



Infrastructure in the Development of Latin America

- ▶ New trends in the region's infrastructure
- ▶ Inclusive, competitive and sustainable cities
- ▶ Global value chains in agribusiness
- ▶ Estimated infrastructure investment

Content

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Abbreviations

PPA	Public private associations
ECLAC	Economic Commission for Latin America and the Caribbean
EIA	Energy International Agency
GJ	Gigajoules (109 joules)
CNG	Compressed natural gas
LNG	Liquified natural gas
IDeAL	Infrastructure for the Comprehensive Development of Latin America (acronym for its Spanish name)
IWMI	International Water Management Institute
ODM	Original Design Manufacturer
OEM	Original Equipment Manufacturer
PPIAF	Public-Private Infrastructure Advisory Facility
PPP	Purchasing Power Parity
SEGIB	Ibero-American General Secretariat (Acronym for its Spanish name)
WEF	World Economic Forum

Presentation



Throughout its trajectory of over 40 years, and under the premise that quality infrastructure is a fundamental factor in the development of more inclusive and competitive societies, CAF –development bank of Latin America– has strongly supported infrastructure in the region.

In 2011, fulfilling a request by the Ibero American General Secretariat (SEGIB for its acronym in Spanish), CAF prepared a strategic diagnosis of Latin America's infrastructure, which was presented in the document titled IDeAL: Infrastructure in the Development of Latin America, in the XXI Ibero-American Summit of Chiefs of State and Government which took place in Asuncion, Paraguay. This document included an analysis of the current situation of infrastructure, and proposed a strategic agenda for its development. In order to maintain the support and deepen the components of the strategic agenda proposed in 2011, CAF presents the second edition of the IDeAL series, with four strategic thematic areas.

The first chapter of the IDeAL 2012 reviews the main advances and trends regarding infrastructure in the region, covering its main sectors: transportation, electricity, gas transportation, telecommunications, and comprehensive water management.

The second chapter addresses an issue that links infrastructure to comprehensive and sustainable development; this year, it presents an analysis of cities. Latin America is the emerging region with the earliest urbanization, and it is ahead of the world's trend toward an increasing urbanization. The global consensus points toward the positive role that quality cities can have in a development process, but also alerts regarding the dangers of a chaotic urbanization. The situation in the region shows

a picture of lights and shadows; large dynamic cities which are engines of growth, but at the same time are centers of marginalization and generators of high social and environmental costs. The study presents a diagnosis and proposes an agenda for the development of infrastructure for inclusive, competitive, and sustainable cities.

The third chapter points to infrastructure as a vehicle to improve the international insertion of the economies of the region: the development of greater value added exports that generate employment of increasing quality. This year, the selected topic is that of agribusinesses due to the great growth potential resulting from an increasing demand, and the capacities and resources of our region. Through case studies of foods with increasing value added, the growing infrastructure needs and its services defined in a broad sense (including logistics, telecommunications, water, energy, and ease of trade) are evaluated, and an agenda is proposed for the development of infrastructure seeking to achieve greater competitiveness in these markets which have high potential for the region.

CAF, in collaboration with ECLAC, has initiated an innovative effort to measure the levels of infrastructure investment in the region. A detailed work has been carried out with staff of ten countries, and for the first time, an overall perspective is presented of the investment effort in the region. In summary, it may be observed that our countries are increasing their investment, that public sectors are making a great effort, and that the private sector actively participates in some infrastructure sectors. The first results are presented in the fourth chapter of the IDeAL 2012. It is the first installment of an effort that both institutions have committed to carry out, with the idea of covering all the countries in the region as of 2014.

CAF intends to continue the efforts in research and knowledge creation that IDeAL implies, aware of the contribution it will provide for the region's growth. With this goal, it presented this document to the countries participating in the XXII Ibero-American Summit of Chiefs of State and Government, which took place in Cadiz, Spain, between November 16 and 17, 2012.



Executive Summary

IDeAL 2012: solid contribution to Latin America's Infrastructure Agenda

In 2011, CAF –development bank of Latin America– prepared a strategic diagnosis of infrastructure in Latin America at the request of the Ibero-American General Secretariat (SEGIB, for its acronym in Spanish), which was presented during the XXI Ibero-American Summit of Chiefs of State and Government which took place in Asuncion, Paraguay. The contents of this report, called Infrastructure in the Comprehensive Development of Latin America (IDeAL 2011), is summarized in the following box.

IDeAL 2011: strategic diagnosis and proposals for a priority agenda

- Infrastructure and its associated services, which are a key factor for comprehensive and sustainable development, suffer a considerable lag in Latin America.
- A review of the different infrastructure sectors enables the identification of the main challenges to achieve the aspirations of expanding and improving the region's infrastructure: financing, institutions and policies, and the integration of environmental factors and social actors in the projects and policies.

- Several issues require priority actions, as for example, the coverage of water and sanitation services, urban mass transportation, expansion of broadband, and road safety.
- A strategic agenda for the countries of the region should be supported by six lines of action:
 - Increase infrastructure investment significantly;
 - Frame the policies and projects in a paradigm of sustainable development and territorial vision;
 - Strengthen institutions in their diverse dimensions;
 - Optimize the use of multiple financing sources and modalities;
 - Promote the development of companies in the region in businesses linked to infrastructure;
 - Promote exchange between governments, regions, and cities.

As a knowledge generating entity in the region, CAF has made the decision of presenting an IDEAL report annually, developing priority subjects of the strategic agenda proposed in 2011, with a format that includes four sections with the following contents:

- i. General trends and changes in the region's infrastructure and the diverse sectors that make it up.
- ii. Infrastructure and sustainable development.
- iii. Infrastructure as a key factor for a better international insertion of the region and the competitiveness of its economies.
- iv. General performance indicators and a series of estimates of investment in infrastructure by country, sector, and source.

On the occasion of the XXII Ibero-American Summit of Chiefs of State and Government which took place in Cadiz, Spain, November 16 and 17, CAF decided to deal with the issue of infrastructure in cities in the second section of this document, and with the issue of infrastructure in the global value chains of agribusiness in the third section.

1. Trends and changes in the region's infrastructure

General trends: intense growth in demand and moderate in investment

A general view shows that Latin America is currently undergoing a period of expansion in the use and provision of infrastructure. The sustained increase in demand is a result of the growth of the economies: the regional GDP registered an average growth rate of around 4.3% during 2011, with five countries growing above 6%. This growth has been reflected in the demand for infrastructure services, particularly transportation, electricity, mobile telephony, and wide band. The growth in demand and a comfortable fiscal position have facilitated an increase of public and private investment, although the level that has been achieved is not enough to close the gap between infrastructure availability and needs. In the past three years, investment levels have been increasing, albeit at dissimilar levels per sector; in current values, investment grew by 17% in 2010 with respect to 2008, and there are clear signs that is kept growing in 2011, exceeding 3% of GDP (it should be between 5% and 6%).

The economic crisis altered financing but opened opportunities

The economic crisis in the most developed countries has altered financing of infrastructure in the region and, therefore, it has strengthened the role of domestic sources, particularly public investment and local development banking. Multilateral entities complement the financing needs in large countries and assume a key role in the small ones. Bilateral funds and the possibility of carbon financing have lost weight since the start of the economic crisis due to the financing difficulties faced by the countries that must contribute the resources. But the crisis also presents an opportunity for the region: the prospect of negative growth in the developed world and the low interest rates have provided an opportunity for Latin America to become an investment destination. There is also a strong attraction of productive investments linked to the high prices of commodities (minerals, coal, grains) that includes infrastructure projects, which has a positive aspect but also presents challenges, as it defies State planning to establish open access networks.

Advances in the strategic agenda of infrastructure are perceived, with more emphasis on investment than on institutional improvements.

An evaluation of sectorial advances in 2011 suggests that the most important progresses have taken place in two of the six lines of action proposed by the agenda: the increase of investment and the use of alternative financing, where there are improvements in the use of public-private partnerships (PPP) mechanisms. Progress has been more limited with respect to the advance toward a paradigm of sustainable development and territorial vision, the strengthening of institutions, the development of companies in the sector, and the exchange of knowledge. The main advances in each infrastructure sector are developed as follows.

Transportation: expansion stage of the networks and services

In the transportation sector there has been a general increase of demand in its diverse segments, resulting from the increase in per capita income, trade, urbanization, and motorization. In air transportation, for example, the Latin American market shows the highest growth rates in the world (together with the Middle East), above the world average, with the consequent challenges for airport infrastructure and for aeronautical support systems. Maritime and port movement has also increased substantially, particularly regarding bulk exports such as iron mineral, carbon, and grains, commodities that generally have logistics with their own facilities. The expansion of the Panama Canal, an investment of USD 5.2 billion programmed to start operations in 2014, will enable an improvement of service times, and the traffic of larger ships, which will have an impact on the ports of the region.

In land transportation, the volume of cargo has accompanied the growth of the economies. The dominant mode continues to be highway transportation; only two countries in the region – Brazil and Mexico – have a significant participation (exceeding 20%) of the railroad in the movement of cargo. Investment in highways has continued to be intense; it is the sector that registers the largest growth of investment in infrastructure, with a wide use of public resources and an increasing private participation, as the increase in motorization and trade have turned PPA schemes viable, which before were not.

Urban transportation is becoming a serious challenge in the region. When incomes grow, the rate of trip generation increases, which undoubtedly is beneficial from one perspective, but implies a detriment to the quality of life as a result of congestion and other negative externalities (pollution, accidents, noise). This situation presents an increasing challenge to address mobility needs –with its unquestionable effect on social inclusion– and to achieve friendlier and more attractive cities for the generation of wealth and knowledge. As a result of this, a trend has been consolidating to consider mobility as a right of individuals; the most notorious step in this regard took place in Brazil, where in early 2012, came into effect an Urban Mobility Law, based on principles such as universal accessibility, sustainable development, equity in access to collective public transportation, democratic management, and social control of the planning and evaluation of the national policy regarding urban mobility.

Electricity: toward regulatory models based on planning

The demand for electricity in the region grew by 4.8% in 2011, in the context of a volatile international energy scenario, characterized by high prices of fossil fuels that many countries in the region use to produce energy. Facing this scenario, in past years there have been regulatory adjustments to improve the conditions for the development of new electricity generation projects, in order to ensure competitive and stable prices for several years. The regional trend has been to implement auction mechanisms with different degrees of sophistication to contract long term provision of energy, through the construction of new power plants.

The use of auctions responds to a new regulatory and planning paradigm, different from the one dominating in previous sectorial reforms. In this new scheme, the decision to develop new generation infrastructure is taken directly or indirectly by the State, through a planning process or by applying specific rules that determine future needs. The reforms that at some point promoted wholesale electricity markets were seeking for efficiency through different agents that competed between them in an organized market (“competition in the market”), with the risks this implies. However, in the auction mechanisms, efficiency is guaranteed by the generation of competition conditions at the time the auctions are carried out (“competition by the market”). Auctions for the expansion of generation infrastructure in the different countries of the region have been based on private financing, hybrid schemes, and models where public works prevail.

Natural gas transportation: new resources in the region and multiple investment projects

The regional demand for gas has grown moderately: 1.3% in 2011 (exceeding the world average of 1.1%), boosted both by countries that are developing their gas infrastructure, as well as by more mature markets. The world trend is toward a greater participation of gas in the primary matrix, which in Latin America remained stable in 2011, at 25%. The participation of gas has grown as a result of the increase in regional trade, first via the integration of gas pipelines, and more recently with the introduction of Liquefied Natural Gas (LNG). Natural gas has been fundamental in thermal plants, which use it to substitute contaminating fuels such as coal and crude derivatives, by spreading cleaner and more efficient electricity generating technologies.

In 2011, for the first time the EIA (Energy Information Administration) included in its data non-conventional gas resources (shale gas, schist gas) which are heavily concentrated in the American continent, and 35% in Latin America; its volume multiplies the proven conventional gas reserves by eight times.

Gas imports represented 20% of the region’s consumption in 2011; one third is increasingly transported by ships with an extra-regional origin (and also regional in past years, from Trinidad and Tobago and Peru). The regional gas trade by gas pipelines grew until 2005, when it was displaced by imports of LNG. The lower exchange by gas pipelines was a consequence of diverse energy integration plans that were never completed in a context of high demand growth. The dissemination of liquefied or compressed gas implies a distribution logistics via trucks (“virtual gas pipelines”) that facilitate the universal use of gas in areas with lower demand, without requiring large investments in the construction of pipelines. The growth prospects of demand promote multiple investment projects and strategic plans in the region. Investment projects for transportation networks have been identified for approximately USD 29 billion.

In telecommunications, the combination of public and private actions is reducing the digital gap.

The adoption of telecommunication services has significantly increased in the past two years. The penetration of the mobile phone and broadband has registered a moderate growth and currently reaches levels similar to those in developed countries. The adoption of mobile broadband, a fundamental technology for the reduction of the digital gap in the region, grew by 5% at the beginning of 2010, increasing to 21% in the second quarter of 2012 (an increase equivalent to 91% annually). It should be noted that the adoption of mobile phones in the lower income deciles has registered a significant increase, from 43.5% to 48%.

Progress in the past two years is a result of greater competition between private operators and public policy interventions to stimulate accessibility, enabling control of the level of quality of the service delivered. The domestic competition of the service has increased in most countries, generating a reduction of rates that exceeds 15% in the three segments (fixed and mobile phones and broadband). However, the price of wide band continues to be significantly higher with respect to countries with medium development. Governments have promoted measures to stimulate mobile competition (establishing number portability, regulating the entry of mobile virtual operators, introducing obligations for the operators that have a significant market power), and reducing retail prices (decreasing interconnection rates and in some cases modifying the tax framework).

The quality of services has improved –particularly regarding the availability of higher speed broadband–, but there are saturation symptoms that reflect the problems faced by operators to maintain a sustained investment pace, and in this way, expand the number of radio bases and of trunk networks, combined with the need to access additional radio electric spectrum bands.

The comprehensive management of water is challenged by climate change, urban growth, and conflicts over its use

The intensification of the hydrology cycle resulting from climate change intensifies the need to protect the sources of water in the region. This phenomena will have strong impacts on some water ecosystems and requires active measures to balance the supply and demand of water resources in the face of uncertain scenarios. The increase of capacity in reservoirs to compensate for the lack of a water regulation by Andean glaciers, and the super elevation of infrastructure in coastal borders are examples of possible actions on supply. The Projections of the International Water Management Institute (IWMI) point out that most countries in the region will suffer from water shortages in 2025. This projection not only considers the physical availability of water, but also the condition of the water infrastructure for its use.

The speed and magnitude of urbanization in the region promotes profound changes in the traditional management modalities for water resources. This implies overcoming the segmented idea of the sector in three components (drinking water, sanita-

tion, and storm drain) to achieve a fuller vision that includes the sources, land management, and management of urban waste, transcending jurisdictional limits and involving new actors in the management. Most of the sources of water supply in the cities of Latin America are severely compromised; the closest ones are insufficient to address urban growth, and in many cases their quality has deteriorated due to discharges of sewage waters, fertilizers, and agro-toxics.

Increasing the productivity of water in agriculture is a determining factor to ensure the sustainability of the balance between demand and its availability in the region. The concept of “virtual water” refers to the necessary water for the production of agricultural commodities and for industrial production. With this idea, it is stated the Latin America is a net exporter of water through the sale of agricultural products.

2. Infrastructure and sustainable development: the focus on the cities

Cities as areas where problems and opportunities concentrate

In past decades there was a strong urbanization process in the world that reached its greatest expression in the most advanced countries and which is currently increasing in developing countries. The main driver of this process has been the migration from rural areas. In 1950, 30% of the world population was urban, and 70% was rural, while currently the proportions are similar but reversed. The concentration of population and activity implies that cities are also the main users of natural resources (75%) and energy (67%), and that they constitute a focus of negative impact on the environment, both at a local level (air quality, water courses) as well as global. The negative impacts of such a concentration give place to a vision of cities as the core of the problems faced by humanity: “*Anti-natural human conglomerates, devastated by pathologies such as the crisis in public health, aggression, and exorbitant costs of living*”. (Bettencourt and West, 2011)ⁱ

But this view opposes another that perceives cities as a source of opportunities, like poles generating progress and innovation: “*Centers of collaborative creativity which have produced some of the best ideas of humanity, such as the industrial revolution and the digital era*”. (Glaeser, 2011)ⁱⁱ

The economies of agglomeration that are achieved in urban areas facilitate the development of productive undertakings, which provide advantages in terms of specialization to the cities, in activities with a high value added due to the ease of access to knowledge and the capacity to concentrate research and development activities and generate innovation.

- i. Bettencourt, L. and West, G. (2011) Bigger Cities Do More with Less. *Scientific American*, September.
- ii. Glaeser, E. (2011) Engines of Innovation. *Scientific America*, September.

Urbanization in Latin America was early and intense

The process of urbanization in Latin America has been more intense than in any other developing region in the world. In 1950, 41% of the population in Latin America and the Caribbean was urban, while in 2010 the percentage rose to 79%. Migration from rural areas to the city contributed to economic growth as the economies of scale have increased the productivity of expanding cities and reduced the cost of the provision of services to its inhabitants. The main 198 cities of the region with 200,000 or more inhabitants jointly contribute more than 60% of GDP, and the 10 largest cities by themselves generate half of the production.

Infrastructure is a critical element for the success of cities

The economies of agglomeration generate favorable conditions for urban development, but they are not a “guarantee of success”. In fact, some cities are successful and others are not. This generates a significant divergence which is reflected in the numerous attempts to compare cities by using indicators. These indicators include diverse factors that condition urban performance, which are usually grouped in four dimensions: the economic environment (the capacity to generate and attract quality employment and to promote innovation), the social conditions and quality of life, the sustainable use of the environment, and the financial performance and urban governance. Infrastructure and its associated services, with its diverse components, is present in all the factors that make a city successful. Infrastructure is not only relevant in the life of a city due to the impact of the services it provides, which directly influence the quality of life of the population, the business climate, and competitiveness, but it is also a key element in the organization of the urban space: it does not only address the demands, but it also induces them and locates them. At the same time, it constitutes a component with a strong relative weight in the allocation of resources in the cities’ finances, both to face investment as well as to support its operation and maintenance.

The global economic and environmental context will impact the development of our cities

Several trends of a global scope will influence the development of Latin American cities.

- Facing global warming, cities must address both the challenge of their adaptation to new conditions as well as contribute to mitigate the emission of Greenhouse Gases (GHG). Adaptation will be a major problem in coastal cities or those located in river coasts due to the impact of the increase of water levels.
- Cities increasingly constitute “competitive assets” for countries, as they not only concentrate the generation of the gross product, but also in the current economic organization they have become the engines of innovation.
- There is an increasing mobility of investments and qualified human resources, so the urban context becomes a key variable to attract them; investors and

individuals will weigh the attributes of the cities (business climate, quality of life, etc.) when making location decisions.

