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Freight Logistics in Latin America and the Caribbean: An Agenda to Improve Performance

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PREFACE

The movements of freight in international trade have shown dynamics that make it ever the more significant. The last years have witnessed an opening of economies and the consequent expansion of supply chains; indeed, globalization has turned out to be *transport-intensive*. Freight movements linked to countries' national trade have also grown, in association with the growth of their economies over the years, improvements in infrastructure, and accompanied by five years of real growth in the region.

However, the changes have not only been quantitative: the organization of freight movement systems has been subject to important transformations. Starting in the 1980's, those companies which produced and sold goods started to review their strategies in operations management, while simultaneously paying attention to transport costs, the quality of services delivered to clients, and costs deriving from the storage of merchandise throughout the supply, production and distribution process. The outcomes of this approach, which characterize modern freight logistics, has strengthened the trend towards a "just-in-time" philosophy, and has brought about deep changes in the way stakeholders make decisions: shippers no longer try to reduce transportation costs, but rather, minimize their logistics costs, which include transportation in its different stages as well as inventory and other associated costs. The third party logistics provider (3PL) - whom they designate to carry forth this activity - not only handles the transportation of goods but also manages inventory, the supply chain and ensures synchronized shipments. These new methods go hand-in-hand with the intensive use of information and communications technologies, and by noticeable changes in technology such as the increased use of containers, with greater effect on the shipping industry and ports.

Governments have taken notice and seek to increase the quality of logistics performance to improve the competitiveness of their economies. This involves working on multiple determining factors. Upon a first reading, emphasis is placed on providing infrastructure, but a more in-depth analysis uncovers the important role of transport services regulation, private sector development (shippers', intermediaries and operators), and international trade and transport procedures and proceedings. The freight logistics agenda poses many challenges: it is a complex and cross-cutting agenda that requires the coordination of actions across several government sectors.

Changes taking place in the market drive modifications of public policies: the freight transport agenda has shifted towards the use of logistics and supply chain concepts in its processes. Additionally, within the context of international trade, the trade facilitation agenda goes beyond procedures and agreements and requires an integrated approach which using a supply chain perspective.

Within this framework, the Inter-American Development Bank considers the preparation of this Technical Note timely; it summarizes the transformations that have developed in freight movements, so that national and sub-national governments may comprehend the context of their public policy decisions thus improving their logistics performance and economic competitiveness. The Technical Note also revises logistics performance in Latin America and the Caribbean by looking at the results of several studies and indicators with the aim of identifying key areas of action and efforts for the Region, thereby proposing an agenda which efficiently contributes to improved competitiveness.

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EXECUTIVE SUMMARY

REPORT OBJECTIVES AND CONTENTS

The purpose of this Technical Note is to identify the main obstacles to logistics performance in Latin America and the Caribbean (“the Region”) and to offer an agenda for action. The note includes a didactic presentation of the conceptual foundations of freight logistics for those interested in the formulation of public policies across the diverse areas covered by this topic. The document studies the relative position of Latin America’s logistics performance by reviewing the main available indicators and analyzing the probable causes of the performance gap between the Region and other countries. The study’s methodology includes: an in-depth review of the most critical components that contribute to the weak regional performance, and an examination of documents that assess the logistics situation of 10 countries in the Region. Based on the results, a public policy agenda is formulated, to improve the Region’s performance and identify country clusters with different requirements.

FUNDAMENTAL CONCEPTS OF FREIGHT LOGISTICS

Freight logistics -a key component of supply chain management- centers on the flow of goods (transport and storage) throughout the value chain. Players in the economy organize logistics based on their inventory, production, and distribution strategies, generally achieved through a balance of factors: transporting production inputs or finished products in large shipments, for example, can reduce freight costs but increase inventory costs, and vice versa. The advent of modern logistics has led to a significant change in freight transport demand, since those who decide to transport their products do not seek to reduce the (general) costs of transportation, but instead try to optimize a more complex function: to minimize the logistics costs, which include inbound and outbound transportation, storage, inventory costs during those stages, product deterioration, and other costs incurred in the movement of goods.

The approach adopted in the development of the conceptual foundations of logistics has its roots in the causes that give rise to the movement of goods in the economy and in the models that aggregate these flows. It analyzes the flow of goods across the value chain, which links diverse units of production, trade, and consumption, and identifies the role of logistics as a group of processes and functions that are part of the supply chain. In this sense, we try to integrate three areas of knowledge: *spatial economics*, which takes the aggregate movement of goods in a country’s economy (in spatial units and economic sectors); *supply chains*, which considers the flow of materials across economic actors organized into value chains (producers, consumers); and *freight logistics*, which centers on goods transport and inventory management.

In the last 25 years considerable changes have taken place in the way firms organize the flow of goods. They have focused on *just-in-time* practices to reduce inventory costs; their product cycles have become increasingly shorter; they have chosen to produce to order versus produce to stock; and they have outsourced logistics functions to operators who -by providing services to several clients- can achieve important economies of scale. The reduction of inventory costs in the last few years has been immense, and the reliability of transportation services has become in most cases more relevant than freight costs. The process of modernization in logistics planning and organization includes both shippers’ -as the organizers of the supply chain- as well as carriers to whom services are outsourced.

Several different perspectives are relevant when it comes to analyzing logistics problems: shippers’ (firms that produce or sell goods); logistics operators (carriers, agents, and other players providing transport services); and government agencies (national or sub-national) that try to improve logistics performance in their territories as a way to improve the competitiveness of their companies. This variety of perspectives explains the diverse set of issues

pertaining to freight logistics. This document focuses on the third perspective and adopts a conceptual framework for the diverse factors that determine logistics performance in a country, as illustrated in the graph below.

The major building blocks of logistics are: (i) transport infrastructure and services, including internal and external freight flows, freight transfers, and trade interfaces and operations; (ii) business logistics, which covers the way that firms organize their supply chains and the

capacities of logistics operators and intermediaries they rely on; and (iii) trade facilitation, which includes standard documentation and inspections, and safety in the physical movement of freight.¹ This complexity, along with the systemic nature of logistics problems, can only be addressed through a “cross-cutting agenda” where very distinct areas of public and private administration merge.

¹ The trade facilitation agenda has broadened in the last years, adopting a perspective for integrated supply chain organization that partially overlaps with the agenda for freight logistics.

The Components of the Logistics System

	Activities	Functions	Typical components
Transport Infrastructure and Services	DOMESTIC FLOWS	<i>Freight movement within national territory</i>	<ul style="list-style-type: none"> ▶ Roads, trucking transportation ▶ Railroads ▶ Inland navigation ▶ Urban logistics
	TRANSFER NODES	<i>International trade transfer nodes</i>	<ul style="list-style-type: none"> ▶ Ports ▶ Airports ▶ Border crossing
	INTERNATIONAL FLOWS	<i>Freight movement outside national territory</i>	<ul style="list-style-type: none"> ▶ Air, maritime transport ▶ International road transport
	INTERFACES AND COORDINATION	<i>Commercial and operations coordination between modes</i>	<ul style="list-style-type: none"> ▶ Coordination of delivery and reception ▶ Multimodal transport
Business Logistics	SUPPLY CHAIN MANAGEMENT	<i>Supply chain design and management</i>	<ul style="list-style-type: none"> ▶ Materials and inventory management ▶ Distribution
	LOGISTICS OPERATORS AND INTERMEDIARIES	<i>Provision of integrated logistics services</i>	<ul style="list-style-type: none"> ▶ Logistics operators, 3PL, forwarders, agents ▶ Logistic platforms
Trade Facilitation	“SOFT” INFRASTRUCTURE AND CUSTOMS	<i>Freight search and inspection on national territory and international movement</i>	<ul style="list-style-type: none"> ▶ ICT ▶ Customs, maritime regulation
	COMMERCIAL POLICY REGIME	<i>Design and implementation of government strategy</i>	<ul style="list-style-type: none"> ▶ FTA, EPA, WTO ▶ Standard Harmonization ▶ Labor, Environmental measures
	BUSINESS ENVIRONMENT	<i>Regulatory environment and its impact on the operation of industries</i>	<ul style="list-style-type: none"> ▶ ISO, SPS, security ▶ Export promotion

The major building blocks of logistics are: (i) transport infrastructure and services; (ii) enterprise logistic and (iii) trade capacities of logistics operators and facilitators.

HOW TO MEASURE LOGISTICS PERFORMANCE

The performance of logistics in a given territory (a country, for example) is not easy to measure or interpret. There are three basic measurement approaches: (i) the macro approach, based on national accounts, which generally tries to estimate logistics costs as a percentage of gross domestic product (GDP); (ii) the micro approach, based on company surveys, which tries to estimate different performance indicators for production units (individually or in the production chain); and (iii) the perception approach, based on indexes taken from surveys to stakeholders. These indexes are relatively new measuring instruments in the logistics field and should be added to the vast array of perception indicators already identified in every country. The complexity of the logistics functions and processes makes it difficult to design indicators, take measurements, or estimate values.

COMPARATIVE LOGISTICS PERFORMANCE IN LATIN AMERICA AND THE CARIBBEAN

According to worldwide measurements, logistics costs as a percentage of GDP in LAC are between 50% and 100% higher than in Organisation for Economic Cooperation and Development (OECD) countries. A similar proportion is estimated for inventory costs, a major component of logistics. Moreover, similar results were found for the logistics costs of companies, although such measurements cannot be used to estimate overall logistics costs by country.

According to the Logistics Performance Index (LPI) -the most specific perception indicator for logistic activities- Latin American countries perform relatively low: out of 150 countries, all but two countries in the Region are ranked below the fiftieth position. Furthermore, the Enabling Trade Index -an indicator recently developed by the World Economic Forum to measure factors specific to international trade logistics- showed Latin America below the United States, Canada, several other countries in Western, Central, and Eastern Europe, the Middle East, and North Africa. Other indicators such as the World Bank's Doing Business yielded similar results.

MOST CRITICAL COMPONENTS

The available international logistic performance indicators provide a clear and consistent message, regardless of the objections that may be raised against their consistency: there is ample space for improvement in the Region. An in-depth review of the various indicators reveals six critical factors that may explain the Region's weak performance:

Extension and conditions of roads network.

The Region's roads network has structural deficiencies as observed by its reduced spatial coverage and the physical state of its assets. In addition, it faces the consequences of an intensive growth in traffic due to increased business activity, trade, and more motor traffic. Both challenges -the expansion, rehabilitation, modernization, and maintenance of the network on the one hand, and an increase of its capacity on the other hand- require considerable financial and management efforts, which makes the infrastructure sector to have the greatest need for resources. The improvements made to the roads network have a direct influence on freight logistics costs and simultaneously satisfy many other mobility needs of the population.

The performance of road freight transportation.

The main problem faced by the trucking industry is the inefficiency of many of its sectors, the effects of which are multiplied since it touches almost every link of the logistics chain. Although road freight is the most important mode of domestic transportation in the region, it has few information sources and there is very little analysis of the sector. The impact of improvements on road freight transportation in logistics is not limited to a reduction of fare rates and travel time; it promotes the development of better management strategies on the part of shippers, which induces innovation and improves the efficiency of companies that produce and trade goods.

Ports. Ports are the most critical nodes in the region because 80% of all international trade passes through them. Although most ports have achieved acceptable levels of performance in

loading and unloading ships due to effective public-private partnership (PPP) coordination, organizational problems persist in the port services community, in the coordination among actors, and in their relationship with the city. In some cases, ports continue to operate under inadequate management models and become relegated in the process. The potential impact of port improvements on international trade logistics is formidable, since it is probably the area where major advances can be made to improve country competitiveness.

Freight railways. In recent years freight railways have managed to widen and modernize their business activity and have specialized in bulk transportation (raw materials), with a strong orientation toward exports. Their transport potential is huge and their ability to reduce negative externalities will continue to make them an attractive option for a sustainable transportation model. Private-sector participation has resulted in important management improvements and some investments, but the active participation of the public sector is going to be necessary for substantial increases in the quantity and diversity of freight and in the quality of service. Increased usage of railroads will have a significant impact in bulk logistics and may also play a role in main container transportation corridors connected to ports. However, the benefits go beyond improvements in logistics, as it also contributes to reducing externalities that are gaining importance in the public policy agenda of many countries in the Region (such as contaminating emissions and greenhouse gases, accidents, congestion).

Trade facilitation and border control. The set of processes that make up trade facilitation (as understood in the strict sense, including formalities, procedures, and administrative issues pertaining specifically to international trade and transportation) show considerably lower levels of development in the Region than in developed countries and other developing countries. The performance indicators show a large dispersion and heterogeneity among facilitation processes, a difference that can be more important than that observed in the infrastructure sector, as high costs and time

delays can cancel out any benefits accrued from large infrastructure investments. Recent studies indicate that, following port efficiency, the factors that most influence competitiveness are customs efficiency and e-commerce. Thus, the actions that improve performance have been clearly identified, and many international organizations (the United Nations in particular) have already developed appropriate programs.

Logistics management performance of small and medium-size enterprises (SMEs). Even though the impact of SMEs on international trade is relatively small, their importance cannot be understated as they are a major source of employment creation. For this reason, their competitiveness is of major interest to countries and national institutions. Export-oriented SMEs prefer intraregional trade, which contributes to the integration process, but their logistic performance is clearly inferior to that of large enterprises. In the Region, their logistics costs are two to three times larger than those of big companies. Analyses and proposals on this subject are scarce, especially considering the impact that improved logistics performance of SMEs could have for a given country. Factors inhibiting the competitiveness of SMEs include: a clear disadvantage in scale (their shipments are sporadic and do not fill up a truck or a container), and other cultural components, such as the difficulty that small entrepreneurs have in valuing the importance of managing inventory costs. International experience suggests that a variety of policies to support private-sector development can be implemented to increase the competitiveness of SME clusters.

The following two Tables summarize the conclusions of this analysis. In general, the current situation is weak for a few components (roads, road freight transportation) and is average for others (ports, railroad). Emerging needs are diverse, since they inherit long-existing “unresolved matters” that overlap with newer needs requiring greater capacity and service quality, derived from newer and larger demands. These needs vary according to the country’s income level and size. This suggests that different agendas will have to be

Summary of the analysis by critical component of regional logistics

	Roads	Trucking industry	Ports
Current situation	Low coverage and poor quality conditions	Low efficiency, lacking professionalism	Intermediate, high impact of reforms and the PPP
Main needs	Multiple needs: more coverage, maintenance, broaden capacity, modernize standards, rural roads	Modernize operating management	Increase capacity and improve performance; reforms that were not done and adjustments where there were reforms
Differentiation by country type	Poorest countries: high investment; large countries, with territorial voids: need to expand network	Problems more salient in countries with lower incomes; duality in mid-income countries	Differences due to management model more than to country income levels
Investment, public and private	High investment needs; mainly public sector; financing sources?	Private investment; the public sector can facilitate upgrading a cleaner and more efficient fleet	Ample space for PPPs; need for good designs and regulatory capacity
Sector's level of knowledge	Generally good	Very low	Generally good
Impact on logistics	High but difficult to measure, affects mobility as a whole; pressure toward increased motorization	Very high, not only on freight but downstream in the value chain, on domestic and international logistics	Very high in foreign trade, with the ability to influence entire ground and maritime chain

	Railroads	Trade facilitation	SMEs and regional logistic development
Current situation	Intermediate to good in freight where there were reforms; great potential for expansion	Intermediate, improvements underway; heterogeneity, cases of extreme backwardness	SMEs with very high logistics costs
Main needs	Improvements in infrastructure, access to ports, belts in urban areas	Expeditious and transparent procedures, paperless systems, single window schemes, facilitate transportation	Training, integration, platforms (logistics platforms), strengthen operators, institutional development
Differentiation by country type	More potential in large countries, with large-scale freight	More related to institutional quality than income	More appropriate in mid-income countries
Investment, public and private	Room for PPP; requires adequate regulation	Basic responsibility of the public sector	State as promoter of private-sector development
Sector's level of knowledge	Generally good	Generally good	Very low
Impact on logistics	High for bulk transportation; potential in general freight when joined with domestic and international multimodal transportation	Very high on foreign trade	Probably high; impact on SMEs involved in regional trade

prepared for groups of countries. Countries that already reformed their regulated services will probably require adjustments to the regulations (second-generation reforms), while countries that have not undergone reform should in most cases carry them forth to catch up on their delay. There are opportunities for public-private partnerships, but they require considerable public capacity-building to structure projects and regulate services.

There is basic knowledge on most components of freight logistics, but this knowledge is markedly low in road freight transportation and the performance of small and medium-size enterprises. Improvements in one component are relevant and/or beneficial for all (that is why they were selected), but for certain components the benefits of those improvements are exclusively centered on international trade logistics or even on specific types of products, such as freight railroads that transport minerals and grains. The benefits accrued from improvements in roads, however, go beyond freight logistics.

ANALYTICAL STUDIES RELATED TO LOGISTICS BY COUNTRY

A review of the logistics situation of various countries in the Region was carried out on the basis of studies performed by different organizations and institutions. What these studies have in common is that they focus on freight logistics problems in general (and do not boil down to a single component), and are relatively current. This approach allows for the identification of needs in greater detail according to specific country characteristics. The factors that initially appear to be most relevant to detect common patterns across countries are a country's level of development, size of territory, quality of institutions, quality of infrastructure, degree of trade liberalization, and landlocked status.

A preliminary analysis of the correlation between logistics performance of the Region's countries -through the LPI index- and variables representing those factors shows that economic development (GDP per inhabitant) is clearly the factor with the highest correlation (correlation coefficient of 0.80). Other important correlations include: the institutional quality, with a correlation coefficient of 0.50 the quality of infrastructure, with a slightly lower coefficient of 0.47, and to a lesser extent territorial size ($r=0.33$). Trade liberalization (the sum of exports and imports as a percentage of GDP) has no correlation with logistics performance. Paraguay and Bolivia are the only landlocked countries in the Region, but their weak logistics performance is clearly associated with poor economic development.

A detailed analysis on the most critical issues of the cases reviewed, while grouping countries according to their levels of economic development, shows that the main weaknesses of countries with middle to lower incomes stem from the supply of basic infrastructure, the need for first-generation reforms in the provision of services (ports, railroad), and trade facilitation and border control. However, mid-to high-income countries have more complex needs that cover not only infrastructure but also services. These include: second-generation reforms (especially railroad, ports, and freight transportation), the search of an institutional organization that facilitates the administration and monitoring of public policies, the emphasis on logistics improvements in SMEs, the development of logistics parks, and the improvement of trade facilitation that promotes unified and paperless control procedures, based on information systems shared among public and private-sector agents.

In addition to this general description, a few trends are noteworthy:

- Some countries try to develop logistics activities to take advantage of opportunities other than their own trade and seek to establish regional logistics platforms; this trend is particularly observed in small countries (Panama, Uruguay) or countries with neighbors generating large trade flows (Mexico).
- Larger countries show a growing interest in logistics performance at the sub-national level (Mexico, Brazil, and Argentina).
- The Caribbean islands are a special case. Because of their small size, internal logistics is not relevant, and the administration of ports and airports as well as maritime and aero-commercial accessibility seems to take on greater importance. Studies on logistics performance seem to exclude smaller countries, thus making existing literature ineffective to identify needs.
- Countries with significant portions of territory that are isolated from main production and consumption centers need to promote the implementation of projects that ensure internal connectivity (Brazil, Bolivia, Colombia, Chile, Peru, Paraguay). The integration projects with neighboring countries relates to this need for cohesion within domestic territory.
- Road vandalism and theft seem to constitute the most serious security issue, greater than the need to control export freight as a result of the events of September 2001.

