnology Sectoral Council in Uruguay, created to coordinate an emerging sector and provide it with public goods that are essential for its development. The Council succeeded in passing a biotechnology law, which was fundamental to these objectives. However, once the law was approved, the collaboration of the Ministries of Agriculture and Health was required for the registration of bioproducts. As both ministries had other priorities, that collaboration was slow to take place (see details in Chapter 3 of Cornick *et al.*, 2018).

In addition, the results of an intervention may end up having effects on areas that are *outside* this initial mapping of actors within the public administration. For example, if the hypothesized intervention in the lemon chain were to involve adopting automation technologies in the harvesting of the fruit to increase the productivity of local producers, there could possibly be a second-order effect on local employment. The policy, to be complete, should contemplate these effects and provide exit solutions for them. In the particular case of the example, it may be necessary to incorporate the Ministry of Labor into the constellation of actors. Not including them may affect the political legitimacy of the intervention.

Another reason to mention is resource competition. PDPs tend to have less political support than social or employment policies, which are usually easier to communicate.³⁶ It is part of the coordination that the division(s) in charge of development policies can clearly convey the importance of the PDPs. This includes being clear about their complementarity and synergy with other areas, both inside and outside the government (we will return to this in the section on the communication and publicity dimension).

Finally, one reason why coordination within the public sector is difficult to implement is related not only to the fact that it requires time and effort, but also to problems of incentives and distrust. Departments with larger budget allocations may resist coordination, because this means surrendering power quotas that are sometimes held by officials more concerned about their political careers than about the quality of public policies (Stein, 2017). This is why, as will be seen below, effective coordination schemes require high-level political support.

Actions

Coordination has been a challenge and a must for governments perhaps since their very conception (Ons, 2018). The current times have led to a complexity of the interactions between its dependencies, which has reinforced these challenges, based on organizational designs that are not always efficient. Box 4.1 presents some types of institutional arrangements for public coordination. A specific proposal for PDPs, developed by Ons (2018), is the figure of the "incompetent coordinator" to address these coordination challenges (which can be framed within the figure of ministers without portfolio or, ideally, the organization arrangements presented in Box 4.1).³⁷ This strategy consists of creating a new government actor (which may be

³⁶ Another characteristic that plays against PDPs is their long-term horizon, which makes them vulnerable to short-term political movements, typically associated with the electoral cycle (Cornick *et al.*, 2018).

³⁷ The author was responsible for an application of this concept in Uruguay with the creation of the National System for Productive Transformation and Competitiveness (Transforma Uruguay) in 2016 from Law 19,472.

an agency) that *does not have* policy competencies, but whose role is only to coordinate the competencies of the other government bodies that participate in the PDP process. Simply put, it is a figure whose duty is to supervise that there is no duplication of efforts, no inconsistencies, and no areas neglected by omission. This figure should be supported by an institutional arrangement that should include a ministerial cabinet responsible for the political management of the PDPs, and a national development plan with cross-cutting and vertical projects, objectives, activities, responsible parties, deadlines and indicative allocation of resources.³⁸

BOX 4.1. ORGANIZATIONAL STRUCTURES FOR PUBLIC-PUBLIC ORGANIZATION³⁹

Central Organizations. These are cross-cutting entities with ministerial hierarchy, typically ministries of finance, treasury or economy, or budget administration bodies. They report directly to the chief executive, with direct influence over the budget and greater relative capacity to influence legislation, which translates into a certain capacity to promote alignment with government priorities. Coordination is not usually a central responsibility of these institutions, but it is an important task.

Leading Organizations. Among the organizations that must coordinate with each other on a policy issue, the coordination lead may be assigned to one that is central to the issue. Although it is a flexible method, it may face the difficulty that the articulator is at the same time a stakeholder.

Commissions of Ministers. The cabinet of ministers is a conceptually appropriate area for the treatment of cross-sectional policy issues, but may not always favor effective coordination of complex policies. One mechanism within the cabinet is to establish commissions of ministers specialized in issues that cut across several ministries, with the main objectives of defining priorities and coordinating policies.

(Continued)

³⁸ Ons (2018) points out that this cabinet should ideally be chaired by the President of the Nation (in the case of a national arrangement), or at least have his regular participation. Box 4.2, on sectoral roundtables, illustrates that these signs of political commitment are key to face processes that require a solid articulation, not only within the public sector, but also between the public and private sectors.

³⁹ Adapted from Ons (2018).

(Continued)

Ministers Without Portfolio. It is another mechanism within the cabinet comprised of officials with the rank of minister, but who do not head a ministry, whose responsibility is to coordinate organizations and programs, including ministries, within a broad policy area. They may have little weight within the cabinet, which may be compensated through a close interaction with the president.

Exclusive Organizations. The entity responsible for coordination may be expressly created for this purpose and have coordination as its main or even sole function. These organizations may be responsible for the direction and monitoring of some plan, and there may be some difference in hierarchy between the coordinator and the coordinated, with this power of coordination provided for in the legislation. These units may directly assist the president in the management of cross-cutting policies.

However, the task of choosing an optimal institutional arrangement is far from simple. This is for two fundamental reasons. The first is that *ex ante*, it is not at all obvious to know which institutional scheme will work best for the conjunction between policy goals and local idiosyncrasies. The second is that, due to this idiosyncrasy, the migration from the current arrangement to the proposed one may face resistance of various kinds. Both factors contribute to the fact that the installation of legitimate institutional designs can take time. The question that arises, then, is what to do in the meantime.

One possible answer is provided by a technology originally designed for public-private coordination: the so-called **executive roundtables (*mesas ejecutivas*)**. The mesas were originally developed in 2014 in Peru as a specific strategy for public-private dialogue, and focused mainly on providing a quick and effective response to small problems of great impact with a collaborative work logic between the different actors of productive sector (Ghezzi, 2019). Thus, the strategy consists of "bringing relevant stakeholders to the table", including both private and public sector representatives. The successful implementation of this public policy management tool has led to its consideration in other countries in the region, such as

Argentina, Chile⁴⁰ and Costa Rica.⁴¹ In practice, the result is that the public sector can coordinate in an agile and effective manner when faced with the challenge of providing concrete responses to a private sector problem. This way, the roundtables constitute a path that has the potential to resolve the two major obstacles to public-public coordination mentioned above: on the one hand, they make it possible to define, through experimentation, an appropriate institutional arrangement; and on the other, they facilitate the transition towards this arrangement. Box 4.2 summarizes the experience of implementing this technology in Argentina, with particular emphasis on the challenges of public-public coordination.

BOX 4.2. THE EXPERIENCE AND LESSONS LEARNED FROM THE SECTORAL ROUNDTABLES IN ARGENTINA⁴²

With the change of government at the end of 2015, Argentina had its own experience with the executive tables. These tables were mainly in charge of the Secretariat of Productive Transformation, under the then Ministry of Production.⁴³

Unlike the Peruvian version, which has an agile scheme of presenting problems and seeking solutions in successive meetings, the first version of the Argentine tables sought to have more structure, and to arrive at the opening of the space with advanced diagnoses of the sectors. As a result, of the 22 tables proposed, far fewer were finally able to meet at any one time. In addition, despite this search for more structure, the Argentine tables ended up being perhaps more disorganized than the Peruvian ones. Due to the challenging macroeconomic conditions, the sectoral representatives tended to focus more on their effects than on structural aspects, and also had a preference for market interventions (such as

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⁴⁰ <https://www.hacienda.cl/noticias-y-eventos/presentaciones/agenda-de-productividad>

⁴¹ <https://www.academiaca.or.cr/webinars/mesas-ejecutivas-como-herramienta-de-apoyo-a-la-gestion-de-los-clusteres>

⁴² For more details, see Obaya and Stein (2021).

⁴³ The Ministry of Agroindustry also undertook its own initiative.

(Continued)

subsidies and credits) rather than public goods (which were the exclusive subject of the Peruvian tables). Finally, the economic and political scenario had its impact on the internal coordination itself; the tables were never a priority at the Ministry level, and this lack of support ended up being what led to their disarmament.

Notwithstanding this poor performance, the first version of the Argentine tables had some successes (the cases of the hydrocarbons tables in Vaca Muerta and some agro-industrial tables) that set a precedent and caught the attention of the then president, Mauricio Macri. This was enough to raise the revenge of the model, with the so-called Sectoral Roundtables 2.0 (*mesas sectoriales 2.0*) around 2017. Higher level political support was essential, as the nature of the issues involved required the interaction of numerous and varied public sector actors, which exceeded the competencies of the agency responsible for its management. At the same time, there was a change in the strategy, abandoning the "planning vision" for an "operational vision", more in line with the Peruvian model: it was a more iterative approach, in the sense that it did not focus on thinking about "the agreement" that the sector's competitiveness would trigger, but rather on identifying and resolving, progressively and sequentially, various problems. This allowed the consolidation of a certain trust-building dynamic and constant learning on how to improve the identification and resolution of obstacles.

Selection

Relevance

In a context of scarce resources (financial, managerial and cognitive), a PDP should identify strategy value chains to be prioritized. This verticality would impose a better use of these resources, provided that the question of how to choose these chains is satisfactorily answered.

To this end, a currently widespread selection strategy is linked to economic complexity (Hausmann and Hidalgo, 2014), answering the question of which products are closer to the current productive base of the economy. However, this strategy of "moving

through adjacencies" may be of limited effectiveness in closing productivity gaps with more advanced countries. This mapping of "possible sectors" must therefore be combined with an exploration of the opportunities that define global prospects within the framework of the new imperatives of GVCs and which, ultimately, also pose strategies for productive transformation (see Upgrading section).⁴⁴ The extent to which these inherently more complex (and therefore riskier) strategies can be applied will be determined by the stock of public and private capacities in place in the country, which, as will be seen below, must be developed on an ongoing basis. Box 4.3 presents a selection strategy developed from this approach.

However, a problem with the previous strategy is that it can often provide lists of products and activities that do not consider the degree of commitment of the business sector to the process of change proposed by the development policy. For this reason, it is also important to have a diagnostic of the entrepreneurial will, and to pay special attention to those sectors that spontaneously present themselves to raise problems or requests for interventions before the policy maker (self-selection). This was partly the strategy followed by the executive roundtables in Peru, where they worked with the sectors that showed quick interest and clear ideas about their situation. This led to a way of working that made it possible to show "quick wins" that contributed to legitimizing the policy. The caveat in this case is the risk of capture, which will be discussed in more detail in the following section.

BOX 4.3. A SELECTION TOOL BASED ON THE ECONOMIC COMPLEXITY APPROACH

The development of new chains in the local territory is one of the most promising policy strategies in terms of the possibility of capturing greater value added and increasing the level of productivity of the economy. It is possible to perform an interpretative and predictive exercise on what are the most likely sectors to emerge. Filippo *et al.* (2022) present an analysis tool that —based on the economic complexity methodology— helps to make these forecasts.

(Continued)

⁴⁴ In this line of work, at least the levels and dynamics of traditional competitiveness variables such as value added, exports, employment and investment should be considered (Filippo and Guaipatín, 2021).

(Continuación)

The tool proposed in the paper is an algorithm that determines a strategic index of production, thus making it possible to identify a list of strategic economic activities for the economy being analyzed. That they are strategic, in this context, can be interpreted in two ways. On the one hand, in the sense that they are the most likely to develop, i.e., even in a scenario without policy interventions. On the other, these activities can be seen as the best bets for an economy that is analyzing its prospects for productive sophistication and seeking to define its productive public policies.