Regional trends will also influence: consolidated megacities and a new generation of medium-sized cities

- An accelerated urbanization and consolidation of megacities: many of the largest cities are fighting with traffic bottlenecks, lack of housing, and pollution, that is, symptoms of diseconomies of scale.
- Close to the largest Latin American cities, there have emerged a new generation of medium-sized cities (56% of the population lives in cities of less than one million inhabitants). These cities are currently behind the largest urban centers in terms of GDP per capita; however, the gap tends to reduce substantially toward 2025. Medium-sized cities may offer an attractive environment for companies and qualified workers, and may become the model of sustainable urban design.

The lack of sustainability threatens the large cities of the region

The comparative analysis of urban performance shows that after decades of growth, the large cities of the region are not taking advantage of the opportunities offered by agglomeration. For example, the urban performance index prepared by McKinsey Global Institute shows these cities with a considerable lag with respect to other large metropolitan areas of the world, with values of 60 and 70 when the best cities in the world reach values of 100.ⁱⁱⁱ In the EIU rating of 120 cities, the best positioned in Latin America ranks in number 60.^{iv} The Master Card Worldwide ranking, which includes 75 cities, does not have any Latin American city among the first 50.^v Cities in the region find numerous obstacles that explain this lag, among which stand out poverty, social segregation and residential informality, environmental degradation, low economic competitiveness, and the development of inefficient urban forms, aspects that are detailed in the following points. As will be seen, infrastructure is a crucial component behind each one of them.

A social scenario characterized by poverty, lack of equity, and segregation

Poverty has urbanized. At least until 2001, the concentration of the poorest levels of the population in cities was increasingly higher. Urbanization has contributed to the reduction of poverty for many people who migrated from rural areas, but the form in which this urbanization took place has not contributed to reduce income inequality. More than one fourth of the urban population in the region lives in precarious housing characterized by the lack of basic services, overcrowding, and insecure ownership.

iii. MacKinsey (2011) *Urban World: mapping the economic power of cities*.
 iv. Economist Intelligence Unit. (2012) *Global liveability survey*.
 v. Master Card (2008) *Worldwide Centers of Commerce Index*.

The informal growth of the cities is a common factor to all the countries in the region; it corresponds to the new population settlements, usually coming from rural areas, and their difficulties to establish themselves in the formal city. The equipment and infrastructure deficits make it difficult for the new arrivals and those who were born in informal areas to leave poverty behind. Infrastructure in these cases is not a structuring function but a palliative one. The cities of the region show a marked contrast between residential areas with a high purchasing level and informal settlements with needs, located in places which are generally subject to higher natural risks.

The degradation of the urban environment

The urban landscape of Latin America shows habitual pictures of environmental degradation. *“Urban environmental conditions have visibly deteriorated in terms of the impact on rivers and aquifers, the final disposal and treatment of solid waste and liquid discharges, the quality of air, and the decrease and deterioration of green areas. Added to this dynamic is the high incidence of natural phenomena that regularly affect the region (hurricanes, cyclones, earthquakes, volcanic eruptions, flooding, and drought), which have profound implications in the configuration of human settlements”.*^{vi} The deficit of urban basic infrastructure in the urban fabric in general is also applicable to the areas of economic activity; this process may be seen as an environmental dumping, potentially damaging in markets with demands that are increasingly globalized and tough.

Megacities of the region are insufficiently competitive despite their dimensions

Latin America's paradox is that – as noted earlier– it is creating megacities that do not have a relevant international projection, and in many cases, act as a suffocating factor for their own countries.

Expanded spatial structure with low ecoefficiency

The shape that many Latin American cities have taken conspires against their good performance. The trend toward low density cities with scattered growths (not aligned in axis, without responding to a territorial planning) has environmental impacts due to the change from the agricultural and forestry use of the land to urban use. In addition, there is a significant relationship between urban density and ecoefficiency in a city, which is expressed in the energy demanded by mobility and consequently, in the emissions that are generated. A comparative exercise shows that low density cities, of fewer than 25 inhabitants per hectare (for example in North America), register a consumption of energy for transportation which doubles that of denser cities, with densities of close to 50 inhabitants per hectare (typical density of European cities).^{vii}

vi. ONU-Habitat (2004) Estrategia Ambiental Urbana.

vii. Newman y Kenworthy, 1989; Atlas Environnement du Monde Diplomatique 2007.

The infrastructure deficit is high, unequal, and of high impact

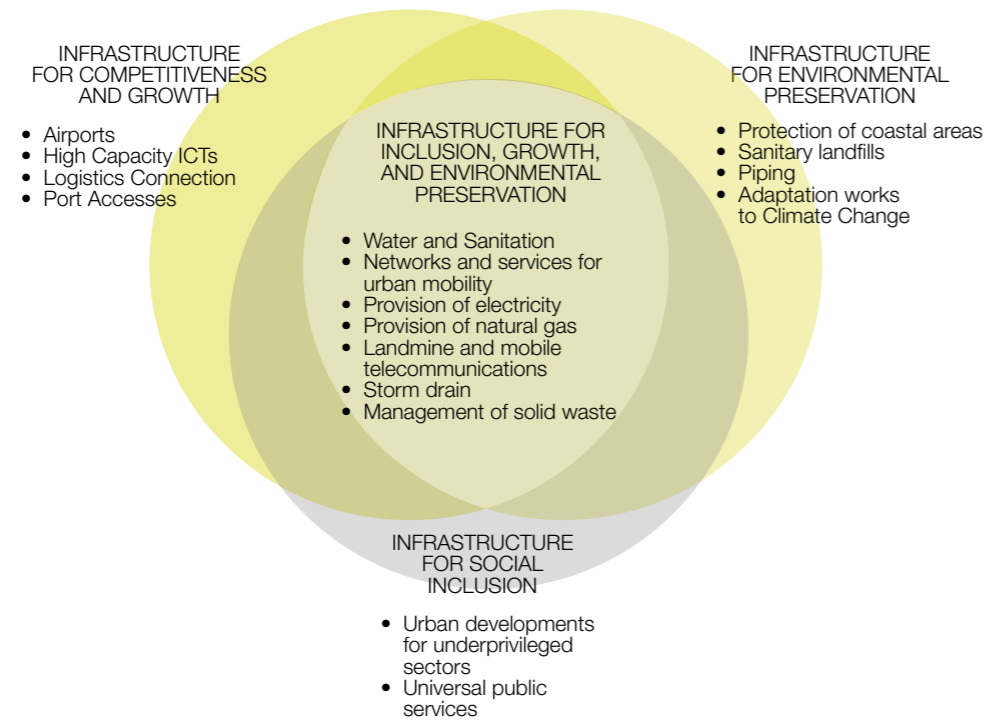
The infrastructure deficit in Latin American cities contributes to strengthen the obstacles reviewed before. The accelerated urbanization during past decades was not accompanied by an adequate planning process and provision of infrastructure and basic social services, generating infrastructure and services gaps that impact asymmetrically on the poorest populations and accentuates exclusion and vulnerability. The urban infrastructure deficit presents a diverse scenario: it is very variable by type of infrastructure, by city, and by area within the cities. The total lack of infrastructure is increasingly infrequent in Latin American cities; the problem is one of incomplete or poorly integrated infrastructure. The deficit of urban infrastructure is particularly pronounced regarding water management (drinking water, sanitation, and storm drain) and mobility. It has serious effects on the quality of life of the population, on health, and on social relationships.

Toward inclusive, competitive, and sustainable cities

Starting from the diagnosis of the performance of Latin American cities presented above and the global and regional trends, a vision is proposed focused on three main characteristics: progress toward inclusive, competitive, and sustainable cities, to specify how the urban infrastructure agenda will adjust to that vision. **Inclusive cities** that offer an adequate quality of life for its inhabitants, opportunities for personal progress, an adequate coexistence for its different groups and social strata, and conditions for citizen participation, governance, and social learning that enable a sustainable growth path. **Competitive cities** that are active mainly in seeking a path toward economic development for our countries, with a dynamic and diverse productive fabric, with a positive interaction with its national territory, with spheres to create and export culture, and which offer attractive profiles for the construction of the country image. **Sustainable cities** that offer a synergistic and not a destructive relationship with its surrounding regions, an equation of sustainable use of non-renewable resources, and an economic and financial model that ensures sustainability and a balanced relationship with the national finances.

Urban infrastructure for the three complementary objectives

Urban infrastructure must contribute to the three components of the vision: inclusion, competitiveness, and sustainability. The three objectives are not conflicting, and most of the investment in infrastructure may satisfy all of them, as shown in the following graph.



Most of the components of urban infrastructure are useful for the three components: drinking water and sanitation, urban transportation, provision of electricity, and landlines and mobile telecommunications. However, there are infrastructure components aimed basically at each one of the three objectives. For example:

- The development of integrated infrastructure for disadvantaged neighborhoods or universal public service programs for social inclusion.
- Airports, logistic parks, and port accesses for competitiveness.
- Sanitary landfills, piping, defense of coastal areas, adaptation works for climate change in order to preserve the environment.

An agenda for urban infrastructure to contribute to face the challenges of the future

To advance in the transformation process of the proposed vision, a strategic agenda made up of six principles is suggested:

- **Develop a global vision of cities from a systemic perspective.** A social dialogue and planning process which, starting from the vision of society and the role of cities, allows for the necessary infrastructure to contribute to the objectives and, in addition, establishes the basic rights of all citizens and the desired productive insertion model.

- **Define the desired organization of the urban space, with a territorial planning approach.** Starting from the vision, define the desired spatial configuration through urban and territorial planning as an organizing element, define spaces for productive activities, residential and commercial spaces, green and cultural spaces, circulation and mobility strategies, interconnection with the national space, etc. Identify infrastructure gaps to be covered and the stages to do so. Establish procedures for citizen and organizational participation that support this process.
- **Offer basic infrastructure to guarantee citizens' rights and inclusion.** On the basis of the definition of basic rights, establish which needs have to be covered, defining plans and projects in each of the cited dimensions to advance in covering the gaps according to the vision's basic rights aspirations.
- **Develop infrastructure for growth and international competitiveness.** On the basis of the defined productive model, establish dialogues with national and international entrepreneurs to evaluate what actions, in terms of infrastructure, are necessary to strengthen the city's attractiveness and its capacity to attract quality employment. Ensure high levels of quality in the provision of some key services for the location of productive and innovative activities as, for example, quality public transportation, high capacity and quality telecommunications, and airports.
- **Ensure rationality and sustainability in the use of resources.** Evaluate the city's current situation regarding the consumption of key resources and environmental quality indicators, and define evolution objectives for these variables by using policies that point to a rational use through the management of demand. Define a sustainable fiscal and financial pact between the city and the nation, as well as policies to finance investments and indebtedness that ensure sustainable development.
- **Build institutions and governance.** The above mentioned principles cannot be fulfilled if a strong improvement in the institutional capacities of the cities is not ensured. In this regard, building Institutions, processes, and governance is recommended to ensure compliance with the proposed principles, and to generate a continuous institutional and social learning process.

3. Infrastructure to add value to food trade

A great opportunity for Latin America

Latin American countries have the opportunity to strengthen their presence in global food chains, and doing so will be key for its development possibilities, beyond the excellent opportunities that are also present in manufactures and services. There is a strong and growing demand for food, and the countries in the region have the resources to satisfy it; the growth of processed food production may generate quality industrial employment and provide opportunities for a respectable entry to small and medium-sized agricultural producers.

Agribusiness: a growing market dominated by developed countries

The world food trade presents favorable growth prospects, especially in the segments with the highest value added. The foreseeable evolution of developed and emerging countries indicate a noteworthy increase of consumers, particularly in emerging countries. The OECD projects a growth of middle classes in the world of 3,000 million people for 2020, of which 2,700 will be in Asia, and 130 million in Latin America. These new middle classes will progressively and significantly change their diets, migrating to higher quality consumption. Food trade has historically been dominated by developed countries, which through public policies and the strategies of their companies developed sustained efforts to maintain their position. In 2008, developed countries concentrated 60% of the world food exports (excluding trade within the countries of the EU).

The food sector is organized around global value chains that cover different stages, from primary production to the sale of brand processed foods. Few emerging nations have built solid positions in these chains; Latin American countries have the opportunity to strengthen their presence through strategies that put together the concept of value chain, the desired positioning, and the competitive factors that have to be developed in order to achieve it, among which infrastructure has a noteworthy role.

The analytical framework to integrate infrastructure in value chains

To analyze how these markets function and understand the way in which infrastructure may contribute to an improved positioning, an analytical framework has been adopted, combining three concepts: value chains, productive districts, and logistic chains. Food markets are organized in **global value chains**, with different actors between the original producer and the final consumer. Companies adopt strategies to position themselves in these chains, so as to capture the stages of generation of value that are more attractive; This positioning may go from the production of raw material, to cover all the stages including the research and development activities and the management of brands.

The production of food originates in specific territories, generally at a sub-national level: **productive districts** in which human and natural resources, public policies, and support industries (clusters) make them competitive. The productive development strategies are not expressed only at a national level, but as local development. **Logistic chains** connect the links of the value chain, including infrastructure and transportation and storage services, the entrepreneurial organization of the supply chain and logistic operations, and the diverse activities of the management of borders and the facilitation of international trade (commercial procedures, customs performance and its integration with other control entities, management of border crossings, etc.).

From the perspective of developing countries, the starting point to understand the positioning of companies in a global value chain is supported by the strategy adopted by the country (international insertion model, productive model) and the competitive strategy of its territories in each value chain. In this context, companies establish which links of the chain they want to include, and which are left under the control

of the purchasing companies (the destination country or an intermediary). In one extreme, companies in emerging countries may place themselves exclusively as raw material producers, usually a commodity. In the other extreme, the company may aspire to include all the global value chain, from the production of raw material to the management of a brand of prestigious differentiated agribusiness, which includes activities such as industrial processing, research and innovation, and distribution, up to the destination market. As the company advances in its positioning, it includes more functions, leaving less in the hands of the purchaser and capturing more value in the chain. These diverse positionings have variable infrastructure requirements, understanding infrastructure and its associated services in its broadest sense. Several cases that have been analyzed illustrate the sense of these positionings and their requirements with respect to infrastructure.

What international best practices teach: align infrastructure to productive strategies

The countries that have progressed the most in the field of agribusinesses have adopted a comprehensive vision. That vision extends from the definition of the desired position in the value chain, supported by a strong national and territorial strategic will to defend and expand their presence in them, to the facilitating elements such as innovation, entrepreneurial development, generation of new capacities, education, and – most notably – infrastructure. A review of several successful cases around the world highlights the tight connection between productive strategies and strategies regarding logistic infrastructure and ICT to promote the competitiveness of the national enterprises, attract new foreign investments, and take positions as nodes or key intermediation markets. Promoting the development of own multinational companies and public-private expansion policies is frequent.

Infrastructure and services with higher quality and sophistication for better positioning in the value chains

A detailed analysis was carried out of three possible positionings of Latin American companies in the agribusiness value chains, with an identification of the respective infrastructure requirements in each case. The simplest positioning is to export raw material with low additional processing, as is the case of the South American grain exporters (humid Pampa, Mato Grosso). They must have the infrastructure to enable the harvest, storage, and dispatch of the product: rural roads, internal transportation networks (roads, railroads) that link the storage centers with the export nodes with the appropriate characteristics, ports with maritime and land accesses, waterways that allow for an efficient navigation, and ICT to coordinate the bulk logistics. In the case of South America, two different situations were analyzed: the plains of the humid Pampa of Argentina and Uruguay, and the new production frontiers of the center-west and north of Brazil. In the first case, there are multiple actors, a long production and logistics management tradition, and a relatively mature infrastructure, with wide road and railroad networks and port terminals that are suffering an increasing pres-

sure taking them to the limits of their capacity, which results in growing costs and several negative externalities. The challenge is to create conditions and an investment climate that allows for business expansion and a reduction of logistic costs. In the center-west and north of Brazil, agricultural production is recent and shows an explosive growth. The basic infrastructure is being built and the actors are concentrated in large companies. The challenges are to complete the basic infrastructure: new railroad lines, port development, and road connections. There is no supplier framework or market relationships that constitute the network model in the traditionally productive areas.

A second case of positioning that is advancing in the capture of value in the chain consists in selling processed foods of an intermediate value to an international purchaser that leads the chain and who sells it with its brand (fruit, pork, vegetables, etc.). The example analyzed is Chile, which in its 2030 vision proposed to become a food power through a vision that integrates entrepreneurial development, an international insertion strategy emphasizing innovation, the construction of brands and the advance in the value chains, and inclusive rural development criteria. This integration vision incorporates infrastructure as an important element, including its hard components (highways, ports, electricity, telecommunications, water resources) and the soft ones too, particularly regarding trade facilitation, customs and sanitary controls, and the use of ICT. This positioning leads to the administration of a more sophisticated logistic chain that coordinates the harvest of the product with its ripening and delivery times, controlling inventories, providing cold facilities and adequate sanitary conditions, and with an appropriate maritime accessibility. Other infrastructure elements are also key: ICT to follow up the merchandise throughout the chain, reliable supply of electricity for the cold facilities, and water resources that ensure the conditions of the product faced with more demanding consumers regarding environmental matters –as well as competitor countries that may use any weakness in this field to protect their markets–.

When seeking participation as an exporter for a leader of the chain, or exporter with its own brand, the demands for infrastructure and logistic capacities grow exponentially: it is not about managing a logistic system up to the port of export, but of controlling a real logistic chain up to the final client, or working with a supplier/partner that can offer these services.

The positioning with the greatest potential to capture value is that of the seller with its own brand for foods or horticultural products, with coverage of the global market and with the largest demands for entrepreneurial sophistication, infrastructure and institutional capacities. An emblematic case is that of the export of flowers in Colombia, which has managed to turn the sector into a brand as a result of an intense associative activity of the companies involved and a decisive governmental support. It is currently advancing toward a greater participation in the value chain through an increasing differentiation of products and variety of destinations. This type of positioning makes it necessary to have the infrastructure services described in the previous case, in addition to managing the logistic chains in the destination markets, including

the final distribution and providing support to the construction of the country-brand. This demands the strength to compete in speed and response capacity with high quality internal, maritime, and air logistics, operation centers at the destination point, permanent logistics innovation, and a strong support of the information systems (ICT).

The agenda to follow: from the strategic vision to the infrastructure and logistic requirements

On the basis of international experience and the Latin American cases presented here, it is suggested that the infrastructure development agendas be organized around five key components and one permanent evaluation and learning cycle:

- The starting point is the country's strategic vision.
- Regional development and competitive territorial policies, to turn the vision into regional development or productive poles.
- Positioning strategies in the global value chains for the desired territories and productive poles.
- National, regional, and local strategies for the development of infrastructure, particularly transportation and logistics (in its hard and soft components) but also energy, quality of water and – increasingly – ease in communications.