THE AGENDA FOR PUBLIC POLICIES

A comprehensive analysis of components and countries under review identified five priorities for public action to improve logistics performance and thus enhance the levels of competitiveness of the Region's economies:

- The first priority is the provision of basic infrastructure for generic use and not solely for freight logistics -basically for the roads network. The distinctive qualities and considerable financial commitment required for the provision of basic infrastructure (including network maintenance) deserve that this action be considered separately from the rest.
- The second priority action area covers a range of infrastructure services for freight logistics, where the role of the private sector in operations is dominant and where private-public partnerships and regulations are of utmost importance. This includes ports and railroads.
- The third priority is linked to services that the state manages independently or secondary activities that it outsources. It includes customs and customs barriers management (immigration controls, phytosanitary controls, etc.) that facilitate trade. The main operations issues are at border crossings and ports.
- The fourth area of action is the support of private-sector development. This includes providing assistance with supply chain management to smaller enterprises as well as to those who offer logistics services, such as transport operators, logistics operators, or intermediaries and their trade associations. Key instruments include the development of logistics platforms (or platform networks), the integration of operations, and training.
- The fifth refers to organizing the public sector to promote quality policies for logistics performance, including multisector, cross-jurisdictional, and public-private coordination; the development of monitoring systems for tracking logistics performance; and general human resource training and development.

Priority Areas of Action in the Region

Priority action areas	Sector-problems	Priorities in medium to low-income countries	Priorities in medium to high-income countries
Development of basic infrastructure	Main roads, rural roads. Maintenance	Basic infrastructure: principal and rural; ensure maintenance	Higher capacity, accesses to port, level crossings, urban by-pass. Toll roads, PPPs.
Infrastructure services and regulations	Ports, railroads	First generation reforms, improve operational efficiency	Second-generation reforms: adjustments. Major investments, PPPs.
Service in charge of the State	Customs controls, border crossings	Customs procedures, time, cargo security, reduce corruption	Integrated border management, unified paperless inspections, cargo security, reduce corruption
Support to private-sector development	SMEs, carriers and logistics operators, logistics parks, human resources	Professionalization of carriers and forwarders	Professionalism and HR development, logistics platforms, regional hubs, outsourcing and 3PL development
Organizational and institutional strengthening	Logistics Councils.	Strengthen and coordinate government areas; training	Inter-sectoral and inter-jurisdictional articulation; private participation; promotion and training

The table summarizes the main elements in each priority action area according to the level of income of the countries.

1. INTRODUCTION

The volume of international trade has grown remarkably in the last few years as a result of greater openness of national economies -expressed in a reduction of duties- and improvements in transportation systems and handling of freight. Not only have these changes been quantitative in nature, but manufactured products have gained an increased role due to changes in the composition of trade.² Markets for these products have increased in quantity, and products have experienced major transformations: their life cycles have been reduced, their marketing has gone global, and their production has been organized by combining inputs from multiple origins. These trends -among others described in this document- have brought the focus of attention to the physical movement of goods, both through space (transport) and time (inventory management), because the efficiency with which these movements are organized in a country influences the competitiveness of firms and therefore that of the economy as a whole.

Along with the growing importance of these practices, a conceptual approach for their analysis and management has emerged in the business and academic communities, giving way to subjects such as supply chain management, the facilitation of trade and transportation, and modern freight logistics. These concepts are key to understanding how different actors make decisions -the companies that produce goods, the operators handling their physical transportation, the intermediaries that associate with them- and to identifying the public policies that can help them achieve this with the highest levels of efficiency. This would favor increased trade and assist with poverty reduction efforts.

² For further detail on this subject, see Hummels, 2007 and Mesquita et al., 2008.

Notwithstanding the considerable impact that this kind of revolution has had on the design and management of physical freight movements in markets -briefly summarized in modern freight logistics- their concepts have only been partially incorporated into public policies. In general, governments still understand freight transportation as having the same characteristics as three decades ago.

The organization of the document is as follows. Following this brief introduction, Chapter 2 presents the fundamental concepts of freight logistics, starting with a review of the role played by the aggregate movement of goods in spatial economics by analyzing how actors of the productive sector organize material flows as a chain and by identifying the functions specific to logistics within the management of supply chains. This review helps to identify the different perspectives used to analyze logistics (shippers, operators providing logistics services, and public policy), which explains the diversity in issues and levels of analysis that render the subject confusing to those who are not familiar with it.

Chapter 3 presents a comparative analysis of logistics in LAC. It starts with a description of the criteria used to measure logistics performance at the national level and recognizes three methods to conduct measurements: on the basis of national accounts, on the basis of enterprise surveys, and through perception indicators. The indicators available for the three modalities are analyzed, which provides conclusions on the relative situation of the Region.

The next two chapters try to identify the causes for major weaknesses in regional logistics performance via two approaches. Chapter 4 includes a review of the six logistics system components that appear to be most critical as per the global indicators: roads, trucking industry, ports, railroads, trade facilitation and

border management, and the regional logistics development of small and medium-size enterprises. Chapter 5 seeks to complement this view with analyses of the main logistics problems experienced in the ten countries of the Region selected for this note, based on relatively recent and existing studies. Even though it is a high-level analysis, it not only allows for the identification of the most critical problems but also helps to classify those problems for countries with different income levels per capita.

Chapter 6 summarizes the results of the previous two chapters, formulates an agenda of public policies for the improvement of logistics performance in the Region's countries, and identifies initially what instruments may be used.

2. FUNDAMENTAL CONCEPTS OF FREIGHT LOGISTICS

For a thorough understanding of the role of logistics, it is important to place its functions within the general framework of production activities. Freight logistics relates to the physical movement of goods within an economy, via transportation and warehousing. At the same time, this movement of goods closely relates to the general design of storage, production, and distribution activities performed by the firms that produce and sell goods. In practice, the strategic decisions for organizing logistics constitute a part of the general business model adopted by a production unit, not an isolated component that can be designed independently. Therefore, an integrated perspective of the productive process and identification of the role played by the flow of materials is required to understand logistics and its functions.

The approach taken in this chapter, summarized in Figure 1, is:

- (i) a review of causes that trigger the movement of goods in the economy, and the models used to represent those aggregate flows;
- (ii) an analysis of material flows throughout the value chain, which link different production, trade and consumption units; and
- (iii) the identification of logistics functions as a group of processes and functions that belong to supply chain management.

Thus, three areas of knowledge are integrated: *spatial economics*, which takes the aggregate movement of goods in a country's economy (in spatial units and economic sectors); *supply chains*, which considers the flow of materials across economic actors (producers, consumers); and *logistics*, which centers on goods transport and storage administration.

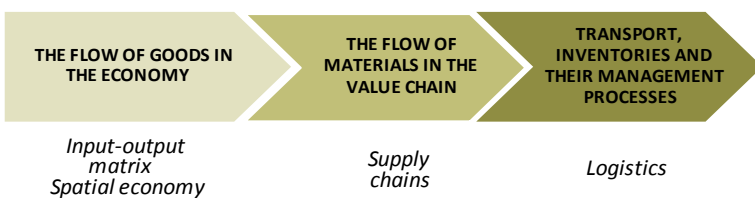
2.1. The movement of goods and spatial economics

The "need for movement" has traditionally been the main reason for transport demand: goods are produced in one place and consumed in another; people live in a specific location and work in another. Transport economy experts have determined the causes of this need for movement: geographic differences, productive specialization, economies of scale, and other objective movement requirements of a political, military, or social nature.³ Therefore, transportation fills the need for movement by facilitating the spatial convergence of supply and demand.

In this context, freight flows result from transactions between actors in the economy and make up a set of inputs that move from supply firms to processing firms and that, in turn, constitute input for other firms until reaching the final consumer. The means to move goods to or from specific locations also has a strong impact on the productive sector's organization. Transportation allows specialization through economies of scale and scope, and generates other positive externalities by supporting innovation and learning processes. This perspective highlights the nature of transport services demand and its role in the organization of the spatial economy.

³ For example, Button, 1996.

Figure 1
Flow of goods,
logistics and
supply chain.



The organization of economic activities can be represented graphically, highlighting the spatial relationships between network nodes and segments. This type of representation, which is highly intuitive, is traditionally used in economic geography to interpret and model flows. In recent years, important advances have been made in the “new economic geography”, mainly in the interpretation and modeling of economies of agglomeration that have influenced the creation of regional urban systems.⁴

Another way of representing transactions is by using the input-output matrix (IO), which represents the aggregated flow of materials across activity sectors. This representation type is traditionally used for national accounts and the analysis of the structure of a country’s economy, since it allows the identification of cross-sectoral relationships. When the input-output matrix is inter-regional, it represents sector and spatial relationships simultaneously, allowing the identification of the spatial structure of the economy and thus, constituting a valuable instrument for the analysis of the regional structure of the economy. An example in Latin America of this type of analysis is one performed in Colombia that estimated an IO matrix with seven regions and nine sectors as an instrument to analyze the (reduced) linkages in the country and the possible regional impact of growth on export activities in certain regions.⁵

⁴ Fujita et al., 1999; Fujita, 2002.
⁵ Bonet, 2005.

2.2. The flow of materials as a chain

Identifying material flows across productive units and resulting chains is possible when moving from the aggregate -the integrated flows belonging to a sector and a region- to individual actors in an economy. At the same time, within a production unit, three phases of material flows can be schematically recognized: procurement, production, and distribution. These three phases, which correspond to functions within the production unit, are generally organized under a common design, and their handling is coordinated, making up the supply chain. Figure 2 outlines the three functions, their sequencing, and the plan that incorporates them.

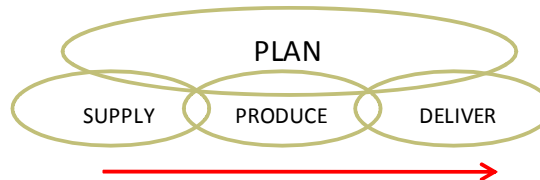
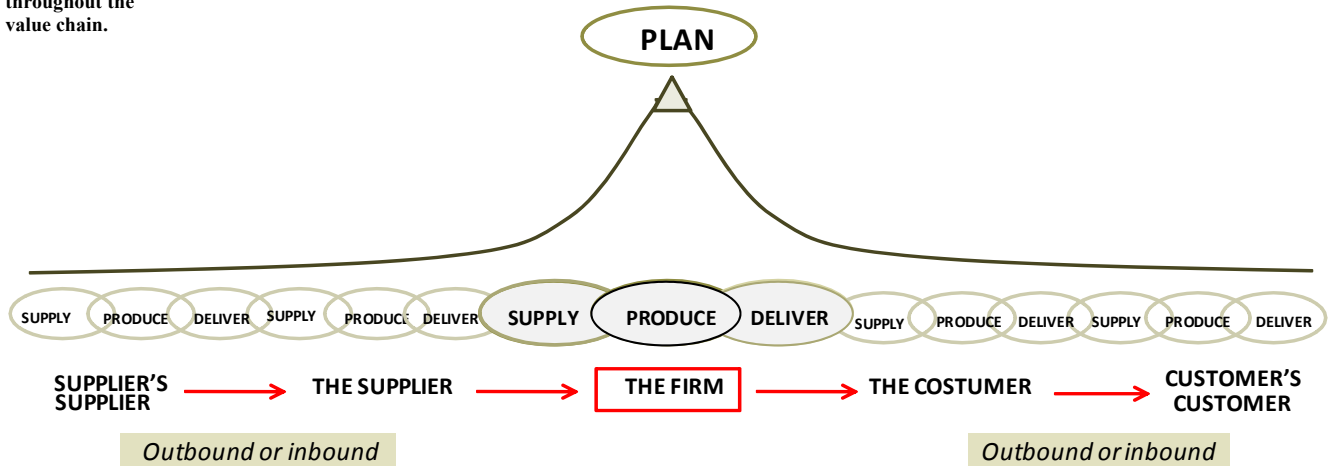


Figure 2
Functions which
involve the flow of
materials.

The supply chain involves the design and operation of the supply, production, and distribution of goods and those tasks -inside or outside the company- that allow the value chain to manufacture products and provide services to consumers. The productive system links activities: the materials delivered by a unit serve as a supply for the next unit, successively until they reach the end consumer, though the linking of suppliers and customers that can be external (different firms) or internal (different departments within a firm). Figure 3 is a diagram of the linkages in the flow of materials between suppliers and customers all along the chain.

Figure3
Diagram of the flow of materials throughout the value chain.



In order to work efficiently, the supply chain covers a wide range of processes, some of which are common to all functions and others that are specific to each one of them. **Planning** requires the tasks of forecasting demand, programming production, the design of a supply strategy, and the organization of distribution, It encompasses all processes. **Supply** tasks require specific actions: the selection and management of providers, procurement, inbound transportation, organizing reception and storage, payment to sellers, etc. The **production** function requires processes such as plant planning, release of materials, quality assurance, machine maintenance and setup, etc. The **distribution** function involves processes like customer order management, warehouse management, outbound transportation, collections and returns processing. A more formal definition of supply chain management would be:⁶

“Supply chain management is a collection of approaches used to efficiently integrate suppliers, producers, warehousing centers and businesses, so that goods are produced and distributed in adequate quantities, to the right locations, at the right time, while minimizing total system costs and satisfying the service level requirement”.

⁶ Source: Simchi-Levi et al., 2008.

2.3. Logistics in the supply chain

There are numerous processes involved in supply chain management. Some of them constitute the focus of logistics and are directly tied to the transport and storage of goods. Even when concept definitions differ, the focus of logistics is clearly placed on transportation, inventory management, and order processing. A definition of logistics, on this basis, is:⁷

“Logistics management is the part of the supply chain process that plans, implements and controls the efficient and effective flow and storage of goods, services and information, from the point of origin to the point of consumption, whilst trying to satisfy customer requirements”.

Definitions of supply chains and logistics are diverse and sometimes ambiguous. The concept of the supply chain is broader than that of logistics. To illustrate this, in the 1990s the Council of Logistics Management of the United States changed its name to the Council of Supply Chain Management Professionals. The conceptual understanding of materials management functions has undergone an evolution process summarized in Figure 4. An attempt to differentiate both concepts is as follows:⁸

⁷ Ibidem.

⁸ Adapted from Rodrigue, 2006.

“The object of supply chain management is the management of materials with an emphasis placed on their organization, while the object of logistics is physical distribution, with an emphasis on the movement of goods in space and time, from production all the way to sale and consumption”.

Logistics basically includes three activities: transportation, inventory management, and order processing. The inventory taken into account in logistics is not only the goods produced that are in transit but all goods generated throughout the supply chain: raw materials inventory; inventory throughout the

productive process; products finished in plant, in warehouses, and throughout distribution channels; as well as inventories in transit during transportation. The trend toward just-in-time manufacturing that started in the 1980s sought to reduce these inventories throughout the entire process of materials management and had an important impact on transportation: it gave way to more frequent and smaller-size deliveries, eventually losing transport economies of scale. More would be spent on transportation (by moving smaller loads) but this was offset by savings in inventory costs (which include the actual cost of storage and especially, the financial cost of tied up capital), during a period of high interest rates.

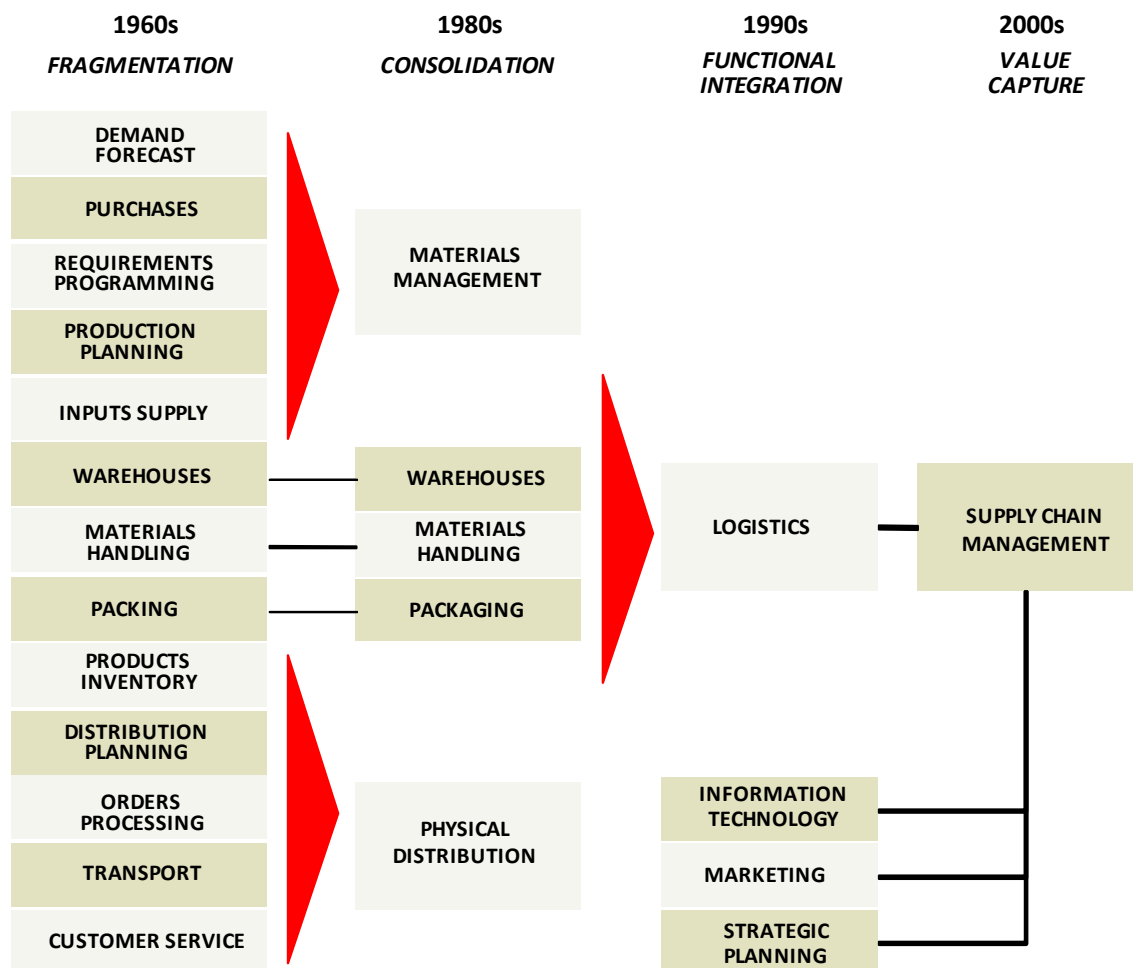


Figure 4
The evolution of the logistics concept.
Source: Adapted from Rodrigue, 2006.

The Council of Supply Chain Management Professionals has estimated logistics costs in the United States since 1970. The time series presented in Figure 5 shows how transportation and inventory costs (warehousing and tied up capital) have evolved. Total logistics costs, in this case measured as a percentage of gross domestic product (GDP), have decreased, but the driving force behind their reduction has fundamentally been the relative decrease of inventory costs, achieved from the integrated redefinitions that companies made of the supply chain.