This strategic index is based on three fundamental variables.⁴⁵

- **Complexity:** Although there is a natural interpretation of what is "complex", the concept is composed of two others that help to understand its construction and scope in this context. The *ubiquity* (the greater the ubiquity, the more locations or regions are capable of producing a given good or service), and the *diversity* (number of different activities performed in the location). A region is considered complex when it has high product diversity with low ubiquity; and a product will be complex when it is produced by entities with high diversification among products with low ubiquity. That is, complex things have few competitors, because they are difficult to make, and economies with complex production produce many things exclusively, which the rest have not yet learned to make.⁴⁶
- **Affinity:** It is indicative of how feasible it is for a region to produce something new, taking into account the activities it already carries out. In short, it is the set of activities it already masters that constitutes the framework of capabilities of this economy, and which provides the

(Continued)

⁴⁵ It should be noted that these variables are in turn constructed by other fundamental particles, highlighting the one that indicates the *proximity* between two goods. Two goods are close when they are frequently produced in the same economy, indicating that whoever can or knows how to produce one of them, takes advantage of this knowledge to produce the other. Note that this does not imply that these are things that are in the same GVC; on the contrary, these learning-derived capabilities make it possible to build bridges between GVCs.

⁴⁶ As the study focuses on products arrived at through learning, production that depends on critical natural inputs (and which may have very low ubiquity) is excluded from the analysis.

(Continuación)

body of knowledge that allows it to advance in new activities. Thus, this variable could be used to construct a probability that a region performs a given new activity, given the set of activities in which it already has mastery.

- **Strategic Value:** It is a measure of future diversification opportunities for a locality, based on the production of some good or service that is not being produced today. That is, the strategic value quantifies how a new product can open pathways to a larger number of products, and/or to more complex products.

The strategic index is not fully determined by technical considerations, but holds an important place for policy choices. In terms of this document, the Upgrading Strategy (see section on this dimension below), will differ according to the risk profile of the decision-maker. In other words, PDPs can be oriented towards large commitments, which have a high expected return but a high probability of failure, or more conservative strategies, but with less uncertain outcomes. Accordingly, different evaluations can be made of the qualities and opportunities offered by each product or service. Key issues are:⁴⁷

- The higher the weighting of **affinity**, the greater the importance given to maintaining the *status quo*. Affinity can be interpreted as a measure of the feasibility of successfully entering into a productive activity, given the current productive structure of a region. In this sense, giving a higher weighting to affinity is associated with a search for “*low hanging fruits*”.
- The higher the weighting of **complexity**, the greater the importance given to seeking growth—migration towards more complex activities—with results in the medium term. That is, we seek to enter directly into more sophisticated sectors, which require a greater number of

(Continúa)

⁴⁷ Filippo et al. (2022), present as an example the case of two of the three states with the lowest GDP per capita and complexity in Mexico, Chiapas and Oaxaca, where it can be noted the sensitivity of the tool to these policy preferences.

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capabilities for their production. These sectors typically generate higher value added, offer higher margins for entrepreneurs, better wages for workers and, in general, higher economic growth. However, they also generally require greater efforts to be successfully developed (high investments, training and human capital development, etc.).

- The higher the weighting of **strategic value**, the greater the importance given to growth with a long-term vision. Some growth strategies will require going through several stages of capacity building and entering sectors that will be used as stepping stones to increasingly complex sectors. These strategies will require more time to achieve their final results, but are potentially more robust by gradually building capabilities that, even after reaching the most complex sectors, keep paths open for incursion into other complex sectors.

After its construction, the strategic index will rank the products or services to which the economy under study could diversify its production. In short, it will be possible to see which are the 30, 50 or 100 activities that are selected according to the criteria used, and to apply the set of public policies deemed necessary to pave the way towards them, according to the aspects discussed in the Diagnosis and Upgrading dimensions.

Actions

In today's times, the great availability of data allows the existence of a wide range of tools for intelligent monitoring of local, regional and global economic activities. In fact, it is from the dissemination of the ideas of economic complexity that novel analyses have begun to be popularized through websites, such as the Atlas of Economic Complexity produced by the Growth Lab of Harvard University.⁴⁸ These tools extend traditional external trade data with indicators of economic complexity, with interfaces that allow interaction with the user.

These types of tools also began to be developed by countries, through the increasingly common data intelligence departments at different levels of government. These

⁴⁸ <https://atlas.cid.harvard.edu/>

developments aim to have their own productive policy compasses, but have also given rise to tools open to local entrepreneurship and potential investors. Some examples are those of Peru⁴⁹ and Colombia,⁵⁰ which take the complexity methodology to subnational levels, such as departments or cities. These "atlases" can then be transformed into tools designed for firms, as in the case of Exporta MX,⁵¹ from Mexico, a tool that provides an overview of the export of a given product, and then provides more operational and administrative details in what is called the "exporter's route".

The new government data departments are actors that are added to the constellation of agencies to be coordinated, in line with what was seen in the previous section.⁵² In general, these departments have been established as autonomous divisions or within the orbit of government economic ministries or secretariats, so that they have a strategic position as primary advisors to those who design development policies. The main challenges come perhaps from the side of breaking down old discretionary structures to give way to what is now popularized as "evidence-based policy", which requires not only data analysis, but also analysis of results (we will return to this in the section on Monitoring and Evaluation).

Besides data, and taking into account the importance of self-selection mentioned above, the tools and skills for interaction with the productive sector will be particularly important in order to get a sense of the willingness to work together with the policy teams. This is discussed in more detail in the following section on public-private coordination.

Public-Private Coordination

Relevance

The mapping carried out in the sector selection phase must be followed by a diagnostic phase of development obstacles that will lead to the design of an upgrading strategy with its corresponding set of associated policies. For this, the expertise of policymakers (together with their coordination capacities, as seen above) is key, but not sufficient. The reason for this is that for an adequate definition of a PDP, the public sector needs information that it does not have, which makes

⁴⁸ <https://atlas.cid.harvard.edu/>

⁴⁹ <http://acomplexperu.concytec.gob.pe/#/?locale=es-peru>

⁵⁰ <http://datlascolombia.com/>

⁵¹ <https://exportamx.economia.gob.mx/>

⁵² These departments differ from traditional statistical departments in their purpose: the primary objective is not to generate statistics for external use, but information for internal decision-making.

it difficult to identify market failures and the appropriate instruments to solve them. Given that part of this information is held by the private sector, which has a better understanding of the obstacles it faces and the public goods it requires to enhance productivity, the public sector should seek a fluid dialogue with the private sector. Thus, having a well-designed and implemented dialogue strategy allows the public sector to obtain more complete diagnoses and more appropriate strategies.

On the other hand, the private sector also needs information that the public sector has, so from all points of view the knowledge of the private sector is complementary to that of the public sector. While the public sector would have a vision that contemplates maximizing social welfare, seeing the chain or sector as just another piece of a "big picture", the chain actors are the ones who know the day-to-day minutiae of the activity, and are clearer than anyone else about the microeconomic obstacles they face for its full development.

The question is how to achieve a space where these visions can converge constructively. In a context that can be marked by mistrust, it is not easy to answer this question. Private sector representatives may have reasons to distrust not only the government's use of the information provided in the dialogue, but also its competitors. On the other hand, the lack of confidence that the initiative will be successful may cause private sector representatives to judge their participation as a waste of time, and dissuade them from joining the space even before it has started.⁵³

These exchanges of views help to refine each party's assessment of the chain's challenges and opportunities. This way, a much richer diagnosis is constructed than that which would result from mere unilateral visions. For the public sector, this interaction with other actors is also useful because it gives its intervention *legitimacy*, since the productive sector becomes part of the intervention from the beginning. In a way, policymakers find in this dialogue the possibility of a pre validation of their concepts and policy proposals, being able to know the willingness of the sector to receive public support (this is not obvious), as well as the relevance of their proposals. With this prior exploration, the possibilities of uptaking of the policies and achieving success in the proposed objectives (which should also be proposed jointly with the productive counterpart, in a common work agenda) are increased.

This construction of legitimacy requires contemplating *all* relevant actors. Thus, instead of speaking of "private sector", it might be more relevant to refer to "non-governmental sector" (Ons, 2018), in order to contemplate not only firms (SMEs and

⁵³ Additionally, certain actors who already have direct access to political spheres may not feel comfortable with these public dialogue proposals, due to the exposure they bring (Cornick *et al.*, 2018).

lead companies), but also other peripheral actors such as NGOs, trade unions, academia, etc. All these other actors should, in fact, be mapped according to the GVC analysis methodology presented in Part 1. Having representatives from different sectors of the chain, with different knowledge and interests, also provides a natural balancing mechanism so that no one "exaggerates" problems or roles too much. Thus, representatives end up acquiring "qualified juror" functions from their counterparts, which helps to avoid the risk of capture (Fernández-Arias *et al.*, 2016).

However, by broadening the scope of the dialogue, a natural trade-off appears between legitimacy and productive dialogue. While incorporating a diverse and representative group of stakeholders is necessary for the construction of a legitimate dialogue space, it is also true that *too many* voices can affect the effectiveness of the process of exchanging ideas. But while the coordination effort is greater, when progress is made, it is more likely to be sustained over time. Incorporating all relevant voices is central to making productive development policies sustainable.

Actions

There are various strategies to create useful spaces for dialogue, not only to facilitate public-private interactions, but also to solve potential coordination problems for the private sector itself (which may be a sufficient reason for a policy intervention). Some of these strategies are easy to implement, such as sectoral dialogues, forums, consultations, etc., and others have more clearly defined methodological structures, such as clusters and executive roundtables, which will be discussed in more detail below. In all cases, it will be essential that these spaces allow us to establish consensus and a common work agenda, within a framework of transparency and trust.

The choice of strategy will depend on several factors, which mostly emerge from the implementation of the methodology of Part 1: the mapping of actors, the identification of governance(s), and the delimitation of the geographical scope, among the main ones. In other words, the proposal cannot go against the institutional framework and governance already in place in the sector. This is why it is usually relatively easier to set up these spaces for exchange in emerging sectors than in others that are already consolidated, and therefore have a certain (tacit or explicit) institutional framework.⁵⁴ Coordination strategies and instruments can adopt flexible and agile structures such as executive tables, or more structured ones such as clusters. Both types of strategies can even be combined, as they can sometimes

⁵⁴ "Emerging" refers to activities that did not exist in the region being worked on, which does not necessarily imply that they are new activities in historical terms.

be complementary. By their nature, both spaces for dialogue should be vertical in nature, aimed at identifying and resolving obstacles to the development and productivity of companies in a specific production chain or link.

Cluster initiatives are a well-known development strategy with a territorial emphasis. From a conceptual point of view, clusters are groupings of companies that belong to the same sector and are geographically close to each other. Thus, a cluster is typically embedded within a value chain. The conceptual idea of clusters originally comes from Porter (1990), who warned that business success is associated with the geographic concentration of companies in similar sectors, which can have benefits in terms of easier access to goods and services such as suppliers, talent, and knowledge, among others. Moreover, the strengthening of input markets that enable the productive activities of the cluster constitutes an externality for the companies that can only be taken advantage of through joint actions. Given that firms must coordinate, which is not easy, since the 1990s cluster strengthening policies gained momentum (Pietrobelli and Rabellotti, 2006; Monge-González, 2018). At the regional level, the IDB has promoted a large number of cluster support programs since the beginning of the century, which have generated lessons about their impact and the determinants of success of this type of interventions (Maffioli *et al.*, 2016; Aboal *et al.*, 2017).

Clusters can even dispense with the public sector and focus on private-private coordination, since it is a tool where companies in a given sector can coordinate to achieve better negotiation conditions, both in terms of the market (obtaining better conditions for the purchase of inputs or the sale of goods and services) and in terms of public goods (joining efforts to achieve certifications, sanitary measures, technology acquisition, infrastructure construction, etc.). Thus, clusters can move towards collective private actions, such as the consolidation of a brand or the construction of common infrastructure for their members. The cluster imposes a form of organization on a sector, so it is important that it respects the pre-existing tacit structure and, in addition, allows the entry of all firms, both SMEs and large lead companies. In addition, they should be sufficiently broad to incorporate other non-business sectors, such as government and academia, in order to achieve better coordination to tackle problems that go beyond the strictly business sector, such as innovation and technology diffusion in a broad sense. Several IDB studies show positive impacts of public-private and private-private articulation experiences in clusters (Villacis, 2022).