4. Investment and performance indicators

How much are we investing? A pending matter for decision making

Numerous studies show that a greater quality and coverage of the infrastructure networks have a positive effect on economic growth and the reduction of inequality and poverty. To recognize their needs, countries need data, and the most appreciated data when the time comes to establish public policies, is the flow of investments in infrastructure. However, the available estimates on the level of investment in infrastructure in Latin America are not very precise. The national accounts system does not have reliable data on this type of investment, which remains included within the gross fixed capital formation.

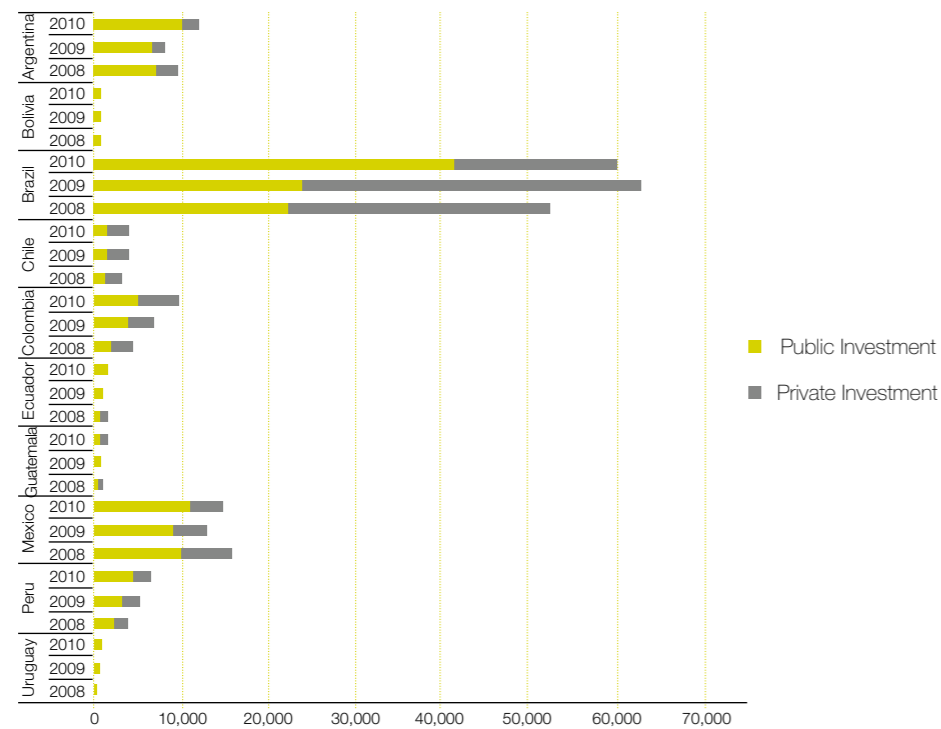
In order to face that bad patch, CAF agreed with ECLAC on a progressive work program, starting with ten countries in 2012 and completing 22 in 2014. To achieve this, the available information was gathered from official sources in the different countries and interviews were carried out in key areas. The estimates cover the four classic economic infrastructure sectors (transportation in its diverse modalities, energy, telecommunications, and water and sanitation), including both private and public investment. Estimates were prepared for ten countries in the region, which jointly represent more than 80% of the investment in infrastructure, covering 2008, 2009 and 2010.

The first results for ten countries

The results achieved for the first ten countries estimated show some relevant trends regarding investment in infrastructure:

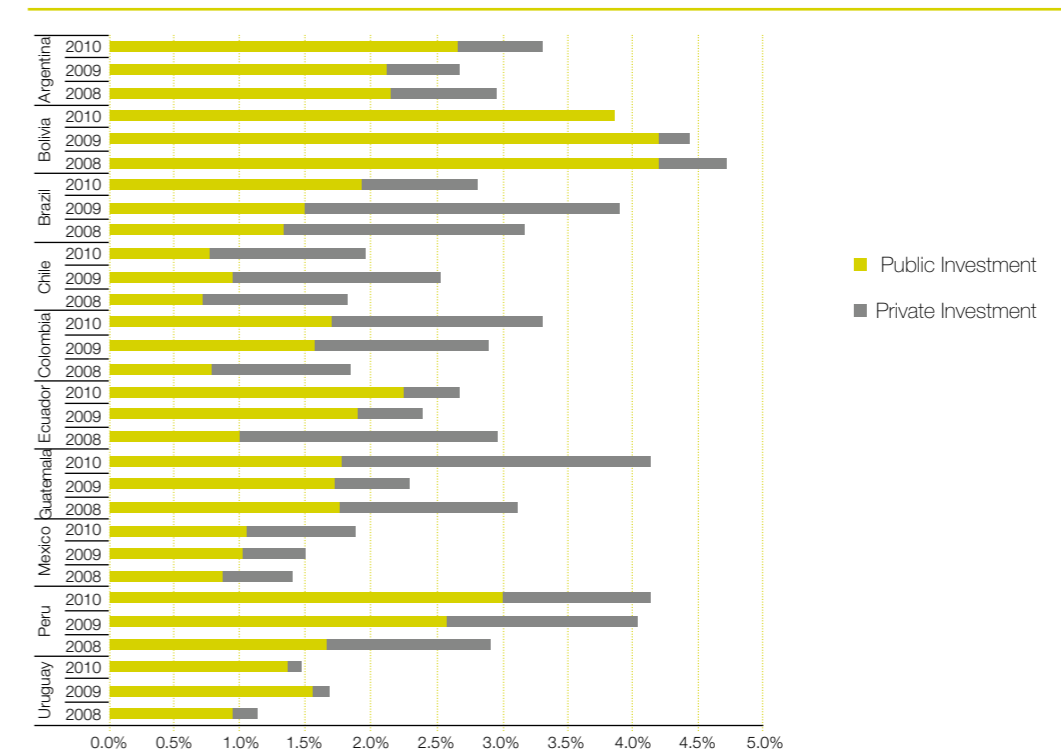
- Total investment has grown 17% between 2008 and 2010 in current values; it fluctuates around 3% of GDP (does not include infrastructure, so it can be slightly higher).
- The sector with the highest participation in investment is transportation (54%), and its relevance is growing. It is followed by telecommunications (20%), energy (18%), and drinking water and sanitation (8%).
- Private participation represented half of the investment in 2008 and 2009, and was more than 34% in 2010.
- In the three years that were analyzed, private participation reached 8.5% in water and sanitation, 20.7% in transportation, 65.8% in energy, and 93.4% in telecommunications.
- The sector that promotes public participation the most is transportation (more than 90% of public investment in 2010).

ALL SECTORS - In million of current USD



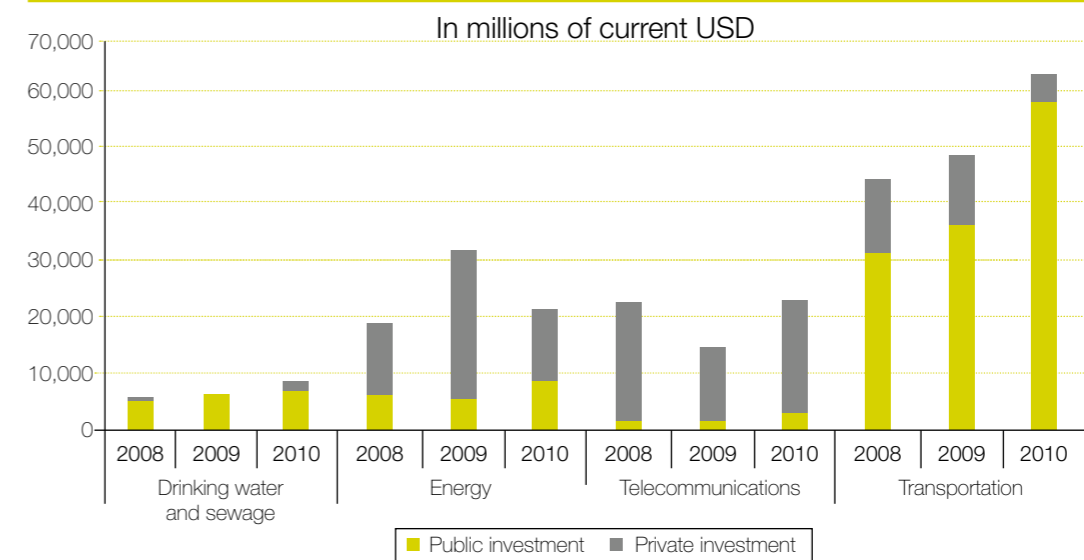
Source: own elaboration.

All SECTORS - In % of GDP



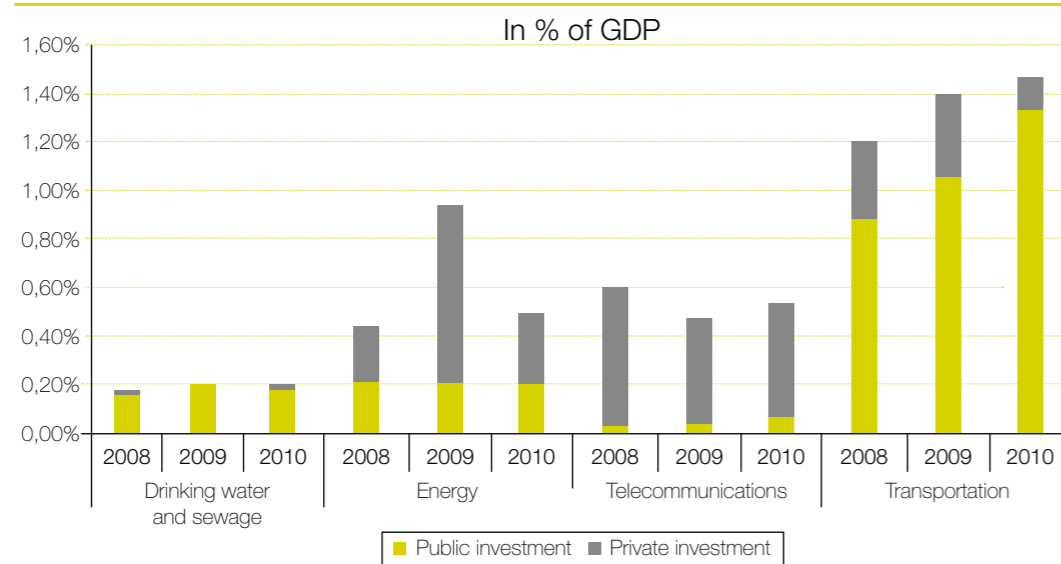
Source: own elaboration.

INVESTMENT PER YEAR AND SECTOR



Source: own elaboration.

INVESTMENT PER YEAR AND SECTOR



Source: own elaboration.



Introduction

In order for Latin America to achieve a more relevant role in the global economy and substantially improve the quality of life of its inhabitants, it is essential to achieve higher and better quality growth, sustained in time, efficient, inclusive, and respectful of cultural diversity and the environment. Infrastructure must be a part of this comprehensive development model, together with an organized management of public finances, innovation, and regional integration. Infrastructure contributes to that development objective in several dimensions: it favors a better quality of life, social inclusion, and opportunities for isolated communities while promoting the growth of the economy and the competitiveness of its enterprises. At the same time, it facilitates the integration of the national space, regional interconnection, decentralization, and internal circulation. It may also contribute with the diversification of the productive fabric, by promoting development and the internationalization of national or regional enterprises linked to infrastructure and its services.

Aware of the relevance of infrastructure for the comprehensive and sustainable development of the region, in 2011 CAF prepared, in agreement with the SEGIB, a Strategic Diagnosis of Infrastructure in Latin America, which was presented on the occasion of the XXI Ibero-American Summit of Chiefs of State and Government which took place in Asunción, Paraguay. That report, called IDeAL 2011, considered infrastructure as a key factor for comprehensive and sustainable development, and highlighted Latin America's considerable lag. The report included a review of the situation of the five main infrastructure sectors, and identified the most important challenges to expand and improve it: financing, institutions and policies, the integration of environmental factors, as well as the integration of the social actors in the projects and policies.

In its conclusions, the report identified a set of issues that require priority actions, such as the expansion of the coverage of drinking water and sanitation, the development of mass urban transport systems, and the expansion of wide band services. In addition, it proposed a strategic agenda based on six axis:

1. Significantly increase investment in infrastructure
2. Frame the policies and projects in a paradigm of sustainable development and territorial vision
3. Strengthen institutions in their diverse dimensions
4. Optimize the use of multiple financing sources and modalities
5. Promote the development of enterprises in businesses linked to infrastructure
6. Promote exchange between governments, regions, and cities.

The main report and six sectorial reports (referring to the five infrastructure sectors considered and financing) are available electronically.¹

CAF proposes to maintain its support to the agenda

Since the XXI Summit, the SEGIB requested CAF to annually present a document that covers diverse aspects related to the region's infrastructure. To comply with the request, CAF has decided to establish a series of annual publications, keeping the name IDeAL (Infrastructure for the Comprehensive Development of Latin America), aimed at carrying out a periodical follow-up of the sector. Following the direction of the IDeAL 2011, it is a report aimed at decision makers, in an agile style without technicalities, based on support documents which are published separately, each with its own value, aimed at the community of specialists.

CAF decided to develop an IDeAL report yearly, developing some priority issues and issues of the strategic agenda. To do this, a format has been adopted that includes four sections:

- The first one includes general information regarding infrastructure, highlighting relevant trends. This section will cover the same sectors as the IDeAL 2011, but widening the scope in the case of water and sanitation, which will be considered from the perspective of a comprehensive management of water resources.
- The second develops a specific topic regarding infrastructure and sustainable development, seeking a cross-cutting subject (different from infrastructure), relevant for sustainable development.
- The third refers to infrastructure as a key factor to improve the region's international insertion, taking a subject each year that constitutes a relevant case for the competitiveness of the economies.

- - The fourth is a list of general performance indicators and a series of estimates of infrastructure investment by country, sector, and source.

Subjects for the IDeAL 2012: infrastructure for the cities and for agribusiness

For 2012, on the occasion of the XXII Ibero-American Summit of Chiefs of State and Government which took place on November 16 and 17 of 2012, CAF decided to deal with the following subjects, considering that they effectively contribute to deepen the agenda stated the previous year:

- As a relevant cross-cutting subject for infrastructure and sustainable development, the subject of cities was included. Urban centers increasingly concentrate the population and economic activity, and their infrastructure is not only a key element to ensure quality of life to its inhabitants and competitiveness to the urban economy, but it will also be the object of an increasing share of investments. Cities require a comprehensive approach for their policies and a specific agenda for their infrastructure, which is a key challenge in the sustainable development paradigm with a territorial perspective.
- The section referring to a better international insertion will focus on the world trade of agribusinesses, which shows clear possibilities for the region to achieve a better position in the global value chains and to generate quality employment. Improvements in infrastructure are essential to increase competitiveness and support sustainable development.

The first section highlights relevant trends that have taken place in the past year in the six infrastructure sectors addressed by the IDeAL: financing, transportation, electricity, telecommunications, gas transportation, and water management. It is expected that its contents will contribute to update knowledge and guide policies and institutions.

The fourth section includes not only the main performance indicators from the infrastructure sectors included, updating the figures presented in the IDeAL 2011, but also incorporates infrastructure investment estimates, an input of great usefulness for planning and financing which has historically presented difficulties. CAF has an agreement with ECLAC for a joint estimate of public and private investment in infrastructure, by sector, which will gradually cover all the countries in the region. The IDeAL 2012 includes estimates for ten countries, but it is expected to cover all the Latin American countries in 2014.

1. <http://publicaciones.caf.com/publicaciones>



Infrastructure Trends in Latin America

General perspective:
a period of expansion in the use
and provision of infrastructure

*A sustained increase of demand resulting from growth
in the economies of the region*

Probably the most significant information regarding Latin America's infrastructure in 2011 is the increase in demand for its services accompanying the growth experienced by the region. The regional GDP during 2011 registered an average growth rate of around 4.3% with five countries that grew more than 6%. This growth has been reflected in high growth rates in the demand for infrastructure services, particularly in diverse transportation, gas, electricity, mobile telephony, and wide band services. The growth of demand and a comfortable fiscal position have facilitated an increase of public and private investment, although the level achieved is not enough to close the gap between infrastructure availability and needs. In the past three years, the levels of investment have grown, although differently by sector; in current values, investment grew by 17% in 2010 with respect to 2008, and there are clear signs that it continued to grow in 2011, exceeding 3% as a share of GDP (should be between 5% and 6%).

Public and private investment on the rise, albeit still insufficient

In response to these increases, the levels of investment have also grown, although differently by sector. In the fourth section of this report there are detailed investment estimates between 2008 and 2010 for the four basic sectors of infrastructure, which show that in current values, investment grew by 17% in 2010 with respect to 2008. Although there are no precise estimates for 2011, data from several countries (Argen-

tina and Mexico, for example) indicate that investment in infrastructure in that year grew with respect to 2010. As a share of GDP, investment in infrastructure already reached 3%.

The economic crisis has altered infrastructure financing

The international financial crisis has impacted the sources of infrastructure financing, altering its relative weight. In this context, the role of domestic sources has strengthened, especially through public investment and local development banks (such as BNDES and Banobras). Bilateral funds and carbon financing start to lose weight due to the crisis. At the same time, multilateral credit organizations complement the financing needs in large countries, and maintain a key role for investment in infrastructure in smaller countries. In the multilateral sphere there has emerged an important trend which consists of making investment pools with other actors, to invest in large works (for example, the expansion of the Panama Canal).

Within the bilateral financing mechanisms, China has increased its relevance through a model of direct investment in infrastructure in exchange for favorable long-term contracts for the supply of raw materials. Given the increasing importance of Latin America as a supplier of raw materials to China, it may be expected that in coming years these types of contracts will be offered to Latin American countries. According to ECLAC, China’s direct investment in Latin America in 2010 reached 50 billion Dollars, concentrating mainly in natural resources, with Brazil and Argentina as the main recipients. At the same time, ECLAC anticipates that in coming years, Chinese investments in the region will concentrate in the railroad transportation sector and telecommunications.

The crisis has also brought an opportunity for the region: prospects of negative growth in the developed world and low interest rates open the opportunity to become an attractive destination for investment. As an example, sovereign funds and foreign pension funds have begun to purchase infrastructure assets that they manage through local specialized enterprises which they sub-contract. The region is very attractive for productive investments tied to commodity prices which include infrastructure projects, especially ports and railroads. These projects usually have positive elements and, at the same time, challenge the planning capacity of the State.

Domestic financing sources, with a significant potential in the region, face limitations and challenges. The low rates of domestic savings and the low banking level of the region explain, in part, the limited role of local Banks in financing infrastructure, although there are exceptions. The lack of maturity of the banking sector in quantifying and measuring risks, which is key for financing large infrastructure projects, is an additional factor reflected in the absence of credits without guarantees. Pension funds are presented as a solid alternative in the absence of a banking sector, but restrictions in their investment regimes limit a greater advance. However, there are successful cases in Chile, Colombia (focused on energy) and Peru. Some advances have been achieved in the use of financial vehicles and innovating operation mechanisms through securitization and new modalities of debt leveraging.

