



BULLETIN

FAL

FACILITATION OF TRANSPORT AND TRADE IN LATIN AMERICA AND THE CARIBBEAN

# Logistics observatories and regional integration indicators: the Mesoamerica project

## Introduction

A growing level of interest has been observed in the creation of logistics observatories across Latin America. Several initiatives led by the multilateral bank, subregional agencies, universities and national institutions have sought to use these instruments to redress the lack of information in the region's logistics sector. The particular characteristics of this sector, the existence of logistics chains that use third countries' infrastructures and the incipient creation of subregional value chains necessitates that, as well as monitoring the national performance, the performance of logistics infrastructures of subregional services also be analysed.

Setting up a data observatory is intrinsically a long-term undertaking that requires a lot of economic and organizational resources; therefore, early coordination of activities will provide a better outcome. Accordingly, coming to a consensus on a set of indicators to monitor the progress of regional integration of logistics infrastructures will result in better information for decision-making, strengthen the regional integration process and turn these instruments into true regional public goods.

This document is divided into three sections. The first gives a general overview of some aspects of the institutional situation of the region's logistics observatories. Following this is a series of theoretical approaches and international experiences, where the coordination of activities has allowed instruments to be developed that not only support the monitoring of national logistics, but also benefit the regional integration process by developing indicators that are comparable among countries. The third part presents the Mesoamerica Project, establishing and considering a minimum set of logistics infrastructure indicators that could serve as a basis and motivation for defining a set of definitive indicators for the Mesoamerican transport projects portfolio.

This *FAL Bulletin* analyses the development of logistics observatories and the construction of regional integration indicators in Latin America and the Caribbean.

To this end, it examines experiences, in the region and worldwide, in relation to the construction of indicators and presents a set of policy recommendations for proper implementation.

The Mesoamerica Project is used as a case study to construct a set of indicators for logistics infrastructures.

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The opinions expressed in this document are those of the author and do not necessarily reflect the views of the Organization.



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Lastly, some recommendations are put forward for the implementation of a system of indicators at the subregional level that could be useful for other physical integration initiatives in Latin America and the Caribbean.

## I. Development of logistics observatories and regional integration

In the last decade, the number of projects seeking to monitor the logistics situation has greatly increased in Latin America, including the work of thematic, labour, national and subregional observatories. Despite the laudable and rational goals of these instruments, the lack of coordination at the national level, as well as with other related observatories (for example foreign trade, facilitation, production, energy consumption, logistics and urban mobility), often produces a duplication of institutional efforts that does not provide better information for decision-making. Public employees or private companies often have to repeatedly respond to similar questions in different formats or at different times. This lack of coordination discourages participation in the initiative, causing the observatory to become out-of-date and thereby losing its value as a tool to support decision-making. Coordinating efforts ahead of time would not only improve data collection, but also strengthen links between public and private institutions and avoid wasting substantial economic and human resources.

Most of the work in the region focuses on so-called foreign trade logistics, with little attention paid to the production processes and urban distribution dynamic. Given the characteristics of modern logistics, an integrative approach is needed, irrespective of geography or fields of application. In order to achieve this, the gathering and production of basic statistics and their metadata must be improved at the national level, with a view to providing good-quality information to these instruments and building adequate institutions that promote national data collection. It is also essential to rebuild the archive of information that was traditionally used to inform ministerial planning, which fell into disuse in some countries after work began to be outsourced to the private sector through different forms of public-private partnership (PPP). The discontinuation of basic statistics in some extreme cases may even hinder the regulation of services and planning of future sectoral activities.

Lastly, there is the matter of funding. Many observatory initiatives emerge from technical cooperation or research projects, without any guarantee of the feasibility of maintaining them in the future. Therefore, institutions spend a lot of time looking for sources of funding, to the detriment of collection and fundamental analysis of data.