One limitation of cluster strategies is that they have a linear logic. That is, moving sequentially from a diagnostic phase (to which considerable time is devoted), to a development phase, and finally to an evaluation phase. In contrast, the executive

roundtables, such as the Peruvian *mesas ejecutivas*, have a circular logic which is initially motivated by a very concrete problem, and then evolves towards more complex problems, elaborating solutions as it goes along. The cycle of the mesas can be characterized as EFA, which stands for experimentation-feedback-adjustment (Crespi et al., 2014). Among the main issues addressed at the roundtables are the simplification of procedures and regulations, the facilitation of international insertion, and improvements in public goods and services relevant to the group. In this sense, it is important that the design provides adequate incentives for the active participation of all members. According to the IDB's experience, the agility of this method makes it evolve rapidly when the private sector observes the benefits of the dialogue, giving rise, for example, to parallel tables of subgroups of stakeholders to achieve better coordination at the central table.

Thus, as mentioned above, the various coordination strategies can be combined. In Costa Rica, for example, work is being done to set up executive roundtables as a technology to support cluster management, within the framework of the National Cluster Program, an initiative supported by the IDB (Torrico and Solis, 2022).⁵⁵

Diagnosis

Relevance

Having selected the chains in which to intervene, a solid communication space with the relevant stakeholders within and outside the government, it is possible to diagnose the problems or opportunities in these value chains. It should be clarified here that, given the permanent interaction with which the different dimensions of intervention must be considered, it is possible that the diagnosis may contribute to refine the prioritization of sectors previously carried out, depending on the magnitude of the problems identified, as suggested by Filippo *et al.* (2022b).

How is a proper diagnosis achieved? Following Crespi *et al.* (2014), a good diagnosis should focus not on the symptoms, but on the causes behind them. As developed in Part 3, these causes are generally market, government, coordination and information failures. These failures may or may not justify a policy intervention. In this sense, if we move forward with an intervention, we must ensure that the proposed solution does not end up being “worse than the disease”, and avoid situations where new government failures or undesired distortions are created.

⁵⁵ Para más detalles, ver <https://www.academiaca.or.cr/webinars/mesas-ejecutivas-como-herramienta-de-apoyo-a-la-gestion-de-los-clusteres/>

Thus, and taking into account the framework of analysis presented in Part 1, the diagnosis is strongly influenced by the Context dimension, which is the one that marks the *tempo* of opportunities and challenges. In light of the discussion in Part 2, it can be said that companies in the region have great opportunities in a scenario where more sustainable and resilient modes of production are being sought. The region has much to offer in emerging chains linked to climate resilience, and digitization (an indispensable tool for chains to improve both efficiency and resilience) can be a fast track for many local firms to integrate to GVCs. However, Box 3.2 has shown that the underlying problems do not change, and the provision of certain public goods remains a priority, since information and coordination failures are the central issues when it comes to mass access for SMEs in GVCs.⁵⁶

Actions

The various instances of public-private and public-public coordination described above are ideal spaces for making progress in the preparation of diagnostic assessments, which should be documented in studies, guided by academic evidence and policy experiences in other areas. These studies can be carried out by governments or entities created to address the issue (executive roundtables, cluster initiatives), or commissioned to third parties that can perform the work from an unbiased perspective.⁵⁷ Methodologies may vary from case to case, but in general they should follow the principles of value chain analysis and the conceptual foundations for productive development policies detailed in Part 1. In this way, the aim is not only to prepare a diagnosis, but also to have benchmarks and policy proposals, among other inputs.

Upgrading

Relevance

As mentioned in Part 3, in the framework of GVCs, the productive policy strategy is defined on the basis of the concept of upgrading, understood as the way in which governments and firms seek to capture greater value added in their participation

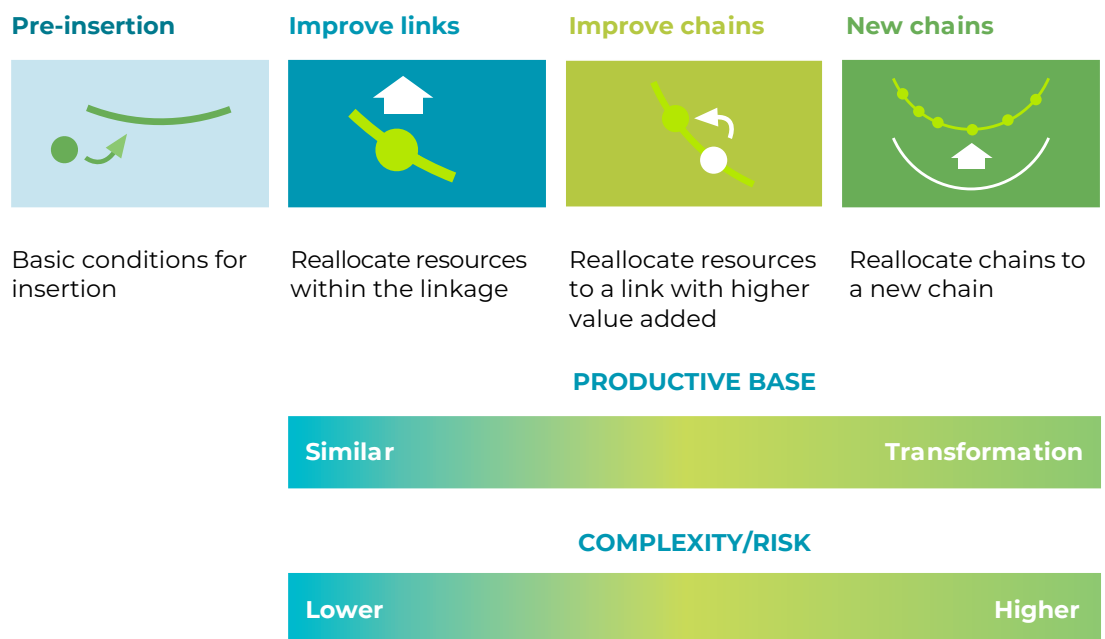
⁵⁶ CTCS (2010) is an interesting example of a guide for Canadian SMEs to understand the opportunities to adapt their business model to the GVC framework, assess their position for successful insertion, and have an overview of possible strategies to achieve this.

⁵⁷ A recent series of IDB diagnostic documents on GVCs for Mexico (Filippo and Guaipatín, 2021, on the strategic chains for the country, and Filippo *et al.* 2022b, for the particular case of the semiconductor GVC) include in their methodology dialogue and rapprochement with the private sector. This also reflects the interdependence of the intervention axes outlined in Figure 4.1.

processes in GVCs. Thus, this dimension takes on a central role for any policy intervention. The type of strategy will define the vertical logic of the intervention and the set of specific tools to be used.

There are several ways to classify these strategies. Here we will follow the one shown in Figure 4.2, which is an extension of Humprey and Smith (2002) and Gereffi (2019), where three specific strategies associated with upgrading itself, and a general one having to do with "pre-insertion" are defined.

Figure 4.2. **Upgrading Strategies in GVC**



Source: Prepared by the authors.

The **pre-insertion** strategy has to do with basic competitive conditions. It includes the items inherent to a healthy business environment, particularly with regard to international trade. The following aspects stand out: low trade costs (not only in money, but also in time),⁵⁸ an active policy in trade agreements and in the facilitation of foreign investment flows; the availability of technically and professionally qualified human resources; and, of course, a quality infrastructure in terms of transportation and communications. In addition, mention can also be made of macroeconomic

⁵⁸ Trade facilities, in terms of costs, bureaucracy and time, are decisive for participating in GVCs, since the country must be able to guarantee a constant and agile flow of intermediate inputs in order to effectively integrate into global production networks.

and political stability issues, which in general are particularly problematic in the region. Ideally, insertion in GVCs entails long-term relationships that require stability on these fronts and, above all, a strong political commitment that is credible to international actors.

Because of their horizontal competitiveness particularities, the policies associated with this strategy can be considered in a complementary manner to the specific strategies of upgrading that will be discussed below (and which impose, as discussed in the Selection dimension, a certain verticality), or they can be addressed in isolation (without necessarily making explicit mention of GVC objectives).

The first specific strategy of upgrading is at the **stage-level**. It can be seen as the least complex of the three, since it involves improving the competitiveness of a particular stage that is *already* present in the country or region. In this case, two sub-strategies are defined, one for process upgrading and the other for product upgrading.

Process upgrading implies doing "the same thing that was already being done" (in terms of production structure), but in a more efficient way. To achieve this, companies should adopt new technologies and best practices that have proven to have favorable results in similar benchmark companies in other locations. This type of upgrading is becoming increasingly relevant in view of the "datification" of GVCs that has been occurring as a result of the opportunities for efficiency gains that digitization of processes within the chain represents, which makes possible new types of relationships within and between chains (see Filippo and Stankovic, 2021).

Product upgrading implies that there may be a higher value-added product line within a value chain stage that is not being addressed. This strategy can also lead to process improvements. As an example, let's take the case of an avocado producer, which initially does not have any type of certification and whose demand is limited to the domestic market. Subsequently, the firm discovers that if it obtains a European GAP (Good Agricultural Practices) certification, not only will it be able to access this market, but its product will have a higher unit price absent this certification. In essence, that product could remain the same, but for the European consumer it now has an additional intangible attribute, which is the traceability recognized by GAP. Adhering to this certification probably implies changes in processes, resulting in a differentiated product for which some customers will be willing to pay more.⁵⁹

⁵⁹ A complete analysis of these competition modalities in agribusiness can be found in Ghezzi *et al.* (2022).

The second specific strategy is that of **upgrading within a chain**, i.e., moving to other activities or stages within a chain in which the firm participates. This functional improvement occurs when, taking advantage of their experience and background in the chain, companies change their mix of activities towards tasks with higher value added (Gereffi, 2019).⁶⁰ Typically, this type of improvement occurs through greater vertical integration, adding new capabilities to a company or cluster, or via specialization, changing one set of activities for another. Both forms of upgrading require new workforce skills associated with the expansion of firms' capabilities. An example of this is shown in Box 1.5, which describes how South Korea specialized in assembly and testing activities (those with the lowest value added) in the semiconductor GVC in the 1960s, which were used as a springboard to later generate capabilities to develop activities with much higher value added (design and production), allowing the emergence of companies that are now world leaders, as it is the case of Samsung. Another classic example is the jeans value chain in Torreón, Mexico, which began in 1993 with the sewing stage for four large U.S. producers (Farah, Sun Apparel, Wrangler, and Levi's), and rapidly expanded its activities, until it covered almost all the activities in the value chain by the year 2000. Thereafter, this cluster had to reinvent itself to face competition from Chinese and other lower-cost manufactures from other countries (Gereffi and Fernández-Stark, 2019).

This strategy has a gradual logic, according to which sectoral knowledge and understanding gained by belonging to a chain can be used as a basis for "climbing" up the value-added ladder, along the smile curve (Figure 1.4). The question here is why these stages have not yet been developed in the territory, and how to promote their emergence. It is therefore important to have a clear understanding of the chain governance and the necessary knowledge base needed to assimilate these new activities.

In general terms, these first two strategies mainly involve movements in the adjacencies of the productive structure, following the logic of economic complexity proposed by Hausmann and Hidalgo (2009). One limitation of this is that, in terms of closing productivity gaps (which is the objective of the PDPs), the results may be insufficient, and more ambitious strategies may be proposed.