More advances with investment and its financing than with the other challenges of the agenda

The IDeAL 2011 report identifies six axis for a strategic agenda regarding infrastructure for the region. A qualitative evaluation, after analyzing sectorial advances, suggests that the most important advances have been in the increase of investment (which reaches an approximate average of 3% of GDP with respect to the target proposed by CAF in 2011 of 5%, and with an increasing trend) and the use of financing alternatives, where there are clear advances in the use of public private association (PPA) mechanisms.

Progress has been more limited in the advance toward a paradigm of sustainable development and territorial vision, strengthening of institutions, development of enterprises in the sector, and the exchange of knowledge. With respect to the concept of sustainable development, the effective incorporation of public policy measures that favor it have been slow. However, there are advances in the implementation of environmental management mechanisms in infrastructure projects. Institutional weakness continues to be a key challenge in all the sub-sectors, with significant effects on the quality of the sector’s policies and projects. The lack of knowledge exchange between governments and cities is, in part, an additional effect of the weakness of institutions. Forums continue being traditional, with scarce progress.

Table 1.1 Advances in the infrastructure strategic agenda

Axis of the Strategic Agenda	Advance	Observations
Significantly Increase investment in infrastructure		Has been growing, exceeds 3% of GDP
Frame policies and projects in a paradigm of sustainable development and territorial vision		Few examples. Slow adoption of sustainable development
Strengthen institutions in their diverse dimensions		Few advances: the institutional weakness is dominant
Optimize the use of the multiple financing sources and modalities		There have been advances in PPA and national-subnational combination
Promote the development of companies in businesses linked to infrastructure		Very few examples of a response to public policies
Promote exchange between governments, regions, and cities		There are examples, but in general the traditional fora continue

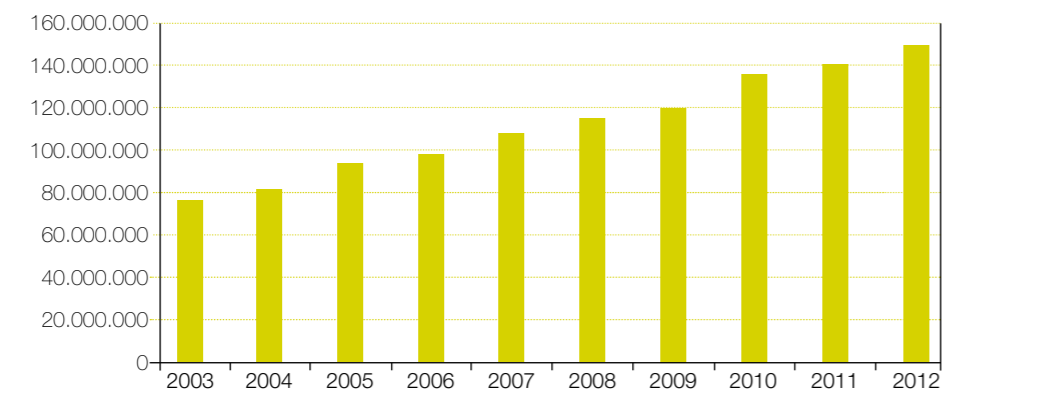
An element to highlight is the advance in the general perspective of infrastructure services as rights. Examples are the right to mobility and the right to water. This explicit recognition involves the adoption of regulations that favor measures to achieve access to those services. In practice, the current implementation of these measures implies a greater national involvement in urban services.

Noteworthy aspects by sector

Transportation: a stage of expansion of networks and services

Probably the most distinctive current information in the transportation sector in Latin America is the general growth of demand, originated by the increase of income, of trade, of urbanization, and of motorization. In air transportation, for example, the Latin American market is the one with the highest growth in the world, with the consequent challenges for airport infrastructure and the support systems for air navigation. In the past ten years, the amount of passengers transported by commercial airlines in the region has doubled, with an annual cumulative growth rate of around 7% (see Graph 1.1).

Graph 1.1 Passengers transported by commercial airlines in Latin America



Source: prepared using IATA data.

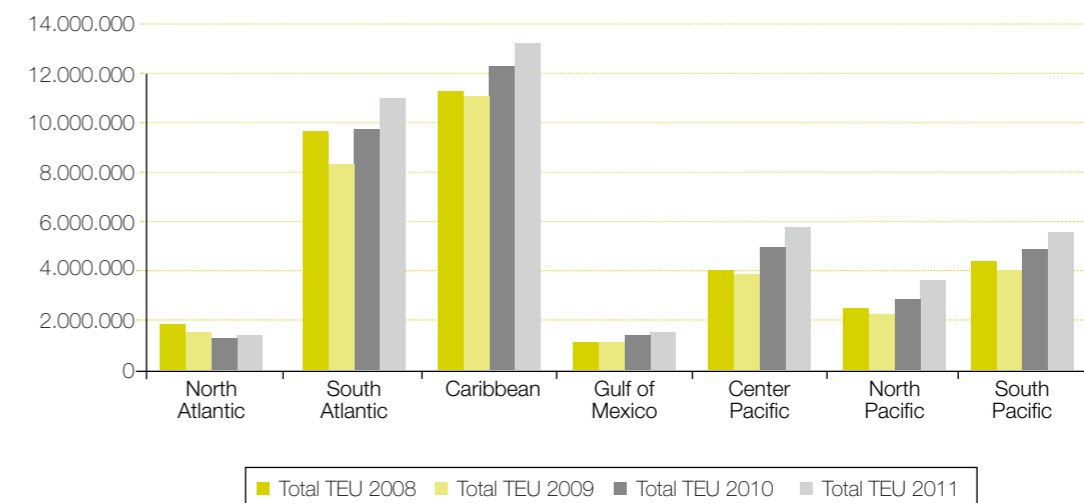
The maritime and port movement has also grown substantially, particularly bulk exports such as iron mineral, coal, and grains. These commodities generally have dedicated logistics, with their own facilities. General cargo, which is mobilized through public terminals, has also increased considerably. Graph 1.2 shows the growing evolution of container movements in ports in diverse sections of the Latin American coast. The concentration of shipping and port activity in global scope operators is noteworthy. The growth of cargo transportation is promoting some trends that are noteworthy, such as the expansion of the Panama Canal, investments in ports, the

pressure of some mining and agricultural sector producers to have bigger and better ports, and the consolidation of port operators and shipping lines. The region is not an actor in the construction, operation, or property of ships; only Brazil has a considerable and growing fleet. The trend to use larger capacity ships, if it proves to be profitable in the medium term, should impact the sector in at least two ways: expansion of ports and consolidation of shipping lines.

The expansion of the Panama Canal, programmed to start operations in 2014, will enable the passage of larger ships and the improvement of the service times of the Canal, generating an impact on the service to routes that mainly tend Asia – Europe, Asia – East Coast of the United States, and Asia – East Coast of South America. This is in addition to the development of a conglomerate of services associated to cargo transportation that is growing in Panama.

In land transportation the volumes of cargo have accompanied the growth of demand. The dominant mode continues to be highway transportation; only two countries in the region, –Brazil and Mexico– have a significant participation (over 20%) in their cargo movements (Kohon, 2011). Investment in highways has continued intensely; it is the sector that registers the greatest growth in infrastructure investment, with public resources and increasing private participation. The growth of motorization and trade is making public-private association schemes possible, when before they were not. The region has the double challenge of completing networks that still do not have the adequate coverage or standards, and simultaneously expand the capacity of tranches that require more than two lanes for each direction.

Graph 1.2 Port container movement in the main 100 Latin American ports



Source: Prepared with ECLAC data

Urban transportation is becoming a serious challenge in the region. When incomes grow, travelling rates increase, which is undoubtedly beneficial from one perspective, but it implies a detriment to the quality of life as a result of congestion and other negative externalities (pollution, accidents, noise) that result from transportation in the cities. The rates of motorization are still low when compared to more developed countries (between 100 and 300 vehicles per 100 inhabitants, against 500 and 700 in European countries, the United States, Canada, or Australia). The increase of motorcycles is a distinctive piece of information; although it provides mobility, it is the cause of high accident rates. This situation implies an increasing challenge to address the needs of the most vulnerable populations in addition to achieving friendlier and more attractive cities for the generation of wealth and knowledge. Recently (2011), IBM developed an indicator associated to the “commuter pain” in cities through a survey carried out in a group of 20 cities. Mexico City is the one where commuting causes the “most pain”, while London and Montreal came out as the ones with the “least” pain. Only one more Latin American city appeared in the survey, Buenos Aires, located toward the middle of the commuter pain scale.

As a result of this situation, a trend has been consolidating to consider mobility as a right of individuals. The most notorious step in this regard took place in Brazil, where at the beginning of 2012 the Urban Mobility Law came into effect, based on principles such as universal accessibility, sustainable development, equity in the access to collective public transportation, democratic management, and social control of planning and evaluation of the national urban mobility policy. The objective of the application of this law is to address the challenges mentioned previously which emerge from the fast urbanization process and from the unequal distribution of access opportunities. Two of the practical aspects of this legislation are the promulgation of rights for urban transportation users, and the definition of the powers of the different levels of government in the development of transportation systems. Most of the countries in the region lack the institutional frameworks that facilitate financing, development, and managing its urban mobility. In addition to Brazil, other countries such as Colombia and Mexico have also made progress in the efforts to regulate the central investment in sustainable urban public transportation projects through specific support programs for collective transportation. At the same time, the growth of the population is directly reflected in higher consumption, production of waste, and other processes that require and generate cargo to be transported, and an additional concern from the perspective of sustainability. This implies addressing urban logistics as a critical part of the daily life of cities.

Some noteworthy trends in the transportation sector are:

- The advances to improve mass transportation in cities; for example, in Colombia, Mexico, and Peru.
- Urban logistics as a relevant subject in large cities.
- Increasing attention to accidents, particularly linked to automotive transportation, even when advances are still moderate.

- The obstacles faced by transportation infrastructure works, particularly environmental aspects and relationships with the communities.

Electricity: toward regulatory models based on planning

The need to ensure generation at competitive prices facing an increasing demand, promoted new auction or bidding mechanisms to contract long term energy supply. The demand for electricity in the region grew by close to 4.8% with respect to the previous year, a high rate compared with more developed countries. It is expected that this growth will continue in coming years. All this is taking place in a volatile international energy scenario, characterized by high fossil fuel prices, which many countries of the region use to produce electricity. Facing this scenario, in past years there have been regulatory adjustments to improve the conditions for the development of new electricity generation projects, to ensure competitive and stable prices for several years. The regional trend has been to implement auction mechanisms of different degrees of sophistication to contract long term energy supply, through the construction of new electric plants.

The use of auctions responds to a new regulatory and planning paradigm, different from the previous dominant sectorial reforms. In the new scheme, the decision to develop new generation infrastructure is taken directly or indirectly by the State through a planning process or the application of specific rules that determine future needs. Underlying the dissemination of the auction mechanism is the recognition that the sectorial organization in pool type wholesale markets is not enough, at least in the regional context, to guarantee the development of new generation infrastructure, mainly the type with lower operating cost but high unit investment cost. While reforms that promoted the creation of wholesale electricity markets sought efficiency through different agents permanently competing between them in an organized market (“competition in the market”), assuming the risk of losing in the process against others who were more efficient, the auction mechanisms efficiency is guaranteed by the generation of competition conditions at the time the auctions are carried out (“competition by the market”).

The current schemes for the expansion of generating infrastructure in the different countries of the region may be classified in three groups:

- **Private financing based schemes**, which implement (albeit not in all cases) auction mechanisms for the allocation of long term contracts which may be supplemented with public financing channeled through Development Banks. With different degrees of implementation advance, in this group are the following countries: Brazil, Chile, Colombia, El Salvador, Guatemala, Jamaica, Panama, Peru, Dominican Republic, and Trinidad and Tobago.
- **Hybrid schemes**, where public and private financing complement each other. This group includes: Argentina, Bolivia, Costa Rica, Guyana, Honduras, Mexico and Uruguay.
- **Public works based schemes**, which includes Cuba, Ecuador, Venezuela, and with some nuances, Nicaragua.

Although generation plants are still awarded through auctions, the execution of projects is not obstacle free. Since January of 2011 long term commitments were awarded to new private generation in Brazil, Colombia, Panama, Peru and Uruguay through auctions. Brazil stands out for its magnitude, with more than 5,000 MW of new committed generation. At a regional level, the bid awards prior to 2011 registered a dissimilar evolution; the main problems faced by some of them are linked to difficulties in the environmental approval, doubts regarding the supply guarantee mechanisms in the face of critical situations, and financing problems resulting from the crisis.

The regional experience shows that to be successful, the mechanism adopted to promote the development of electricity generation must consistently combine a series of elements. In first place, the change toward a more active role of the state in investment decisions requires a consistent reallocation of the risks (this is reflected, for example, in the design of the mechanisms to update long term prices). In second place, the centralization of decisions and the reallocation of risks require extreme precautions to guarantee competition in the processes to assign long term contracts due to the subsequent inflexibility to correct initial errors.

A third factor is the consistency between the allocation of risks and responsibilities, and the prospects of each country regarding access to international credit. Finally, another condition for success is ensuring the managing and execution capacity of companies in charge of public or private investments. All of this must take place while guaranteeing sectorial sustainability, which necessarily implies that projects must be able to sustain themselves with the electric sector's own income, including eventually a subsidy policy in accordance with the economic context of each country.

Transportation of natural gas: new resources in the region and multiple investment projects

During 2011 the demand for gas in Latin America grew by 1.3% (a lower rate than that of the last twenty years, which reached 3.3%) but a larger increase is expected, of 3.2% annual, until 2025. The increase in demand in 2011, albeit moderate, exceeded world growth (1.1%), and stands out with respect to the European Union's setback (-10%) and the OECD (-0.6%). The largest consumer of natural gas is Mexico, with almost one third of the region's total consumption, followed by Argentina, Venezuela, and Brazil. The estimated increase of the demand for gas in the region until 2025, translates into an increase of 56% between 2011 and 2025. Growth will be led by the expansion of demand in countries such as Brazil, Peru, and Venezuela, with potential resources and lower gas infrastructure development. The growth of exports and a greater consumption by the electric, industrial, and petrochemical sectors in these countries will drive the increase. Mature markets such as Argentina, Mexico, and Colombia will also grow.

There is a world trend toward a larger participation of gas in the primary matrix, which in Latin America remained stable in 2011 at 25%. The share of gas has

grown, first with the increase on the gas regional trade, first via integration by gas pipelines, and most recently with the introduction of Liquefied Natural Gas (LNG). Natural gas has been essential in thermal plants, which use it to substitute contaminating fuels such as coal and crude derivatives, since the dissemination of cleaner and more efficient electric generation technologies.

To address the increasing demand, the region has conventional gas reserves in addition to significant non-conventional gas resources such as shale gas. The proven gas reserves in the region total 284 TCF; almost two thirds of which are located in Venezuela, while the rest is atomized. These reserves exceed by slightly more than 50% the accumulated demand foreseen until 2025. At the same time, the region concentrates 35% of the world's non-conventional gas (shale type gas) (Table 1.2). These reserves, included for the first time in the calculations of the EIA in 2011, multiply the proven conventional gas reserves of the region by 8 (2,294 TCF v. 284 TCF). The Floating Liquefied Natural Gas (FLNG) processing Project in Brazil, which will supply natural gas from the Pre-Salt in Santos, adds an additional source of resources.

Table 1.2 Estimations of shale gas resources

Asia			1,389	21%	Oceania			396	6%
China	1,275			19%	Australia	396			
India	63			1%					
Pakistan	51			1%	Europe			639	10%
					Poland	187			
America			3,156	48%	France	180			
USA	862			13%	Norway	83			
Argentina	774			12%	The rest	189			
Mexico	681			10%					
Canada	388			6%	Africa			1,042	16%
Brazil	226			3%	Southern Africa	485			
Chile	64			1%	Libya	290			
Paraguay	62			1%	Argelia	231			
Bolivia	48			1%	The rest	36			
Uruguay	21			0%					
Colombia	19			0%	TOTAL			6,622	100%
Venezuela	11			0%					

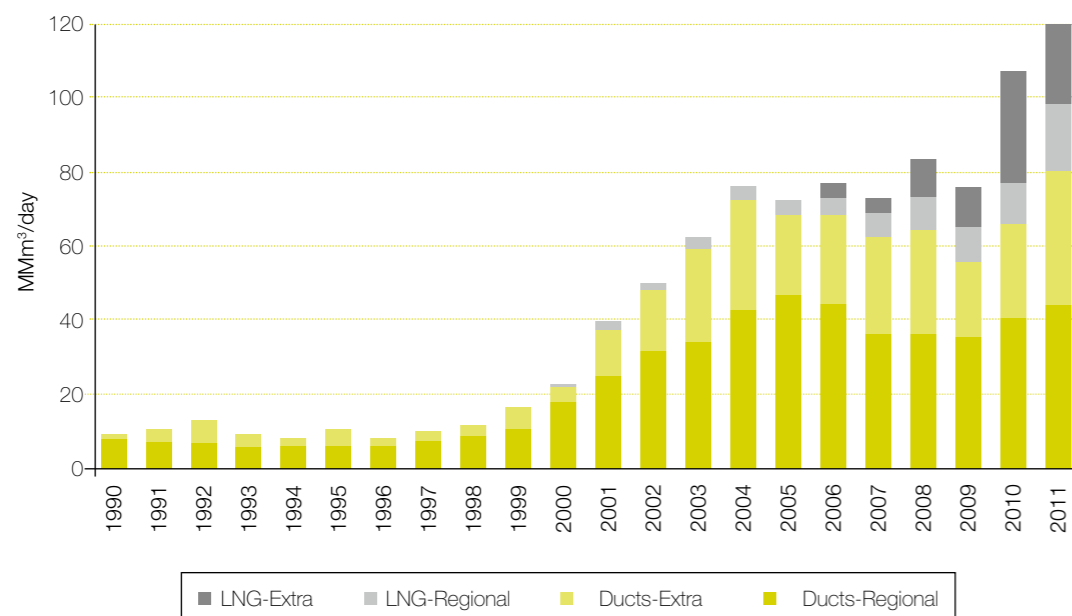
Source: Based on EIA -2011 (World Shale Gas Resources)

Imports represent 20% of the region’s consumption and one third of these imports are increasingly transported by ships originating extra-regionally, and regionally in past years, from Trinidad and Tobago and Peru. Regional gas trade by gas pipelines grew until 2005, when it was displaced by the import of liquefied natural gas (LNG). This lower exchange through gas pipelines was a consequence of diverse regional energy integration plans that were abandoned, in a context of high demand growth.

The prospects of demand growth promote multiple investment projects and strategic plans in the region. Investment projects for transportation networks have been identified for approximately USD 29 billion. Several countries have developed strategic energy plans, toward 2025 and 2030 (Mexico, Brazil, Chile); Peru is focusing on a sustainable energy matrix and the Strategic Environmental Impact Evaluation (EIAE, for its acronym in Spanish) as planning instruments.