ECLAC, aware that setting up a data observatory is a complex and long process requiring a lot of economic and human resources, has successfully created organizations geared towards concrete activities that benefit good-quality and long-lasting data generation. As a result, the Commission has collected and generated primary information in various areas of economic and social development over its 67 year history, including infrastructure services<sup>1</sup> to strengthen public policies in the region's countries. Within this context, the region must not only remove trade or physical barriers to achieve greater competitiveness, but also promote the coordination of common policies to regulate and equally distribute benefits in an egalitarian manner in pursuit of sustainable and equitable economic and social development for the whole region. As well as promoting a regionally coordinated logistics policy, the construction and implementation of indicators for constant monitoring are indispensable tools for better logistics governance.

Given the importance of infrastructure projects and logistics services to the region's countries and to the process of regional integration, creating analytical tools at the subregional level is essential to steering activities and evaluating logistics performance and the integration process at a wider level. The promotion of value-added logistics services, as well as participation in subregional or global value chains, requires indicators to monitor the quality of services, border crossing times and other obstacles to trade and transport that could affect the competitiveness of logistics corridors. Furthermore, indicators can be a useful tool for supporting decision-making in cross-cutting issues such as logistics security, public-private cooperation and energy efficiency by allowing comparisons to be made between commercial initiatives and integration efforts at the regional and international levels.

Logistics observatories must widen their scope of action in the short term to include production, distribution and urban logistics, as well as links to neighbouring countries in order to efficiently support the development of subregional value chains and promote regional integration, given that production integration cannot exist without first having an efficient and competitive logistics integration.

## II. Theoretical approaches to constructing a regional integration indicator

As a first step, it is important to understand that an indicator is an instrument that provides objective information about an activity's progress in relation to a predefined goal. Therefore, in order to measure progress,

<sup>1</sup> Much of this information can be found on the division's website at <http://www.cepal.org/drni> and the Maritime and Logistics Profile of ECLAC at <http://www.cepal.org/perfil>

a baseline is needed, as well as periodic collection of quantitative and qualitative comparable data in key chosen areas (Carranza, Gómez and Pérez-Salas, 2015).

Depending on the goal, two types of indicators can be used: strategic and management. The former refers to instruments that seek to improve strategies and the allocation of resources used to meet the general objectives of the initiative, while the latter monitors the way in which products or services are created and delivered. In other words, it assesses the immediate, intermediate and final results.

For integration indicators, the academic literature identifies two types of theoretical approach. The first is based on the construction of indicators disaggregated by category, factor and structural characteristics, where the different areas of integration, as well as their relative importance, vary between each implementation. For example, the European Commission uses a system of indicators comprising multidisciplinary classifications in four categories: economic integration, regional cooperation, functioning of institutions and implementation of community programmes. The European Central Bank, through work carried out by Dorrucci et al. (2002), uses a disaggregated system of indicators that seeks to show the progress made in institutional and economic integration. Other authors such as De Lombaerde and Van Langenhove (2006) propose a multidimensional system comprising six categories: actors, structural factors and characteristics, institutionalization, implementation, effects and interdependence. Best (1997) proposes a system of indicators that analyses the state of institutions and government policies linked to regional integration and also gauges the difficulty for a group of countries to reach the planned integration goals over a certain time frame. Feng and Genna (2004) propose a system based on economic analysis with some institutional elements, which focuses on aspects of economic policy classified by sector. Alberola et al. (2002), analyse the contribution that integration processes make to the degree of real convergence between countries.

The second methodological approach is based on composite regional integration indicators and is a less developed strategy, which is therefore used less frequently by integration initiatives at the international level. Notably, Ruiz Estrada (2004) proposes introducing the idea of “monitoring” integration processes using an integrated model—known as the Regional Integration Global Dimension Model (GDRI-Model)—which analyses the level of integration from an economic, political, social and technological perspective. Lastly, the work proposed by Ramírez (2011) suggests implementing an aggregated index based on the optimum currency area theory, with a view to determining the degree of preparation of the Latin American regional blocs in order to move towards greater regional integration.

One regional example of this is the work that the Secretariat for Central American Economic Integration (SIECA) is carrying out with its Regional Central American Integration Index (IRIEC), which is intended to quantify the strength of economic integration between Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama. The IRIEC is a composite index with three dimensions: linkage, management and convergence. These dimensions comprise a total of 10 indicators based on 43 different variables, two of which are related to the provision of transport services (metric tons moved in ports and number of passengers transported by aeroplane) and one on the provision of infrastructure (total kilometres of roadways). With this information, the IRIEC aims to provide data on key aspects of the integration process and inputs for resource allocation and policy design at the regional level (SIECA, 2015).