In this sense, the specific strategy of **development of new chains** can be **gradual** (chains with the same productive base as others already present, but with greater potential value added) or **disruptive** (completely new chains, which move away from the economy's current knowledge base and therefore represent a commitment

⁶⁰ These functional improvements could also involve product innovations, with or without process improvements incorporated, but with disruptive effects for the company.

to *transformation*). Upgrading to new chains involves moving to more technologically advanced production networks, which implies entering new industries or product markets that use different marketing channels and technologies. These types of improvements generally require new workforce capabilities and major innovations; they are "moonshots" (Bloom *et al.*, 2019) with highly uncertain outcomes.

These productive transformation strategies will be increasingly complex and will therefore require greater capabilities, both at the level of firms and policymakers (see Part 3). In turn, they will require more "risky" tools, as they usually involve vertical market interventions that may have undesired effects, such as capture. Continuing with the example of the semiconductor chain, the South Korean case is an example of success: a chain with high potential was attracted to the territory due to comparative advantages (low labor costs). With a long-term policy, the country was able to strengthen its capacities to eventually make the leap to higher value-added activities, and to have its own national champions, such as Samsung and SK Hynix. On a smaller scale, years later Costa Rica would have a similar, albeit more modest, experience with Intel (Box 4.4).

BOX 4.4. INTEL'S EXPERIENCE IN COSTA RICA⁶¹

The case of Intel in Costa Rica provides a history of the development of new value chains for the region. At the end of the 1990s, as part of a national strategy to develop the semiconductor industry led by the Investment Promotion Agency (CINDE), an Intel plant specialized in assembly and testing was installed in the country (see Box 1.5). In its first years of operation, the technological externalities resulting from production linkages with domestic companies were limited, mainly due to the type of initial investment (assembly and testing activities are the lowest value-added activities in the chain) and the lack of production of strategic inputs in the country.

These difficulties were partially overcome over time, with the incorporation of new tasks of greater added value, in circuit design (intensive in R&D) and global service provision (associated with the company's commercial

(Continued)

⁶¹ This experience is documented in detail in Monge-González (2017).

(Continued)

strategy). Thus, Intel Costa Rica began to offer opportunities for greater productive linkages and external technological integration (collaboration in R&D with local suppliers or clients for Intel's own activities) to promote knowledge spillovers and greater productive linkages with the rest of the economy. In the meantime, the company's presence also produced positive externalities in the local economy, including the promotion of higher standards for occupational safety and environmental management, the promotion of investment in education and human capital in Costa Rica. These advances also served as a background for attracting this type of FDI, which is intensive in knowledge and innovation. According to a study by Zolezzi and Miranda (2020), the effect of Intel in Costa Rica can be quantified as an average increase of between 1.3% and 2.6% in the annual growth rate of GDP per capita.

In 2014, the company migrated its assembly and testing operations to Asia. Although this was a blow to the country (the company's exports represented 20% of the country's total trade), the remaining activities developed in previous years were maintained in the country, associated with a higher value added and a higher quality of linkages in knowledge-intensive segments. Faced with the global crisis of the chain unleashed by the disruptions caused by the COVID-19 pandemic, and again with the mediation of CINDE, in 2021 the company announces the reopening of the assembly and testing facilities in the country, giving Costa Rica a key role in the global restructuring phase of the chain.⁶²

This is an example of how multinational companies can promote innovation in the host country. The Intel experience shows that it has been possible to foster local innovation capabilities in Costa Rica, both through knowledge spillovers to domestic firms and through the promotion of Intel's own activities in the GVC.

⁶² <https://www.reuters.com/article/tecnologia-costarica-intel-idLTAKBN28K2AX>

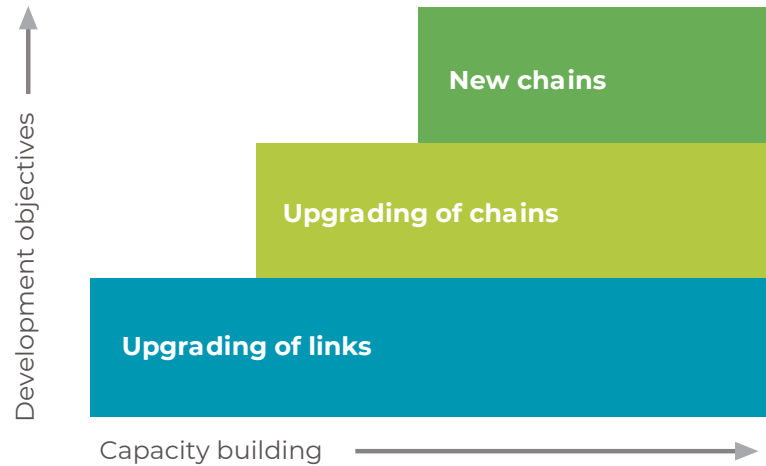
From the review of the characteristics of upgrading strategies, it is clear that they are strongly dependent on aspects covered in Part 1, such as chain mapping and, in particular, context conditions, which ultimately define the opportunities for upgrading. The next question is **how to define which strategies to follow**. In addition to the Diagnosis and Selection dimensions, here we must answer how and with what tools we will address the weaknesses and opportunities detected. For that purpose, it will be necessary to keep in mind two key concepts: **relevance** and **feasibility** (Crespi *et al.*, 2014).

Relevance refers to the fact that the intervention proposal corresponds to the diagnosis that justifies it, which is not always the case. Many times, the policy maker may be enthusiastic about how another country is tackling a certain problem and wants to replicate it inch by inch in their economy. Many times, these actions end up materializing, and many times they end up failing. This is because, we know, what works in one place will not necessarily work in another. This has to do not only with idiosyncrasies and contexts, but also with the problems that the solution is targeting: if the nature of the failures is different, then different solutions are needed, taking into account the local context. There are no one-size-fits-all recipes, tailor-made suits will always be needed.

Feasibility refers to having the necessary resources (financial, managerial and cognitive) to execute a given plan. That is, the proposed plan must be in line with our current capabilities: a "good policy" built on a foundation of insufficient capabilities is likely to fail, so a more "modest" policy strategy, but one that is adequate to base capabilities, is preferable. Under this perspective, the aim is to prevent government failures and the result that the remedy ends up being worse than the disease.⁶³ For this purpose, it is very important to take into account the discussion presented in Box 4.3, further elaborated in Filippo *et al.* (2022).

It should be noted that, in complex contexts, even a good stock of capacities may be insufficient. Complex policies require continuous learning, where the processes of diagnosis, strategy and evaluation are in constant feedback. This way, a staggered vision can be proposed, where policy objectives grow in ambition as the capacities of policymakers and the private sector itself accumulate (Figure 4.3). For countries with a low stock of capacities, this implies starting with baby steps, generating the minimum conditions to address certain problems.

⁶³ Developing toolkits to measure the technical-institutional capacities of each region and thus determining what type of intervention is most appropriate may be useful. There is also the possibility of "acquiring" capabilities by hiring experts in certain areas. However, the success of these acquisitions depends on an enabling institutional context and certain minimal capabilities in the work team (Fernández-Arias *et al.*, 2016).

Figure 4.3. Development Strategies, Capacities and Objectives

Source: Prepared by the authors.

Actions

The list of actions in this dimension is as varied as it is extensive, as it includes all the policy tools that can be combined within one of the upgrading strategies presented. As such, this dimension is the focus of any intervention and is therefore the one that takes the most resources.

Several studies suggest a variety of PDP instruments oriented to GVCs. For reference, Monge-Naranjo *et al.* (2020) propose five groups of interventions to improve productivity: access to information and generation of externalities; human capital development; financing; business climate and institutional framework; and innovation policies, assigning central importance to the latter.⁶⁴ Criscuolo and Timmis (2017) identify a series of policies that are of direct relevance for GVC integration, including: (i) trade policy, trade facilitation and coordination of standards, (ii) regulations that promote competition to facilitate access to transportation, logistics, communications, and services, among others, and (iii) innovation policies. Finally, Kummritz *et al.* (2017) focus on a similar set of actions.

In line with this work, the following is a (non-exhaustive) list of different policy tools to enhance firms' participation in GVC. Without necessarily going into the details

⁶⁴ When speaking of innovation policies, the analysis is divided into supply and demand policies, and presents a taxonomy of instruments according to the market failure it seeks to correct (externalities, financial information asymmetries, technological information asymmetries, and coordination), which is based on the Sectoral Framework document of the IDB's CTI Division.

of each tool, the idea is to illustrate the universe of possibilities that exist within the logic of a GVC intervention. Specifically, trade, investment, infrastructure, human capital, financial and innovation policies are considered here, tools that are summarized in Table 4.1 at the end of the document.

Trade Policy

In a complex value chain, intermediate goods cross borders many times. Considering tariffs, administrative and paperwork costs, each border crossing accumulates higher trade costs. On the other hand, since tariffs are charged on the gross value of imports, rather than on domestic value added, even low tariffs can have a high (negative) impact on export value added. Regarding non-tariff issues, the application of standards (hygiene, safety, sanitary, phytosanitary, etc.) differentiated between countries may represent a barrier to trade that amplifies its impact within a GVC.

Trade policy includes a large number of variables that are typically found in the various competitiveness and ease of doing business indices. These variables range from macroeconomic aspects (such as **exchange rate stability** and the level of **trade tariffs**) to microeconomic aspects that have to do with the **number of procedures and days** it takes to carry out a given operation, as well as corruption at the border, to mention just a few.

In this regard, it is worth noting that insertion in GVCs generally involves building long-term relationships with customers and suppliers, so a stable and open framework for trade is necessary: the country's position in terms of trade agreements and tariff and non-tariff policies are the main aspects to be ensured in this regard.

In addition, agility is needed in order not to disrupt the supply chain, so the microeconomic aspects mentioned above, such as harmonization and consistent application of standards requirements, are key to enabling successful and lasting insertions. Thus, a trade-friendly framework is more of a basic condition for a GVC strategy.

In addition to these aspects of "trade facilitation", other actions can be included, such as **trade missions and reverse trade missions**, in order to resolve information gaps in both directions: on the one hand, to show multinational companies the stock of local capabilities and potential; on the other, to inform local businessmen about opportunities for insertion in chains. Hallack and López (2022) present a detailed analysis of support programs for productive internationalization in Latin America, ranging from trade agreements, trade facilitation, export promotion, and financial and tax regimes, to investment attraction policies, which is the point discussed below.

Investment Policy

There are two main ways in which a firm can join a GVC: one is by being an exporter itself; the other is by being a supplier of a lead company, (typically an MNC affiliate).⁶⁵ The demand of the lead companies will be aligned to international standards, so local companies will have to make a "quality leap" to become their suppliers. Thus, attracting **foreign direct investment (FDI)** is probably the "fastest" way to integrate local firms into GVCs, since these investments bring capital, technologies and managerial know-how that allow a fast track to raise the "quality" of local business (see Part 3). These effects occurs as long as the investment agreements involve the creation of linkages with the local productive network, something which is not always easy.

The policy toolkit for attracting FDI involves instruments such as **tax exemptions** extended over time, and **subsidies** on, for example, land acquisitions and -eventually- the construction of the facilities. In order to ensure that these fiscal resources (generally substantial) are not wasted, local governments should agree with MNC affiliates on participating in **local talent and supplier development programs**.⁶⁶ In turn, FDI can be attracted by packages that combine other types of measures such as those that will be developed below, which may include a commitment to the construction of specific infrastructure or the promotion of R&D activities. *Ad hoc* instruments such as **soft-landing agencies and investor assistance centers** can also be included.⁶⁷ From a geographical perspective, most of these types of incentives can be concentrated in a **free trade zone**. An experience in the region is provided by the case of Intel in Costa Rica (see Box 4.4), which began operations in the country in 1997, registered in the Free Trade Zone created by Law No. 7210 of 1990. A recent study by Zolezzi and Miranda (2020) performs a counterfactual

⁶⁵ The company can also integrate into a value chain by acquiring foreign inputs and technologies, which can be facilitated mainly through trade policies, complementary to investment attraction policies.