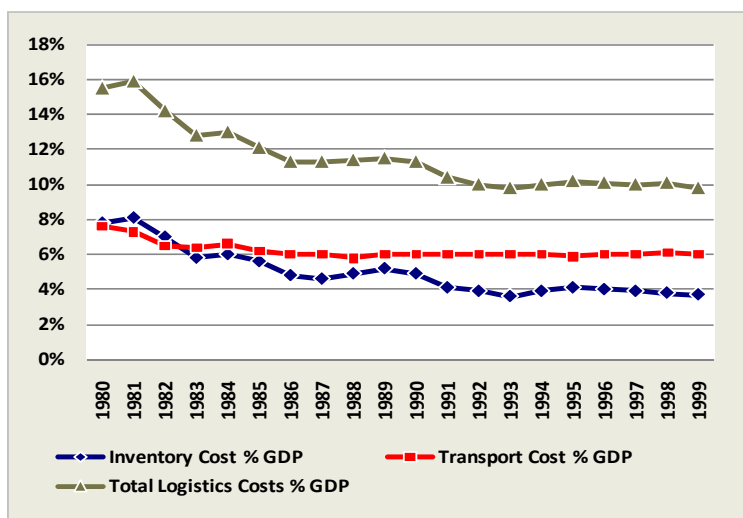
Logistics decisions are a series of trade-offs: an improvement made to one component or sequence can result in a worsening in another. The joint consideration of transportation and inventory costs reveals that implementing a strategy for transportation in small lots with greater speed and reliability will increase transportation costs but reduce those of inventory. Conversely, transportation in larger quantities comes at a low cost with increasing inventories (Figure 6). Similar trade-off situations arise when defining the numerous attributes in a business model (service quality, product diversity, etc.).

In the last few decades, particularly since the 1980s, several factors have contributed to the modification of freight logistics, evolving from fragmented to modern integrated logistics, as illustrated in Figure 4. The major trends that have shaped modern logistics are as follows:

- from a push-type supply that is supply-driven to a pull-type supply based on actual demand;
- from infrequent transportation of large lots to frequent transportation of smaller lots;
- from the existence of buffer inventories allowing more tolerance in the face of poor synchronization to a flow of materials without buffers, where synchronization is imperative;
- from an ex-post moderate flow of data to real-time massive flow of data, essential to the coordination and control of flows;
- from distribution networks organized on multiple levels with reduced areas of influence to distribution networks with few levels and large distribution centers that operate as interconnected regional hubs;
- from producers and suppliers using their own transportation to outsourcing to logistics operators;
- from supply and sales centered on one's own country to the globalization of markets (suppliers and customers);
- from logistics in one direction (deliver finished product) to reverse logistics (unsold goods, containers, defective products, recycling);
- from poor awareness of environmental impacts of logistics activities to a concern for green logistics.

Figure 5
The evolution of transportation and inventory costs in the United States.

Source: Prepared with CLM data.



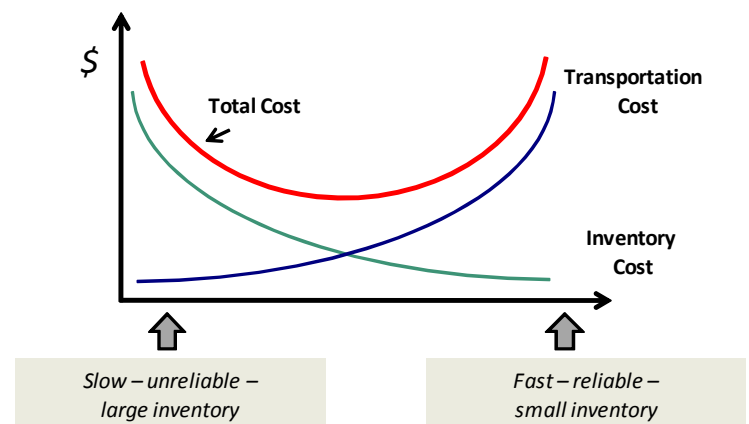
These changes have made logistics an emerging independent discipline. Technology has played an important role: improvements in transport modes (ships, trucks, railroads, freight planes); improvements in freight terminals (containers, pallets); and improvements in electronic commerce and the adoption of information and communications technology (electronic data interchange (EDI), e-commerce, real-time vehicle and freight tracking). Some actors in the economy have gained strength while others have emerged: shipping companies (container ships), freight forwarders, freight consolidators and freight agents, warehouse and storage operators, terminal operators (port and airport facilities), third-party logistics operators (called 3PLs).

Although this description tries to capture the great transformations that have affected the physical movement of freight in the last years, there has been a high level of specialization leading to very diverse types of logistics in many activity segments. There are logistics chains with distinctive features, owing to the scope of flows (international, national, urban) as much as to the type of product involved (general freight, liquid bulk, etc).

According to the geographic reach of flows, the following observations can be made:

- an international trade logistics that has grown tremendously with globalization: the role of trade facilitation is highly relevant, since fiscal controls (customs, immigration, sanitary and phyto-sanitary, anti-narcotic) can obstruct or delay trade flows. International logistics operators extend their influence to local segments as well;
- domestic logistics are key in the distribution of goods to the hinterland, with a big effect on prices and quality of service that consumers receive in the diverse sub-regional spatial units;
- city logistics, which constitutes a special case because of the relevance of its externalities (use of urban soil, congestion, pollution), with an effect on the costs of products consumed by city inhabitants;

Figure 6
Characteristic trade-off situations in logistics decisions.



According to the freight type, logistics can also take on very distinctive characteristics:

- general freight logistics, which includes the movement of containers, pallets, small parcels, express services, vehicles, large loads, etc.;
- cold chain logistics for fruits, food, and perishables;
- large dry and liquid bulk logistics, with vehicles and facilities specific to the transportation and storage of minerals, cereals, oil products, liquid fuels, sugar, juices, forest products, etc.

The discipline of freight logistics tackles these diverse issues with common conceptual tools.

2.4. Logistics perspectives and common issues

The three principle actors in modern logistics have different but related perspectives on the subject: (i) shippers, generally a production or trading-retailing company; (ii) logistics operators (transport operators, warehouses, terminals, etc.), that offer services to shippers; and (iii) public policy-makers, national and sub-national authorities aiming at logistics efficiency as a competitiveness factor in the economy of a given territory or by which countries combine efforts to improve performance at the regional level. Figure 7 outlines these three perspectives and illustrates typical issues for each case. This diversity of perspectives explains why the literature on logistics treats so many subjects under the same heading, which includes the macroeconomic analysis of its importance to economic competitiveness as well as operational or other specific aspects.

2.5. Trends in modern logistics

The globalization of supply chains has created a more transport-intensive economy, particularly on international trade. As an example, while the gross product of Latin America grew at a 3% annual rate between 1996 and 2005, the values for international trade grew at 6% and the movement of goods through ports grew approximately 9%. Why has trade grown more than production? Various reasons may explain this phenomenon. The liberalization of international trade involved the globalization of supply chains and, in a certain way, the replacement of domestic trade for international trade. Productive organization models have progressively changed, reducing integration and substantially increasing out-sourcing. World trade has not only grown in volume, it has also modified certain characteristics: its annual growth rate was 4.4% and annual manufacturing production was 5.4% between 1975 and 2004.⁹

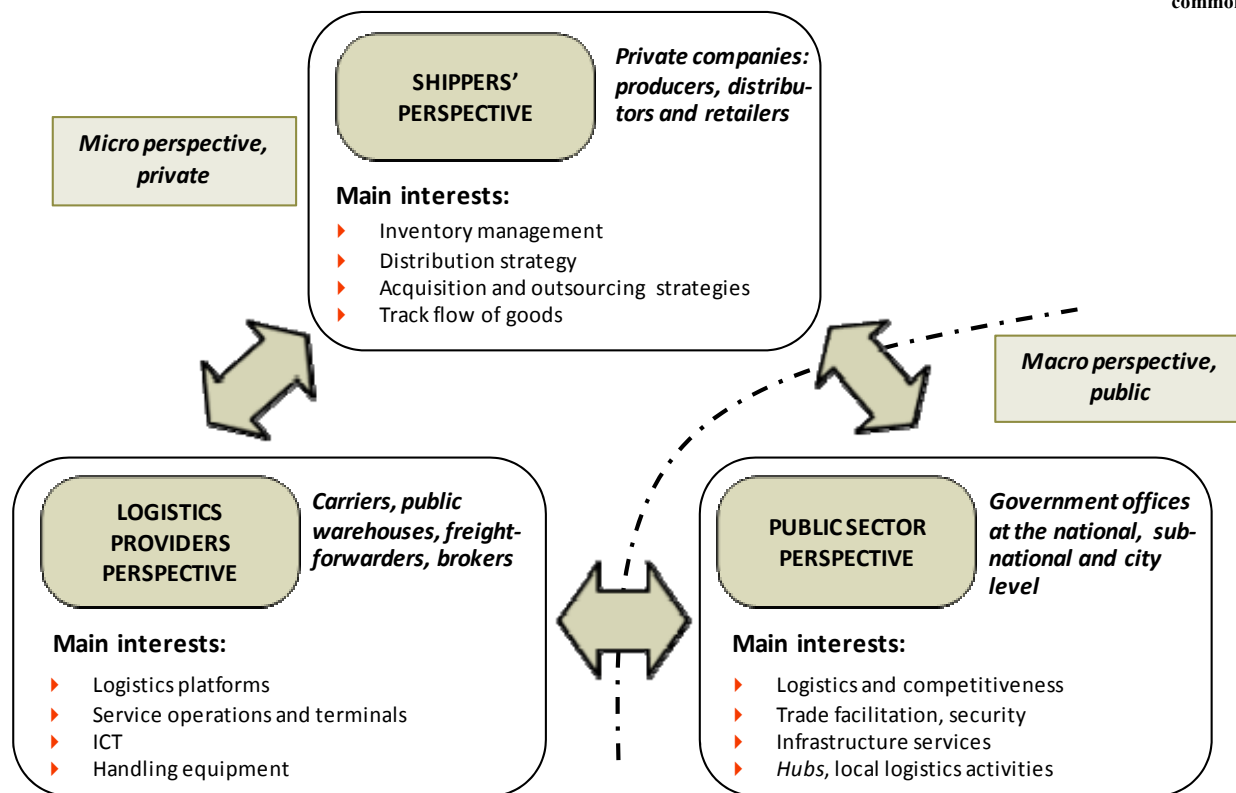
⁹ Widdows, 2007; Hummel, 2008.

Why have movements at certain nodes, such as maritime container terminals, grown even more? In this case, the possible causes are the completeness of the containerization process, the traffic of empty boxes that it entails, and -above all- the reconfiguration of sea routes incorporating one or more transfer stations between points of origin and destination.

Through 2008 different trends in the global economy drove changes in the organization of supply chains. Some of them were:

- increased integration and cooperation, within a company and between firms, facilitated by information and communications technology (ICT);
- regional or global concentration of production and warehousing in order to supply global suppliers, making the transition from national markets to regional or global markets;
- the outsourcing of transportation and logistics activities. Companies center on their core business and contract transportation and warehousing of their freight with logistic operators (also known as 3PLs) that often may also include other “value added” logistics activities (such as packaging, packaging-labeling, inventory control);
- a reduction of the number of materials and services providers in order to achieve economies of scale, facilitate cooperation, and reduce transaction costs;
- the “shortening” of the supply chain, a fundamental step for large retailers that brings them in direct contact with big suppliers while avoiding wholesalers; and
- the development of e-commerce through the Internet for direct buying from producers and distribution via new channels, which generates numerous long-distance small shipments.

Figure 7
Logistics perspectives and common themes.



Changes have also occurred in transportation and logistics activities, such as:

- the consolidation of large operators (through acquisitions and mergers); concentration of market power; arrangements with small operators (for example, concentration in the shipping industry);
- the expansion of many logistics service providers that have moved from being local to regional or global operators;
- the growing use of intermodal services that seek more efficiency by combining and coordinating different modes of transportation, which requires not only physical coordination of modes but also harmonization of documents;
- the trend among logistics operators toward specialization and concentration in specific niches; and
- the intensive use of ICTs to facilitate new practices demanded by clients and operators, such as freight tracking, electronic data interchange, and the optimal planning of routes and operations.

The “transport-intensive” characteristic of the globalized economy in the early twenty-first century also presents some worrisome aspects that cast doubts on its sustainability under its initial form. The global management of materials can produce important environmental impacts throughout the logistics chain all the way from extraction of raw materials to waste disposal. These impacts can be local, regional, or even global in nature, as is the case of greenhouse gas emissions, which are considered the main cause of global warming. The transportation sector accounts for 14% of global greenhouse gas emissions, consumes one-third of the planet’s energy, and is growing at rapid rates.¹⁰ In LAC, the transportation sector is responsible for one-third of carbon dioxide emissions. These emissions have been growing quickly (although with very different trends in different countries), with road transportation and air transportation (to a lesser extent) being major emissions generators. Many factors may favor the increase of emissions and, in this case, the drivers are the intensive use of energy and the emissions by modes of transportation and economic growth.¹¹

¹⁰ WRI, 2005; IEA, 2008.

¹¹ Timilsinda and Shrestha, 2008.

3. LOGISTICS PERFORMANCE IN THE REGION

The previous section examined the significance of logistics on the supply, production, and distribution of goods. In world trade, following a drastic reduction of tariffs in the 1990s and the elimination of many non-tariff barriers, logistics costs became central to the competitiveness of countries. The liberalization of trade and the globalization of supply chains have led some authors to believe that the world is flat and that localization has lost relevance. Without denying that liberalization has brought opportunities to regions that were once isolated from large trade currents, the fact that logistics costs are so relevant suggests that localization continues to be important and that overcoming the impediments presented by distance requires effort. In the case of domestic trade, it is a component of cost that consumers face. Logistics costs affect the entire value chain since they recur in the production function. In addition, the importance of logistics does not boil down to its impact on final product costs: quality of service is of growing importance. The challenge lies on how to measure its relevance. This section reviews the main approaches available for this.

3.1. How to measure logistics performance

The logistics performance in a territory (a country, for example) is not easy to measure or interpret. Three basic measurement approaches can be used:

- a macro approach based on National Accounts, which generally estimates logistics costs as a percentage of GDP;
- a micro approach based on company surveys, which estimates different performance indicators for production units (individually or in a chain); or
- a perception approach based on indices derived from surveys of select participants.

The text box below summarizes the difficulty of designing indicators, taking measurements, or estimating values for logistics processes and functions that are complex.

The difficulties of measuring logistics performance

“The logistics of international shipments is a complex combination of services and procedures involving many public and private operations that does not lend itself easily to measurement”.

“There is no statistical indicator that proxies the performance of the entire supply chain, or even a major part of it”.

Source: World Bank (2007) *Connecting to Compete -Trade Logistics in the Global Economy.*

The **macro approach** is based on National Accounts; measurements require many assumptions that must be homogeneous in order to be able to compare results. Logistics costs must be estimated for each sector of the economy, even when they are heterogeneous, and similar criteria must be used across countries in order for results to be comparable. This approach has the advantage of offering general results, since the exercise covers the entire economy of a country. A good example is the CASS methodology for calculating logistics costs that has been used in the United States since 1973 (see results in Figure 5). This methodology considers three cost components:

- (i) *inventory costs that cover the costs of tied up capital, associated services (insurance, taxes) storage space, and inventory risks (pilferage, deterioration, obsolescence);*
- (ii) *transportation costs, inbound and outbound, including shipping and receiving; and*
- (iii) *administration costs that cover the planning and management of logistics functions.*

Figure 8
Logistics costs as a percentage of GDP.

Source: Kogan & Guasch, 2006.

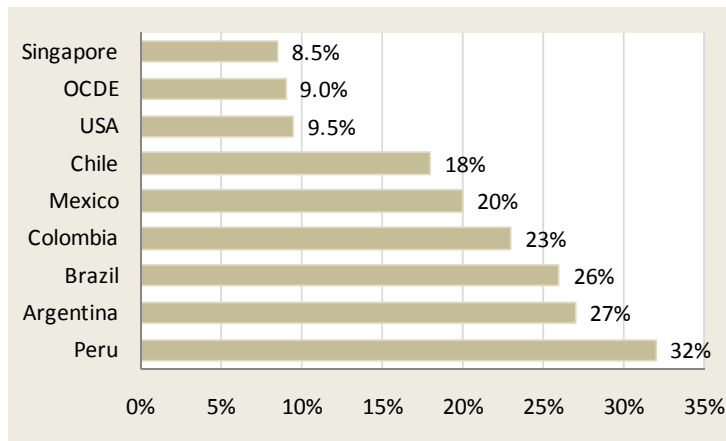


Table 1
Incremental inventory costs as percentage point of GDP in Latin America.

Source: Kogan & Guasch, 2006.

Country	Raw Materials	Finished Products
Chile	2.17	1.76
Venezuela	2.82	1.68
Peru	4.19	1.65
Bolivia	4.20	2.74
Colombia	2.22	1.38
Ecuador	5.06	2.57
Mexico	1.58	1.46
Brazil	2.98	1.98

The **micro approach** concerns company-level measurements. It requires a common methodology and large samples to be able to expand results. Measurements are performed within a firm; logistics costs are generally expressed as a percentage of sales. However, micro indicators encompass not only financial indicators (costs) but also other logistics performance indicators, such as quality indicators (perfect orders, order fulfillment, on-time delivery, deterioration percentages) or productivity indicators (for warehouses, transportation vessels, personnel, inventory turnover).

In order for results to be successfully extrapolated and provide robust indicators, samples must be large, and this is costly. These measurements are usually performed by company observatories or associations that try to use benchmarks as internal control mechanisms. Companies have an interest in measuring performance, since the management of logistics and supply chains has a strong impact on results. Improved logistics management can reduce order cycle times, increase delivery fulfillment, reduce inventories (up to 75%, according to recent studies),¹² reduce planning cycle times, and create many other impacts that noticeably influence results in the company's balance sheet and statements.

Perception indicators are relatively new in the field of logistics and are gathered for each country. This is a new practice, made popular by the World Trade Organization, that consists of surveying several select individuals, generally from the business community, and organizing responses on the basis of an ordinal scale, for example from 1 to 7. This exercise provides a single indicator per country that can correlate with indicators for other attributes such as infrastructure or institutional quality. In the past few years, several exercises of this type have been conducted: they generate specific sub-indices that combine to form general indices and tend to be accompanied by hard data.

The rest of this section will address the results shown in several measurement exercises, organized by using the three approaches described above.

¹² LALC (Latin American Logistics Center). *El estado de la Logística en América Latina y la Referencia Mundial*. Atlanta, 2004.

3.2. Measurements based on National Accounts

Logistics costs, when measured as a percentage of gross national product, reflect the relevance that logistics has on country competitiveness. Results from these exercises show that LAC countries have logistics costs that are at least twice as high as countries that belong to the Organisation for Economic Co-operation and Development (OECD). Figure 8 presents results for the calculations made using this methodology.

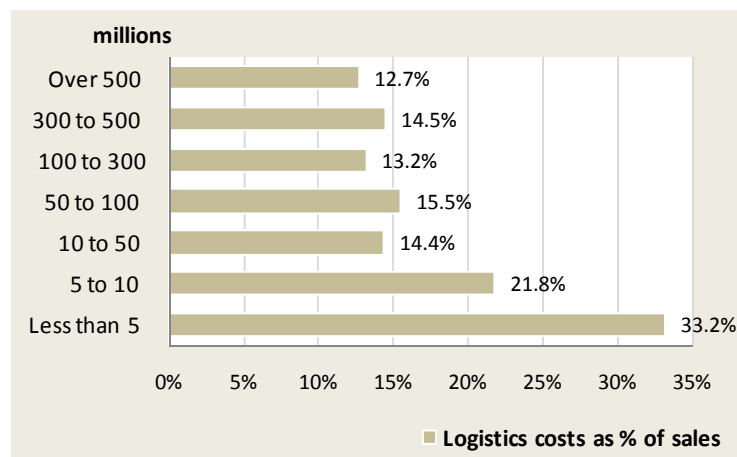
An indirect method of measuring logistics performance is through inventory estimates, which allow measurement of the performance of the transportation system: the less reliable it is, the greater the logistics costs for actors in the supply chain. Studies done in 2001 (when interest rates were high in the region) revealed that incremental inventory costs -due to a weakened logistics system- were two percentage points of GDP.¹³ Inventories account for 15% of GDP in OECD countries and approximately double that figure in LAC (Table 1).