The dissemination of liquefied or compressed gas is facilitating a logistic distribution through trucks (“virtual gas pipelines”) which would enable the transport of gas to areas with lower demand without requiring large investments in the construction of gas pipelines. This practice is expanding in Chile, Colombia, Mexico, and Peru. Isolated and specific consumption, such as municipalities in the interior of countries, have a great possibility of being covered through these new modalities.

Graph 1.3 Regional gas imports, by origin and transportation modality



Source: Based on BP and EIA

Telecommunications: the combination of public and private action is reducing the digital gap

The adoption of telecommunication services has significantly increased in the past two years (see Table 2). The penetration of mobile telephony and wide band has increased moderately, and currently reaches levels that are similar to those of developed countries. Mobile broadband, a fundamental technology to reduce the digital gap in the region, grew from 5% at the beginning of 2010 to 21% in the second quarter of 2012, an increase equivalent to 91% annually. It should be noted that the adoption of mobile telephony has registered a significant increase, from 43.5% to 48% in the lower income deciles (see Table 1.4).

Table 1.3 Comparative regional adoption of phone services

	First Quarter 2010	First Quarter 2011	First Quarter 2012	TACC (*) 2010-2012
Latin America	90,71	100,60	110,48	10,36
North America	87,33	87,96	102,88	8,54
Asia Pacific	56,30	67,60	76,70	16,72
Middle East	76,60	87,80	96,90	12,47
Africa	38,20	45,60	53,10	17,90
Europe	103,86	105,42	112,50	4,08
World	68,20	77,10	85,70	12,10

(*) Annual Compounded Growth Rate
Sources: Wireless Intelligence; UIT; author's analysis

Table 1.4 Adoption of mobile phones at the base of the pyramid (two lowest deciles)

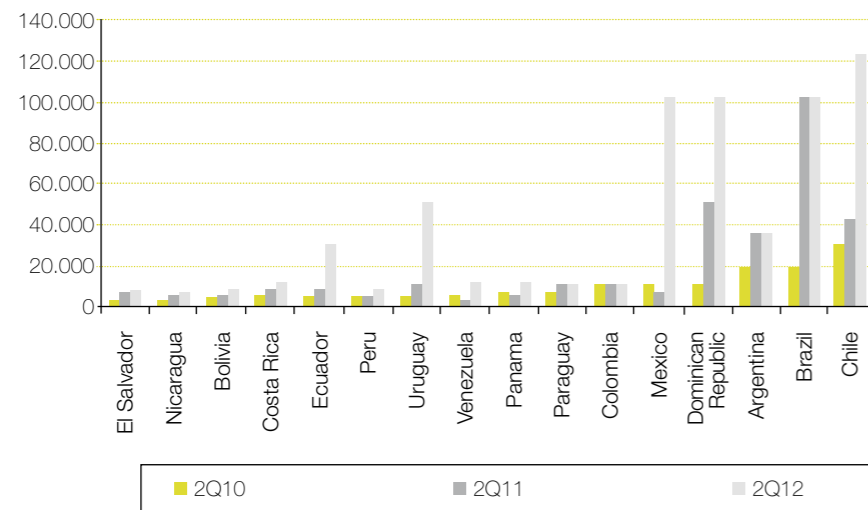
Country	2010 (%)	2011 (%)
Argentina	55,30	58,95
Bolivia	33,20	39,85
Brazil	34,90	39,85
Chile	61,60	63,30
Colombia	67,90	71,00
Costa Rica	47,20	49,10
Ecuador	50,70	59,15
Guatemala	35,60	37,60
Mexico	52,60	57,40
Peru	26,80	31,60
Dominican Republic	42,10	45,35
Uruguay	59,60	62,90
Venezuela	20,50	22,40
Total	43,62	47,98

Sources: Euromonitor (based on National Household Surveys; author's analysis)

The progress of the past two years is a result of the development of competition between private infrastructure operators and specific public policy interventions to promote accessibility, controlling the level of service quality delivered. Domestic competition in the sector has increased in most countries. The structure indices of the markets show that on average, concentration in mobile telephony is moderate, while it is higher among fixed wide band service providers. Due to the entry incentives and the expansion of mobile wide band, the level of competition in the sector increased by 18% in the past two years. The entry of “virtual operators” (without their own network) has contributed to intensify competition. Progress in the development of competition has led to a reduction in rates which exceeds 15% in the three segments. In any case, when prices are compared, especially wide band prices, with those of medium development countries (controlled by purchasing parity), Latin America’s wide band continues to be significantly more expensive.

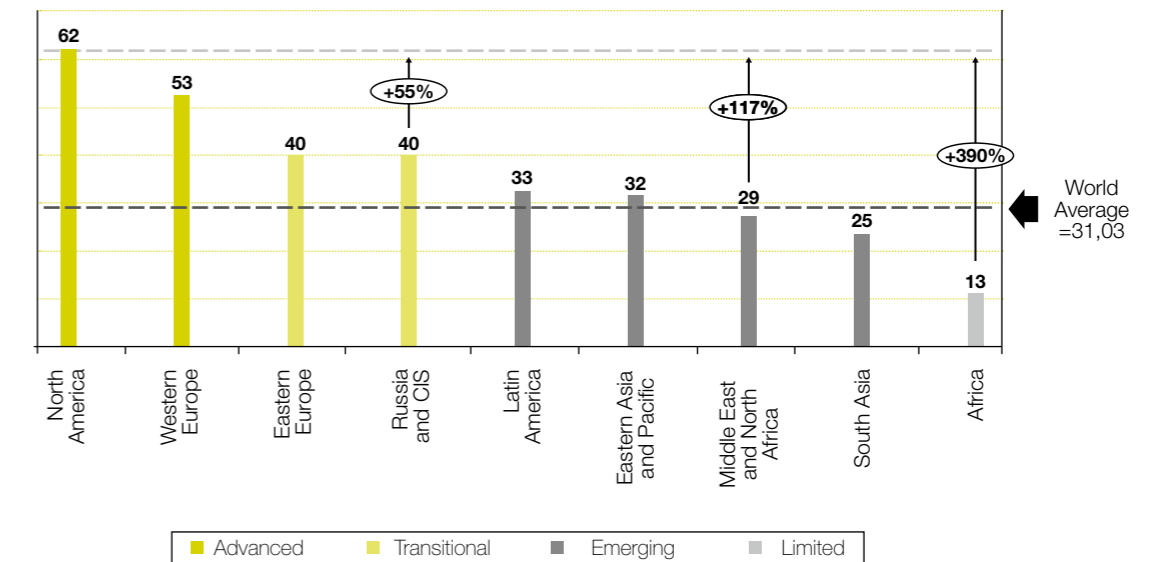
The quality of services has improved, especially regarding the availability of higher speed wide band, but there are symptoms of saturation. Starting in the second quarter of 2012, seven countries in the region offer services at speeds exceeding 20 Mbps (Argentina, Chile, Brazil, Ecuador, Mexico, Dominican Republic, and Uruguay) (see Graph 1.4). In addition, the coverage of mobile telephony has notably improved in Brazil, Chile, Mexico and Uruguay. However, despite statistics, and judging by the recent regulatory actions aimed at controlling the quality of mobile services, the accelerated growth of the user base has entailed the appearance of numerous coverage and signal reception problems, and the aggregate coverage figures hide congestion problems that most of the networks in the region are experiencing. Saturation reflects the problems faced by the operators to maintain a sustained investment pace to ex-

Graph 1.4 Maximum download speed available for fixed broadband (2010-2012)



Fuente: análisis de Telecom Advisory Services en base a datos de Galperin (2012).

Graph 1.5 Digitalization index, average by region, (2011) (normalized for population)



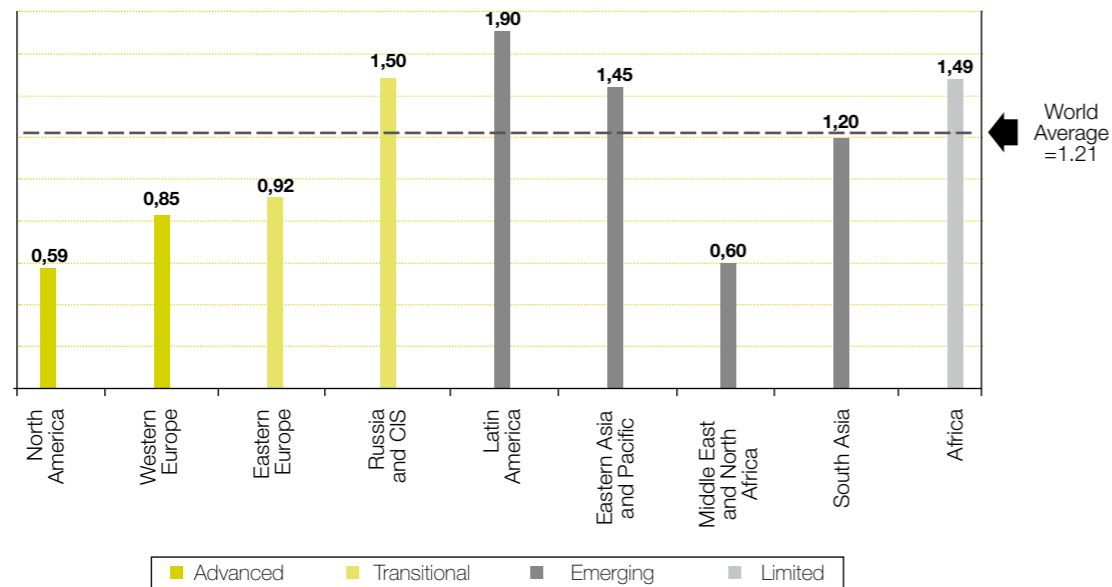
Fuente: análisis de Booz & Co.

pand the number of radio-bases and widen the trunk networks (backhaul), combined with the need to access additional radio-electric spectrum bands.

Regulatory and public policy activity has been intense. Governments and regulatory entities have promoted agendas tending to stimulate mobile competition (establishing numerical portability, regulating the entry of virtual mobile operators, and introducing obligations for operators that have a significant market power), reducing retailer prices (reducing interconnection rates and, in some cases, modifying the tax framework of services to reduce the final price of telecommunications products and services), controlling the service quality and establishing controls to reduce crimes based on digital technology. Simultaneous with these initiatives in the regulatory area, both the public and private sectors have faced important technological projects such as the construction and interconnection of national optic fiber trunk networks and the opening of mobile phone services and broadband networks to provide service to the increasing access needs to internet while trying to reduce transmission costs.

The combination of private activity and public action has led to a significant advance in the development of the region’s telecommunications sector. Latin America has shown the largest progress at a world level in terms of the digitalization index, an indicator which not only measures the adoption of digital technology but also its use in applications and services such as electronic trade, electronic government, and social networks (see Graph 1.5 and Graph 1.6). This index grew by 1.9% between 2010 and 2011, reaching an average of 33, compared with Eastern Europe (40) and Western Europe (53). Chile is the country with the highest digitalization index, reaching 41.4, followed by Uruguay, with 36.4.

Graph 1.6 Regional growth of the digitalization rate (2011)



Fuente: análisis de Booz & Co.

Water: challenged by climate change, urban growth, and conflicts over its use

The IDeAL 2011 presented three main messages regarding the Latin American drinking water and sanitation sector. First, investments in drinking water and sanitation must be accompanied by modern policies and institutions that simultaneously promote efficiency in service provision and equity in access for the poorest segments in society. Secondly, environmental degradation, as a consequence of water pollution and its negative impacts on health, have an economic cost that fluctuates between 0.7% and 1.2% of GDP in several countries of the region. Thirdly, problems related to water need comprehensive solutions that include substantial improvements in precarious housing and solutions to the informal urbanization of 25% to 30% of the region’s urban population; protect the water sources; and control the final disposal of domestic and industrial residual waters.

The intensification of the hydrology cycle due to climate change has become a key factor in the balance between supply and demand for water resources. The need to protect the region’s water sources intensifies in the face of climate change, which will have marked impacts in some water ecosystems, including the shrinking of glaciers in the tropical Andes, the increase of coastal flooding, the increase of droughts in already dry areas (such as the Northeast of Mexico, North of Chile, and Northeast of Brazil) and the possible decrease in precipitations in the middle area of the Amazon and Orinoco basins. These phenomena require detailed studies for each country, and

active measures to balance the supply and demand of water resources facing uncertain scenarios. The increase in capacity in reservoirs to compensate for the lack of water regulation by the Andean glaciers and the over-elevation of infrastructure in coastal areas are examples of actions on the supply of water resources. The measures that favor more efficiency in the use of irrigation water and supply for domestic and industrial use act on demand. With respect to safeguarding the sources, key measures are the establishment and empowering of coastal and interior wetland environmental services, conservation of water producing forests, and the protection of water recharge areas.

Projections from the International Water Management Institute (IWMI), point out that most of the countries in the region will suffer from water shortages in 2025. This projection not only considers the physical availability of water, but also the condition of the water infrastructure for its use. A considerable part of these assets has been in operation for over 30 years, and lacks adequate maintenance. Given that it is a capital intensive industry (surpassed only by the electricity and oil industries), maintenance of the service capacity of these infrastructures requires large investments. The fast urbanization of the region accentuates this need, focused on new trunk investments for the management of water in cities.

The speed and magnitude of urbanization in the region promote profound changes in the traditional management modalities of water resources. This phenomena highlights the need to transcend the segmented vision of the sector in three large components (drinking water, sanitation, and storm drainage) to achieve a more complete vision of the sources, the management of the land, and of urban waste that is dragged to natural drainages. This implies transcending the jurisdictional limits to advance toward new management modalities that involve new actors. A clear example is storm drainage, which is usually under the responsibility of municipalities, which many times do not have the jurisdiction (or capacity) to manage urban flooding, which may only be effectively managed within the logic of the hydrographic basin —which generally does not coincide with the municipalities’ political-administrative limits. In this line, measures to mitigate environmental degradation in the face of urban growth have led to a more active role of new actors: in Colombia, a system of 34 environmental corporations, with financing from diverse sources, which contributes with investment programs and control of pollution in the river and savanna of Bogota.

Most of the water supply sources in Latin American cities are severely compromised. In the first place, because the closer ones which have traditionally supplied the cities, are insufficient to service the accelerated urban growth. In second place, in many cases its quality has deteriorated as a result of the discharge of sewage waters, in addition to fertilizers and agro-toxics resulting from agricultural and grazing activities. The high levels of loss in the networks, which reach 40% of the treated water in some cities, worsen the situation. For these reasons, the search for new supply sources (with reasonable volumes and quality) has required water transfers with costly conduction and pumping works. This is an increasing trend, which demands enormous incremental investments in many cities, with the aggravating factor that

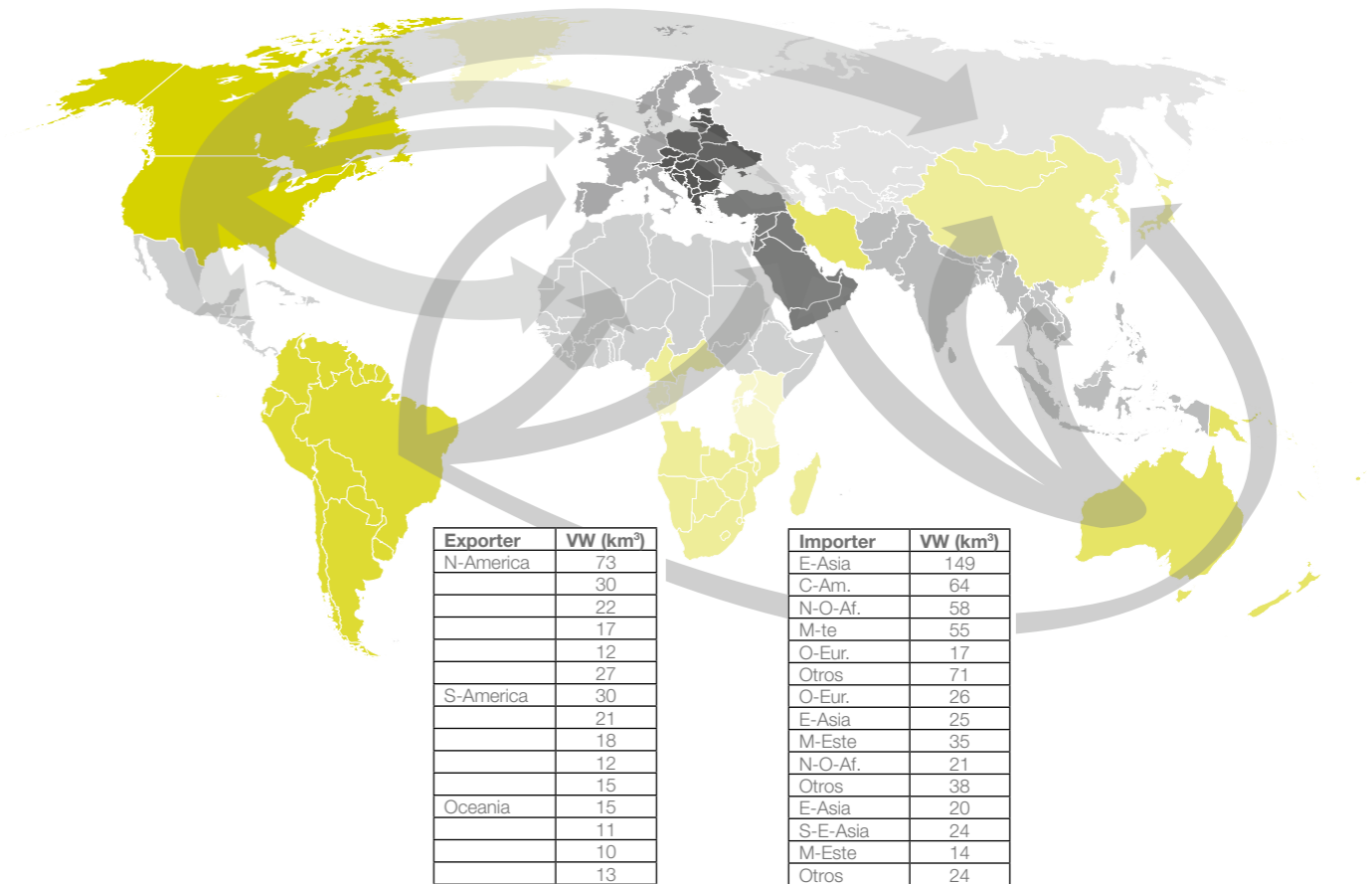
they involve large diseconomies of scale that impact on the financial viability of the water and sanitation companies. To preserve the quality of the sources, cities have advanced in the control of the use of land in the areas of influence of rivers, lakes, reservoirs, and water bearing recharge areas.