⁶⁶ An alternative to supplier development strategies are the **local content rules**, which legally establish the obligation of a certain proportion of domestically produced inputs in the production of the multinational subsidiary. However, it should be noted that legal enforcement is no guarantee of success if there are not adequate incentives and certain possibilities in terms of local capacities. For example, Brazil required the local supply of 60% of the components for the installation of its wind farms. Weiss (2016) notes that while the local content may have been high, the program was not very successful in encouraging the expansion of wind power capacity, in part due to the high cost of local components.

⁶⁷ These strategies have much to do with coordination within the public administration (and between public entities at different levels), avoiding duplication of requirements and seeking to simplify procedures in order to facilitate the installation of new companies in the territory, especially large lead companies in the case of GVCs. Normally, they are channeled through offices established exclusively for this purpose, and may be either at the country level (for example, the *Oficina de Grandes Proyectos* [Major Projects Office], in Chile) or at the subnational level (for example, the City of Cordoba has its *Centro de Atención al Inversor*). Also, soft-landing services can be provided by private agencies.

exercise with a synthetic control methodology, where it finds that, while the installation of Intel brought an impact that doubles the country's GDP per capita growth between 1998 and 2018 with respect to the situation "without Intel", the same exercise performed on the free trade zone finds almost zero results before the firm's establishment. This serves to illustrate the importance of having strategic allies within the governance of GVCs, and the development of comprehensive policies (for its establishment, Intel agreed with the government on certain commitments to improve technical programs for human capital training).

Infrastructure Policy

Infrastructure is another basic pillar of competitiveness indicators that has an importance that does not need to be explained. However, in the context of the GVCs, it is an extremely relevant aspect. Infrastructure makes possible certain services, such as energy, transportation, logistics, communications, and quality certifications, among others, which are required for good coordination and competitiveness of a value chain. Therefore, it is not only important to promote these investments, but also to have favorable regulations to access these services in an effective and efficient manner.

Quality infrastructure is fundamental for efficient connectivity (in transportation and communications), which is a central attribute for GVCs (Salamanca *et al.*, 2021; Granada *et al.*, 2022). The infrastructure policy must cover the **basic transportation routes** (roads, railways, ports, airports) for both goods and people, the development of related services, and facilitate the **communication** with, for example, a wide and fast internet network (Iglesias Rodríguez *et al.*, 2022). In addition, many chains have demands not only on the stability of the **energy and water supply**, but -increasingly- there are requirements to give details on energy sources, in line with the sustainability imperative discussed in Part 2 of this paper.⁶⁸

It is worth pointing out the perhaps obvious fact that it is difficult (and, of course, costly) to seek to homogeneously improve *the entire* national infrastructure. An effective strategy for concentrating efforts in this regard is to define **industrial zones** or **special economic zones**. This way, in small geographic locations, it is possible to ensure infrastructure and services of the quality necessary for the insertion in GVCs (industrial parks), as well as to concentrate certain fiscal and tax benefits (economic

⁶⁸ This is a clear example of the need for public-public coordination, where in order for the CGV program to be attractive to MNCs, the support and collaboration of the portfolios of Energy, Private Works, Public Works, Transportation, among others, is required.

zones, free trade zones).⁶⁹ Although this type of policy has proliferated in the region in recent times, its evaluation is complicated (Frick and Rodríguez-Pose, 2021). Existing evidence for developing countries, however, indicates that the success of these measures in terms of productivity gains and spillover effects is highly dependent on the existence of other supporting measures (Mugano, 2021).

Finally, there is one type of infrastructure that is particularly relevant to a GVC strategy. This is the **national quality system or quality infrastructure**, usually organized around national metrology institutes. These institutes are in charge of establishing the country's measurement standards, in order to comply with various norms and standards required for participation in GVCs.⁷⁰ It is highly relevant that these institutes and their network of laboratories have modern equipment in line with the needs of Industry 4.0, in order to provide a dense network of measurement services that will allow local companies to comply with the current requirements of GVCs. Thus, maintaining a quality infrastructure with up-to-date services is relevant both as a basic condition for insertion in GVCs, and to propose various strategies for upgrading, in response to the specific compliance requirements of the target chains (see Box 4.5).

⁶⁹ There is a difference between these concepts, since economic zones may include free zones in their design, but a free zone does not necessarily constitute an economic zone. This is because free trade zones are mainly characterized by offering tax and customs benefits to the companies that operate within them, having a logic of investment attraction and trade facilitation. Economic zones, on the other hand, are broader concepts that encompass various geographic areas where economic activity and development are to be promoted. Thus, economic zones may include not only free trade zones, but also industrial parks, technological development areas, financial districts, among others.

⁷⁰ Hallack and Tacsir (2021) analyze the importance of traceability systems as differentiation tools for insertion into global agri-food value chains, and the coordination challenges this poses for public policy.

BOX 4.5. NO QUALITY, NO PARADISE: THE IMPORTANCE OF QUALITY INFRASTRUCTURE⁷¹

Participating in global production networks imposes the need to "speak the same language". In the case of GVCs, this language is that of quality: while countries set certain regulatory standards that products entering their borders must meet, multinationals will additionally require certain attributes that the products of their suppliers in other countries must meet. The activities used to assess whether that product complies with such technical requirements are part of what is known as **conformity assessment**.⁷² These requirements can be described in terms of mandatory standards (associated with national legal requirements) and "voluntary" standards (associated with agreements between companies).

Conformity assessment is supported by the **national quality system** (known as **quality infrastructure**), which consists of **calibration, metrology, accreditation** and **standardization** organizations (Guasch *et al.*, 2007). Although conformity assessment activities may be performed by the supplier or by the purchaser of the product in question, independent organizations often perform this function (which contributes to lower transaction costs). Calibration laboratories ensure the reliability of measurements made by testing laboratories and inspection bodies. To demonstrate the accuracy and precision of their measurements, calibration laboratories establish traceability of reference measurement standards by calibrating their own equipment at the **national metrology institutes**.

To put the above in an example, take the case of the rejections suffered by Mexican avocados in their main Asian markets due to the presence of certain pesticides in the products. This problem originated in the fact that local laboratories in charge of pesticide level compliance were not able to detect the levels required by trading partners. In this situation, the National

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⁷¹ The IDB has conducted a series of studies on the importance and institutionalization of quality infrastructure in various countries in the region, which can be consulted from the links published in Casaburi (2017).

⁷² Strictly speaking, the evaluation of the product (which can be a good or a service) can be complemented with evaluations of its processes and even the characteristics of its production company.

(Continued)

Metrology Center (CENAM) played a key role in reopening the international market by developing certified reference materials and technical aptitude tests for avocado pesticides for their controls and conformity evaluations.⁷³

This way, quality infrastructure is a basic requirement for companies to successfully insert into global production networks. A solid quality infrastructure requires that the network of actors that form part of it be well articulated and coordinated. On the other hand, it is important that conformity assessment services reach all firms in quality and quantity. To this end, it is important to achieve an adequate geographical distribution of the laboratories in the network, a proactive attitude on the part of public agencies to disseminate among companies the basic requirements for inclusion in GVCs (resolving information gaps), and to keep services updated and relevant to the modern requirements of the supply chains.⁷⁴

Human Capital Policy

Global chains require specialized human capital at different skill levels, as shown in Box 4.6, for example, in the case of the talent needs of the semiconductor GVC in Mexico. In this sense, the national education policy is highly relevant, not only at the level of formal education, but also in terms of the institutionalization of a **training system** for those who already form a full part of the country's labor force. The former falls under the purview of ministries of education and is part of long-term plans that are unlikely to fit 100% into a GVC strategy. The latter is partly the responsibility of the labor ministries, but the corporate culture of training and the receptiveness of workers to training processes are also relevant.

In this sense, governments can carry out actions to **promote certain professions or trades** (which can range from advertising to solve information gaps to subsidies for students in these careers), but in general it is advisable for the private sector to commit itself to these processes. One way to do this is to encourage companies to be **co-creators of programs** containing exactly the skills they demand to improve the country's position in a value chain, which implies the possibility of coordination

⁷³ <https://www.notimex.mx/es/noticia/168493>

⁷⁴ See Valqui *et al.* (2019) for considerations on the challenges and opportunities offered by digital transformation for metrology.

with academia and the public sector. Privately, companies may have their own training strategies, including visits of workers to subsidiaries in other countries, to obtain the know-how on-site.

However, the pandemic generated very specific demands for talent to which traditional mechanisms have not been able to provide a rapid response. The clearest example is the demand for programmers and other digital profiles. As a result, innovative reskilling solutions appeared, such as bootcamps for specific certifications. The IDB has supported several programs in this regard, in conjunction with local institutions (see for example, Torrico, 2020, and Torrico *et al.* 2021).

Finally, and more as a complement to the innovation policies that will be presented below, an increase in the supply of scientific human capital, both in quality and quantity, is also a prerequisite for increasing innovation. In this sense, it is the universities that are responsible for training talent in science, technology, engineering and mathematics, which are the basis for research centers in universities and the private sector. Finally, given that innovation is elitist, as inventors typically come from families at the top of the income distribution (Bell *et al.*, 2019), improvements in school quality and exposure to innovation career profiles can help circumvent barriers to training new inventors (Bloom *et al.*, 2019).

BOX 4.6. INNOVATION AND TALENT: THE CHALLENGES OF THE SEMICONDUCTOR GCV IN MEXICO⁷⁵

For the semiconductor chain, talent availability is an extremely important issue. In some way, a critical node in this value chain has to do with qualified talent and with the competition that the industry must provide with others linked to the software and IT services sector. The novelty of these segments (which were growing strongly and were boosted by the pandemic) is that they offer the possibility of much faster growth than the semiconductor chain is able to provide. In turn, knowledge in the semiconductor segment is often quite specific, even at the intra-firm level, which leads companies to make great efforts in training and talent retention.

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⁷⁵ These points are further elaborated in Filippo, *et al.* (2022b).

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As a reaction to this, companies in the chain are often strongly committed to training talent at various stages. Representatives of the chain in Mexico are no exception: companies such as IBM and Intel have a long history of co-creating programs with aligned universities or requesting these study centers to offer specialization programs for their employees. It is also common to encourage highly qualified employees to serve as teachers at universities, which functions as a dual “hunting” strategy (professors can identify outgoing talent firsthand) and as a link between academia and the productive world, which serves as a way for students to consider their future career options. Regarding the latter, internship programs are also widely used, and result in large positive externalities for the industry, since, according to the sources interviewed, the retention rate of these interns does not usually exceed 50%.

In view of the specific knowledge required, these strategies are often “internationalized” to the extent that they also achieve knowledge sharing among the various company locations in the world.

In summary, the global strategy of the companies could be described as one of minimizing personnel turnover, in which the companies collaborate so that the ecosystem has a good base for the formation of talent, which once hired is sought to be retained, promoting ongoing training and the possibility of growth within the company.

In Mexico, these local talent training activities carried out by Intel, are complemented by a network strategy to promote innovation: Intel supports and partners with university-sponsored technology innovation centers across the country, contributing training and equipment to support the development and expansion of the ecosystem.

Innovation Policy

Despite ample evidence that innovation is the main determinant of productivity gains (Bloom *et al.*, 2019), countries in the region underinvest in innovation (Navarro *et al.*, 2016). Box 4.7 describes the main market failures that justify innovation policies and the set of policies proposed in the literature. This group includes a large number of actions, understanding innovation in a broad sense, ranging from the adoption

of technologies and processes in local companies to the joint execution of R&D activities. A natural partner here will be those in charge of the countries' science and technology portfolios.

BOX 4.7. WHAT MARKET FAILURES JUSTIFY INNOVATION POLICIES?