### A. The African regional integration index

The African Union Commission, the African Development Bank and the United Nations Economic Commission for Africa (ECA) are implementing an index to monitor the progress of the regional integration process at the national and regional levels. To this end, a set of quantitative indicators are being used at the national level, allowing information on several areas of regional integration to be encapsulated in just one instrument, which helps governments and the general public to visualize the performance of the process and identify areas that need to be strengthened at the national and regional levels.

The index includes the key elements for African integration set out in the treaties and protocols signed by African authorities, such as the Charter of the Organization of African Unity, the treaties of the constitution of the African Economic Community, and several other protocols and treaties in Africa that deal with important and interrelated areas such as: trade liberalization, free movement of people, goods, services and capital, development of regional infrastructure and development of productive activities, especially intraregional trade and harmonization of policies.

The index also monitors the implementation of current African Union integration policies, focusing on relevant areas with clear implications for cross-border interactions among African countries.

Points are attributed to each country to help governments and citizens assess their relative performances, showing the areas where progress is being made and where more work is required. More specific indices are also used to monitor institutional progress (for example, policies adopted and treaties signed) and progress in physical integration (for example, trade and investment flows and





amount of passengers and cargo transported between countries) in order to provide a more comprehensive overview of the process, looking at institutional as well as physical integration.

### III. A logistics infrastructure integration indicator for Mesoamerica

As outlined in the previous section, integration indicators tend to be focused mainly on analysing macroeconomic and institutional aspects of regional integration and do not often monitor areas related to society, the environment or economic infrastructures in particular. Given that these areas are a determining factor in promoting development of the region, domestic production and regional and intraregional trade, this dimension must be incorporated into the regional integration indicators.

A system of subregional indicators for logistics infrastructures was developed to provide quantitative information to facilitate the prioritization and funding of priority infrastructure projects, with particular emphasis on works that provide subregional services or promote sustainable development. Furthermore, they allow the progress and remaining challenges of the integration process to be monitored, delivering a clear picture of the initiative's efforts and principal results. Lastly, combined with shared and egalitarian dialogue between nations, a set of indicators with these characteristics strengthens participation and ownership of the process on behalf of the countries and society as a whole, creating a virtuous cycle for nations and the integration process itself (Jaimurzina, Pérez-Salas and Sánchez, 2015).

In this context, the Executive Directorate of the Mesoamerica Project considered it necessary to create a set of sectoral

indicators that allow them to monitor the progress of the initiative and its components. This is intended to generate information that can be used for technical-political decision-making and fundamentally to allow the results and commitments of the States to be evaluated. This requirement was set forth in item 7 of the Conclusions signed at the end of the meeting of transport ministers of Mesoamerica, held on 4 December 2013 in San José, Costa Rica, where ECLAC was asked to provide technical support in drafting a proposal for follow-up and monitoring indicators for the Mesoamerica Project transport portfolio (ECLAC, 2013). The proposal, prepared by ECLAC and subsequently ratified by the Regional Technical Commission of Transport, in which all of the initiative's countries participate, seeks to improve the monitoring of the progress of investment projects (management indicators) as well as the evaluation of the initiative's progress in the participating countries (strategic indicators).

The following sections present two management indicators for monitoring the agenda of projects based on the current and projected expenditure of infrastructure projects, which are funded mainly with repayable and non-repayable loans from the multilateral bank and other cooperation agencies. In the second part, a set of strategic indicators are presented, which seek to measure the impact of these investments on the subregion's logistics performance, taking into account both the provision and the quality of available infrastructure. These indicators are, without doubt, the first step towards constructing a wider set of indicators that give a proper account of the economic, social and environmental impacts of the integration process. In order to achieve this, additional information must be gathered and existing observatories must coordinate with one another to provide better information for decision-making.

#### A. Composition of the Mesoamerica Project sectoral policies portfolio

The Mesoamerica Project arose from the Puebla-Panama Plan in 2008. It currently comprises 10 countries: Belize, Colombia, Costa Rica, the Dominican Republic, El Salvador, Guatemala, Honduras, Mexico, Nicaragua and Panama.