Increasing the productivity of water in agriculture is a determining factor to ensure sustainability and balance between its demand and availability in the region. The production of foods that satisfy the daily diet of people requires converting close 3,000 liters of water into vapor —approximately one liter per calorie. Therefore, improving the productivity of water in dry areas through seeds that are resistant to drought and plagues, fertilizers, and especially scientific management of humidity in the soil, will be crucial technological factors to increase the production of food without increasing the demand for water. The concept of “virtual water” illustrates the importance of this subject and refers to the water that is necessary for the production of agricultural commodities and industrial production. The map in Graph 8 shows the weight of the region in the flows of exports and imports of virtual water at a world level.

Increasing conflicts surrounding the use of water have several dimensions that emphasize the need to have mechanisms to arbitrate interests and build consensus in the framework of sustainable development models. Conflicts surrounding mining or hydroelectricity projects in environmentally sensible areas (for example Conga in Peru, and HydroAysen in Chile, respectively) are relatively frequent. The problems between users that are located upstream or downstream, or between urban drinking water companies that are expanding rapidly and agricultures have also gained relevance. In the future, tensions may be anticipated between domestic and industrial users that are already latent in large cities such as the metropolitan area of Sao Paulo, the valley of Mexico, and Lima, among others. This scenario of real and potential conflicts associated to water is a natural consequence of the development process of countries. The challenge is to generate knowledge and negotiation instruments within the countries to contribute to balance the interests, with social credibility.

The formal recognition of the right to water and sanitation, established by the United Nations in 2010, forces countries to adjust their legal and regulatory frameworks, facilitating the application of strategies for the drinking water and sanitation sector so as to respect this mandate. Even though this exists in many legislations as a vague right, its explicit recognition and incorporation to the positive legislation will lead to the adoption of regulatory norms also prepared by the UN. In the case of Latin America, the resolution confirms universal access to water and sanitation with quality services at the level of homes, and offers an opportunity to help revert the existing inequalities while at the same time favoring social inclusion.

Map 1. Virtual flows of water by exports and imports



Source: Swiss Federal Institute for Aquatic Science and Technology (eawag)



Infrastructure for inclusive, competitive, and sustainable cities

Cities concentrate the problems,
but also the opportunities

Visions of the city: sum of calamities or engines of innovation?

Cities occupy 3% of the planet's land surface, holding half of the human population, and concentrating a substantial portion of the product: the main 600 urban centers, with one fifth of the world population, account for more than 60% of GDP (McKinsey 2011). The urbanization of the population has led to the urbanization of poverty: in Latin America, for example, almost 40% of the urban population lives in conditions of poverty, representing 70% of the poor people in the region (UNEP/UN-HABITAT, 2003). The concentration of population and activity implies that cities are also the main centers of use of natural resources at a world level (75%) and energy (67%) (IEA, 2011), and constitute a focus of negative impact on the environment, both at a local level (air quality, water courses) and global. Cities are the main generators of greenhouse gases: 40% considering emissions in urban areas, but up to 70% considering the consumption carried out in them.

The negative effects of this concentration gives place to a vision of cities as centers of the problems faced by humanity:

"For centuries, people have described cities as anti-natural human conglomerates, devastated by pathologies such as public health crisis, aggression, and exorbitant cost of living. Why, then, do people all over the world continue to leave the countryside to go to cities? Recent research (...) is beginning to reveal the reply: cities concentrate, accelerate, and diversify economic and social activity" (Bettencourt and West, 2011.).

Chapter 2

This chapter has been based on the work of José María Ezquiaga: "Hacia la sostenibilidad urbana cualificando las infraestructuras" (Toward Urban Sustainability Qualifying Infrastructure). CAF, 2012. Included in the IDeAL 2012 series.

This vision is opposed to another that perceives cities as a source of opportunity, as poles that generate progress and innovation:

“Crime, congestion, and pollution affect all cities (...) But another force triumphs over the inconveniences of urban life: cities bring opportunities for progress and the creative inspiration that can only be a result of a face to face contact with other people. In fact, the agglomeration of people that live in closed places encourages the collaborative creativity that has produced some of the best ideas of humanity, including the industrial revolution and the digital era. In coming years this type of collaboration may contribute to solve the most pressing problems in the world: poverty, scarcity of energy, and climate change” (Glaeser, 2011).

The economies of agglomeration achieved in urban areas facilitate the development of productive undertakings, by providing the cities with the advantages of specialization and diversity. Specialization is as result of activities with a high value added due to the ease of access to knowledge and the capacity to concentrate research and development activities and generate innovation. For example, in the cities of the countries of the OECD, more than 81% of patents generated are originated in urban areas (OECD, 2006).

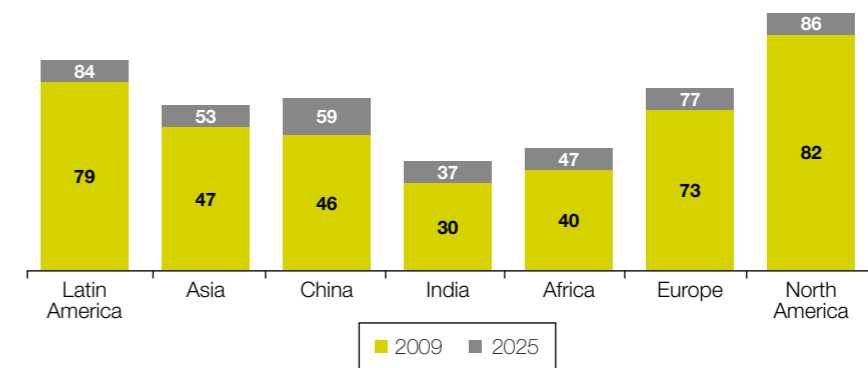
Urbanization in Latin America was early and intense

The Latin American urbanization process has been more intense than in any other developing region in the world; in 1950, 41% of the Latin American and Caribbean population was urban, while in 2010 the percentage increased to 79%. The region experienced an early urban development, linked to the substitution of imports policies that concentrated industrial production and the centers of consumption in its cities. This was particularly evident in the case of the large countries of South America and Mexico; the Central American countries have experienced a slower urbanization process.

Currently, 479 of the 603 million people who inhabit the region live in cities. Four out of five Latin Americans lived in urban centers in 2010, becoming the only developing region where the urban population is a majority (see Graph 2.1); less than 40% of Africans or Asians live in cities, and it is not expected that urban population will exceed the rural population at least until 2020.

The move from the farm to the cities has contributed, to a great extent, to the growth of Latin America, since the economies of scale have increased productivity in the cities in expansion and reduced the cost of the provision of basic services to its inhabitants. The main 198 cities with 200,000 or more inhabitants contribute jointly more than 60% of GDP, and the 10 largest generate by themselves more than half of that production. This concentration of urban economic activity between the largest cities is comparable to the image of the United States and Western Europe today, but it is much more concentrated than in any other emerging region. In China, for example, the main 10 cities contribute close to 20% of GDP (MGI, 2011).

Graph 2.1 World population living in urban areas



Source: MGI, 2011.

Although the large cities in the region are usually the emblem of urbanization, it should be noted that 56% of Latin America’s population lives in cities of less than 1 million inhabitants. Intermediate cities are growing at a higher rate than the average, above the large and consolidated cities. Many megacities in the region have started to experience difficulties; urban management must address increasing demands in ever growing metropolitan regions which are absorbing neighbor populations. The resulting political limits fragment responsibilities, hindering the design and implementation of public policies among the diverse participant jurisdictions.

Infrastructure is a critical element for the success of cities

The economies of agglomeration generate favorable conditions for urban development, but they are not a guarantee of success. In fact, some cities are successful and others are not, with a great divergence which is reflected in the numerous attempts to compare cities by using indicators, such as the Cityscope prepared by the McKinsey Global Institute, the city ranking prepared by the Economist Intelligence Unit, or the Worldwide Centers of Commerce Index prepared by Master Card Worldwide. These indicators include the diverse factors that condition urban performance, which are normally grouped in four dimensions: the economic environment (capacity to generate and attract quality employment and promote innovation), the social conditions and quality of life, the sustainable use of the environment, and the performance of finances and urban governance.

Infrastructure and its associated services, with their diverse components, are present in all these factors, intervening in different ways. Transportation systems are the ones that ensure the mobility of people and goods, making the economies of agglomeration effective and the social fabric viable. The provision of electricity is an indispensable input for the quality of life and production of goods and services. Water management, through the provision of drinking water, sanitation, and storm drain

constitutes the base to ensure basic needs and guarantee health to the urban population. Telecommunications are increasingly becoming a key component to connect the actors of the city between themselves and with the rest of the world, and as a crucial link in the social relationships in the city.

Infrastructure is not only relevant in the life of the cities for the provision and quality of the services it provides, which directly impact the population’s quality of life and the business climate and competitiveness. It is also a key element in the structuring of the urban space: it not only addresses the demands, but it also induces and locates them. It constitutes a component with a strong relative weight in the allocation of resources in the cities’ finances, both to confront investment as well as to support the operation and maintenance.

The global environmental and economic context will impact on the development of our cities

It is to be expected that several macro-trends will influence the development of cities in Latin America in coming years, some of them global, and others regional. Among the first, the environmental and organization of economic activities stand out.

- i. **Global warming and increasing pressure on natural resources.** Global warming is a process that affects all the planet, but its effects may be especially relevant for the cities of the region. Faced with this trend, cities must address both the challenge of their adaptation to the new conditions as well as contribute to mitigate the emission of greenhouse gases (GHG). Adaptation will be a major problem in coastal cities and those located in the coasts of rivers, due to the impact of the increase in the water level. In general, Latin American cities are very vulnerable to the effects of global warming and natural disasters (earthquakes, tsunamis). In addition, urban growth generates a greater pressure on natural resources and ecosystems (land, water, forests, biodiversity), which constitute the support for the development of economic activities and interventions in general, and gives place to an increasing amount of waste that deteriorate environmental quality (UN – HABITAT, 2011).
- ii. **Cities as “competitive assets” for countries.** Cities not only increasingly concentrate the generation of the gross product; in the current economic organization they have become the engines of innovation. *“As centers of world trade, cities facilitate integration with the world economy. People in developing countries may achieve prosperity if they can sell their time transformed into goods and services to rich markets. In essence, cities connect poor countries with rich markets.”* (Glaeser, 2011). Historically, megacities have been engines of innovation, expanding the economies of their respective countries; the economies of agglomeration have been the great strength behind that process. But this trend has been lost in Latin America, and megacities are growing less than the economies of their countries. Some see this as proof of the relative

stagnation of these metropolitan areas due to the diseconomies of agglomeration and their incapacity to adapt to the demands of the current world (MGI, 2011). On the other hand, others consider that growth has concentrated in medium-sized cities, which would be a favorable trend.

- iii. **Growing mobility of investments and qualified human resources.** The organization of the economy and society is enabling a large mobility of investments and people. The urban context becomes a key variable to attract investments and qualified human resources, which will closely weigh its attributes (business climate, quality of life, etc.) when making decisions regarding where to settle.

Regional trends: consolidated megacities and a new generation of medium-sized cities

There are also regional macro trends that will affect our cities.

- i. **An accelerated urbanization and a trend toward the consolidation of megacities.** While in some areas of the Caribbean and Central America the percentage of the rural population is still important and will remain high until 2040, in the more developed and populated countries of the region the percentage of urban population is already high and will increase, albeit with a low margin due to the low proportion of the current rural population.

Table 2.1 Demographic growth by size of city (agglomeration) between 1985 and 2015

Size of agglomeration	Average size (thousands)			Growth during 15 years (%)	
	1985	2000	2015	1985-2000	2000-2015
10 million or more	13.752	14.454	17.067	5,1	18,1
5 to 10 million	8.045	6.367	7.376	-20,9	15,8
1.5 million	1.916	1.943	2.098	1,4	8,0
500,000 to 1 million	696	693	720	-0.4	3,8

Source: “Estado de las Ciudades de América Latina y El Caribe 2010”- ONU HABITAT.

It is estimated that the population of a working age will increase to reach a maximum in 2040, generating a significant demographic potential that needs adequate socio-economic policies to take advantage in a context of important aging of the population of the more advanced economies. However, Latin America has conque-

red a large part of the easy gains that come from the expansion of urban population. Currently, many of the largest cities in Latin America are fighting traffic bottlenecks, shortage of housing, pollution, all the symptoms of the diseconomies of scale. The significant growth of metropolitan areas has led to situations where the economies of agglomeration may be counteracted by systemic inefficiencies.

ii. **A new generation of medium-sized cities.** Together with the largest cities of Latin America, medium sized cities have emerged with a wide base of high growth. Currently, 188 medium-sized cities represent almost one third of the region's GDP, and probably they generate almost 40% of the region's growth for 2025. These cities currently stand behind the larger urban centers in terms of per capita GDP; however, the gap tends to reduce substantially for 2025. Medium-sized cities may offer an attractive environment for companies and qualified workers, and may become the model for sustainable urban design.

iii. **The increasing need to have world quality cities,** which represent growth engines in the global competition for economic activities, investments, and qualified human resources. It is foreseen that 198 large cities of Latin America will generate 65% of the region's growth in the next 15 years (MGI, 2011), which is equivalent to close to 6% of the projected world GDP growth and exceeds the contribution expected from the large cities in Western Europe by 1.5 times, and similar to the contribution expected from the large cities in India. In this context, a regional space for competition between cities is consolidating, seeking to position themselves as centers that attract investments, qualified human resources and innovation opportunities.

Lack of sustainability threatens the large cities in the region

The comparative lag of Latin American metropolitan areas

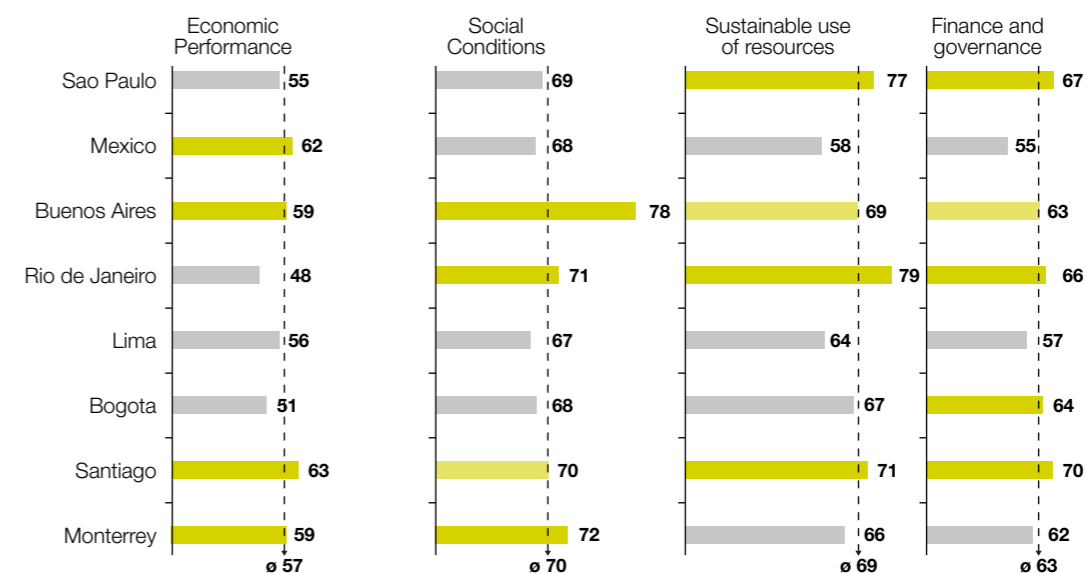
Comparative analyses of urban performance show that after decades of growth, the large cities of the region are not taking advantage of the opportunities offered by agglomeration. For example, an analysis conducted by the McKinsey Global Institute (MGI, 2011) shows them with a considerable lag with respect to other big metropolitan areas of the world, with values ranging from 60 to 70, when the best cities of the world reach values of 100 (see Graph 10). The analysis covers four basic aspects; economic performance, social conditions, sustainable use of resources, and finances and urban governance, and compares the cities with a world benchmark (equivalent to 100 in Graph 4).

According to the ranking of 120 cities published by The Economist Intelligence Unit in 2012, based on the analysis of eight indicators, the first position for a Latin American city in terms of a multi-criteria synthetic indicator corresponds to Buenos Aires, in number 60, and twelve others follow in the list of the first 120 cities. No Latin American city in among the first 60 regarding physical capital, showing weakness in terms

of infrastructure. Jointly, the study shows that Latin American cities benefited from their economic dynamism in past years, but this dynamism does not compensate for structural shortages regarding training, infrastructure, and economic stability. A similar analysis carried out by Master Card Worldwide on 75 cities, does not locate any Latin American city among the first 50. In view of this weakness, CAF has promoted the analysis and action toward local development understood as the development of cities and regions (See Box 1).

The cities in the region find numerous obstacles to explain this lag. Among them are poverty and social segregation, environmental segregation, low economic competitiveness, the development of urban shapes that are inefficient, and informal housing, aspects which are detailed in the following points. As will be seen, infrastructure is a crucial component behind each one of them.

Graph 2.2 The relative lag of the large Latin American cities



Source: MGI, 2011 traducido.

A scenario framed by poverty and segregation

Latin American cities have experienced a significant demographic growth during past decades, increasing the pressure on the public service systems which have not been able to adapt adequately. Poverty has urbanized; at least until 2001 there was an ever increasing concentration of the poorest levels of the population in cities. More than one fourth of the urban population in the region lives in precarious homes characterized by a lack of basic services, overcrowding, and an insecure possession. In

the past four decades the absolute number and percentage of urban inhabitants that live in poverty has increased from one fourth in 1970 to one third currently.

Urbanization has contributed to reduce poverty for many people who migrated from rural areas, but the shape of this urbanization has not contributed to reduce income inequality. The equipment and infrastructure deficits make it difficult to leave poverty behind for those that have just arrived and those born in informal areas. The persistence of inequality, which exceeds the values of any country of the OECD or Eastern Europe (10% of the population concentrated 42% of the income in 2008), and the arrival of new disadvantaged rural migrants to cities, contributes to perpetuate this problem in metropolitan areas (see Graph 5). However, despite this dynamics, the human development index has improved in past years as a result of the global growth of GDP, especially in the three large economies (Argentina, Brazil, and Mexico), as well as life expectancy, which in 2010 reached 73.4 years, four more than in 2000.

The cities of the region are marked by disparity between residential areas of the rich and the poor; this leads to a contrast between residential areas of high purchasing power and informal settlements with shortages, that are located in places that are generally subject to higher natural and technological risks. The emergence of closed urbanizations is extended in the region, and confirms a trend toward the consolidation of this socio-spatial segregation patterns.

The informal growth of the Ibero-American cities is a common factor for all the countries of the region. It corresponds to new settlements of populations, generally coming from rural areas, and their difficulties to establish themselves in the formal city. In this cases, infrastructure does not play a structuring role, but a palliative one. The needs of these urban fabrics, the social stigma often associated to the residency in these areas, and violent situations, are compensated for its inhabitants as these are the only housing category to which they have access. The informal urban fabric complicates the provision of infrastructure services, particularly regarding mobility, drinking water and sanitation, and natural gas supply networks.