The main market failure affecting innovation is knowledge spillovers. When a firm creates something new, this knowledge spills over to other firms that copy or learn from the original research, without having paid the full R&D costs. This means that there is insufficient appropriation of the benefits of innovation, which is related to the public good nature of knowledge.

The problem is that, even with a well-designed intellectual property system, the benefits of new ideas are difficult to fully monetize. From a theoretical point of view this market failure can generate under- or over-investment, depending on the size of knowledge spillovers relative to what Bloom *et al.* (2019) call “product market spillovers”. The latter makes private incentives to invest in R&D to gain market share (business stealing), which occurs in specific cases such as pharmaceuticals, which may spend large sums of money to create a new product that has a low marginal social benefit, in order to dominate the market.

Beyond the ambiguous effects of these externalities from a theoretical point of view, empirical evidence consistently finds that social returns to R&D investment are by far superior to private returns, which justifies policies to encourage innovation (Bloom *et al.*, 2019).

In addition to spillover effects, there are other arguments to justify R&D support policies, which are related to failures in other markets. For example, financial constraints can limit firms' innovation. This is because, given that innovation is intangible, it is difficult to use it as collateral for debt. This suggests that the equity market may be a better way to obtain financing, which however also has problems of information asymmetries: the inventor has low incentives to disclose her innovation because of the risk of potential investors stealing her idea, and it is difficult for the potential investor to believe an inventor who “promises” that she has a great idea.

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Given that the problem of underinvestment in innovation is not only financial but also informational, the most effective policies are those that combine R&D funding with appropriate mechanisms to identify the highest quality projects. Aghion *et al.* (2009) also refer to problems of coordination of private actors to develop innovations that could benefit them mutually.

In summary, insufficient appropriability of the benefits of innovation in the face of spillover effects, financial restrictions, information asymmetries and coordination problems are the main elements of underinvestment in innovation.

In that context, the main policy instruments suggested by Bloom *et al.* (2019) to stimulate innovation are tax policies for R&D, public subsidies for research, policies to increase human capital for innovation, intellectual property policies, and policies to promote competition.

It was mentioned earlier that the **promotion of R&D activities** can be part of the FDI attraction package. This is because, if the strategy is to migrate towards higher value-added links or chains, which are normally R&D intensive, an interesting objective may be for R&D activities to be developed locally and, if possible, jointly with other companies or local academic institutions. This increases the likelihood of knowledge spillover, and even of the appearance of spinoffs that consolidate the linkages.

These R&D promotion policies must be accompanied and supported by a clear and efficient framework for **intellectual property registration**. Intellectual property issues, however, are not restricted to R&D innovation activities, but also affect process innovations associated with the "datification" of chains (see Box 2.4). According to Filippo and Stankovic (2021), policies that prevent cross-border data flows may not only reduce the efficiency of supply chains, but reduce some of the potential benefits of participating in GVCs. According to the authors, very restrictive policies can cause two types of effects on GVCs: (i) changes in their configuration, and (ii) efficiency losses.

On the other hand, local MNCs affiliates, which are set up by FDI, may demand local capabilities to supply in compliance with certain standards. In these cases, governments can support the design and implementation of **supplier development** programs, where local companies are prepared to compete in the supply chain. In

this way, multinationals transfer knowledge to local firms, strengthening linkages through the creation of new capacities. This encompasses the creation of managerial, financial and productive capabilities through the adoption of standards and certifications. In the event that the local business community already has an adequate (or at least sufficiently mature) skills base, actions to **promote certification to standards** can be taken to signal this (see the discussion on the quality hurdle presented in Part 3, and Box 4.5 on the quality infrastructure needed to conform to international standards).

In addition, the productive modernization of local companies, which is necessary for their insertion in GVC (see the discussion on the new imperatives in Part 2), can be addressed by governments with **extension and technology transfer** strategies, which work mainly on the information gaps that exist with respect to technology adoption. These tasks can be carried out in alliance with lead companies and/or rely on the structures of the national innovation system. In Peru, for example, the network of Centers for Technological Innovation, Entrepreneurship and Sustainability (CITES), created in 2014 and under the coordination of the Ministry of Production (PRODUCE), brings together sectoral innovation services according to geographical location, including, but not limited to, extension services. But there are countries (or regions within countries) where these types of actions are carried out by other actors, such as universities. This is the case of the role of the Escuela Superior Politécnica del Litoral (ESPOL) in Ecuador, for example. Finally, these types of activities can be private initiatives, motivated for example by a cluster, or by the interest of a lead company that wishes to have a way of transferring and generating knowledge with local companies.

In turn, if high impact entrepreneurship is targeted, the **innovation challenges** can be aimed at locally solving niche problems that can have a major impact on the GVC. For promoting the startups ecosystem there are different tools, which have to do with the development of **venture capital markets**, and **incubation and acceleration programs**, among others. In Ghezzi *et al.* (2022) and Bisang *et al.* (2022) report several cases of Argentine and Uruguayan agtechs that contribute not only to improving productivity in various stages of agri-food chains (from production to genetics), but also to product traceability, which has been shown to be a key attribute for GVCs.

Financing Policy

Access to credit is the obligatory counterpart to the investment requirements that may be involved in the insertion and upgrading in GVCs. That is, local companies need to be able to access **financing that will enable them to acquire new technologies**,

and even **certify their processes and products**. In addition, participation in GVCs requires a certain financial margin from the companies, since both export operations and sales to lead companies may imply payment processes of several months that local companies can hardly afford at the beginning of the commercial relationship. That GVC programs contemplate the importance of **financing working capital** is, therefore, a point that should not be neglected (Filippo and Guaipatin, 2021).

For established companies with a consolidated presence in GVCs, accessing credit may not be so complicated, but for firms aiming to enter GVCs, the challenge may be significant. Indeed, it is to be expected that the problems of access to financing will mainly affect MSMEs which, due to their characteristics, tend to have a high mortality rate, lack sufficient equity and collateral base, have no credit history if they are new, and also present weaknesses in their management practices (Demichelis *et al.*, 2021). All this increases financial information asymmetries and hinders access to credit for these firms, a situation that is aggravated in a region with low financial depth such as Latin America and the Caribbean.

However, when a firm belongs to a value chain with a clear upgrading strategy, credit risks can be reduced. From this perspective, several IDB programs analyzed in Demichelis *et al.* (2021) are aimed at facilitating financing for MSMEs with scaling-up potential belonging to productive chains. It is also common to work in conjunction with the countries' development banks, and strategies can be varied.

For the adoption of technologies, the **granting of loans at subsidized rates** can be used, while **guarantees funds** can be a tool of broader scope (whenever there are situations of information failures in which firms are not able to demonstrate their payment capacity to the banking entities).

As mentioned before, in the case of targeting dynamic venture segments such as startups, the tools will differ, and the appropriate path will be the development of a **venture capital market**.

Monitoring and Evaluation

Relevance

There is currently consensus on the fact that any policy intervention should include, from its very design, one or more instances of evaluation and monitoring (ideally, the project should be able to have permanent monitoring indicators). This responds to a number of reasons (Maffioli *et al.*, 2016). First, there is transparency and accountability: an adequate monitoring system makes it possible to follow the way in which

public resources are being used, and an impact evaluation will make it possible to measure the effectiveness of this use. In turn, having key performance indicators (KPIs) can allow policymakers to have an idea of how well or poorly they are performing according to certain parameters, to project results, and to make any necessary adjustments during implementation.⁷⁶ Finally, an impact evaluation of the program (after its completion) is critical to understand whether the program was effective and relevant, and to be able to draw lessons and make adjustments for further steps forward. These evaluations also contribute to the academic knowledge of this type of intervention, which has far-reaching effects if external validity can be demonstrated.

However, both monitoring and evaluation require certain basic actions, such as the definition of indicators and targets. Recognizing that policy interventions are a complex phenomenon (where neither the problems nor the solutions are obvious), it is well known that these tasks are not easy, since the validity of these indicators may be compromised as program implementation progresses. This is not because, for example, a high-ranking politician has arbitrarily decided to modify the program, but rather because of lessons learned during its implementation. That is, there may be totally everyday cases where, late in the implementation of the program, it is discovered that the greatest contribution of the intervention will not be in achieving "A", but "B". Thus, it may happen that changing the specific objective "A" to "B" means that the monitoring of certain goals and indicators, which may have taken days of discussions to define, will have to be discarded. But it must be done, because it is now known that doing "A" will do very little for our overall goal.

This is part of the continuous learning process that has been consistently referred to and can be conceptualized here as a "space for experimentation" (Cornick *et al.*, 2018). A trade-off between planning and flexibility is naturally introduced. Planning and commitment to established objectives and metrics contribute to the transparency and evaluability of the policy, as well as forcing a certain discipline that, if too rigid, can end up undermining the basis of the intervention. Flexibility, which may be desirable in terms of achieving the social optimum of the policy outcome, may "tempt" to always work within the margins of evaluability.

An additional particularity regarding impact evaluation has to do with the difficulties in defining the scope of the policy's results, and whether it is indeed evaluable in all aspects. Regarding the scope, it should be taken into account that the usual

⁷⁶ This is relevant not only in order to improve the overall performance of the program execution, but also to somehow shield the program from shocks affecting the political cycle. Given their long-term horizons, PDPs are particularly vulnerable to being disrupted or substantially modified by conjunctural aspects that have nothing to do with the nature of the policy, but rather with difficulties of political validation (Cornick *et al.*, 2018). Being able to show intermediate results, then, is important to mitigate this type of risk.

impact assessment methods will not always be able to measure various second-order effects and externalities, beyond the fact that there are important methodological advances in this regard (Maffioli *et al.*, 2016). However, the important thing will be to be able to measure the objective on which the policy has made its commitments. Since these are PDPs, it is known that, ultimately, productivity growth is evaluated. However, detecting this may require too long a timeframe for the political times, so intermediate objectives can be set, such as the effective insertion of companies in GVCs, according to a criterion determined *ex ante*. Case studies will always be a necessary complement for obtaining and systematizing lessons learned, especially in cases where the impact assessment is not robust, not only because of methodological issues, but also because of the time required to detect impacts.

Actions

The space for experimentation required by PDPs may be inconsistent with certain public structures, which are too tied to bureaucracies and rigid structures. The governments of the region have achieved these spaces through new institutional arrangements (which may well complement or supplement those suggested in the "public coordination" dimension presented above). Cornick *et al.* (2018) provide some examples. One is the case of the export and FDI promotion regime in Costa Rica, which is jointly managed by a public institution (the Ministry of Foreign Trade, which establishes policy guidelines), a non-state public institution (the Trade Promotion Agency, in charge of the purpose for which it is named), and a private organization (CINDE, in charge of FDI promotion). Another case is Argentina, where the National Institute of Industrial Technology (INTI) and the National Institute of Agricultural Technology (INTA) are decentralized entities that operate within the organization charts of the ministries of industry and agriculture, respectively, but with more flexible operating rules than those of direct government agencies.

Regarding follow-up actions, they are standard: the intervention design must include **operational follow-up metrics (KPIs)** for monitoring, and **outcome metrics** for evaluation. These metrics should include baselines and targets based on the country's own experience and international benchmarks. It is also essential that the indicators comply with the "SMART" standard, an acronym that comes from the words Specific, Measurable, Achievable, Relevant and Time-bound:

- **Specific:** The indicator must be clear and precise as to what is to be achieved. You must answer the questions: What will be measured? Why is it important? Who is involved?

- **Measurable:** The indicator must be quantifiable and measurable. This implies that it must be possible to collect data or information that will allow the evaluation of progress towards the achievement of the objective.
- **Achievable:** The indicator must be realistic and achievable. It is important to consider available resources, capacities and constraints to determine if the objective is feasible.
- **Relevant:** The indicator must be aligned with the organization's overall objectives and strategies. It must be meaningful and contribute to overall success. Assessing relevance involves asking oneself: Is this indicator important for the achievement of the objectives? Does it relate directly to the organization's purpose or mission?
- **Time-bound:** The indicator must have a defined time frame. It is essential to establish a deadline or time frame for its achievement. This provides a sense of urgency and helps maintain focus on achieving the objective within a given period.