The project organizes its activities around two strategic axes: economic, which focuses on development of transport, energy, telecommunications and trade facilitation and competitiveness; and social, which deals with sustainable development, risk management, housing and food security. In both axes, the provision of infrastructure and regulation of related services are essential for sustainable development.

The composition of the Mesoamerica Project portfolio can be seen in table 1, which shows that the transport sector

accounts for 65.8% of historic investments (between 2008 and June 2015). Furthermore, the energy sector makes up 26.5% and health 7.3% of the total portfolio. The rest of the sectors form a smaller share: trade facilitation and competitiveness (0.4%), telecommunications (0.1%) and risk management (0.02%).

**Table 1**  
**PROJECT PORTFOLIO INVESTMENTS (2008 TO JUNE 2015)**

Area	Amount (US\$ Millions)	Share of portfolio (Percentages)
Transport	2 023.5	65.8
Energy	816.0	26.5
Health	223.5	7.3
Trade facilitation and competitiveness	10.9	0.4
Telecommunications	2.7	0.1
Risk management	0.8	0.0
Total	3 077.4	100

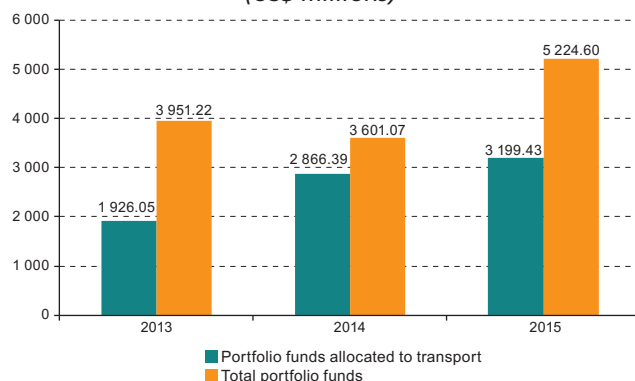
**Source:** Infrastructure Services Unit of ECLAC, on the basis of data from the Executive Directorate of the Mesoamerica Project, *Informe Estado de los proyectos. Proyecto Desarrollo e Integración de Mesoamérica*, June 2015.

**(a) Management indicators for the Mesoamerica Project transport portfolio**

**(i) Indicator: proportion of transport infrastructure projects in the total Mesoamerica Project portfolio**

Indicator characteristics: This indicator is expressed as the percentage of investment that goes towards construction, repairs or expansion of regional cargo and passenger transport projects —interconnections and other regional transport infrastructure— against the total investment in the Mesoamerica Project.

**Figure 1**  
**INDICATOR 1: SHARE OF TRANSPORT INFRASTRUCTURE IN THE MESOAMERICA PROJECT PORTFOLIO (US\$ millions)**



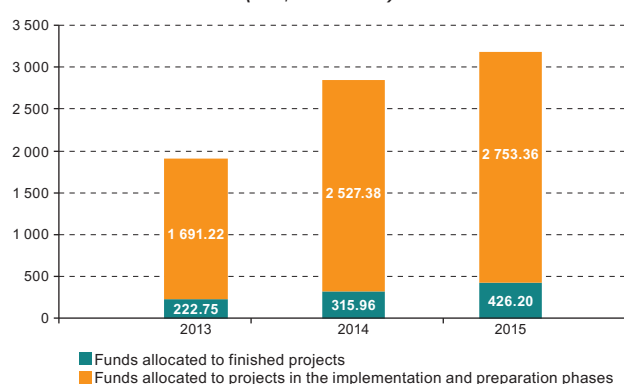
**Source:** Infrastructure Services Unit of ECLAC, on the basis of data from the Executive Directorate of the Mesoamerica Project, *Informe Estado de los proyectos. Proyecto Desarrollo e Integración de Mesoamérica*, June 2015.