Degradation of the urban environment

Latin America's urban landscape shows frequent pictures of environmental degradation. Cities consume significant amounts of natural resources, mainly water, foods, and raw materials for production, and depend strongly on electricity and internal mobility that generate high levels of pollution. The production rates of solid wastes and residual waters are alarming. The causes of environmental degradation are worrying. The accelerated and extended growth undoubtedly have contributed and seriously hinder the possibility of providing the infrastructure necessary for a better environmental management. Institutional shortages and the inhabitants behavior contribute in many cases to local contamination in several dimensions: solid and liquid waste without treatment, emission of contaminants that degrade air quality, noise pollution, alteration of the urban landscape, and neglect of the historical and cultural heritage.

“Urban environmental conditions have deteriorated ostensibly in terms of the impact on rivers and water tables, the final disposal and treatment of solid waste and liquid effluents, air quality, and decrease and deterioration of green areas. Added to this dynamics is the high incidence of natural phenomena that regularly affect the region (hurricanes, cyclones, earthquakes, volcanic eruptions, flooding, and drought), which have profound implications in the configuration of their human settlements. The recurrence of these phenomena, combined with structural economic and institutional conditions that limit the capacity to prevent and mitigate their consequences, has turned extensive regions and their urban centers into extremely vulnerable physical and social areas. The confluence of all these elements configure a situation of structural urban vulnerability that hits specially lower income communities that are forced, by the predominant urbanization patterns, to settle the areas with higher physical and environmental risks”. UNEP/UN-HABITAT, 2003, Urban-Environmental Strategy for Latin America and the Caribbean.

The deficit of basic infrastructure in the urban fabric is, in general, applicable to the areas of economic activity. Although there have been improvements, the deficit—especially regarding sanitation and treatment of waste—is more severe due to industrial effluents and solid waste. This process may be seen as “environmental dumping”, potentially harmful in markets with demands that are increasingly tougher and globalized.

Megacities in the region are not competitive despite their dimensions

As has been pointed out in the previous section, the world economy shows an increasing hierarchization and specialization in the strategic roles of the cities. A limited number of “global” cities is consolidating, exercising a dominant influence on the flows of trade, investments, services, and even in the cultural sphere; London can be mentioned in this group (it is estimated that London generates between 15% and 20% of the United Kingdom's GDP), New York, and possibly Tokyo. In a second level are cities of regional importance, that project themselves beyond their countries of origin toward an expanded region, as the competition may be observed currently between Paris, Frankfurt, and Berlin, or between Hong Kong and Shanghai. Finally, there are cities that are “inventing” for themselves a role as trade, investment, and services node, as is the case of Dubai and the more successful Singapore. In general, it may be observed that countries make an effort to strengthen the international projection of their cities, as they represent competitive assets, generators of foreign currency, of qualified employment, and even cultural influence or soft power.

The Latin American paradox is that it is creating megacities that do not have a relevant international projection, and which in many cases act as a factor of suffocation for their own countries. It may be said that Sao Paulo is acquiring a role as dominant metropolis in the Southern Cone, as well as Mexico City in the North, and Rio de

Janeiro and Buenos Aires have opportunities to create an attractive profile as service cities, but the advances are slow and with limited results. Some countries show ambitions of international roles for their cities, as is the case of Santiago, in Chile, Bogota and Panama. CAF has been actively working to revert this trend and contribute with entrepreneurial development and competitiveness in the economies of the region (see Box 1).

Box 1. CAF's Program in Support of Competitiveness

One of CAF's objectives is to design and implement programs that promote entrepreneurial development and competitiveness with productive and social inclusion criteria in all the region. For this, it seeks to promote innovative enterprises as well as generate knowledge that enables to repeat successful experiences, mobilize resources from the international sphere to the national and local, create institutional capacities, and strengthen productive chains that facilitate the access of companies to international markets.

The Program in Support of Competitiveness (PAC for its acronym in Spanish) emerged from this objective, and has been in operation since 1999, a period in which member countries have strengthened public-private agendas to improve competitive factors, support the development of clusters and value chains, as well as companies that add value to the products within a territorial framework where entrepreneurial development is the ultimate objective. The success of these initiatives depends on the institutional strengthening based on public-private dialogues, the generation of consensus regarding objectives and roads to follow, the collaboration schemes with anchor companies of a larger size, the direct support to improve the insertion of SMEs in international markets, and the promotion of entrepreneurial associative schemes that guarantee the sustainability of these interventions.

At the same time, the PAC promotes the institutional capacities for the provision of entrepreneurial services both at a national and local level. These projects are aimed at structuring the entrepreneurial support of public-private agendas to improve the competitive indicators through institutional improvements –as for example improving the business climate through a reduction of administrative barriers to investment– as well as the promotion of agendas for the productive transformation of sectors with an exporting potential and great impact on its economic development.

Finally, innovation and information technologies are currently subjects of ample debate. The PAC promotes the development of innovation entrepreneurial activities, as well as support for the SMEs for their entrepreneurial insertion with innovative components that enable them to strengthen their competitive advantages using the available technologies.

In the 12 years of the PAC, CAF and its counterparts have financed more than 200 projects focused on improving the competitive advantages of Latin American countries. The contribution of CAF and its partners to this type of project has been of approximately USD 36 million, which have been totally financed through technical cooperation non-reimbursable resources, allowing the generation of real commitments by those who are allies trying to materialize the productive transformation of the region.

Expanded spatial structure with a low eco-efficiency

The shape that many Latin American cities have assumed, characterized by a marked territorial expansion and a scattered spatial structure, conspires against their good performance. An illustrative example is Mexico, where cities have expanded in terms of territory in the last 30 years at a much larger proportion than the growth of its population; the city of Toluca, for example, increased its population by 3.2 times between 1980 and 2009, while its surface expanded 25.3 times (SEDESOL, 2012). One of the main forces driving this trend is the massive construction of housing, boosted by an increasing access to mortgage loans (which have reached lower income sectors), the maturity of the financial sector, and the strengthening of the construction market. As a result, enormous housing complexes have been developed, exclusively for residential use, and far from urban centers. This solution, economic in the isolated calculation of each project, generates important expenditures in infrastructure to solve the communication and transport needs.

The trend toward cities with low density and scattered growth (not aligned in axis, not responding to territorial planning) has environmental impacts due to the change in the use of the agricultural and forest lands to urban lands. The scattering of the residential function has not been accompanied by a similar scattering of other urban functions, especially employment: the resulting spatial pattern leads to an enormous demand for mobility, and by complicating the provision of public transportation services, it contributes to motorization and individual movement. Housing developments are increasingly located far from urban areas (where land prices are lower) and from sources of employment and education, health, and supply services; they are organized as closed urbanization with one or two vehicular and pedestrian

accesses for hundreds or thousands of houses; public transportation does not enter housing complexes, and citizens must walk kilometers between the access and their homes. The cost of mobility represents between 25% and 30% of family incomes; for this reason, the housing vacancy coefficient is alarming, reaching close to 26% (SEDESOL 2012, CTS 2012).

There is an significant relationship between urban density and ecoefficiency of a city, expressed in the energy demanded by mobility, and consequently, the emissions generated. A comparative exercise shows the North American cities, which generally have a density of less than 25 inhabitants per hectare, register an energy consumption in transportation of between 40 and 80 GJ annually per person. European cities, with densities of approximately 50 inhabitants per hectare, require between 20 and 40 GJ annually per person.²

A deficit of infrastructure which is high, unequal, and of high impact

A high infrastructure deficit contributes to strengthen the obstacles reviewed in previous points. The accelerated urbanization of Latin America during the past decades was not accompanied by an adequate planning process with provision of infrastructure and basic social services. Thus, a gap of infrastructure and services emerged, impacting asymmetrically on the poorest populations, and accentuating its situation of exclusion and vulnerability.

The deficit of urban infrastructure presents a diverse scenario: very variable by type of infrastructure, by city, and by area within the city. The total lack of infrastructure is increasingly infrequent in Latin American cities; the problem is one of incomplete or poorly integrated infrastructure. The fast demographic and economic growth combined with extensive periods for the execution of projects (housing, transportation) generates recurrent capacity deficits.

The deficit of urban infrastructure is particularly pronounced regarding the management of water resources (drinking water, sanitation, and storm drain) and mobility:

- **Water.** It is estimated that for this sector only, USD 12.5 billion are needed annually (almost three times the current investment) during the next 20 years to close the infrastructure gap, which would include providing universal drinking water and sewage services, extend the storm drain networks to cover 85% of the urban surface, address the renovation and rehabilitation of infrastructure assets, generate new sources of water to satisfy the increasing demand, raise the volume of treated residual waters to 64%, and formalize the informal housing connections of at least 20 million homes.

- **Transportation and mobility.** Within the city, the growth of the population is combined with a greater generation of trips which is a result of a greater per capita income and the extension of trips due to the expansion of cities and the disperse pattern of new settlements. Economic growth is associated to a greater variety of travel motives: not only for work, but in increasing proportions due to study, recreation, social activities, and tourism. In addition, there is a clear trend toward more movement away from metropolitan areas, generating numerous trips linking peri-urban areas with neighbor conglomerates. The space where urban inhabitants live has been progressively surpassing the limits of the cities to draw a metropolitan space which has variable dimensions, inhabited in different ways depending on the hour or day of the week. Thus, a metropolitan city emerges which is even inhabited by populations that do not reside or work in them (Muñoz, F. 2010).

These mobility models reinforce the trend toward motorization and the use of individual vehicles. The rate of motorization has grown substantially in the large cities of Latin America. However, there have been improvements in the past decade regarding the organization of collective transportation, generating integrated public transportation systems, with common rates for different transportation modalities, implementing more efficient route structures (trunk-fed) and innovating with respect to vehicles and technologies. The Urban Mobility Observatory developed by CAF has enabled a detailed observation of these trends (see Box 2).

It is not only the movement of individuals which generates problems and challenges. In large cities the movement of goods continues due to the population growth, consumption level, and geographic dispersion; today urban logistic is not only a problem for the cities (approximately 10% to 20% of traffic is associated to the transportation of goods) but also for the distribution of goods: constitutes the “last mile”, the most complex tranche for logistic chains aimed at supplying the increasing consumption of urban populations.

The shortage of adequate urban infrastructure has serious effects on the quality of life of the population: on health, due to the pollution of the environment in multiple ways, and on social relationships (connectivity deficits, contrast between formal and informal neighboring urban fabrics that promote segregation). The impact of congestion on cities has been estimated to be the equivalent of approximately 2% of GDP (Ezquiaga, 2012).

2. Newman et Kenworthy, 1989; Atlas Environnement du Monde Diplomatique 2007

Box 2. Infrastructure and transportation: CAF's Observatory of Urban Mobility

With the objective of responding to shortages in the availability of quality information which is reliable and updated regarding transportation and urban mobility in the region, CAF started the Observatory of Urban Mobility (OMU for its acronym in Spanish) which started by analyzing 15 metropolitan areas in nine countries. The fifteen cities included in the analysis, which provides information regarding numerous variables are: Buenos Aires, Belo Horizonte, Bogota, Caracas, Mexico City, Curitiba, Guadalajara, Leon, Lima, Montevideo, Porto Alegre, Rio de Janeiro, San Jose, Santiago and Sao Paulo. Other cities are in the process of entering the OMU. The compiled information has numerous variables related to urban mobility, which makes the OMU the main source of analysis of this type for the region. To carry out this program, CAF has established strategic alliances with institutions linked to research regarding urban transportation in the region, such as the Latin American Public Transportation Association (ALATPU, for its Spanish acronym), the Sustainable Transportation Center of Mexico (CTS), for its acronym in Spanish), and the National Association of Public Transportation of Brazil (ANTP). The data and results of the analysis may be consulted in <http://omu.caf.com/>.

Toward inclusive, sustainable, and competitive cities*A vision of Latin American cities aimed at comprehensive development*

As of the diagnosis of the performance of Latin American cities presented in previous points and the global and regional trends, the question arises as to how to propose a vision of the desired cities that will enable to guide the efforts of our societies. A vision of the cities is proposed that may be defined by three main characteristics: progress toward inclusive, sustainable, and competitive cities.

In first place, the objective is to promote the development of inclusive cities that offer:

- An adequate quality of life for its inhabitants, in line with a growing social trend: the appearance of the concept of urban rights.
- Attractive life conditions for the generation of quality employment; the positive effect generated by policies to attract innovative activities to the urban fabrics is well recognized, not only due to the appearance of qualified professionals

with high salaries, but also for the important multiplier effect in the generation of medium qualification employment, especially the local provision of services.

- Opportunities for progress for its citizens; the concept of ascending social mobility.
- Adequate coexistence between different groups and social stratum; diversity as a positive factor for the city. In fact, the concept of diversity is no longer considered a problem of rights of the poorest individuals, but a basic condition for the generation of dynamic urban spaces with improved social indices, security, etc.
- Conditions for citizen participation, governance, and social learning that enables a sustainable growth path. Urban problems, as we have stated previously, are increasingly complex, multi dimensional, and require not only multidisciplinary approaches but also dialogue and social participation processes.

In second place, the objective is to promote the development of competitive cities, which are fundamental assets in searching for an economic development path for our countries. As has been shown in previous sections, both developed and emerging nations seek to strengthen the competitiveness of their cities. This greater competitiveness should include the following characteristics:

- Have dynamic and diverse productive fabrics: an adequate combination of non-tradable service activities, export services, and manufacturing base with the highest possible value added.
- Show a positive interaction with its national territory: they are revitalizing poles of the economic activities of its area of influence.
- Generate spheres of creation and culture exportation; cultural activities are increasingly a significant source of high quality employment and contribute to the attractiveness of urban life.
- Offer attractive profiles for the construction of the country image; cities are a fundamental element for this differentiation process; the efforts of countries to position their cities as cities of global or regional importance may be observed, contributing significantly to attract investments, decision and international services centers, and knowledge workers.

Finally, the third component is that of sustainable cities that offer:

- A synergic and not destructive relationship with neighboring regions: cities may be engines of growth for their regions, or entities that absorb resources and weaken them. A joint planning of the city and its region must be assured to ensure the fulfillment of the greatest synergies and the reduction of external diseconomies.
- An equation of sustainable use of non-renewable resources: as has been pointed out, cities may create phenomena which are highly destructive for the consumption of resources. In addition, we also know that adequate levels

of urban density enable broad economies of scale in the provision of urban equipment. The aim is to ensure the highest possible sustainability equation.

- An economic and financial model that ensures its sustainability and a balanced relationship with the national finances: cities require enormous amounts of resources for the development of their infrastructure and public services. In general, these investments require fiscal resources that exceed the capacity of the cities. There is a logic to explain why nations and regions must contribute to finance these infrastructures: for the multiple benefits that a competitive city will offer to the territories; but these flows must be transparent, sustainable, and agreed upon through participative political processes.

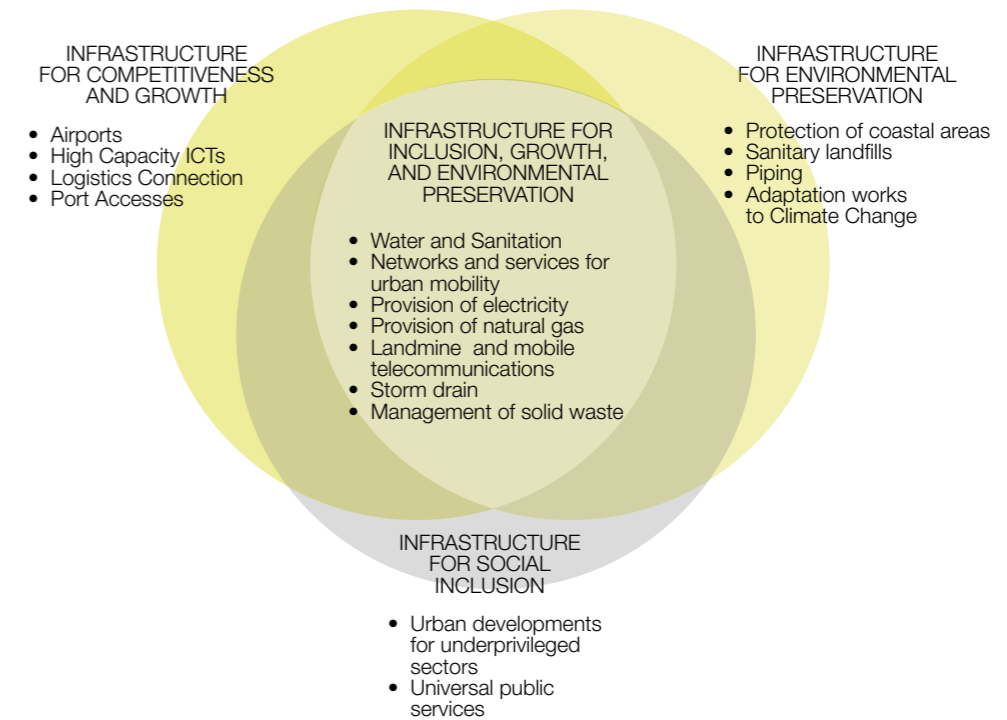
Urban infrastructure for the three complementary objectives

Urban infrastructure must contribute with the three components of the vision: inclusion, competitiveness, and sustainability. The three objectives do not conflict as most of the investment in infrastructure can satisfy them jointly. Diagram 2.1 shows the interaction between the three types of infrastructure. The infrastructure to satisfy the three objectives, as for example the provision of drinking water and sanitation, electricity, fixed and mobile telecommunications, and public transportation networks. Being able to offer quality infrastructure and public services enables the improvement of the quality of life for its inhabitants, strengthen their competitiveness, and improve the urban environment

However, resources for the development of infrastructure with a clear impact on inclusion must be taken into consideration, aimed at improving life conditions for the least favored social sectors or the reduction of inequalities between urban areas or socio-economic groups, as for example urban development for emerging classes and provision of universal public services.

At the same time, all planning must incorporate infrastructure that strongly contributes to competitiveness, that is, that improves the competitive conditions of the companies located in the city, or for high quality human resources. For example, the development of productive and service poles, airports, logistic connections, port accesses, or high capacity and quality ICT. Finally, it is necessary to incorporate in the planning the resources for the development of infrastructure that contributes to sustainability, as may be the case of sanitary fillings, coastal defenses, facilities for the treatment of effluents, piping for storm drain, or works for the reduction of noise pollution. Facilities and systems to ensure financial sustainability, such as traffic rates charge systems, fiscal control, etc. should also be taken into consideration.

Diagram 2.1 Urban infrastructure for the three complementary objectives



Source: own elaboration.