Box 4.8 presents some indicators that can contribute to measuring the success of the general objective of a program of this type, generally focused on improving integration in GVCs. However, other indicators will also be needed at the level of specific objectives and beneficiaries (firms) which, as such, will vary depending on the structure of the policy.

In addition, it can be proposed a calendar that defines the dates on which the accounts must be rendered, as established by most international organizations in their lending operations for development programs.

BOX 4.8. SOME BENCHMARK INDICATORS TO MEASURE CGV INTEGRATION⁷⁷

When the four dimensions of the GVC analysis were presented in Part 1, some of the data sources used to size the geographic scope of the chains were presented. Data from these sources (and others) can be translated into indicators that are useful for understanding and monitoring the progress of the country's position in GVCs in general or in certain value chains in particular (if efforts are being made to strengthen only some of them). These indicators will serve both to monitor our interventions, but particularly (by their nature) to evaluate their results.

Using conventional trade data sources, some indicators to consider are:

- *Share of Intermediate Goods in Exports and Imports.* The degree of global exposure to trade in GVC is obtained by adding the sum of exports and imports of intermediate goods over the sum of the total traded. This indicator is usually complemented with other specific indicators for exports and imports separately. In the case of exports of intermediate goods over a country's total exports, this indicator makes it possible to infer the relative position of a country within the GVCs (how "upstream" it is in the production of intermediate goods, with respect to final goods). In the case of imports of intermediate goods over total imports, this gives an idea of the dependence of domestic production on the GVCs.

- *Share of Trade in Intermediate Goods in GDP.* Since the indicator of the sum of exports and imports of intermediates over total trade may not be a consistent measure of integration (a country with a lot of external trade and a high degree of trade in intermediates may have a ratio similar to that of a country with little trade and little trade in intermediate goods), an alternative is to consider GDP in the denominator. In this way, exposure is measured according to the size of the economy.

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⁷⁷ This Box largely follows Ahmad *et al.* (2017). This source can be consulted for mathematical details on the construction of indicators and other discussions on the pros and cons of each case.

(Continued)

- *Ratio between Imports and Exports of Intermediate Goods.* Imports and exports of intermediate goods are directly related. A value above one would indicate that the country has to specialize in downstream stages in the chain, while the reverse would indicate upstream strength.

- *Intra-Industry Measures.* Intra-industry indices measure the degree to which firms within the same industry participate in international trade of similar products. In other words, these indices measure the level of trade between firms in the same sector producing similar goods, rather than trade between firms producing different goods. As such, they are an important measure of global economic integration and productive specialization.

- *Revealed comparative advantages.* The index of revealed comparative advantages, originally proposed by Balassa (1965), compares (in the numerator) the percentage of exports of a given product for a country's basket with the same indicator for global trade (in the denominator). Thus, an index greater than one indicates a country's revealed comparative advantages for that product. This can be applied directly to intermediate goods in order to have relevant inferences for GVC insertion.

- *Complexity.* Based on the idea of revealed advantages, Hausmann and Hidalgo (2009) refined an economic complexity indicator (ECI). The ECI is calculated from an international trade matrix, which shows a country's exports and imports in relation to other countries. In this approach, a good or service is considered more complex if its production requires a greater number of advanced skills and technologies. Therefore, if a country exports more complex goods and services, it is considered to have a greater capacity to produce advanced goods and services. One of the main biases of this indicator is that for countries that are "downstream" in the GVCs, assembling technological products, they will appear as very complex, when in reality it may just be a case of cheap labor (hence the importance of taking advantage of these links to generate new linkages locally).

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However, it was also mentioned in Part 1 that conventional trade data have certain problems, such as double counting. For this reason, GVC analysis has increasingly focused on value added. For this purpose, global input-output indicators are used, such as:

- *Ratio of Imported Inputs to Domestic Inputs* In this case, values above one indicates a greater dependence on imported inputs than on domestic ones. The dynamics of this indicator are important for the GVC framework.
- *Vertical Specialization*. This concept includes a series of indicators, divided mainly according to the perspective from which the country of reference is taken. On the one hand, then, there is the case in which vertical specialization is of interest from the point of view of an exporting country that demands inputs from abroad. In this case, the indicator originally proposed by Hummels *et al.* (2001) provides an estimate of the imported content of a country's exports. This indicator was then refined to also incorporate indirect imports (imports used in the production of local inputs). On the other hand, there are indices from the perspective that analyze the degree of local content in exports from other countries (the country is a supplier of inputs abroad). Finally, Amador and Cabral (2009) propose a measure of vertical integration that combines input-output sources with standard trade data, which allows anchoring the input-output structure to a point in time (and assuming it to be constant) in order to perform temporal analyses with trade data, which are typically more frequent and easier to access.
- *Value-added-focused indicators*. The domestic value added embodied in a country's exports can be divided into three components: direct value added (from the producer of the product under consideration), indirect value added (from local suppliers), and reimported value added (imported products containing local inputs). Thus, there is a series of indicators associated with local versus imported value added, which follow the logic of vertical specialization presented above.

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Finally, certain industrial surveys may even include a question on the degree of linkages with global production networks, which can serve as intermediate indicators. Unfortunately, in Latin America there are few cases where this happens. An example is provided by Mexico's INEGI, which in its National Survey on Productivity and Competitiveness (ENAPROCE) of SMEs has a specific module on this.

In addition, it is worth highlighting the point that, ultimately, PDPs pursue productivity improvement, in this case via insertion and upgrading in GVCs. This way, traditional productivity indicators will be necessary to be able to evaluate the ultimate objective of the interventions.

Currently, there are several digital tools that allow **monitoring dashboards** to be created, tools that allow transparent and real-time monitoring of the planned indicators. The following section will discuss the importance of these communication inputs in order to legitimize the program.

The econometric impact assessment will be carried out using the usual techniques adapted to the case, taking into account that there will be at the chain level or at the beneficiaries (firms) level. In the latter case, there may be additional techniques, such as synthetic control or event studies, among others that may be adjusted. In addition, these quantitative evaluations can be complemented with case studies to extract and systematize lessons learned.

Communication and Advertising

Relevance

The communication and advertising of the intervention have an effect on several of the dimensions reviewed above. In the initial phase, it is important that the launching of the initiative is adequately advertised and communicated. This, in addition to favoring transparency and accountability, is a way to generate commitment with stakeholders (both inside and outside the government).

Linked to the monitoring dimension, it is important for the program to show intermediate results, not only for accountability, but also to achieve a "shield" against

short-term political shocks, typically related to the electoral cycle. Having tangible results to show can prevent undesired phenomena, such as the suspension of the program or drastic changes for reasons unrelated to the nature of the plan.

In turn, the dissemination of results can motivate the self-selection of other sectors for subsequent phases of the program, providing feedback to the process. This way, desirable by-products would be obtained, such as the resolution of certain information gaps about the potential of certain strategies or tools. Thus, for example, visualizing success results of a cluster initiative or sectoral roundtable, can motivate private coordination actions on other sectors, even outside the scope of the original program.

Actions

This includes classic communication actions ranging from a public launching event to the publication in academic journals of possible articles arising from the evaluation of the program after its completion. The strategy will be based on the dissemination institutional framework of those responsible for development, and may include diffusion in specialized social networks, in conventional graphic and audiovisual media, and congresses, among others.

At the same time, it has been highlighted the importance of achieving engagement, for which it is necessary to be able to show "quick wins". These early milestones would contribute to breaking the "futility trap" (Andrews, 2018), which in the countries of the region is characterized by a lack of confidence regarding the achievement of policy objectives (both from the private counterpart and from the policymakers themselves). Being able to show favorable results in a short period of time generates legitimacy for the proposal, giving it additional strength. One strategy in this regard is the executive roundtables, which have already been reviewed as an instrument for other dimensions, whose philosophy is to provide a rapid response to small, high-impact problems. This can be illustrated by the example of the forestry roundtable in Peru, which is the most successful case of the first implementation of the strategy, around 2014. This roundtable achieved quick wins in terms of simplification of procedures, regulatory changes, and even market interventions such as improved access to credit for producers. When two years later the government changed, and the Ministry of Production decided not to continue with the *mesas ejecutivas*, this roundtable managed to continue operating thanks to the engagement achieved in its private sector members, who sought a new "host" in the government, first in the Ministry of Agriculture, and finally in the Ministry of Economy and Finance (Cornick *et al.*, 2018).

The example of the *mesas* in Peru also serves to illustrate the use of dissemination to break down preconceptions about vertical government policies: the strategy included everything from an event supported by the IDB to constant communication of advances in the news by both the government and the private sector.

The Framework in Practice

This section presents a hypothetical application of the presented intervention framework for the case of Mexico. The analysis follows the diagnosis and selection of strategic GVCs by Filippo and Guaipatín (2021).

The **Diagnosis** is motivated by Mexico's position in the GVCs and the opportunities that emerge for the country as a result of the new global scenario in general, and the entry into force of the new United States–Mexico–Canada Agreement (USMCA) during 2020. Mexico's participation in GVCs is heavily influenced by the maquila scheme, which originated in the 1960s, so that it is one of the countries in the region with the highest degree of backward or upstream participation (see Box 1.4). With the consolidation of Asian countries as competitors in the final stages of the chains (product assembly), Mexico's position in this indicator deteriorated, but nevertheless remained high, due to its proximity to the United States and the consolidation of its productive and trade links. The question is whether this strategy has generated sufficient spillovers to Mexican businesspeople.

In this sense, there is a great contrast between the backward participation indicator referred to above, and the forward (downstream) indicator, which is a measure of the degree to which national production is used as a production input in other countries. In the latter case, Mexico has one of the lowest records in the region and the world (see Box 1.4). From this point on, it can be said that Mexico has not been able to take advantage of the potential of its GVC linkages to develop in higher value-added segments and activities. In turn, according to the 2018 National Survey on Productivity and Competitiveness (ENAPROCE), less than 5% of SMEs have any link with GVCs (which also includes supply activities to lead companies in national territory).

The reasons behind this are varied, but all have at their core distinct information and coordination failures. The main point raised by the study of Filippo and Guaipatín (2021) was that neither the lead companies had adequate knowledge of local sourcing capabilities, nor the SMEs were informed of the opportunities that participation in GVCs brings, much less of the requirements necessary for this to be a real possibility. Thus, problems of deficient technological adoption and certification of standards to ensure the conformity of their processes and products with the

requirements of the GVCs appear in the local business community. On the other hand, firms that are aware of the opportunities to participate in GVCs face financial restrictions to undertake these investments (here, information failures appear in the inability of traditional banks to observe the payment capacity of small firms with poor credit history).

Although the above can be extended as a general conclusion for the Mexican economy, the authors propose a **Selection** of chains based on their congruence with the current knowledge base of the economy, export potential, their potential to substitute intermediate imports, and their relevance in the USMCA, among others. Therefore, the sectors identified as priorities for policy intervention were automotive, aerospace, electrical, electronic and medical equipment products.

The above selection determines that the strategy of **upgrading** has to do with both **upgrading within a value chain stage** (improving standards of participation in activities in which Mexico already has a presence) and **value chain upgrading** (seeking new activities with greater value added within the chains in which it already has operations). This makes it possible to narrow the spectrum of intervention to a subset of companies that have high development potential (that can clear the quality hurdle).