The above figure shows that the Mesoamerica Project portfolio expanded significantly in 2015, with a 10% rise in funds allocated to projects in the transport sector, currently representing 61% of the portfolio. This indicates that the construction, repair or expansion of regional cargo and passenger transport projects —interconnections and other regional transport infrastructures— continues to form a significant part of the Mesoamerica Project. Furthermore, investment in other traditional investment sectors such as energy (21.9%), but also new areas such as trade facilitation and competitiveness (9%) and health (6%), performed well, thereby improving logistics and sustainable development in the participating countries.

**(ii) Indicator: progress of transport infrastructure projects for integration**

Indicator characteristics: This indicator is expressed as a percentage of actual investment in construction, repair or expansion projects for regional cargo and passenger transport —interconnections and other transport infrastructure of regional importance— by integration process in the Mesoamerica Project. The indicator takes into account only projects that are in the operational phase; in other words, those that have already been completed and are ready for use.

**Figure 2**  
**PROGRESS IN TRANSPORT INFRASTRUCTURE PROJECTS FOR INTEGRATION (US\$ millions)**



**Source:** Infrastructure Services Unit of ECLAC, on the basis of data from the Executive Directorate of the Mesoamerica Project, *Informe Estado de los proyectos. Proyecto Desarrollo e Integración de Mesoamérica*, June 2015.

On the basis of available information, summarized in the figure above, it can be seen that actual investment in projects completed in 2015 rose by 36% year-on-year, driven by the opening of six large works during the analysed period, which are related mainly to improvement and rehabilitation of roads on the Atlantic corridor.

The indicators presented above internally assess the portfolio's projects, providing a different perspective

on whether progress is being made towards regional integration and the transport infrastructure goals of the Mesoamerica Project. This shows how the number of completed transport infrastructure projects increased over the period, together with the volume of investment and the creation of new projects. However, this information must be complemented by other indicators that take into account improvements in infrastructure operating conditions (level of service, improvements in speed or security), as well as possible impacts on the economic or social development of surrounding areas.

### (b) Performance indicators for the Mesoamerica Project transport portfolio

#### (i) Perception of the quality of the Mesoamerica Project logistics infrastructure

Together with the progress of the portfolio's projects, the impact of these investments on competitiveness and the population's quality of life must also be analysed. To this end, qualitative infrastructure indicators were used (through international perception indicators in the absence of comparable national or subregional records) as well as quantitative indicators based on information available in the Maritime and Logistics Profile of ECLAC and information on existing infrastructure provisions from the countries themselves.

Although the international indicators, which base their evaluation on surveys of the perception of each country's performance, are less accurate at measuring infrastructure quality compared with other instruments such as the

International Roughness Index (IRI), which assesses road surfaces and transport costs and durations, the sources outlined in this section are used in the absence of other more accurate measures for this preliminary approach. In particular, the variables related to the quality of road, rail, port and airport infrastructure from the Global Competitiveness Report were used. These variables were based on a survey carried out by the World Economic Forum, which uses a scale of 1 (extremely underdeveloped) to 7 (extensive and efficient by international standards), with the great advantage that all types of infrastructure are evaluated simultaneously under the same methodology. The Logistics Performance Index (LPI) of the World Bank was used only for its data on the quality of trade and transport infrastructure in order to obtain information on the efficiency of customs clearance, quality of trade and transport infrastructure, ease of arranging shipments at competitive prices, quality of logistics services, the ability to track shipments and the rate at which shipments arrive on time, which is complemented with the aforementioned indicators. In this last case, the methodology applies a score between 1 and 5, with the higher number representing better performance.

Table 2 shows the 5 previously chosen indicators and the 10 participating countries of the Mesoamerica Project, as well as the average performance of the Mesoamerica Project (in the MP column), based on data collected in the countries in 2015 by the World Economic Forum and the World Bank 2015-2014 reports. Red cells represent the region's worst performances, while green cells represent the best scores. Data for Belize correspond to 2011 and the World Bank does not have LPI data for this country.