3.3. Measurements based on company surveys

Measurements made by a logistics performance observatory (the Latin American Logistics Center, or LALC) between 2005 and 2007 allow the observation of logistic cost variations by sector and by company size, as well as the relative weight of components. The samples are relatively small (around 400 companies), which makes the comparison of results for cross-country difficult. They show the magnitude of logistics costs for different sector activities and for different company sizes and analyze their composition (Figure 9).

Another indicator used to evaluate the logistics performance of a country (or group of countries) is one that uses logistics service providers: the greater the outsourcing of activities the higher the efficiency of logistics. Recent studies show that outsourcing is widespread in Latin America, although less so than in more developed regions, and is more concentrated

Figure 9
Measurement results of logistics costs in LAC at the firm level by sales (a), sector (b), and process (c).



Sector	Logistics cost
Trade	13.8%
Construction	40.0%
Mass consumption	7.8%
Pharmaceuticals	5.3%
Manufacturing	12.5%
Petrochemicals	6.5%
Services	31.0%
Logistics Services	27.9%
Technology	6.5%
AVERAGE	17.8%

Process	Logistics cost
Orders, customer services	2.0%
Inventory management	5.0%
Transport and distribution	5.3%
Warehousing	2.5%
Procurement	2.3%
TOTAL	17.1%

¹³ Kogan and Guasch, 2006.

in the basic functions of transportation and warehousing.¹⁴ Some 70% of companies interviewed outsource domestic and international transportation to third parties, and 62% outsource warehousing. In the Asia-Pacific region, by comparison, 92% of companies outsource domestic transportation, 89% outsource international transportation, and 75% outsource warehousing. The gap is larger when one considers other logistics functions such as customs procedures, logistics consolidation, or reverse logistics.

The Doing Business database contains measurements for numerous factors relating to the difficulty of developing productive activities. These measurements are prepared every year by the World Bank Group through a survey to companies with the goal of reviewing regulations and the investment climate in 155 countries. One of the categories measured is “Trading Across Borders”, through indicators that serve to measure trade logistics performance since they evaluate processes that directly impact transaction costs. Doing Business centers on indicators that relate to international trade:

- (i) *number of documents required to carry out export or import activities;*
- (ii) *the time used to carry out an operation; and*
- (iii) *the operations cost of a standard container.*

While other developing countries performed less well than Latin America, results show that there is a clear gap between LAC and OECD countries. As shown in Table 2, Doing Business allows a performance comparison between the LAC region and other regions and differentiates results through country-specific indicators.

¹⁴ Georgia Tech et al., 2008.

3.4. Perception Indicators

A recent study entitled Connecting to Compete: Trade Logistics in the Global Economy has developed a comprehensive Logistics Performance Index (LPI). The index was developed in a research initiative launched by a transport and trade facilitation alliance, composed of several public and private international organizations.¹⁵ The technical note was prepared by the Turku School of Economics in Finland. The LPI is based on a survey of international freight forwarders for 150 countries who provided feedback on their perceptions of several logistics attributes of the countries in which they operate and with which they trade. The responses allow for the calculation of seven sub-indices that together make up the LPI index. The LPI is expressed through a score (from 1 to 5) and a ranking (from 1 to 150), according to the position held by an individual country within the group.

By providing results for so many countries, the LPI allows the correlation of logistics performance with other indicators. Results show a high correlation with governance indicators: corruption control (0.54), governance effectiveness (0.57), and the rule of law (0.54). To a lesser degree, they show a correlation with indicators for global competitiveness gathered by the World Economic Forum (WEF): infrastructure quality (0.48), ports infrastructure (0.42), road conditions (0.12), and airport infrastructure quality (0.01).

¹⁵ The *Global Facilitation Partnership for Transportation and Trade* has among its main partners UNCTAD, FIATA, IRU, World Bank, TIACA, WCO, UNIDO, and UNECE.

Region	Export documents	Export time	Export costs	Import documents	Import time	Import costs
	Number	Days	US\$ container	Number	Days	US\$ container
Far East and the Pacific	6.9	23.9	884	9.3	25.9	1,037
Eastern Europe and Central Asia	7.4	29.2	1,45	10.0	37.1	1,589
Latin America and the Caribbean	7.3	22.2	1,067	9.5	27.9	1,225
Middle East and Northern Africa	7.1	27.1	923	10.3	35.4	1,182
OECD	4.8	10.5	811	5.9	12.2	882
Southern Asia	8.1	34.4	1,236	12.5	41.5	1,494
Sub-saharan Africa	8.2	40.0	1,561	12.2	5.5	1,946

Table 2
Measurement result of Doing Business: by region (a) and by country in Latin America and the Caribbean (b).
Source: Adapted from Gonzalez, Guasch and Serebrisky, 2007.

Region	Export documents	Export time	Export costs	Import documents	Import time	Import costs
	Number	Days	US\$ container	Number	Days	US\$ container
Argentina	6.0	16.0	1,270	7.0	2.0	1,750
Brazil	7.0	18.0	895	6.0	24.0	1,145
Chile	7.0	20.0	510	9.0	24.0	510
Colombia	6.0	34.0	1,745	11.0	35.0	1,773
Costa Rica	7.0	36.0	660	13.0	42.0	660
Mexico	6.0	17.0	1,049	8.0	26.0	2,152
Peru	7.0	24.0	800	13.0	31.0	820
Uruguay	9.0	22.0	552	9.0	25.0	666
USA	6.0	9.0	625	5.0	9.0	625

	LPI General	Customs	Infra-structure	International Shipments	Logistics Competence	Tracking and Tracing	* Domestic Logistics Costs	Timeliness
Argentina	48	56	52	43	45	51	93	43
Brazil	41	82	37	65	34	36	126	20
Chile	49	41	50	94	48	40	115	44
Colombia	72	66	62	112	61	82	80	64
Mexico	50	62	44	77	44	45	101	54
Peru	67	64	56	93	71	70	59	79
USA	15	15	7	36	11	5	144	16
Spain	25	22	25	48	24	16	107	21

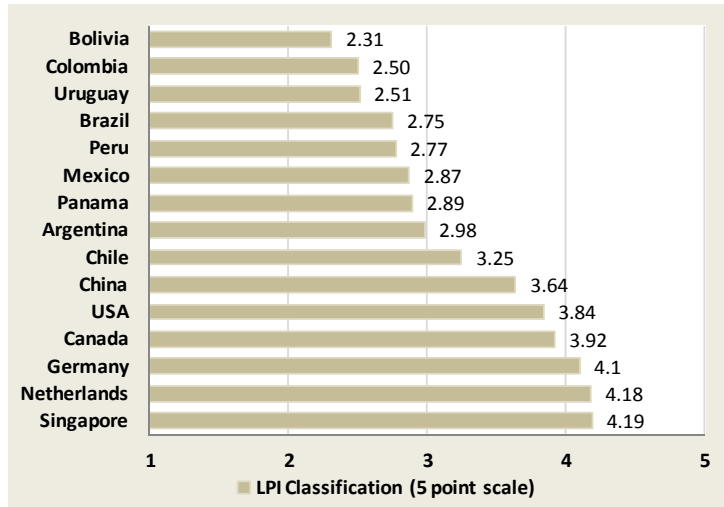
Table 3
The LPI and sub-indexes for several Latin American countries.

Source: *Connecting to Compete*, 2010.
* *Connecting to Compete*, 2007.
Data not available in the 2010 version.

Position in ranking of General LPI and its seven dimensions

Figure 10
Logistics
Performance
Index Country
rankings.

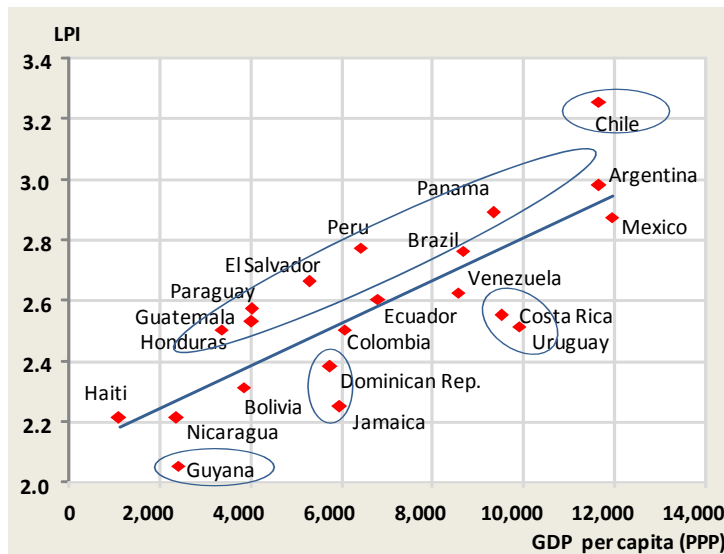
Source: *Connecting
to Compete, 2007.*



Overall results (some values for the scores obtained by countries in the Region and other values are illustrated in Figure 10) highlight the logistics gap between developed and developing countries. The gap reflects not only income levels; an orientation toward international trade is generally associated with better performance. There is great variance among countries with similar income levels, with the exception of wealthier countries (all of which show high levels of logistics performance). In developing countries where growth relies on international trade, logistics performance is superior to that of other countries with equal income levels, as shown by South Africa, Malaysia, Chile, China, and Viet Nam.

The indicators demonstrate that LAC countries are at the bottom two thirds in the table. Chile is ranked 49, Argentina is ranked 48, and most of the countries are found between ranks 50 to 125. Table 3 presents LPI results and sub-indices for six Latin American countries, according to their position in rankings for 150 countries.

Figure 11
Correlation
between
GDP per capita
and the LPI.



For countries under study in the region, the correlation between LPI scores and a country's gross product per capita allows the identification of their relative performance. In Figure 11, the following data stand out: Chile's high performance levels; a group of countries with performance levels slightly higher than expected, probably linked to their degree of trade liberalization (Panama, Peru, El Salvador, Guatemala); countries with clearly lower than expected levels namely, two mid-income countries (Costa Rica and Uruguay) and a set of Caribbean countries with mid-to-low level incomes (Dominican Republic, Jamaica), and Guyana.

Another perception indicator is the Infrastructure Quality Gap Index developed by the WEF in 2007, which covers three key sectors of logistics: ports, airports, and roads. In the WEF study, the infrastructure quality gap is used to calculate the Infrastructure Private Investment Attractiveness Index. This takes a country like Germany with optimal infrastructure and on that basis makes comparisons. Results come from combining the perception of specific actors with available “hard data”. This index was calculated for 12 countries in Latin America. The results, as illustrated in Figure 12, help compare gaps between the region’s countries and analyze the relative situation of the three sectors. The biggest gaps are for roads and the smallest are for ports (except in Brazil and Venezuela, where roads and ports have larger gaps than airports).

In 2008, the World Economic Forum prepared the Global Enabling Trade Report with the assistance of several organizations and multilateral entities; this identifies the obstacles that each country has with international trade, including logistics obstacles. It takes into account 10 pillars, which allowed the development of four sub-indices, summarized into a single index called the Enabling Trade Index 2008 (ETI 08). Two sub-indices are key to logistics performance: border management and transport and communications infrastructure. The exercise covered 118 countries; the base information ties in interviews (perception) and other available data. Figure 13 shows the relative position of LAC for both indices; the regions in the world with poor development levels had the worst performance (Central Asia, South Asia, and Sub-Saharan Africa). Border management had less favorable scores than infrastructure, transport services, and communications.

The WEF study analyses weaknesses in logistics performance for each country (see Table 4). Problems stand out in the transport services and customs performance.

Figure 12
The infrastructure quality gap in roads, ports and airports.

Source: WEF, 2007. Benchmarking National Attractiveness for Private Investment in LA Infrastructure.

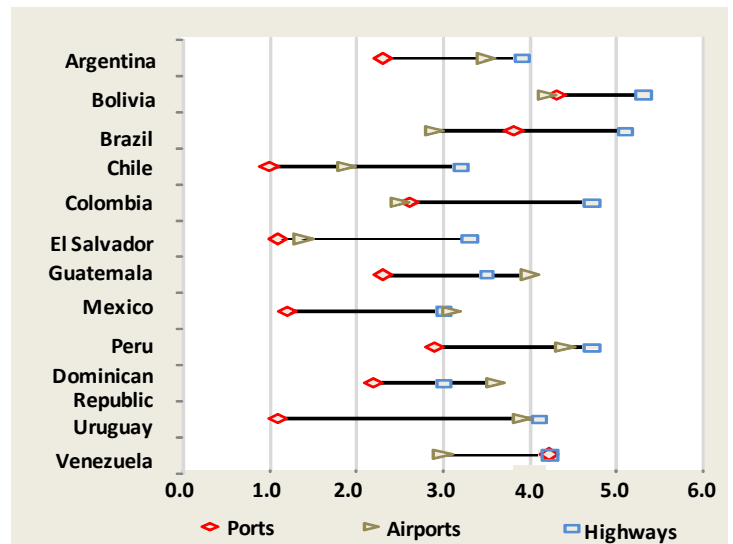


Figure 13
Latin America and the Caribbean’s position in the ETI 2008 ranking.

Source: WEF, *The Global Enabling Trade Report*, 2008.

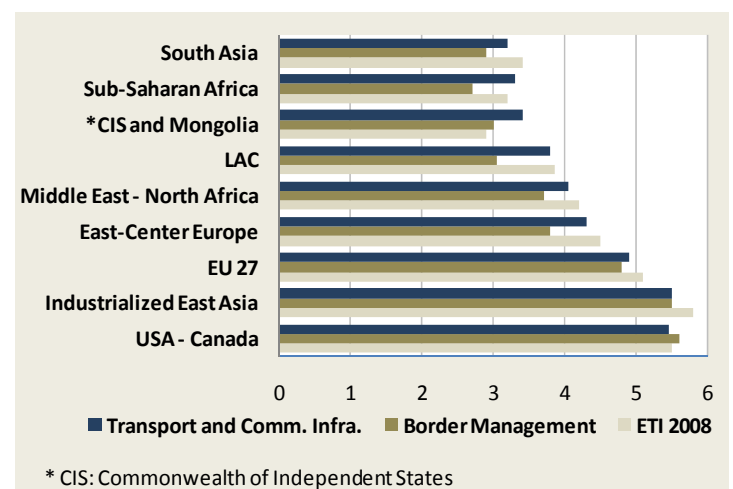


Table 4
ETI 2010
logistics
indicators.

Source: WEF. *The Global Enabling Trade Report, 2008.*

Country	ETI08	Custom Efficiency	Procedure Efficiency exp/imp	Custom Transparency	Transportation Infrastructure	Transport Services	ICT
Argentina	95	87	86	96	70	72	49
Bolivia	98	77	93	110	95	119	96
Brazil	87	94	78	67	99	42	54
Chile	18	21	47	20	44	64	46
Colombia	91	91	84	66	74	88	47
Costa Rica	44	34	51	47	75	87	71
Ecuador	89	83	92	116	77	78	79
El Salvador	57	61	50	65	93	101	66
Guatemala	69	37	95	63	89	82	72
Honduras	66	93	85	85	64	92	82
Mexico	64	65	71	70	61	67	67
Nicaragua	79	92	76	84	96	98	99
Panama	61	79	13	64	45	74	58
Paraguay	103	55	101	113	113	121	88
Peru	63	70	70	53	94	94	76
Dominican Republic	73	73	42	76	63	50	78
Uruguay	50	75	91	34	83	97	45
Venezuela	121	101	120	124	76	90	63

3.5. Summary of the results: regional logistics performance

These indicators have a common denominator: there is a considerable gap between LAC logistics performance and the developed countries, including the emerging countries of East Asia:

- logistics costs measured as a percentage of GDP are between 50% and 100% higher than in OECD countries, and the calculation of inventory costs -a key component- shows similar proportion;
- company logistics performance metrics, even when they cannot be expanded to reflect total country costs, give similar results to those found for logistics costs as a ratio of GDP;
- the position of participating Latin American countries in the Logistics Performance Index ranking, an index which best measures logistics activities, is relatively low: except for four cases, most countries in the region are ranked below the fiftieth position out of 150 countries; and

- the Global Enabling Trade Report that was recently published by WEF and that emphasizes variables relating to international trade logistics places Latin America below the United States and Canada, European countries, Central and Eastern Europe, the Middle East, and Northern Africa.

Logistics performance indicators can be subject to criticism due to errors, biases, and lack of representativeness; however, when they provide a clear and consistent message, it is evident that there is ample space for their improvement in the region.

4. REVIEW OF MAIN COMPONENTS OF THE LOGISTICS CHAIN

4.1. Components of the logistics system

The description presented in Chapter 2 of how freight logistics works highlights the diversity of factors that determine performance in a given territory, such as a country, region, or subnational entity within a country (province, city) or area belonging to two or more countries (for example, a corridor as defined by the Initiative for the Integration of the Regional Infrastructure in South America (IIRSA)). The big activity blocks that influence logistics are: (i) transport infrastructure and services, including domestic and international freight flows, trade interface operations, and transferences; (ii) enterprise logistics, which covers how companies organize their supply chains and the capacity of logistics agents and intermediaries

they rely on; and (iii) trade facilitation, which includes traditional aspects relating to documentation and inspections as well as those relating to the safety of freight physical movements. Figure 14 summarizes the functions for each one of these activity blocks and some of their typical components.

This conceptual framework can be used as a checklist to identify the components that indicators highlight as being most relevant for explaining poor logistics performance in the region. An overview of the indicators described in Chapter 3 -especially those that break down the factors with the biggest effect on low performance- helps identify several critical factors.

	Activities	Functions	Typical components
Transport Infrastructure and Services	DOMESTIC FLOWS	<i>Freight movement within national territory</i>	<ul style="list-style-type: none"> ▶ Roads, trucking transportation ▶ Railroads ▶ Inland navigation ▶ Urban logistics
	TRANSFER NODES	<i>International trade transfer nodes</i>	<ul style="list-style-type: none"> ▶ Ports ▶ Airports ▶ Border crossing
	INTERNATIONAL FLOWS	<i>Freight movement outside national territory</i>	<ul style="list-style-type: none"> ▶ Air, maritime transport ▶ International road transport
	INTERFACES AND COORDINATION	<i>Commercial and operations coordination between modes</i>	<ul style="list-style-type: none"> ▶ Coordination of delivery and reception ▶ Multimodal transport
Business Logistics	SUPPLY CHAIN MANAGEMENT	<i>Supply chain design and management</i>	<ul style="list-style-type: none"> ▶ Materials and inventory management ▶ Distribution
	LOGISTICS OPERATORS AND INTERMEDIARIES	<i>Provision of integrated logistics services</i>	<ul style="list-style-type: none"> ▶ Logistics operators, 3PL, forwarders, agents ▶ Logistic platforms
Trade Facilitation	"SOFT" INFRASTRUCTURE AND CUSTOMS	<i>Freight search and inspection on national territory and international movement</i>	<ul style="list-style-type: none"> ▶ ICT ▶ Customs, maritime regulation
	COMMERCIAL POLICY REGIME	<i>Design and implementation of government strategy</i>	<ul style="list-style-type: none"> ▶ FTA, EPA, WTO ▶ Standard Harmonization ▶ Labor, Environmental measures
	BUSINESS ENVIRONMENT	<i>Regulatory environment and its impact on the operation of industries</i>	<ul style="list-style-type: none"> ▶ ISO, SPS, security ▶ Export promotion

Figure 14
The components of the logistics system.