Considering the coordination problems between lead companies and local SMEs, the intervention strategy could include the establishment of executive roundtables at the chain level, so that companies can jointly find the key points to advance in the development of new activities in the country: what are the characteristics of these activities, what are the necessary investments, and what are the compliance standards required. This type of tool could contribute to a refinement of the general diagnosis elaborated by the study, now involving in a binding way the representatives of the main beneficiary groups of the policy.

The next question is whether Mexico has sufficient capacity to link up with the private sector to enable it not only to lead these roundtables, but the entire intervention, in a successful manner. The answer is yes: Mexico has several public institutions with high technical capabilities for PDPs. For example, Nafin and Bancomext are two excellent candidates in this regard, and also, as part of the country's development banks, they have the capacity to devise financing schemes in line with the shortcomings detected above and that are useful for the companies linked to the selected chains to achieve their development objectives.⁷⁸ In addition,

⁷⁸ Nafin, for example, has a specific program for advising and coordinating production chains (see <https://www.nafin.com/portalfnf/content/cadenas-productivas/>), while Bancomext specializes in financing foreign trade activities and the internationalization of companies (see <https://www.bancomext.com/empresas-que-apoyamos/internacionalizacion-de-empresas>).

as they are autarkic entities, they can have flexible execution mechanisms. However, given the decentralized structure of the Mexican states, these institutions face their own challenges of coordination with state governments, which is relevant for a comprehensive arrival of policy in the territory.

Accordingly, the intervention would be based on the existing capacities of a relevant institution in this area, such as those mentioned above (Nafin or Bancomext). The activities should include spaces for **public-private coordination** such as executive roundtables where the information and coordination problems that precede the financial problems for making relevant investments in technologies and standards certifications can be solved. In fact, the space would serve as demand validation for a lending scheme. Based on these agreements, the institution in charge would determine the best financing scheme for local SMEs, which could include a combination of loans (for investments) and grants (for certifications). The combination and amount of these instruments will depend on the characteristics of firms' financial constraints and the reasons why they did not execute these investments without the support of a public program. For example, in a supplier development program, which also includes technology transfer, the lead companies could also commit resources to providing new capabilities to local entrepreneurs.

Additionally, it will be important for the program to include spaces **for public coordination** at different levels of government, to ensure consistency with other interventions, and to facilitate the **dissemination of the program**. To this end, it is essential that the intervention be inserted into the government's flagship programs, such as the National Development Plan (*Plan Nacional de Desarrollo*) 2019-2024.

Finally, the program design should include both **monitoring and evaluation indicators**. The monitoring indicators will depend strongly on the final characteristics of the intervention and will have to do mostly with uptaking: number of roundtable meetings, number of loans granted, number of certifications, etc. Therefore, targets should be set at the beginning of the intervention to get an idea of the effectiveness of the program's progress.

The impact or result indicators must have a baseline, so they can be associated to the ENAPROCE form, which was used for the diagnosis and to ask several questions about the linkages of SMEs with GVCs. Forward and backward participation indicators at the chain level could also be considered. And it should not be forgotten that the ultimate objective is to increase firms' productivity, so the productivity parameter to be evaluated and the source of the data for its calculation should be clearly defined.

Conclusion: A Toolbox for PDPs in the GVC Framework

This last Part of the document discussed in depth each of the dimensions proposed for a sustainable productive development strategy within the framework of the GVCs and their new imperatives. Taking into account the international experience, especially that of the IDB in the region, some of the actions or policy tools relevant to each of these dimensions have been reviewed, without prejudice to the fact that some tools may contribute to more than one dimension of the proposed intervention framework. This is because, as has been pointed out several times, the proposed scheme is nourished by the interactions between these dimensions, in order to achieve more solid and far-reaching interventions.

Table 4.1 below summarizes these policy tools, pointing out which stakeholders might be most relevant to each of them and which upgrading contexts they can best contribute to. It should be noted that the list of tools contained in this table is not exhaustive, not only in terms of the coverage of possible actions, but also in terms of the nuances that each of the tools considered may entail. Since the importance of "tailor-made suits" has been highlighted, policymakers should consider the reality of their countries and the relevant market failures to establish the most useful version of each tool, as well as the set of tools that will provide the greatest synergies. Once again, experimentation, adaptation and learning capacities are the key attributes to achieve effective SPDPs to face the triple imperative of efficiency, sustainability and resilience.

Table 4.1. The Toolbox for PDPs in the GVC Framework

Dimension	Action	Key partners	Upgrading Context				References
			Pre-insertion	Link Upgrade	Chain Upgrade	Chain Development	
Public-public Coordination	Institutional Coordination Arrangement	Ministries with direct and indirect links to productive development	X				Ons (2018) reviews the case of Transforma Uruguay's institutional arrangement as an incompetent coordinator of that country's sustainable PDPs. Cornick <i>et al.</i> (2018) includes several examples of (successful and less successful) institutional arrangements for PDPs in the region.
	National Development Plan		X	X	X	X	
Selection	Data Intelligence	Data Departments		X	X	X	Hausmann and Hidalgo (2009) present the basic ideas of economic complexity, which are taken as inputs for a chain selection strategy in Filippo and Guaipatín (2021). Chapter 9 of Crespi <i>et al.</i> (2014) discusses selection in depth, with case analyses of the region.
Public-Private Dialogue	Sectoral Roundtables	Relevant Government Agencies, Representatives of Business and other Non-Governmental Sectors		X	X	X	Ghezzi (2019) explains in depth the original experience of the tool, while Obaya and Stein (2021) systematize lessons on the experience in Argentina.
	Cluster Initiatives	Representatives of Businesses and other Non-Governmental Sectors		X	X	X	The literature on clusters is abundant. Some examples of recent cases supported by the IDB can be found in Torrico and Solis (2022) and Villacis (2022).
Diagnosis	Specialized Studies	External Consultants	X	X	X	X	There are a large number of diagnoses for various sectors and chains in several countries, for example, the studies of GVCs in strategic industries and semiconductors in Mexico by Filippo and Guaipatín (2021) and Filippo <i>et al.</i> (2022b).
Upgrading	Trade Agreements	Trade Department	X				The evidence indicates that trade agreements are necessary but not sufficient conditions for development through GVCs (Ruta, 2017; Laget <i>et al.</i> , 2020). Evidence for the region highlights the importance of regional chains to this end (Sanguinet <i>et al.</i> , 2021).
	Customs Modernization (simplification of procedures and digitization)	Customs	X				Kummritz <i>et al.</i> (2017) analyze the influence of this and other strategies on the potential for insertion in GVCs.
	Tax benefits for FDI	Ministry of Finance			X	X	Evidence indicates that these policies make sense only in conjunction with others, which allow the development of local linkages (Kummritz <i>et al.</i> , 2017)
	Soft Landing Programs	Ministry of Finance, Regulatory Agencies			X	X	
	Supplier Development	MNCs, Ministries with Direct and Indirect Links to the Sectors to be addressed			X	X	Due to their characteristics, evaluations of supplier development programs are not abundant. The Chilean experiences are positively evaluated by Dini (2009) and Arráiz <i>et al.</i> (2013), while Navarro (2018) finds certain limitations in the case of suppliers for the mining sector, highlighting the importance of coordination and incentives in the design. The cases of CR Provee and PROPYME in Costa Rica also had positive effects on local companies according to Monge-González and Rodríguez-Álvarez (2013).

Table 4.1. The Toolbox for PDPs in the GVC Framework (Continued)

Dimension	Action	Key partners	Upgrading Context				References
			Pre-insertion	Link Upgrade	Chain Upgrade	Chain Development	
Upgrading	Local Content Rules				X	X	These types of policies have proven not to generate a good incentive scheme and, therefore, failed to achieve their productivity objectives. For Brazil, for example, Sturgeon <i>et al.</i> (2017) evaluate the policy in the automotive sector, and Weiss (2016) does so for the case of wind energy.
	Transportation Infrastructure	Public Works, Ministry of Public Works	X	X	X	X	There are several papers that analyze the implications of these key pillars for ease of business on GVC insertion possibilities and productivity. Kummritz <i>et al.</i> (2017) is one example.
	Telecommunications Infrastructure	Public Works	X	X	X	X	
	Infrastructure Energy	Public Works, Ministry of Energy	X	X	X	X	
	Quality Infrastructure		X	X	X	X	Quality infrastructure is essential to reduce transaction costs between local suppliers and multinationals. Kummritz <i>et al.</i> (2017) evaluate the effect of quality standards, and Lee <i>et al.</i> (2012) discuss the importance of the standards for agri-food GVCs.
	Industrial Parks	Public Works, Energy		X	X	X	The difference between industrial parks and Special Economic Zones is that the latter include certain geographic tax benefits (in addition to the parks' own infrastructure). By its nature, evaluation is difficult, but the evidence for developing countries seems to agree that its development effects depend on the existence of other supporting measures (Frick and Rodríguez-Pose, 2021; Mugano, 2021).
	Special Economic Zones	Public Works, Energy, Finance		X	X	X	
	Tax benefits for R&D	Ministry of Finance	X	X	X	X	Recent evidence finds an inverted U-shaped relationship between R&D subsidies and the position in GVCs (Qian and Yuan, 2022).
	Strengthening of the Intellectual Property Registration System		X	X	X	X	An adequate intellectual property protection system is necessary to ensure the information flows required to participate in GVCs and to capture higher value-added activities (Yang <i>et al.</i> , 2020).
	Extension and/or Technological Transfer	Ministries of Science and Technology, Universities		X	X	X	These programs are often difficult to evaluate individually, but participation in GVCs themselves imply transfers of knowledge and technologies that have had positive impacts on the performance of local firms (Blalock and Gertler, 2008; Rigo, 2021).
	Training System	Ministry of Labor		X	X	X	Evidence indicates that a country's stock of skills is fundamental not only for its insertion in GVCs (Kummritz <i>et al.</i> 2017), but also for enhancing spillover effects (Meyer and Sinani, 2009).
	Promotion of Relevant University Courses and Careers	Ministry of Education		X	X	X	
Co-Development of Educational Programs	Universities			X			

Table 4.1. The Toolbox for PDPs in the GVC Framework (Continued)

Dimension	Action	Key partners	Upgrading Context				References
			Pre-insertion	Link Upgrade	Chain Upgrade	Chain Development	
Upgrading	Subsidized Loans	Development Banks		X	X		Access to credit helps to enhance access to GVCs for SMEs (Kummritz <i>et al.</i> , 2017) and allows improving the quality of their participation (Elshaarawy and Ezzat, 2022).
	Guarantees	Development Banks		X	X		
	Venture Capital	Angel Investors			X	X	The role of startups in GVCs is not yet evaluated in depth, and there is an open research agenda (Wagner, 2021). However, startups are key to certain emerging chains in Industry 4.0 (Lundquist and Woo Kang, 2021).
	Business Acceleration/Incubation			X	X	X	
Evaluation and Monitoring	Monitoring Dashboards	Data Departments	X	X	X	X	There are several manuals for implementing social cost-benefit analysis (ex ante and ex post) in public policies, which are valid for GVC programs (see ADB, 2013 for general guidance; Dixon, 2013 for a focused analysis of climate effect mitigation projects; Florio <i>et al.</i> , 2016 for a discussion on R&D infrastructure project evaluations). Impact evaluations are also widely documented (see Gertler <i>et al.</i> , 2016 on impact evaluations in general, and Maffioli <i>et al.</i> , 2016 on impact evaluation of cluster development programs).
	Cost-Social Benefit Analysis	Data Department, External Consultants	X	X	X	X	
	Econometric Evaluations	Data Department, External Consultants	X	X	X	X	
Communication and Advertising	Launching Event	Communications and Press Department	X	X	X	X	Some references can be found in Padilla Pérez and Oddone (2016) and Ons (2018).
	Social Media Outreach	Communications and Press Department	X	X	X	X	
	Publications in Specialized Journals	Communications and Press Department	X	X	X	X	

Source: Prepared by the authors.

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