**Table 2**  
**INTERNATIONAL INDICATORS: QUALITY OF LOGISTICS INFRASTRUCTURE IN 2015**

Country	Belize	Colombia	Costa Rica	Dominican Republic	El Salvador	Guatemala	Honduras	Mexico	Nicaragua	Panama	Mesoamerica Project
Road infrastructure	3.04	2.67	2.83	4.40	4.64	3.74	3.33	4.42	3.55	4.74	3.8
Rail infrastructure	-	1.48	1.87	-	-	-	-	2.77	-	3.90	2.5
Port infrastructure	3.34	3.72	3.00	4.58	4.67	4.05	4.13	4.28	3.17	6.27	4.1
Airport infrastructure	4.40	4.14	4.59	4.82	4.98	4.09	3.89	4.57	3.67	6.11	4.5
Trade infrastructure (LPI)	-	2.44	2.43	2.61	2.63	2.54	2.24	3.04	2.20	3.00	2.6

**Source:** Infrastructure Services Unit of ECLAC, on the basis of data from the World Economic Forum and the World Bank.

In terms of road infrastructure quality, the best performing country is Panama, followed by El Salvador and Mexico, while Colombia is the worst performing, followed by Costa Rica. Among the participating countries with a rail network, Panama scores highest, while Colombia has the lowest score of the four countries considered. There are no data available for the rest of the countries in the Mesoamerica Project for this indicator.

In terms of port infrastructure quality, Panama has the best score, trailed at some distance by El Salvador and the Dominican Republic. Costa Rica has the lowest score in this indicator. With regard to the perception of airport infrastructure quality, Panama again shows the best results, followed by El Salvador and the Dominican Republic, while Nicaragua scored lower than the rest of the included countries.

Lastly, the best performing country in the LPI trade and transport infrastructure quality indicator is Mexico, followed by Panama as a very close second (with 3.04 and 3.00 points, respectively). Nicaragua was the group's worst performing country in this indicator.

Indicators based on national data, with real information on transport infrastructure and its use, help give a more precise reading of the changes in infrastructure and provide a more accurate overview for the analysis of infrastructure development in the Mesoamerica Project. In the next section, the proposed indicators are presented, constructed on the basis of national sources of information from the countries of the Mesoamerica Project.

**(ii) Performance indicators: infrastructure and logistics services in the Mesoamerica Project**

In order to gain a clearer overview of the development of transport infrastructure in the Mesoamerica Project, a set of indicators was constructed based on official data from the participating countries. These indicators show the progress of road, rail, air and port infrastructure provisions. Together with this, they also illustrate the

progress of services carried out on these infrastructures, looking at total passengers and tons of cargo transported. In maritime transport, the tonnage and twenty-foot equivalent units (TEUs) of cargo transported are taken into account. Lastly, in air transport, the total number of passengers and tons of cargo transported are considered. In the case of road transport, this information was not available in a comparable manner for all of the countries analysed during this period.

Using this information, a rate of change index<sup>2</sup> was constructed, taking 2008 (the year the Mesoamerica Project began) as a base year. With this index and the values recorded in 2014 each country can be compared against its own performance and that of other countries, revealing areas where progress has been made and where more work is needed. In the same vein as the table of quality indicators, the table below shows the best and worst performing countries in the selected indicators by colouring the corresponding cells green and red, respectively. Lastly, it shows the average rate of change of the Mesoamerican Project as a whole (in the MP column).

**Table 3  
INFRASTRUCTURE PROVISION INDICES IN THE MESOAMERICAN PROJECT IN 2014**

Indicator	Belize	Colombia	Costa Rica	Dominican Republic	El Salvador	Guatemala	Honduras	Mexico	Nicaragua	Panama	Mesoamerica Project
Total road coverage (km)	N/A	N/A	118.25	107.85	113.13	113.66	123.72	118.28	145.99	130.02	121.36
Paved roadways (km)	N/A	133.87	112.64	110.77	102.73	105.85	109.92	106.78	112.57	113.39	112.06
Total rail coverage (km)	N/A	47.49	96.67	189.66	N/A	N/A	32.00	100.09	N/A	105.48	95.23
Passengers transported by rail	N/A	109.35	297.47	N/A	N/A	N/A	N/A	171.03	N/A	N/A	192.61
Cargo transported by rail (tons)	N/A	131.31	56.80	N/A	N/A	N/A	N/A	117.30	N/A	N/A	101.80
Cargo transported by sea (tons)	131.54	149.83	111.41	91.06	97.92	128.42	134.76	107.88	147.02	158.77	125.86

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