Table 5
Critical factors
arising from
International
comparison.

Source study/Indicator	Critical factors
Latin America Logistics Center	Small and medium-size enterprises (SMEs) have higher logistics costs than larger companies
Doing Business	Inadequate trade facilitation increases times and costs of foreign trade
Logistics Perception Index	Main problems were identified in documentation and inspections, customs, international shipments, and timeliness (typically freight providers that deliver past deadline dates at port facilities without respecting cut-off times)
Infrastructure Quality Gap	Roads appear to be the main weakness
Trade Enablers	Customs efficiency and transport services in general appear to be major determining factors

Six critical factors were identified on the basis of onsite work in the Region and the results summarized in Table 5. The performance of these critical factors affects logistics performance in general, particularly that of international trade:

- road conditions and coverage;
- performance of road freight transportation;
- ports;
- railroads;
- trade facilitation and border controls; and
- performance of SMEs in supply chain management and regional logistics development.

The next section provides a brief review of each critical success factor to understand the causes of weak logistics performance in the Region. Each one of these components has been the object of specific analyses, numerous studies in some cases, and limited ones in others. This chapter provides an overall summary, assessing their conditions and performance and identifying causes of their limitations.

4.2. Review of the critical components in the Region

4.2.1. Roads

The spatial scope of the roads network in Latin America is well below the global average. Available indicators¹⁶ show that the world average is 241 km of network for every 1,000 km², while in LAC the figure is only 156 km.¹⁷ The lowest network coverage is in South America (145 km for every 1000 km²) and Mexico (183 km). In Central America it is slightly higher (209 km), and in the Caribbean it exceeds 630 km. Road density is directly linked to a country's level of development. OECD country road densities range from 600 (United States, Germany) to 3,000 km (Belgium, Holland, Japan) of roads per 1,000 km². However, coverage is also linked to a territory's dimension. High-income countries with very large territories, such as Canada, have a roads network that is similar to that of LAC's (155 km for every 1,000 km²). Figure 15 illustrates the relationship between a country's road density and its territorial surface (expressed as a logarithmic scale) and indicates the position of some of the region's countries.¹⁸

¹⁶ World road databases generated by the International Road Federation cannot always rely on precise inventories, especially with developing countries, so analysis results should be interpreted with caution.

¹⁷ Based on sample that covers all countries except a few small islands or uninhabited territories for which there is no information.

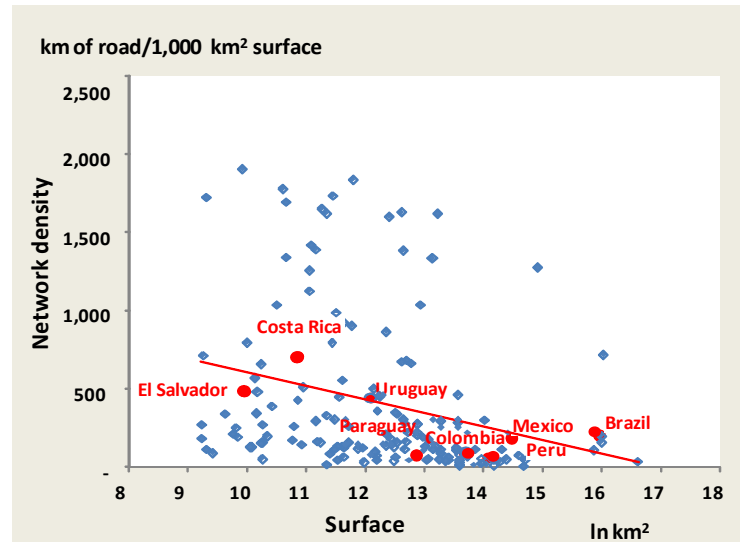
¹⁸ The correlation excludes countries that are less than 1,000 km² as well as three countries with unusually high roads density: Belgium, the Netherlands, and Japan.

The coverage of the roads network may also refer to the population or to the gross domestic product. For both of these measurements, Latin America is well above the global average. LAC has a roads network of 5.7 km for every 1,000 inhabitants, against a global average of 4.8. In this case, values for South America (6.8) are double those for Central America (2.7) and the Caribbean (3.8). The world's most developed countries have values of around 15. As for the kilometers of roads per million dollars of gross product, indicators for LAC (1.5) are double those for the global average (0.7), with values in South America (2.1) doubling those of Central America (1.2) and the Caribbean (0.9).

In terms of network quality, the easiest way to assess a network is to count the portion that is paved. Worldwide, 57% of the road network is paved. In more developed countries this value is invariably close to 100%, with a few exceptions (such as Canada, at 35%). LAC show levels of road surfacing that are noticeably low, namely 16%, with South America at 11% and the Caribbean at 60%. By comparison, China has 89% of its networks paved, Malaysia has 78%, India has 64%, and Indonesia has 58%.

Indicators that can compare the state of roads network maintenance in different countries are scarce. Many countries do not have this information, or measurement results are not comparable. The World Road Statistics contain solid information on 33 countries, of which 7 are in LAC. While the sample is small, the results suggest that the state of maintenance of roads in Latin America -in aggregate- is considerably inferior to that of other regions, the most developed ones (Europe, Asia Pacific) as well as developing ones (North Africa, Middle East).

Figure 15
Road density to country size ratio.



To conclude, the road network has had limited development, especially in relation to the extensiveness of a territory. This low coverage is more noticeable in countries with large portions of their territories uninhabited or with natural obstacles or environmentally sensitive areas, such as Paraguay, Colombia, and Peru in Figure 15. But the quality of networks seems to be weaker than its coverage, measured by the proportion of network that is paved as well as by the lack of assessments on their state of conservation.

The demand for road use has grown significantly in the last few years, in association with an intense motorization process resulting from unusually high economic growth rates witnessed in the last five years, in the order of 5%. The current level of motorization in the region is relatively low, and its rapid growth has generated a substantial increase in congestion, mainly in cities and urban accesses but also on many intercity highway links (particularly where they cross towns).

Growing demand has led countries in the region to expand their roads network capacity through the replacement of old roads with modern alternatives (curve radius, highway shoulder, slopes, lane width), new road structures, and increased capacity through an increase in the number of lanes.

The road transport network's historical weakness -limited coverage and mediocre quality and maintenance- combined with high demand pressures generates overlapping needs for the region's countries: build new roads linking domestic territory with neighboring countries; extend the capacity of existing road stretches; and rebuild and modernize existing network. These needs are not limited to main roads but also concern secondary and tertiary roads that serve as capillaries that ensure the accessibility of the territory. The maintenance of the network has become a key factor in sustaining these assets.

The impact of roads in logistics costs is important because of their effect on the accessibility of territory, transit time, vehicle operations and maintenance costs, and the condition of the merchandise being transported.¹⁹ The principal transportation mode in the Region is roads, which repeatedly plays a part in value chains; hence, its impact on performance multiplies. Recent studies on the needs of road networks in Latin America have identified the infrastructure sector as the one requiring the most investment.²⁰ The countries with the greatest investment requirements, in terms of GDP per capita, have the lowest incomes: Bolivia, Guyana, Haiti, Nicaragua, and Suriname. A few large countries stand out, based on the amount of their investment needs, with part of their territories being sparsely covered, such as Brazil, Colombia, Paraguay, and Peru.

¹⁹ The poor quality of paved roads can have negative impacts, for example, in the transport of fruit or pallets.

²⁰ Fay and Morrison, 2007. The exercise consists of estimating yearly investment requirements for 20 years, to achieve infrastructure levels similar to South Korea's.

In summary:

- *The Region's roads network suffers structural backwardness, reflected in reduced territorial coverage and the poor condition of road assets; in parallel, it must respond to the impact of intense traffic growth (due to greater economic activity, more trade, and growing motorization).*
- *The challenges – expansion, rehabilitation, modernization, maintenance and widening – demand important financing and management efforts, making it the infrastructure sector with the highest funding requirements.*
- *The impact of improvements on the network definitely influences freight logistics costs, but it simultaneously satisfies many other mobility needs that the population has other than logistics.*

4.2.2. Road freight transportation

Road freight transportation (trucking industry) is without question the most important domestic mode of transport in the Region, and it has significant influence on logistics chains. However, there are no statistics available on their participation in freight transportation continent-wide. The measurement of their relative weight depends on how the market is defined; in some cases only conventional modes of surface transportation are considered (truck and railroad), whereas others also use maritime and inland waterways transportation, pipelines, and air freight transportation at a domestic level.

Measurement results for road transport activity are also sensitive to the way the sector is defined; generally, although not always, smaller units are excluded (less than 5 tons gross weight, mostly for urban distribution). The heterogeneity of measurement criteria makes international comparisons difficult.

In spite of these difficulties, data for some of the region's countries help illustrate the heightened participation of trucks in domestic freight transportation. In Brazil, for example, trucking accounts for 60% (tons per kilometer) of all other modes (80% considering only road and rail transportation). In Argentina, trucking accounts for 66% of all transport modes (pipelines, maritime, and inland waterways transportation); 93% considering only rail transportation. In Mexico, trucks account for 70% of domestic freight transportation volume and 80% of its value, and in Colombia, 81% of volume. According to Hine (2007), the participation of trucking in domestic freight transportation for developing countries is, in general, around 70% of the total volume and 80% of the total value.

The high participation of trucks is not exclusive to developing countries. Within the European Union, for example, road transportation accounts for 78.5% of freight movements measured in tons-km (over 80% when excluding water transportation); in 1980 (though fewer there were fewer members in the Union) it only accounted for 66.5% (during that period

railroad participation went down from 23.3% to 14.8%).²¹ In the United States, where railroad and waterways transportation have developed considerably, four-fifths of domestic transport measured in value are for trucking transportation.²² Just-in-time trends described in Chapter 2 confirm the important role of road freight transportation, and prospective studies indicate global-wide growth, particularly in LAC.²³

The importance of road freight transportation for the economy is greater than what is reflected in National Accounts, since companies carry out a large amount of transport activities with their own vehicles. The sector has a complex and fragmented structure with strong social implications: in all countries, modern and efficient companies work collaboratively with numerous small operators that have a work-based ethic that is closer to employees than management. The large size of the sector, its role as a major employer, and the economic and cultural traits of its organization give it considerable social and political influence that can further the potential of reforms.

There are several niches within the road freight transport industry, which actually constitute differentiated markets. The sector is not limited to domestic transportation, since it is gaining more and more strength in international transportation. For example, in Argentina the value of international trade carried by truck is 18% and in Costa Rica it is 16% (only exports). Intra-regional trade has increased in the last years, and a big part of it is done by truck. Even in Mexico, 60% of the country's international trade (excluding oil) is carried out by land and predominantly via truck (even while railroads are increasingly being used).

Despite the importance and complexity of the sector, the lack of systematic knowledge is remarkable compared with other transport modes. Activities in the Region are performed almost entirely by the private sector, accentuating the importance of the regulatory framework

²¹ EMCT, 2006.

²² NAFTA – Transportation statistics, at <http://nats.sct.gob.mx/nats/sys>.

²³ Sustainable Mobility Project.

that organizes it, and this is a deciding factor in the sector's efficiency and of prices and service quality provided to users. From the few studies available, the efficiency of the sector in the region is low. Typical indicators for productivity are kilometers traveled per year and the average annual load factor. For example, in Colombia these indicators are along the lines of 50,000-60,000 km-year and 30% empty km/traveled; in developed countries, trucks travel around 200,000 km per year and empty km/traveled are somewhere around 25%.²⁴ While truck productivity partially depends on the type of demand (type of product) and the time-space structure (directional imbalance, traffic seasonality), in part it is also a consequence of the organization among companies, which depends on the regulatory framework established by the state and the degree of professionalism of the sector.

Road transportation regulations can be organized in two groups: technical and commercial. Technical standards include issues such as vehicle weight and dimension, power-to-weight ratio, maximum life-span, and emissions. Commercial regulations cover areas such as market access conditions, tariff setting, and labor and tax regulations. The regulatory framework and the capacity to enforce it not only determine the sector's performance but they are also important for the large externalities created (on roads maintenance, road safety, polluting emissions, and greenhouse gases) and the competitiveness relationships with other transport modes (especially railroad: the non-compliance of maximum weights on the part

²⁴ Considering EU countries; Source: Eurostat.

of trucks generates unfair competition, in addition to visibly increasing road maintenance costs).

Several countries in the Region have implemented reform programs in the last few years, generally through transport deregulation (Mexico, Argentina). Private operators have in most cases progressed in enterprise management efficiency (Uruguay, Chile), incorporating diverse logistics activities into their transport services. In federal countries, these reforms are difficult to implement given the legal mandate is with sub-national jurisdictions.

The impact of road transportation on a country's logistics is higher than initial analyses may suggest. The improvements that may be achieved in terms of price and service quality can not only reduce costs and transit time faced by shippers in the short run, they can also allow companies that produce or trade goods to develop more efficient supply strategies in the medium term. For example, studies on deregulation impacts of road transportation carried forth in Mexico at the end of the 1980s allowed the observation that many years later users of these services, when faced with the new regulatory scenario and greater competition among trucking companies, innovated in the organization of their companies, thus generating downstream impacts in the value chain.²⁵

²⁵ Dutz, 2005. His work was replicated in Eastern Europe, confirming the nature and magnitude of the impact that road transportation deregulation has had on productivity.

In summary:

- *The main problem experienced by road freight transport in the Region is low efficiency in vast industry sectors, the impacts of which multiply given its presence in practically every link of the logistics chain.*
- *Despite being the most important domestic transportation mode in the Region, there are very few information resources and analyses for the sector.*
- *The impact of road freight transportation improvements on logistics not only consists of reducing prices and travel times but also fosters the development of better strategies used by freight shippers for materials management, favoring innovation and leading to the greater efficiency of companies that produce and sell goods.*

4.2.3. Ports

Ports have a privileged place in the logistics chain since they are at the intersection between land and maritime (water) transportation. This gives them a pivotal location for the development of production and sales activities. There is a marked segmentation of port activities, since port terminals tend to be exclusively assigned to specific freight, such as dry bulk freight (minerals and grains), liquid bulk (fuels, other chemical products), vehicles, or containers (which concentrate a major portion of general freight). Some ports have different types of terminals and others specialize in specific types of freight.

The geographic position and products that make up international trade in LAC give ports and maritime transport a crucial role. The Region's ports transfer an annual volume of 1,450 million metric tons being the main entry and exit nodes of international trade. It is worth noting that 80% of the volume that is moved constitutes exports and 20% is imports, due to the distinctive exporting nature of the region's commodities (minerals, grains, hydrocarbons). Some 62% of the movement is found on the eastern coast of South America, 15% on the western coast, and 23% in Mexico, Central America, and the Caribbean.²⁶

Many ports in LAC have undergone important reforms in the last 15 years. Port reform modalities have been diverse (existing ports concession and privatization, licensing of new private ports, outsourcing of port public companies activities). The organization of processes leading to private-sector openness and the start-up of control and regulations entities have taken many formats and given different results. In general, the landlord model has been adopted, in which port authorities (public or mixed) lease port facilities to several specialized terminals that serve all users demands (providing services to ships and freight). The opening of port activities to the private sector in the last few years has been significant not only in the region and in other developing countries but also world-wide. Ports

constitute an excellent example of public-private cooperation in which firms may invest in equipment and operations management (which has gained sophistication), while the state contributes by supplying basic infrastructure, which because of its characteristics (size, indivisibility, long lifespan, externalities) can seldom be fully assumed by private operators.

In general, the port reforms carried out in LAC had positive impacts where they occurred, improving service quality and prices as a result of better terminal effectiveness and productivity and substantially expanding capacity (more loading capacity as well as the ability to receive larger ships). It is very likely that the recent trade expansion of certain countries such as Argentina, Chile, or Mexico would not have been possible without these reforms. Studies coincide on the fact that they have contributed to the substantial improvement of terminal performance -in loading and unloading of vessels- but not as much in the functioning of ports as a whole, where problems persist in trade facilitation, information exchange among the port community, and landside accesses that are restricted by the usually conflictive city-port relationships.²⁷

In the last five years, while the Region's economy has grown at an annual rate of 5% and trade approximately twice as much, ports have undergone strong pressures not only due to increased freight volumes (container and grain terminals have physical annual growth rates over 15%) but also to changes in vessels characteristics. Greater demand has led to the entry of larger vessels, which require greater depth, more extensive berth locations, loading and unloading equipment with greater power and capacity, larger yards, etc.

²⁷ Sánchez, 2006.

²⁶ CEPAL, 2007. Values for 2006.

The limitations of the port reforms, together with the investment requirements resulting from the trends in market demand, lead countries that have had reforms to adjust their port organization models, creating second-generation reforms to adapt to the new reality, incorporating financing models based on public-private partnerships. Countries that did not make port reforms have generally lost ground in terms of their competitiveness on international trade.

Port performance clearly affects maritime connectivity, particularly in the movement of containers that move freight with the highest unitary costs. In the last few years shipping lines that organize their maritime container transport services with regular itineraries have introduced changes to the configuration of their networks, making transshipment a common practice. The ease with which containers are loaded and unloaded allows them to organize their shipping lines by operating large-capacity vessels in main corridors, which only have access to principal ports, and smaller feeder vessels that serve ports that handle less freight or have poor performance (less depth, worse equipment, etc.). Trade alliances between shipping carriers have facilitated the expansion of this operating mode. In this way, main ports become pivotal to shipment transfers (port hubs); their large scale and the types of vessels they operate allows them to significantly improve maritime connec-

tivity. Therefore, countries seek to transform their ports into regional hubs, since this favors the competitiveness of their own trade.

The impact of port performance on logistics and international trade is evident. Recent studies have estimated that if the region's ports had similar levels of performance as developed countries, international transport costs could be reduced between 10% and 25%.²⁸ Studies performed in other developed countries draw similar conclusions: port efficiency is a clear determinant of international trade, and improvements in this sector by itself can have a greater impact than improvements to all the other sectors analyzed (customs, regulatory context, tariffs, electronic commerce) as a whole.²⁹

The financial and stock market crisis in the second half of 2008 had a huge impact on the maritime industry in general, and has decelerated growth trends over the last five years. Maritime freight charges decreased by almost 50%. Despite this crisis, the magnitude and length of which is hard to foresee, structural problems in LAC ports are highly relevant and affect logistics costs.

²⁸ Mesquita et al., 2008
²⁹ Wilson et al., 2003.

In summary:

- *Many of the Region's ports have achieved acceptable performance levels of their ship load and unload functions; public-private sector articulation has proved to be particularly efficient in this sector.*
- *Even in successful cases, problems persist relating to the organization of the port community, articulation between stakeholders, and in the relationships with the city.*
- *In some cases, ports continue to operate with inadequate management models and are losing relevance in the region*
- *The impact of port improvements on logistics is enormous: this is probably an area in which the greatest progress can be made to improve competitiveness*

4.2.4. Rail freight transportation

The railroad network has witnessed considerable development in several countries of Latin America, fundamentally in South America and Mexico. From its beginnings in the mid-nineteenth century it has expanded by more than 100,000 km.³⁰ The railroad system has reached its greatest development in the countries with the largest territorial extensions that transport large volumes of bulk freight, such as Brazil, Colombia, Mexico, Argentina, Chile, Peru, and Venezuela.

Despite the extension of the network, toward the end of the 1980s the level of railroad activity was stagnant or declining, dominated by very large and bureaucratic state owned and managed structures characterized by low productivity, poor adaptation to customer needs and large financial deficits. In the early 1990s an in-depth reform was implemented, in line with similar changes attempted in other countries in the world.

The principal element of reform was the concession by which a company (generally private) becomes responsible for the infrastructure, operations and administration, while assets remain the property of the state. Concessions for the most part maintained a vertical integration: the private concessioner administered the services and the infrastructure of a network segment in the same manner that the public company had done previously. There have been exceptions, basically in Chile and Peru, where it was decided to separate the infrastructure operations from management. While vertical integration facilitates operations management and the consistency of investment plans, it can lead to regional monopolies. It is assumed that competition with other transport modes, and not between railway companies, will motivate private concessionaries. The regulatory framework must ensure that the sector operates competitively.³¹

³⁰ The first railway in the region was built in Cuba in 1837.

³¹ Railroad regulation in its beginnings – when railroad companies constituted big monopolies – was a pioneer in the economic regulation of public services.

With reference to railway freight services (those relevant to logistics), reforms have generally had positive results, fulfilling initial objectives to increase volume, reduce rates and improve services.³² The result of reforms is a permanent topic of debate, in which consensus is not reached at present. Nevertheless, it is common knowledge that reforms have been more successful in rail freight transportation than for passenger services (urban and commuter rail). Investments made by concessionaries have been moderate; the biggest contributions have been in the organization and management of services.

Following the reforms, at the beginning of the twenty-first century the railways in the region transported over 400,000 tons a year; the transportation of minerals, coal and grains accounted for more than 90% of freight.³³ Brazil is by far the biggest user of railroad transportation, accounting for almost three-fourths of total movements (measured in tons), surpassing 300 million tons per year. Mexico, Colombia, Chile, and Argentina domestically transport between 20 million and 40 million tons by rail.

The current influence of railways on logistics centers on the value chains that involve the massive displacement of bulk commodities. Some railway lines exclusively serve large clients that have their own freight facilities and operate in private ports, as is the case of minerals (Peru, Brazil, Chile), cellulose (Chile), or coal (Colombia). In the case of grain there is a greater variety of carriers and terminals (Argentina, Brazil). The growing trend in container transport is incipient, although its expansion is particularly noticeable in Mexico, which is oriented toward international trade with the other members of the North American Free Trade Agreement. The railroads in Central America have very low levels of activity and mainly transport fruit.

³² Sharp, 2005.

³³ Kogan, 2006. North America Transportation Statistics (<http://nats.sct.gob.mx>).

The participation of railways in freight transportation in the region is relatively low and has great growth potential. Currently in Brazil it accounts for 20% of tons-km, in Mexico 11%, and in Argentina 7%. These values may vary, depending on what transport modes are considered, whether they are measured in tons or tons-km, and if international trade or only domestic traffic is considered. In a context that promises greater energy efficiency and reduced emissions, the transfer of freight from trucks to railroads will be an objective of all countries with a railway network. However, tapping the full potential of railways will depend on the quality of operations management and its capacity to adjust to client logistics requirements; this is particularly true for the expansion into freight markets with higher unitary values, since railroads compete more easily when it comes to bulk freight. This will also depend on the ability that authorities have to guarantee a plan ensuring fair competition with road freight transportation, especially to avoid excess loads and informal economic activity, and to establish fair roads infrastructure user charges.

While the railway concession model adopted in the 1990s has brought positive results to freight transportation, the leap required to capture substantially larger portions of the freight market requires investments that can hardly be faced by private concessionaries without government support. Massive renovations and changes in technology and operations models (greater rail axis weight, longer trains, better frequency, level crossings, port access, and urban beltways) imply large-scale investments that will require restructuring the existing regulatory framework. As is the case in ports, railways constitute a service in which first-generation reforms allowed a much more efficient use of existing equipments and facilities, but a public-private partnership (PPP) financing scheme will be needed in order to expand capacity.

In summary:

- *Freight railroad transport has achieved the broadening and modernization of its activities after reform, with a focus on bulk freight transport and a strong export orientation.*
- *Its transportation potential is immense and its ability to reduce negative externalities will continue to make it more attractive as a model of sustainable transportation.*
- *Private participation has allowed important improvements in management and some investment, but the active participation of the public sector will be necessary in order to take a leap in terms of freight quantity and the diversity and quality of service.*
- *The impact that greater railway participation will have on bulk logistics shall be important and can also contribute to main transport corridors for containers linked to ports. The benefits, however, go beyond logistics improvement, reducing externalities that are more and more important to the agenda of public policies (contamination and greenhouse gas emissions, accidents, traffic congestion).*

4.2.5. Trade facilitation and border administration³⁴

When a country already faces favorable market access conditions, improving the efficiency of bringing goods to international markets becomes increasingly relevant, since the major constraint to exports is less likely to be the ability to access these markets, but rather the ability to supply markets. At the same time, reductions in trade barriers more broadly are eroding some of the traditional preferences enjoyed by countries, particularly in the Caribbean, further elevating the importance of trade facilitation in maintaining a competitive advantage vis-à-vis other countries.

Recently, the agenda of trade facilitation has broadened and overlaps with the logistics agenda: "In the last years international trade facilitation experts have shifted towards a comprehensive understanding of the supply chain, and not only look at trade procedures but also take into account import and export supply chains of developed countries and associated physical movement of goods".³⁵ However, this document considers a narrow, yet consistent, approach which focuses on the simplification and streamlining of trade procedures and international transportation including, inter alia, import and export procedures and documentation (customs or license formalities); regulations relating to trade and transport (SPS, TBT); payment, insurance and other financial requirements; trade policy (antidumping, safeguards) and trade agreements; and security. These additional security requirements are driven by concerns over theft, piracy, smuggling, and terrorism. Supply chain security is no longer just about asset protection; supply chain management must extend beyond the company's internal processes and those of their reliable suppliers to address security procedures at every point along the supply chain in order to plan, manage, facilitate and monitor the global movement of goods. The aim of international standards, such as those promulgated by the World Customs Organization (WCO), Council Framework of Standards to Secure and Facili-

tate Global Trade (SAFE), is to combat threats while ensuring the smooth flow of trade.

The reduction of tariffs and non-tariff barriers, long distance maritime transportation deregulation, the growth of trade and multimodal transport, and the rapid growth in the use of ICT have contributed to greater cooperation between stakeholders, through most efficient and least costly international trade transactions. The right use of integrated logistics practices and trade facilitation measures, taking full advantage of modern ICT tools, has proved to be effective for reducing costs and improving service and competitiveness. Further, trade facilitation measures focusing on customs procedures and regulatory environments can lead to improved controls, reduced administrative costs, and thus increased cooperation between the public and private sectors even when applying these measures implies costs. Djankov, Freund, and Pham³⁶ estimate that one additional day in product delays prior to shipping cuts trade by at least 1% and is equivalent to a country distancing itself from its trading partners by an additional 70 km. Research on Sub-Saharan Africa reveals that it takes 48 days on average to get a container from the factory to a ship. Reducing export times by 10 days is likely to have a bigger impact on exports (expanding them by about 10%) than liberalization in Europe or North America.³⁷

Lastly, Otsuki,³⁸ using a sample of 75 countries (weighted toward developing economies) found that improving these countries' trade facilitation records to the global average resulted in trade gains equivalent to US\$377 billion, representing an increase of about 9.7% in total trade -with Latin America accruing about 20% of these gains (South Asia, 40.3%). A little over 40% of these gains would come from improved service sector infrastructure, while nearly 20% are due to improvements in the regulatory environment.³⁹

³⁴ With contribution by Krista Lucenti, International Trade Consultant, IDB.

³⁵ Arvis et al., 2008. Implementing Trade Facilitation.

³⁶ Djankov, Freund, and Pham, 2006.

³⁷ Hummels, 2007.

³⁸ Otsuki et al., 2003.

³⁹ Guerrero, Lucenti, and Galarza, 2009.

Chapter 3 describes several indicators that show deficiencies in the trade facilitation processes of LAC, through hard indicators (such as those provided by Doing Business), as well as through the perception indicators belonging to the LPI, and particularly, the Enabling Trade Index (ETI). These indicators serve to identify the region's relative situation and to identify major issues:

- According to Doing Business, LAC require 52% more documentation than OECD countries to carry out export activities, 111% more time and with a cost per container that is 32% higher. For import activities these ratios are 61%, 129% and 39%. There is great disparity across indicators at the country level.
- Of the seven sub-indices that make up the LPI, those for customs performance and international shipping procedures are below average: the standard value of the LPI ranking of countries in the region is 80, the sub-index corresponding to Customs is 82, and international shipments is 85 (the highest score for all seven sub-indices, which implies the worst relative performance). The value for infrastructure is 79. In several countries customs performance and international shipment procedures rank much less favorably than other indicators (in Paraguay, for example).
- The three sub-indices related to customs and international trade procedures in the ETI show results that are slightly better than those for transportation and infrastructure. As in the case of the LPI, the variance of customs performance indicators is very high (the highest variation coefficient), with exaggerated values (which indicate poor performance) in several countries, inasmuch as efficiency and customs transparency are concerned; in Ecuador and Venezuela, for example.

Trade facilitation is an area in which very diverse subjects converge. There are five types of actions, key to the region, which illustrate the problems that need to be solved in order to improve performance: (i) Core Customs Modernization; (ii) Integrated Border Management: the Single Window Environment and the Joint Border Crossing Model; (iii) Electronic Data Interchange; (iv) In-transit Freight Circulation; and (v) Security.

Core Customs Modernization. The main objective of modernization is to facilitate trade by accelerating the customs clearance process through the use of information technology and the simplification of documentation and procedures. In addition to facilitating trade, modernization generates savings to customs authorities and provides comprehensive information for decision-making. A computerized system is at the heart of the reform and requires a lengthy and costly installation process, since it must be extended to the multiple entry and exit gates of a country (ports, airports, border crossings) and other internal customs controls posts. Compatibility among systems and across countries is fundamental for the facilitation of regional integration and in-transit circulation. It is worth noting that customs are only one out of many agencies that are responsible for border control, but they are usually in charge of overall coordination activities. Though improving customs performance remains a priority for the region, projects need to increasingly support the modernization of other border agencies including, inter alia, agriculture, quarantine, health, immigration, and police. Any new agenda on trade facilitation and logistics should seek to improve coordination among agencies involved in border processing; create greater competition in transport services and other trade-related services (freight forwarding, railways); and improve existing transport and trade policies and regulations.

Percentage of Respondents who evaluated performance or quality of services as very high/high					
	Top LPI Performers		Low LPI Performers		
	Q1%	Q2%	Q3%	Q4%	Q5%
Competence of Customs Agencies	48	54	53	56	66
Competence of Non-customs Agencies	38	40	33	37	57
Use of IT in Customs Agencies	66	56	63	78	77
Quality of Logistics Services	53	30	26	29	41

Table 6
Restrictions to trade logistics.

Source: LPI, 2007.
Note: Q1= top quintile, highest performance in the LPI; Q2 =second quintile, high performance in the LPI; Q3 = third quintile, average performance in the LPI; Q4 = fourth quintile, low performance in the LPI; Q5 = bottom quintile, lowest performance in the LPI.

ii. Integrated Border Management

a. **Single Window Environment** (Domestic Implementation). The Single Window Environment (Figure 16) is a cross-border, intelligent facility that allows parties involved in transport and trade to lodge standardized information, mainly electronic, with a single entry point to fulfill all import, export, and transit-related regulatory requirements (WCO website). Such documents include customs declarations, applications for import/export permits, and other supporting documents such as certificates of origin and trading invoices. If the information is electronic, data must only be entered once. The single window system offers important advantages for government and for private sector trade and transportation companies. For the government, it helps improve risk management during inspections, safety controls and tariff income. For the transportation and trade community, it increases clarity of standards and transparency and reduces transaction costs.⁴⁰

b. **Joint Border Crossing Model** (International or Regional Implementation). Intraregional trade in Latin America -mainly conducted

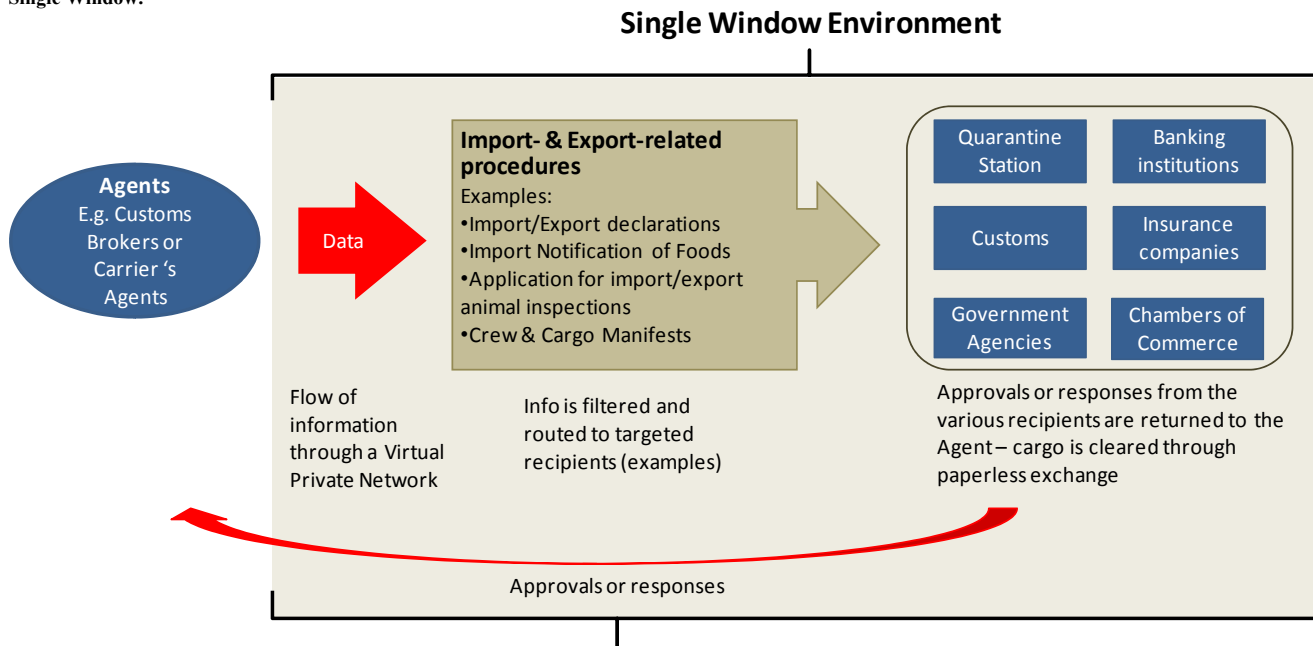
through road transport- has grown more than international trade as a whole, placing increasing pressure on border crossings. Border crossings join the control functions of two countries, each including many agencies with different mandates and priorities, and reporting to different Ministries, who themselves coordinate little. For example, regulations often warrant the complete unloading of goods at one border and the reloading into trucks from the country of entry, with resulting cost overruns and extended transit time. Joint Customs control at neighboring borders would entail processing documents and undertaking inspections by Customs authorities at one border crossing and/or mutual recognition of clearance/inspection results of the partner Customs authority. The objective is to eliminate redundancies e.g. no duplications of certificates, checks done once, data-sharing between authorities. The number of stops would be reduced by combining both countries' activities into one common location, or at a location for each direction (juxtaposed facilities).⁴¹ Regional harmonization has also been discussed within the context of the IIRSA.⁴²

⁴¹ ADB, 2003.

⁴² IIRSA, 2005; Sanchez y Cipoletta, 2004.

⁴⁰ UN/CEFACT, 2005.

Figure 16
Electronic
Single Window.



- iii. **Electronic data interchange (EDI).** EDI is the computer-to-computer transmission of (business) data in a standard format (UN/EDIFACT website) between trading partners -presented according to pre-determined formats as agreed internationally- which substantially facilitates communication between public and private actors in the trade and transportation sectors. The format and sequencing of data transmission generally used is UN/EDIFACT, the electronic interchange of data for administration, trade and transportation, which replaced earlier standards that were not mutually compatible and is the principle international standard. The automation of data interchanges facilitates transactions and reduces billing and shipping errors (since the input of information is done only once); reduces human and material costs of paper documents, meetings, faxes; and reduces the time needed to receive and incorporate information. According to a recent report, 34% of purchase orders are transmitted electronically in North and South America; 36% in Europe, Middle East and Africa; and 41% in Asia Pacific region. In addition, the average paper requisition-to-order costs a

company \$37.45 in North and South America; \$42.90 in Europe, Middle East and Africa; and \$23.90 in the Asia Pacific region. With an EDI requisition-to-order, costs are reduced to \$23.83, \$34.05, and \$14.78 respectively.⁴³

- iv. **In-transit freight circulation.** In the cases of trade between two bordering countries, in-transit circulation means that customs clearance is performed at facilities furnished within a country and not at its border. This implies a credit of trust on the part of the receiving country, since the truck entering its country shall only pay corresponding duties upon reaching its destination; the risk of fraud is controlled with warranties (bank or the actual truck owned by the carrier) whose characteristics have been defined in international trade agreements. In cases where goods are being transited from one country through one or more countries before reaching their final destination, a system for ensuring safe passage is fundamental. Early results from the implementation of the system for International Transit of Goods (TIM in

⁴³ Aberdeen Group, 2008; www.aberdeen.com.

Spanish) are optimistic: In El Amatillo, on the border between El Salvador and Honduras, the average border-crossing time has been cut from 61 minutes to 8 minutes, which translates into valuable time savings in waiting, thanks to the introduction of a single electronic customs declaration form and a single procedure for all control agencies. This has had a positive impact on the control activities performed by the customs authorities because they are given information in advance, which helps them analyze and assess risk.

- v. **Security.** The proliferation of cross-border threats and illegal activities has introduced an additional factor of risk to international commercial transactions. At the same time, trade liberalization necessitates a reduction of transactional costs and greater control over goods along supply chains. In response to this dichotomy, "control versus facilitation", the WCO developed a set of uniform application measures contained in the SAFE Framework of Standards. SAFE sets out a range of standards to guide international Customs Administrations towards a harmonized approach based on Customs-to-

Customs cooperation and Customs-to-Business partnerships. Certification programs for reliable operators, the Authorized Economic Operator (AEO), are one of the building blocks of the SAFE Framework. The AEO is "a party involved in the international movement of goods in whatever function that has been approved by or on behalf of a national Customs administration as complying with WCO or equivalent supply chain security standards. Authorized Economic Operators include inter alia manufacturers, importers, exporters, brokers, carriers, consolidators, intermediaries, ports, airports, terminal operators, integrated operators, warehouses and distributors" (WCO website). Accordingly, the United States launched the C-TPAT program in 2001, the EU formalized their AEO in 2008, while Canada, Japan, Australia and New Zealand have also developed their own programs. For operators, their certification in these programs or the mutual recognition of certificates between customs programs means in practice, faster channels in goods, both import and export, and cost savings.

In summary:

- *The quality of Trade Facilitation measures are weaker in the region than in developed countries.*
- *Indicators show great dispersion, showing a large heterogeneity in performance; however, in many cases improved performance in trade facilitation outweighs the benefits from improved infrastructure.*
- *Effects on trade are huge: the costs and times involved may cancel out any benefit achieved through large infrastructure investments.*
- *Recent studies show that customs efficiency and electronic commerce are the factors that most impact competitiveness, following port efficiency.*
- *The actions required to improve performance have been clearly identified and several international organizations have elaborated corresponding programs (mainly United Nations).*

4.2.6. Small and medium enterprises and regional logistics development

Small and medium-size enterprises play a prominent role in the economy, not only for their contribution to the generation of products or fiscal revenues but for their creation of jobs. Several analyses show that SME logistics costs tend to be much larger than those of large companies and that this is not only related to scale but also to a limited capacity to organize flows of materials throughout procurement, production, and distribution processes. For many SMEs, logistics integration (with suppliers and clients) is a major challenge. SMEs tend to be pressured by larger companies -their clients- who force them to change their traditional business styles and adapt to integration within value chains that they dominate, and they evaluate them with the same criteria used to measure their own logistics performance. A few difficulties experienced by SMEs, particularly on international trade, are the following:

- they export small quantities that do not fill a container, which requires the consolidation of freight between various customers;
- their negotiating capacity with government organizations and other companies (customers, suppliers) is reduced;
- they do not usually have the appropriate knowledge on the benefits of good logistics management principles on business results;
- they are subject to excessive controls on transport freight and documentation; and
- they have difficulties relating to the management of information referring to international trade logistics rules, and completing procedures is a lengthy process.

Partial studies in Latin America (for example, studies or surveys performed by the World Bank in Argentina and Colombia) show that logistics costs for SMEs tend to be between two to three times bigger than those of large companies. In Mexico, the Ministry of Economy estimates that 20,000 SMEs with exporting potential do not gain access to international markets mainly due to their lack of knowledge on how to design a logistics chain for the distribution of their products. Despite the relevance of this subject, research on SMEs and logistics is still incipient and centered on more developed countries. These analyses show that SMEs and large companies have different approaches on how to plan and manage logistics chains, demonstrating a need to continue research on this issue.

The problems faced by SMEs regarding logistics can be illustrated by reviewing the solutions they usually propose to improve their logistics performance. This is not a field in which basic studies and proposals have been already elaborated and acknowledged, as is the case of trade facilitation. Three critical limitations faced by SMEs are highlighted, providing an outline of possible solutions which are listed in the following page.

The support for the logistics development of SMEs can be linked to territorial policies as logistics platforms (for a country, sub-national entity, or city). The same training can take a broader application and be oriented not only to production units but to the community at large for the development of logistics excellence in a given territory. Such an approach requires the active cooperation of the business community, logistics operators, academia, and multilateral organizations.

Limitations faced by SMEs and possible solutions

- (i) **The reduced size of shipments impedes the achievement of economies of scale in logistics functions.** To overcome this, several small companies can integrate their operations; this basically includes joint logistics planning and procurement. Success stories in Italy show that savings in logistics costs can be considerable, up to 40%. Another efficient form of collaboration is the development of logistics platforms (or a platforms network), which -in the sense of clusters and territorial dimension- offer the possibility to share resources and facilitate logistics performance. In recent years there has been an explosion in the development of Logistics Activity Areas whose impact reaches more than just SMEs. In addition to Logistics Activity Areas, virtual platforms may be developed through portals that support SMEs.
- (ii) **A lack of logistics operators who provide services to small companies.** If the supply of s operators is increased, small operators can, in turn, test integration strategies themselves, thus integrating collaborative networks. The existence of Logistics Activity Areas facilitates the networks.
- (iii) **There is scarce training on logistics topics in SMEs.** Different levels of government may promote and support logistics training at SMEs. Programs tested in Mexico by the Ministry of Economy have demonstrated that technical assistance to redesign supply chains have led to important cost reductions in small and medium-size enterprises.

In summary:

- *Since SMEs are big employment generators, their competitiveness is of great interest to countries and sub-national entities.*
- *The logistics performance of SMEs is clearly lower than that of large companies; their logistics costs in the Region are between two to three times higher.*
- *Exporting SMEs are more oriented toward intra-regional trade.*
- *Studies and proposals on this subject are very few and should be increased.*
- *International experience suggests that policies to support private-sector development can help SME clusters increase competitiveness.*

4.2.7. Other critical components

Even though these six sectors present the main challenges to freight logistics in LAC, there are other sectors with different types of obstacles to regional logistics performance. Three sectors are particularly relevant.

Maritime transportation

Maritime transportation services are linked to the characteristics of ships and include: (i) shipping companies with regular routes and freight mostly transported in containers; (ii) solid bulk transportation such as minerals or grains, not subject to regular routes; (iii) liquid bulk transportation (fuels, chemical products); and (iv) specialized services such as ships transporting vehicles, reefer ships and ships prepared for large dimension freight, among others. This analysis focuses on the first type, responsible for transporting the freight (domestic and international) with the highest value density (\$ per ton). At present, LAC move around 25 million Twenty-foot Equivalent Units (the capacity measuring unit of a 20 foot container) -TEU-per year.⁴⁴

The containerization process has had a strong impact, giving way to the expansion of ships and specialized terminals by increasing the capital-intensive character of the activity and favoring a concentration process of global carrier companies and port operators. Shipping companies have experienced a horizontal expansion through mergers and acquisitions, allowing cooperation practices (consortia, alliances) to benefit from economies of scale. The maritime routes have been reorganized with a trunk-feeder model (hub and spoke) in which large-dimension ships are assigned high-density routes and call on few ports, while smaller ships -feeders- feed them with the traffic from remaining ports. This blueprint has implied the broad development of transfers as a port activity (port dynamics is no longer dependant on hinterland trade⁴⁵) and it has unleashed a race in ports that want to become hubs to receive larger ships and offer better trans-

portation conditions (time, price). The containerization process has also promoted the vertical expansion of shipping lines, who in some cases have established their own port terminals and seized the opportunity to provide intermodal services with maritime and landside segments (from “port to port” to “door to door”), directly becoming logistic operators (generally through independent companies).⁴⁶

The coverage in terms of maritime service companies that LAC has is acceptable: the Liner Shipping Connectivity Index⁴⁷ shows the Region in an intermediate position with high growth rates: 16 out of 24 countries are ranked in the 20 to 70 position range over 162 countries in the world. In general, these are competitive markets in terms of price and quality of service, particularly in ports with major activity, even when there are cases in which a shipping line (or a group of them) reaches considerable market power. The freight costs (subject to strong worldwide variations) depend on distance and traffic density because of economies of scale of ships and terminals; port characteristics and services, such as depth of accesses and peers or the handling capacity of docks and yards; or the performance of loading and unloading equipment. Recent analyses indicate that the value-weight ratio of merchandise to transport and port efficiency are the principal determinants of the freight transportation value.⁴⁸

⁴⁶ Heaver, 2001.

⁴⁷ The Liner Shipping Connectivity Index (UNCTAD) calculates its values by considering the quantity of line ships, the freight capacity of containers, the quantity of shipping companies, the number of navigation routes, and the dimension of the largest ship that dock in the ports of the country. The countries' scores rank them from 1 to 162.

⁴⁸ Mesquita et al., 2009.

⁴⁴ Source: The American Association of Ports Authorities, which includes ports of South and Central America.

⁴⁵ At present, one out of two containers transfer in a port before reaching their final destination.

Air freight transportation

Air freight transportation has grown significantly in LAC; 4.1% between 1997 and 2007 (in terms of volume transported), which is important but not as sharp as sea containers transported (9.8% for the same period). Air freight transportation is more concentrated on particular kinds of traffic that are related to international trade of higher value-density products. In some countries an important part of trade (measured by value) is performed by air, reaching 23% in Colombia, the largest air freight transportation market in the Region. A third of the sector's activity -measured in tons per km- corresponds to intra-regional traffic and two-thirds to extra-regional traffic, of which almost 80% is trade between LAC and the United States and Canada.⁴⁹ The largest part of traffic (65%) has its origin or destination in South America, particularly in Brazil, Colombia, and Chile; about 25% is from Central America and Mexico (the latter accounting for more than half these flows), and 9% is from the Caribbean (with the Dominican Republic as the origin or destination of half of air freight traffic).⁵⁰ There is an imbalance in the three zones due to the dominance of south-to-north traffic, which is even more marked in the south of the continent.

The freight cost values are very sensitive to fuel prices and economic cycles. The crisis of 2008 caused traffic to fall 25% in the Region (in volume; with respect to income, the decline was substantially bigger since freight costs went down).

Commercial air transportation includes freight and passengers, creating synergies between both types of service. A significant part of freight is transported in the haul of passenger planes (occupying up to 40% of those units), while the rest uses special freight aircrafts when volumes are important. The special freight airplanes are operated by mixed air transportation companies (passengers and freight), by exclusively dedicated freight firms, and by integrated express service operators. In general,

freight and passenger planes share parts of the airport infrastructure and services (such as landing strips) while they have specific terminals for their activities. There is a marked trend in the Region toward developing specialized freight terminals specifically prepared for delicate and perishable products, such as fruits or flowers.

Air freight transportation has few commercial access restrictions and has more freedom than passenger transport services. The convenience of dispatching air freight depends on the type of product (value density) and hull availability, particularly because of unused hull capacity generated on the way back. For example, if a country generates exports by air, imports are favored to fill up hull space coming back, or the other way around. This process can be organized at the regional level: for example, the fruit exports of Chile may facilitate imports by air to Argentina. The principal restrictions to the expansion of air freight transportation are centered on reduced demand, higher competitiveness of alternative means (maritime and roads), and the weaknesses of regional airport infrastructure. A distinctive characteristic of air freight transportation is the need for fast processing during inspection and control procedures, to the point that generally customs (and other non-customs agencies) achieve better performance at airports than at ports and border crossings.

Surface transport security

Freight theft and piracy in land transportation are endemic throughout the entire region, mainly on trucks (they also occur in trains that ride at low speeds in certain traffic segments). There are no exact records, but estimates have been made by different countries. The Logistic Association of Argentina estimated there were 250 monthly piracy events in 2007. In Costa Rica, freight transport has changed from truck to plane due to piracy, with freight costs that are three times higher. At times, theft involves just merchandise but in other situations they include robbing the truck as well, which is later dismantled and sold. Criminal activity involves

⁴⁹ Latin America and Caribbean Air Transport Association (ALTA), reports and traffic.

⁵⁰ Presentations by Boeing World Air Freight.

products chosen by two criteria: the value of the goods and the ease of resale. Typical piracy targets food and drink, electronics, cigarettes, shoes and clothing, and medicine.

The impacts of this type of crime are multiple. It produces considerable economic loss (in the case of Argentina, it is estimated at between 4% and 9% of invoicing).⁵¹ With increased risk, security costs also rise in terms of insurance premiums, satellite positioning systems, guards, private surveillance posts, and other precautions that shippers and carriers need to take. Also, it creates non-compliance with the client and undermines the competitive position of the company responsible for the shipment. Furthermore, it diminishes the company's image and its products, which end up being traded through clandestine channels without quality traceability.

International traffic is also negatively impacted. In-transit freight is exempt from duties and border tariffs, but if it is lost inside a territory, the customs office is obligated under the presumption of fraud to enforce the payment of warranties. In accordance with valid regulations in South and Central America, though insufficient, the "in-transit" traffic warranty: has served to facilitate the expansion of the intra-regional trade. However, the customs in the region have taken a negative attitude due to the frequency of piracy and the weakness of warranties, which puts a system that has facilitated trade and integration at risk.

⁵¹ ARLOG, 2007.

4.3. Conclusions from the analysis by components

The previous section draws conclusions about the critical components of regional logistics system. These conclusions are summarized in Table 6, which considers the present situation of each component, the principal needs arising from the analysis, differences in needs according to the country type (if that were the case), the investment requirements and the roles of the public and private sectors, a sector's level of knowledge, and the impact that improvements could have on the Region's logistics performance. Briefly, with regards to these six critical components:

- the current situation is weak for some components (roads, road freight transport, trade facilitation, logistics performance of SMEs) and intermediate for others (ports, railroads);
- the needs are very different because they include long-standing "pending matters" that overlap with new needs for more capacity and quality of service;
- in general, needs vary according to the income level of the countries and the dimensions of their territories;
- some countries that implemented reforms in regulated services may require adjustments (second-generation reforms), while those that did not implement them should do so;
- there is room for public-private partnerships;
- there is basic knowledge in various components, except in road freight transportation and the logistics performance of SMEs which are exceptionally low;
- the impact of improvements is relevant to all components, but in some cases, it is more concentrated on international trade logistics or certain types of products. In the case of roads, it has multiple impacts that go beyond the logistics of freight; and
- improvements would touch on different areas of specialization, such as transportation, international trade, public management, and development of the private sector.

Table 7
Summary of the
analysis by critical
component of
regional logistics.

	Roads	Trucking industry	Ports
Current situation	Low coverage and poor quality conditions	Low efficiency, lacking professionalism	Intermediate, high impact of reforms and the PPP
Main needs	Multiple needs: more coverage, maintenance, broaden capacity, modernize standards, rural roads	Modernize operating management	Increase capacity and improve performance; reforms that were not done and adjustments where there were reforms
Differentiation by country type	Poorest countries: high investment; large countries, with territorial voids: need to expand network	Problems more salient in countries with lower incomes; duality in mid-income countries	Differences due to management model more than to country income levels
Investment, public and private	High investment needs; mainly public sector; financing sources?	Private investment; the public sector can facilitate upgrading a cleaner and more efficient fleet	Ample space for PPPs; need for good designs and regulatory capacity
Sector's level of knowledge	Generally good	Very low	Generally good
Impact on logistics	High but difficult to measure, affects mobility as a whole; pressure toward increased motorization	Very high, not only on freight but downstream in the value chain, on domestic and international logistics	Very high in foreign trade, with the ability to influence entire ground and maritime chain

	Railroads	Trade facilitation	SMEs and regional logistic development
Current situation	Intermediate to good in freight where there were reforms; great potential for expansion	Intermediate, improvements underway; heterogeneity, cases of extreme backwardness	SMEs with very high logistics costs
Main needs	Improvements in infrastructure, access to ports, belts in urban areas	Expeditious and transparent procedures, paperless systems, single window schemes, facilitate transportation	Training, integration, platforms (logistics platforms), strengthen operators, institutional development
Differentiation by country type	More potential in large countries, with large-scale freight	More related to institutional quality than income	More appropriate in mid-income countries
Investment, public and private	Room for PPP; requires adequate regulation	Basic responsibility of the public sector	State as promoter of private-sector development
Sector's level of knowledge	Generally good	Generally good	Very low
Impact on logistics	High for bulk transportation; potential in general freight when joined with domestic and international multimodal transportation	Very high on foreign trade	Probably high; impact on SMEs involved in regional trade

5. COUNTRY PERSPECTIVES: COUNTRY STUDIES

The preceding chapter describes an analysis of the most relevant freight logistics components of the Region that were identified on the basis of results in different international comparisons. The analysis is complemented in this chapter with a different approach: the results of logistics studies conducted in 10 countries in LAC. This is a very general review and only attempts to identify the main logistic problems faced by countries for which relatively recent studies have been done.

methodologies. What they all have in common is that they address general freight logistics problems (rather than focusing on a single component) and they are relatively recent. Most of the sources consulted were taken from studies funded by the IDB, the World Bank, the U.S. Agency for International Development, the International Finance Corporation, and national institutions and think-tanks. A brief summary of the main problems discovered for each case follows.

5.1. Country overview

Country cases were prepared on the basis of studies done by different organizations or institutions with different approaches and

Source: Argentina: the Challenge of Reducing Logistics Costs. World Bank Report No. 36606-AR, December, 2006.

5.1.1. Argentina

- Capacity problems at bulk transfer nodes (for grains and oilseeds) and container transfer nodes, particularly on road accesses.
- Excessive weight of road freight transportation, and low usage of railways in freight typically transported by rail.
- Steep logistics costs for SMEs in the northern region of the country.
- Frequent road piracy of freight transportation.
- Some failed inspection mechanisms; excessive red-channel on international trade, requiring inspection.

Source: Trade and Logistics Study on Bolivia. IFC, 2008.

5.1.2. Bolivia

- Port access difficulties due to the country's complex geographical characteristics and interbound nature.
- SMEs have poor logistics knowledge; limited professional training of operators (in cold storage chains, for example).
- Deficient basic transportation infrastructure (roads, railways, inland navigation).
- Difficulties with customs at border checkpoints: unreliable information systems and multiple windows.

5.1.3. Brazil

- Excessive usage of road transportation in detriment of inland waterways, maritime and railways transportation.
- Interference of freight transportation with urban traffic flows due to absence of road and rail beltways.
- Low efficiency in ports and recurrent problems in waterside and landside accesses.
- Excessive delays due to customs and sanitary inspections.
- Road network weaknesses: capacity problems in certain segments, deficient maintenance conditions, needs for rehabilitation.
- Distortions in traffic flows due to local taxation.
- Road piracy of freight merchandise.
- Institutional strengthening requirements: data, strategy, a National Logistics Council.

Sources:
National
Logistic Plan,
COPPEAD/UF
RJ and
Procomex
Reports.

5.1.4. Colombia

- Institutional weakness, absence /dispersion of basic information.
- Faulty road infrastructure.
- Poor efficiency of road freight transportation and logistics operators
- Little development of other means of domestic transportation other than trucks: railways (except for coal), inland navigation.
- Port capacity and competence problems, particularly in the Pacific coast.
- Limited use of information and communication technologies.
- Interest in the development of logistics platforms linked with trade corridors.

Source:
CONPES⁵²
3547, 2008.

⁵² Consejo Nacional de Política Económica y Social. Órgano de planeación para todos los aspectos de desarrollo económico y social del país.

5.1.5. Costa Rica

- Port inefficiency, fragmentation of yard operations, and draught restrictions have a deep impact on maritime accessibility.
- Excessive delays at border crossings.
- Customs modernization process, still in its early stages, covers some but not all entry-exit checkpoints
- Roads weakness: rehabilitation and maintenance needs; capacity enlargement requirements and standards improvement of main roads.
- Growing congestion problems in urban areas.
- Road robberies.

Source: joint
World Bank /
IADB report,
studies under
way.

5.1.6. El Salvador

- The high road transportation costs and the lack of professionalism in the industry have an impact on inventories due to delays, robberies, and deterioration in domestic transportation.
- Road congestion (due to increased motorization), urban by-passes needed.
- Port restrictions (shallow port, lack of equipment) affect the ships that have access to the port and increase the value of maritime freight rates.

Source: REDI-
SR World Bank,
2006.

Source: IADB internal reports.

5.1.7. Guyana

- Insufficient basic infrastructure: roads (main roads, feeder roads, bridges) and ports; infrastructure is limited, poorly maintained, and with negligible investment for expansion.
- Erratic domestic airline services (impact on tourism).
- Lack of land transport harmonization with neighboring countries, and difficulties with in-transit transportation.
- Export security controls.
- Minimum development of cold chains.

Sources: Mexican Competitiveness Institute, Mexican Transportation Institute⁵³, World Bank report on trade facilitation.⁵⁴

5.1.8. México

- Roads are particularly important because international trade is mostly handled by land rather than by water; modernization process (improvement of standards) and the establishment of adequate maintenance routines still need to be completed; due to increased motorization, there is a simultaneous need to make important capacity enlargements to main roads.
- Trucking industry: in part very efficient and in part too spread out and inefficient; inefficiencies at border crossings with the United States.
- Ports and port inspections: although they perform well in the loading / unloading of ships, they have problems with “second switching” maneuvers related to excessive inspection requirements by customs officials, absence of adequate information systems, and corruption; empirical studies have shown that this is a sector where unilateral reforms would have the highest impact on export growth (Soloaga et al 2006).
- Customs Office: still in the process of implementing unified inspections and paperless procedures.
- Growing interest at the sub-national level on the improvements of SMEs logistics performance and the development of logistic zones.
- Opportunities for new activities: US-bound traffic, establishment of logistic centers around large freight generation nodes, greater development of multimodal transportation.

⁵³ Mexican Transportation Institute, 2003. General diagnosis of the freight transportation logistic platform in Mexico. Querétaro: IMT.

⁵⁴ Soloaga et al. Moving Forward Faster: Trade Facilitation Reform and Mexican Competitiveness. World Bank Policy Research Working Paper 3953, June 2006.

Source: USAID-Canada.

5.1.9. Paraguay

- Weaknesses in roads (mainly rural roads) and domestic transportation (reduced volumes).
- In-transit circulation obstacles by other countries of the region, delays in border checkpoints.
- Cost overruns in customs processing.
- Restrictions on river navigation.

Source: Logistics and Transportation Cluster, supported by the EU.

5.1.10. Uruguay

- Institutional weakness in the coordination of logistic policies.
- Expansion and improvements of port works, development of associated dry ports.
- Need for railroad reforms and improvements.
- Challenges to the transportation of forestry products.
- Development of regional services, making Uruguay a transport hub.

5.2. Towards a classification of logistics issues in the region

Indicators show great diversity in the logistics performance of countries and point to the diverse problems that they face. What factors influence these differences? Can a typology of countries with similar problems be established? What follows is an attempt to answer these questions, first with an analysis of the results obtained from the case studies reviewed in the previous section, and later with a general analysis correlating logistics performance with specific characteristics of LAC countries.

A SYNTHESIS OF THE REVIEW OF CASE STUDIES

A more detailed analysis of the principal problems detected in the cases reviewed, after sorting countries by their respective levels of economic development (adopted from the World Development Indicators), reveals that the main weaknesses of low-to-middle-income countries are the provision of basic infrastructure, the need of first-generation government reforms for the provision of services (ports, railroads), and the facilitation of trade and border controls. On the other hand, middle-to-high-income countries have a more complex agenda of needs that includes, not only infrastructure but also services, looking at second-generation reforms (particularly of railroads, ports and road freight transportation), the search for an institutional organization that facilitates the management and monitoring of public policies, an emphasis on the logistic improvements of SMEs, logistic clusters and parks, and trade facilitation improvements with unified and paperless control procedures, all being supported by information systems shared by public and private agents.

Beyond this general characterization, some particular trends have been detected:

- Some countries try to develop logistic activities by cashing in opportunities beyond their own commerce, such as becoming regional logistic platforms; this trend may be observed in small countries (Panama, Uruguay) or in countries that have neighbors with large trade flows (Mexico).
- Large-sized countries have a growing interest in logistics performance at the sub-national level (Mexico, Brazil, Argentina).
- Due to their small dimensions, the Caribbean islands are a special case where domestic logistics is of little relevance and the main aspects that seem to be more important are management of ports and airports as well as nautical and air commercial accessibility. Studies on logistics performance tend to exclude very small countries from their analyses and are therefore insufficient to determine the needs of these types of countries.
- Countries with significant parts of their territories isolated from the central areas of production and consumption need to secure internal connectivity (Brazil, Bolivia, Colombia, Chile, Peru, Paraguay); integration projects with neighboring countries are often linked with this need to improve cohesion within their own territories.
- The most serious security problem is road piracy, with clearly a larger impact than the need to control international freight following the events in September 2001.

WHAT FACTORS DETERMINE PERFORMANCE DIFFERENCES BETWEEN COUNTRIES

The factors that initially appear to be more relevant for recognizing common patterns are the development level of a country, the dimension of its territory, the quality of its institutions, the quality of infrastructure, and the degree of commercial openness and accessibility. A preliminary analysis of the correlation between the logistics performance of the Region's countries -measured through the Logistics Perception Index- and variables representing those factors gives the following results:

- Economic development (expressed as GDP per capita) is clearly the factor with the highest correspondence (correlation coefficient of 0.80).
- Institutional quality follows in order of importance; it was measured using three indicators: effectiveness of government, quality of regulations, and control of corruption.⁵⁵ All three indicators show very similar correlation coefficients, with the LPI close to 0.50.
- The quality of infrastructure shows a slightly lower correlation of 0.47. In this case, the sample taken was smaller because the infrastructure quality gap indicator is available only in 12 countries of the Region.
- The correlation between the LPI and territorial dimension is low ($r = 0.33$). Some countries with large dimensions show poor logistics performance (Colombia, Bolivia).
- Commercial openness (the sum of exports and imports as a proportion of the GDP) does not present a correlation with logistics performance, probably because some countries with poor logistics performance import a high portion of their consumption (Nicaragua, Guyana) and others with high logistics performance constitute relatively closed economies (Argentina, Brazil).
- Finally, the landlocked condition exists only in Paraguay and Bolivia, whose weak logistics performance is clearly associated with low economic development.

Table 7 contains the basic information that was used. Although the analysis is limited by the sample size -relatively small because only 21 countries in the Region have an LPI score- the results are consistent. Economic development appears as the principal factor influencing logistics performance, followed by institutional quality and quality of the infrastructure.

⁵⁵ The institutional quality indicators were taken from the 2007 estimates of the *Worldwide Governance Indicators*, and they may be accessed at <http://info.worldbank.org/governance/wgi>.

Table 8
Logistics performance and associated factors.

Source: Author's own work, explanations in body of text.

Country	LPI	GDP per capita	Territorial extension	Trade openness	Infra. gap	Government effectiveness	Corruption control
Argentina	3.10	11,670	2,780	38	3.23	-0.14	-0.45
Bolivia	2.51	3,840	1,099	58	4.60	-0.83	-0.49
Brazil	3.20	8,700	8,515	22	3.93	-0.12	-0.24
Chile	3.09	11,660	757	66	2.03	1.22	1.35
Colombia	2.77	6,100	1,142	37	3.27	0.03	-0.28
Costa Rica	2.91	9,540	51	89	n/d	0.39	0.39
Ecuador	2.77	6,810	284	60	n/d	-1.04	-0.87
El Salvador	2.67	5,320	21	61	1.93	-0.23	-0.13
Guatemala	2.63	4,030	109	58	3.27	-0.59	-0.75
Guyana	2.27	2,440	215	163	n/d	-0.09	-0.64
Haiti	2.59	1,110	28	43	n/d	-1.33	-1.28
Honduras	2.78	3,380	112	68	n/d	-0.57	-0.69
Jamaica	2.53	5,960	11	76	n/d	0.12	-0.49
Mexico	3.05	11,970	1,964	62	2.43	0.13	-0.35
Nicaragua	2.54	2,380	130	76	n/d	-0.91	-0.78
Panama	3.02	9,370	76	35	n/d	0.25	-0.34
Paraguay	2.75	4,040	407	84	n/d	-0.85	-0.96
Peru	2.80	6,440	1,285	42	4.00	-0.44	-0.38
Dominican Rep.	2.82	5,750	49	55	2.93	-0.46	-0.65
Uruguay	2.75	9,930	176	45	3.03	0.57	0.96
Venezuela	2.68	8,590	912	50	3.80	-0.87	-1.04

6. THE AGENDA FOR PUBLIC POLICIES

The previous two chapters have allowed, through two approaches, for the identification of the principal problems faced by LAC in the improvement of their logistics performance: the examination of the most relevant logistics components and the review of a significant number of case studies (countries). After giving some thought to the underlying causes of logistics weakness in the Region, this chapter tries to identify the public policies that could provide solutions to these problems, determine the priorities of the Region, and, in a preliminary way, discuss the requirements and impacts that these policies could have.

6.1. The causes of weak logistics performance

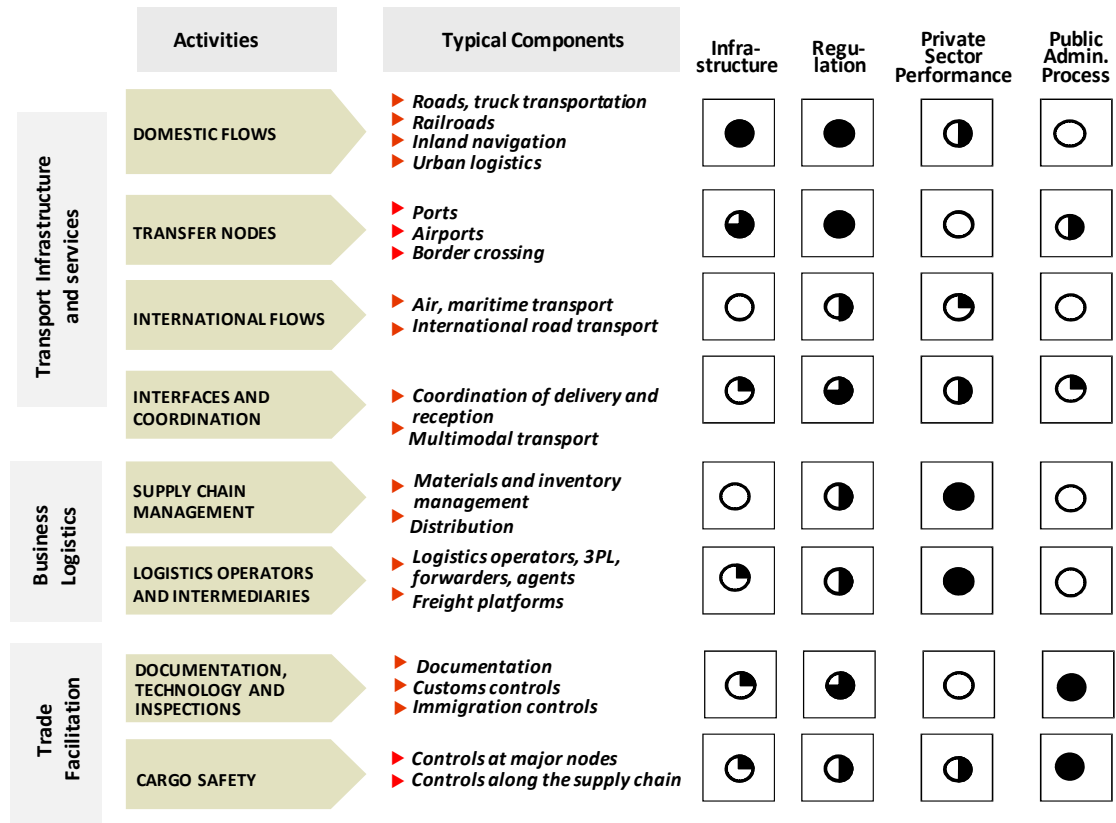
Before advancing an agenda to correct the logistic weaknesses in the Region, it is necessary to reflect on the factors responsible for the identified problems. Even though a comprehensive treatment of this subject exceeds the scope of this work, some of the underlying causes and roots of shortcomings can be anticipated, especially those of an institutional, financial, and business development nature.

The causes of weak logistics performance

- (i) ***Institutional weakness.*** In almost all countries a marked weakness can be observed in the public-sector institutions dealing with logistics performance, particularly in the shortness of trained human resources within government offices (national and sub-national) and the absence of information systems for monitoring and evaluation. This weakness is further accentuated by coordination needs for the logistic agenda: between sector policies, between different government jurisdictions, and between the public and private spheres of action.
- (ii) ***Regulations.*** An institutional aspect most relevant to logistics is regulations, because they set standards for transportation systems and for border management, for example. Some cases stand out, such as regulations for the in transit circulation, for coastal navigation (generally reserved to national flag ships), for air navigation, or for establishing the conditions for the participation of the private sector in the provision of infrastructure services. These regulations are often born out of conflicting processes between numerous stakeholders (carriers, shippers, workers, equipment providers, constructors), and the final results do not always reflect the common good.
- (iii) ***Shortage of financing.*** The drastic reduction of public infrastructure investment that took place in the 1990s was not compensated by the incentives given to private investment. The required infrastructure investment levels (for overall infrastructure in the economy, not just related to freight logistics) should be between 5% and 7% of the GDP to maintain existing networks, improve their coverage, satisfy increasing demand, and reach levels similar to those achieved by successful Asian countries within 20 years (such as South Korea). At present, investment in the Region is around 4% (3% public and 1% private).
- (iv) ***Scarcity of human resources and entrepreneurial capacity.*** Logistics performance depends not only on public sector competences but in large part on the competence of private actors that operate throughout the value chains. Main weaknesses are found in small enterprises that operate as freight and logistics service providers.

These aspects should also be considered when designing concrete measures to improve logistic performance.

Figure 17
Logistics
components and
public policies.



6.2. Public policy instruments to improve performance

Figure 14 on section 4.1 conceptually describes the components of a country's logistics system. Figure 17 uses the same components to illustrate their relationship to four groups of public policies that can improve their performance: (i) the provision and improvement of infrastructure, (ii) the service regulations, (iii) the support of private-sector performance, and (iv) the management of processes in charge of the public sector (customs controls, for example). The density of the circles in Figure 17 indicates the capacity that each kind of policy has to influence the performance of each component. The figure also shows the wide range of policies that should be considered when national governments, sub-national territories, or cities want to implement a logistics improvement policy. This complex agenda goes against the reigning idea in the Region that the response of public policy on the improvement of logistics is limited to infrastructure improvements.

A consequence of this diversity of instruments is that the agenda for the improvement of logistics performance in a country (or sub-national unit) contains subject matters that pertain to different entities and public agencies: the Transportation or Public Works ministries (in their infrastructure and transportation services areas), the Economy or Production ministries (in their support to the enterprise logistics, SMEs, phytosanitary aspects, etc.), the Trade Ministries (as promoters of trade), the Revenue or Finance ministries (for customs), and the Interior ministry (for internal security aspects). Given this mosaic of jurisdictions, the question then becomes: who takes responsibility for promoting the agenda? Many countries in the Region have attempted to address this question by establishing transversal institutions, similar to a Logistics Council, to integrate different public and private actors.

6.3. The priorities of the regional agenda

The joint analysis of components and country case studies under review allowed for the identification of five priority areas for public policy action to improve the logistics performance and competitiveness of the Region's economies, using the instruments identified in the previous section.

These areas of priority action may show diverse intensities across the Region's countries. Some areas of action are typical requirements of middle-to-low-income countries, while others are typical of middle-to-high-income countries.⁵⁶

⁵⁶ The threshold of US\$ 7,500 yearly per inhabitant has been adopted as a divider between the two groups of countries. In the analyzed sample, only one country in the Region – Haiti – has been classified as a low-income country below US\$ 2,000 per year.

Although the improvement of logistics performance in a given territory may be approached from the single perspective of a country or a sub-national jurisdiction (province, state, city), it is also possible to consider logistics performance from policies that combine efforts between two or more countries in a geographical corridor that belongs to their territories. Significant advances have been made in this direction through the work of IIRSA⁵⁷ on integration and development axes of South America: these are multinational corridors that concentrate present and future potential trade flows where a common quality standard for infrastructure services is sought, including freight transportation and logistics. A methodology for the promotion of value-added logistics services was developed within the context of IIRSA as well as a methodology for the potential of productive integration at the axes, which were finally conso-

⁵⁷ It may be accessed at <http://www.IIRSA.org>.

Areas of priority action in the regional agenda

- (i) The first priority area for action is the provision of basic infrastructure for generic use and not solely for freight logistics – basically the roads network; its distinctive qualities along with its financial magnitude (including network maintenance) deserve that this action be considered separately from the rest.*
- (ii) The second priority action area covers a range of infrastructure services for freight logistics, where the role of the private sector in operations is dominant and where private-public partnerships and regulations are of utmost importance. It fundamentally includes ports and railroads.*
- (iii) The third area relates to the services that the state operates exclusively or that are only secondarily outsourced. These services include customs and non-customs management (immigration and phytosanitary controls, etc.) that facilitate trade and aid in the control of merchandise piracy. Main operations issues are found at border crossings and ports (and road robberies, which are more prevalent near urban areas).*
- (iv) The fourth area of action is the support of private-sector development. This includes providing smaller enterprises assistance with the organization of their supply chains, as well as to those who offer logistics services such as transport operators, logistics operators or intermediaries, and their trade associations.*
- (v) The fifth area of action refers to organizing the public sector to promote quality policies on logistics performance, including multi-sector, cross-jurisdictional and public-private coordination, the development of monitoring systems for tracking logistics performance, and general human resource training.*

Table 9
Priority action areas for the Region.

Priority action areas	Sector-problems	Priorities in medium to low-income countries	Priorities in medium to high-income countries
Development of basic infrastructure	Main roads, rural roads. Maintenance	Basic infrastructure: principal and rural; ensure maintenance	Higher capacity, accesses to port, level crossings, urban by-pass. Toll roads, PPPs.
Infrastructure services and regulations	Ports, railroads	First generation reforms, improve operational efficiency	Second-generation reforms: adjustments. Major investments, PPPs.
Service in charge of the State	Customs controls, border crossings	Customs procedures, time, cargo security, reduce corruption	Integrated border management, unified paperless inspections, cargo security, reduce corruption
Support to private-sector development	SMEs, carriers and logistics operators, logistics parks, human resources	Professionalization of carriers and forwarders	Professionalism and HR development, logistics platforms, regional hubs, outsourcing and 3PL development
Organizational and institutional strengthening	Logistics Councils.	Strengthen and coordinate government areas; training	Inter-sectoral and inter-jurisdictional articulation; private participation; promotion and training

Table 10
Timeliness of the impacts and requirements of proposed actions.

Action priority areas	Impact timetable	Investments requirements	Institutional requirements
Development of basic infrastructure	Medium to long	High, elevated public investment	Reduced for enlarging the network, major for its maintenance
Infrastructure services and regulations	Short and medium	Medium to high; space for APP schemes	High; capacity for managing APP, regulate services, avoid captures
Services in charge of the state	Short and medium	Low – medium; basically public	High; need to modernize procedures and culture
Support to the private sector performance	Short and medium	Low: training, support to modernization	Medium to low; capabilities for programs design and implementation
Organizational and institutional strengthening	Medium and long	Minimum	High; coordination within the state and with public-private

lidated into a single methodology applied in pilot cases. The approach adopted includes consultations with the private sector, evaluation of the exchange patterns in the productive structure of the corridors' areas of influence, and action proposals for the emergence of an adequate supply of logistic services to the productive sector in its role as user of the infrastructure that IIRSA proposes.

The table above is useful to orient actions at the regional level; however, each country requires a unique evaluation so as to determine precisely its logistics performance improvement needs.

6.4. Agenda requirements and impacts

It can be expected that all the identified actions will have a significant impact on logistics performance since they have come out of a prioritization process. The quantification of their benefits requires detailed work that should be made at the local level (not regional) of a country or specific sub-national entity. What can be anticipated of these actions, though, is the time element of the impact (if immediate or of mid- or long term), the generic investment requirements, and the institutional and political difficulties for their implementation. Table 9 shows the results of this exercise.

It should be understood that a logistics performance improvement strategy includes some actions requiring large investment (and with public financing, in many cases) together with "soft" actions that have very little investment costs, even though they may require great political and institutional capability since they involve changing commercial activities and deeply rooted attitudes among the public and private actors. This brings back the need to develop competent institutions, capable of managing the numerous actors participating in logistic activities with technical know-how and adequate policies.

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