An agenda for urban infrastructure to contribute to face the challenges of the future

To advance in the process of transformation of the vision proposed in the previous section, it is necessary to define a series of guiding principles for action. A strategic agenda is proposed, which includes six guiding principles for the development of cities that are competitive, inclusive, and sustainable:

1. Develop a global vision of the cities.
2. Define the desired organization of the urban space.
3. Offer the necessary infrastructure to guarantee basic citizen rights and inclusion.
4. Develop infrastructure for growth and international competitiveness.
5. Ensure rationality and sustainability in the use of resources.
6. Build institutions and governance for planning, execution, and service provision of infrastructure, and develop processes and capacities that ensure a continuous learning in the urban space.

Following is a brief description of the key action to carry out each of the six proposed principles.

Develop a global vision of cities from a systemic perspective

A social dialogue and planning is proposed to reach consensus regarding the following issues:

- Starting from a global vision of the desired society, what is the role assigned to cities in the national vision?
- Aspirations: international ambition, global city, city with regional relevance, etc.
- How do we intend the city to contribute to our productive model with international insertion: productive or services poles, or a combination of both?
- What is our vision regarding the social composition and the interaction between different socio-economic groups?
- How are the basic rights of the inhabitants of the city defined and measured?
- How do we intend infrastructure to contribute to the defined growth and social objectives?

Define the desired organization of the urban space with a territorial planning approach

To fulfill this principle, the following four key questions of urban planning are proposed:

- Starting from the vision, establish how the desired spatial configuration will be defined: spaces for productive activities, residential, commercial and cultural areas, traffic routes, connection with the national space, etc.
- How do you compare the current configuration with the desired one, what are the main gaps?
- How to act, in what sequence and timeframes to reduce the gaps?
- What citizen participation processes and institutions to evaluate result, adapt the vision, and decision making?

Offer the basic infrastructure to guarantee citizen rights and inclusion

On the basis of the definition of basic rights in the vision, establish which are the key needs to be covered, through the definition of plans and projects in each of the cited dimensions. This implies specific sectorial plans for infrastructure such as drinking water and sanitation, electricity, public transportation, and mobility to facilitate access to education and health, urban development for disadvantaged sectors, and works to improve public spaces.

Develop infrastructure for growth and international competitiveness

To advance in the fulfillment of this principle, a process based on the following activities is proposed:

- Carry out comparative studies to evaluate the city's position. This activity implies developing capacities to define comparable and/or competitor cities, the development or use of performance indicators, the systematic survey of those indicators, and their critical analysis.
- On the basis of the defined productive model, establish dialogues with national and international entrepreneurs to evaluate what actions regarding infrastructure are necessary to strengthen the city's attractiveness and its capacity to attract quality employment.
- Once the strategy and gaps to cover are defined, it is advisable to ensure high quality levels in the provision of key services for the location of productive and innovative activities, for example: quality public transportation, high capacity and quality telecommunications, airports, and logistics facilities.

Ensure rationality and sustainability in the use of resources

Sustainability is one of the key dimensions to address in the future development of cities. To ensure the desired results, the following is proposed:

- Evaluate the current situation of the city regarding consumption of key resources: land, water, energy, and environmental indicators of the quality of life (health, noise levels, emissions, air quality), and define the evolution objectives for these variables.
- Establish policies that promote the rational use of key resources: incentives to reduce consumption or pollution and policies to manage demand. The environmental component must be implemented as a support for the other components which are systemically related with the development of planning processes.
- Specially consider the effects of climate change, both regarding mitigation and adaptation.
- Evaluate the financial and fiscal flows generated between the city and the national state, and establish evolution objectives. Define a sustainable fiscal and financial pact between the city and the nation, as well as policies for investment financing and indebtedness to ensure sustainable development.
- Develop capacities and institutions to measure the city's sustainability, evaluate the results, and propose corrective actions.

Strengthen institutions and governance

All the previous principles cannot be fulfilled if a strong improvement of the institutional capacities of the cities is not ensured. In this regard, it is recommended to build institutions, processes, and governance that ensure compliance with the five

proposed principles, and which generate a continuous process of institutional and social learning. The following capacities must be developed to:

- Develop and update the vision of the city, and translate the vision into action strategies and plans.
- Develop infrastructure strategies for growth and equity.
- Ensure infrastructure planning, execution, and service provision.
- Evaluate the advances of the strategies and plans, measure its results, generate social dialogues regarding it, and develop corrective actions.



Infrastructure to add value to food trade

The challenge of achieving international insertion with a greater value added

The first decade of the XXI century has been positive for Latin America. With an average GDP growth rate of 3.8% annual for the 2000-2010 period, the region has surpassed its performance of the 1990-2000 period, and reached a speed of growth that had not been achieved for several decades. This growth was achieved in the framework of a strong growth of the world economy (only interrupted by the 2008-2009 crisis), where a new structural trend was confirmed: emerging countries have grown, and according to the consensus of projections, will continue doing so faster than developed nations (see Graph 3.1).

Graph 3.1 Comparative growth of the world economy



Source: IMF WEO July 2012.

Chapter 3

This chapter has been prepared by Jorge H. Forteza. It is a summarized version of: "Infraestructura, capacidades e instituciones para progresar en las cadenas de valor internacionales: el caso de los Agronegocios en Latinoamérica" (Infrastructure, capacity and institutions to advance in the international value chains: the case of agribusinesses in Latin America). CAF, 2012. Included in the IDeAL 2012 series.

Beyond economic growth, Latin America has been able to advance in this decade in the construction of better quality societies; in general, growth has translated into: i) an improvement in social indicators: a reduction of the share of the population living in poverty and indigence (although the number of inhabitants in this situation has not decreased), ii) advances in the distribution of income, which have been uneven; this dimension presents a great challenge for the future, iii) The Human Development Indicators –as defined by the UNDP– have improved, and iv) the levels of education, which have started to improve but still register large gaps across the region. At the same time, the region has improved its business climate, new Latin American companies have emerged with global ambitions, and Latin America has continued attracting significant levels of direct foreign investment (although it has lost participation in the total investments aimed at emerging countries). Finally, it must be noted that the countries of the region have registered advances in the validity of democracy and quality of its institutions.

The new situation is as follows: Latin America currently has several countries in the middle income group (defined as those with per capita income at purchasing power parity between USD 8, 000 and USD 15,000). These countries have the opportunity (at least theoretically) of reaching levels of developed countries (defined as approximately USD 25,000 of per capita income), in a period of time that fluctuates between 20 and 30 years, that is, a generation. There are several reasons for this optimism regarding the possibility of achieving development in one generation, and the exponents of an “optimistic view” for the region emphasize the following positive factors: i) The sustained demand for raw materials and foods by a world where emerging economies would be growing purchasers during at least two decades; ii) The provision of natural resources, land and water, with a great potential for expansion, and the large availability of energy and mineral resources; iii) A young and growing population, with the subsequent “demographic bonus” which in any case, will start depleting as countries complete their demographic transition, and iv) Growing domestic markets due to the combined effects of the demographic and per capita income growth, and a new situation in the region: the consolidation of middle classes and access of new classes to intermediate consumption levels.

However, this “Golden vision” of Latin America’s perspectives must be submitted to an objective analysis, which outlines some questions and challenges that state that access to development will not be “automatic”, and that Latin America must continue working on a considerable strategic agenda to confirm its potential and not end the decade with the feeling of having lost another great opportunity. To address the fundamental issues, an analysis of the following dimensions is proposed: the model for insertion in the world economy, the competitiveness levels of Latin American economies, the capacities for innovation, the sophistication of management practices, education, and business climates.

Finally, it may be observed that Latin America is slowly advancing in the improvement of its physical and technological infrastructures: in general, the physical infrastructure is not accompanying the demands linked to the fast growth of exports and

domestic markets. Several analyses confirm the situation: the World Bank indicators (Logistics Performance Index), the WEF (Competitiveness in Information Technology and Communications), those carried out by private companies, such as the Global Connectivity Index presented by DHL, and the opinions of entrepreneurs gathered by the World Economic Forum which present an almost unanimous vision reflected in Table 3.1 no Latin American country stands out for the quality of its infrastructure. The general situation is that of an insufficiency of the current supply that translates into high operating costs and generates difficulties for the growth of exports of current products and the expansion of exports toward products and services with more value added.

Table 3.1 Position of the countries of the region in quality indicators of infrastructure and competitiveness

	Per Capita Income (PPP) ⁽¹⁾	Human Development ⁽²⁾	Competitiveness (WEF) ⁽³⁾	Competitiveness (IMD) ⁽⁴⁾	Global Connection ⁽⁵⁾
20% (Quintile 1)	X	X	X	X	X
40% (Quintile 2)	3	9	4	X	1
60% (Quintile 3)	10	12	7	1	2
80% (Quintile 4)	4	4	9	3	7
100% (Quintile 5)	3	1	5	3	8

■ Mediana

Fuentes:
 (1) Banco Mundial, WDI, 2010, (2) PNUD, HDI, 2011, (3) World Economic Forum, GCR Index, 2011-2010.
 (4) IMD, Competitiveness Index, 2011, (5) DHL, Global Connectedness Index, 011.

This chapter focuses on the key role (both as drivers or otherwise generators of obstacles) that infrastructure, logistic systems, and related institutions, play in seeking for a better insertion in the global economy through the export of goods and services with more value added. To illustrate the concepts, one of the most promising areas of opportunities for Latin America has been chosen: the export of foods, fruits, and horticultural products of increasing value added (some examples of opportunities will be considered in grain exports). The chapter is organized in the following three sections:

- In the first section, global trends in the agribusiness trade are analyzed, and examples are presented of strategies that countries and the private sector are developing to ensure significant positions in the respective global value chains.

- The second section places the emphasis in the region, seeking to evaluate the opportunities to strengthen the Latin American positions in the global value chains of agribusinesses; case studies will be carried out to seek guiding conclusions, emphasizing the role of infrastructure.
- Finally, the third section proposes a strategic agenda for the development of an infrastructure that favors competitiveness in agribusinesses by formulating a comprehensive vision of entrepreneurial development, public policies, and the role of infrastructure.

Global trends in the trade of agricultural and food products

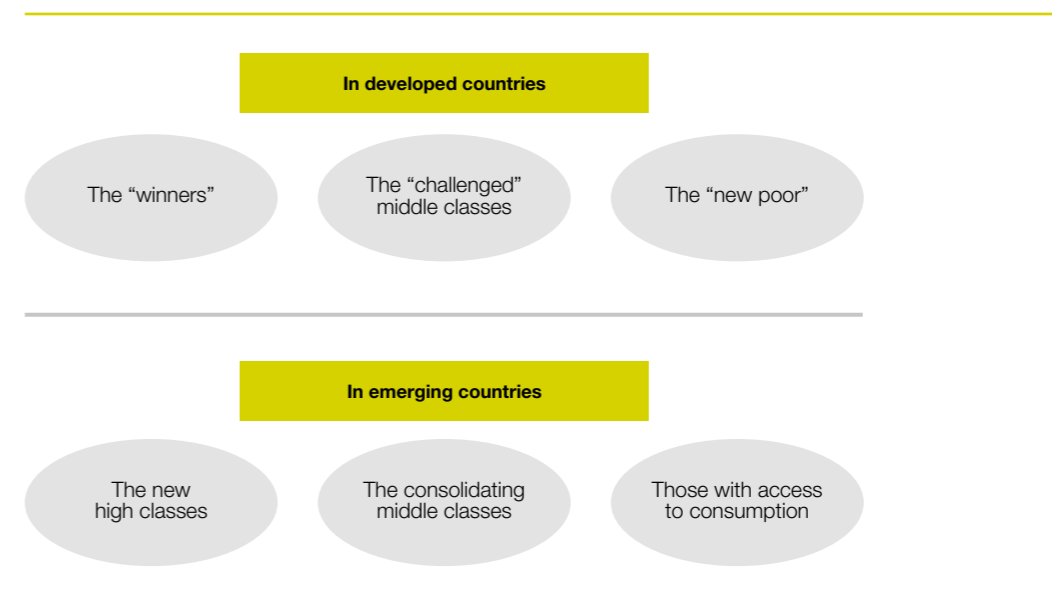
A growing market dominated by developed countries

The analysis of the trends of the demand for food must consider the foreseeable evolution of societies in developed and emerging countries. It has already been pointed out that in developed countries there is a generalized consensus regarding their slow growth prospects for the next decade due to the need to strengthen finances after the 2008 crisis, the current European crisis, and the high levels of unemployment added to important productive restructurings. Added to these trends is a persistent deterioration process in the distribution of income and the emergence of new poverty strata that some studies present as an irreversible change in the “social contract” and the welfare states of developed societies (Stiglitz, 2012, Pigasee, 2012).

As a result of these trends, an analysis model may be proposed of developed societies in three large groups (see Diagram 3.1): i) The “winners” will continue to consume high quality and expensive foods, will consume in different places (for example outside the home), will seek new products and experiences, and will be demanding in terms of sanitation and the “ecological” and “social” quality of their consumption. At the same time, the “threatened” middle classes will show dual consumption, with some moments of “satisfactory” consumption, and a daily life guided toward searching for better quality/price relationship (products of the private brand of distributors, products in low value chains, etc.) and the “losers” will be clients of products poorly differentiated, without brands, generic, purchased in low cost channels.

In addition, most studies present projections of a growing importance of consumers in emerging countries due to the combined effect of the growth of population and purchasing power; in fact, a recent OECD study projects a stagnation in the size of the middle classes of around 3 billion people toward 2020, of which 2.7 billion are located in Asia and 130 additional million in Latin America (see Graph 14). In emerging countries there are also three segments with differentiated consumption (OECD, 2009): i) The new high classes, which will increasingly consume luxury items and differentiated brand foods: a great opportunity for the leading companies of developed countries, ii) The new middle classes which will significantly change their diets, migrating to better quality consumption, and iii) Those who are entering the consumption market, which will adopt diets which are richer in proteins and with more fresh products.

Diagram 3.1 Six consumer segments that will offer new opportunities



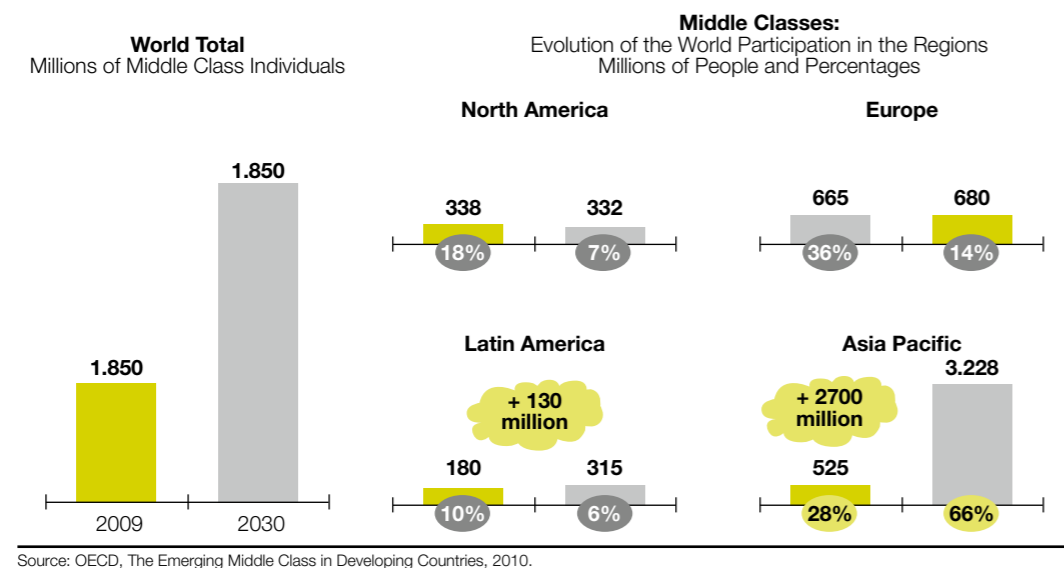
Source: own elaboration.

These socio-economic trends in developed and emerging countries will generate a deepening of the trends in the world basic and processed foods trade that we can summarize as follows (see the OECD, FAO and OMC studies, cited for greater detail (FAO-OECD, 2012, Rosegrant et al., 2002):

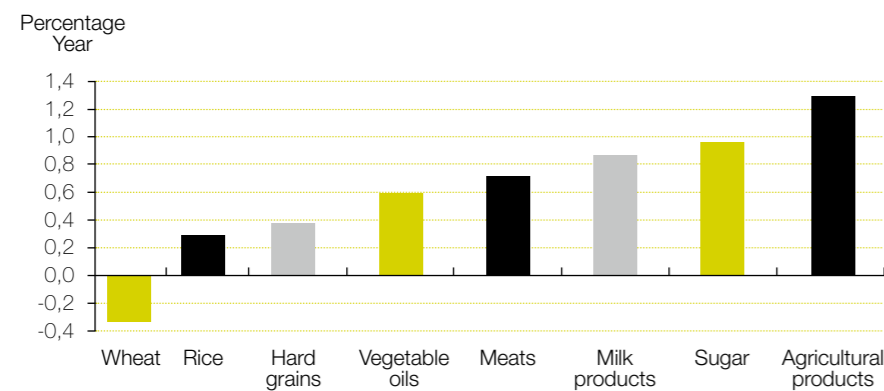
- World trade will continue to grow faster than the Gross World Product, and the trade of manufacturing products and services will grow faster than that of raw materials and foods.
- The trade of agricultural products (which represents close to 8% even with the current high prices) (Abler, 2010, Liepis, 2011), will lose a share of the total. Within the food segment, processed foods and those of higher value added will grow faster than grains and basic foods.
- Most of the growth in the production of foods will take place in developing countries, with average annual rates of 1.9% compared with 1.2% in developed countries (2012-2021).
- At the same time, the structure of trade will change as a result of the evolution of demand and the diet in developed and emerging countries, toward more processed foods, animal fats and proteins. Among these stand out the growth in poultry (which is replacing pork), beef for higher income segments in regions such as Asia and oil producing countries, fishing products, and dairy products and its derivatives (see Graph 3.2).
- Food trade between developed countries will grow slowly; emerging countries will capture a greater share of this growth, with especially favorable evolutions in the case of Brazil, Thailand, and possibly Ukraine.

In summary, we may observe trends that are potentially favorable for food producing emerging countries, among which the countries of Latin America play a major role. However, the key question is who will be the winning actors in these new international trade trends: the companies from developed countries, or new competitors from companies in emerging countries such as China and India, or companies in countries with a large food exporting capacity, such as those in Latin America.

Diagram 3.2 Evolution and location of middle classes (2009 a 2030)



Graph 3.2 Global per capita consumption growth projections 2012-2021



International lessons: link productive strategies with those of infrastructure

We have previously stated that the processed foods market will register a dynamic behavior in coming years, and that these markets are currently dominated by companies from developed countries. Facing this situation, it is important to present a brief summary of the strategies adopted by developed and emerging countries (and their companies) who aspire to defend or increase their strategic presence in global value chains. We will end this section with an analysis of the opportunities and challenges that these strategies will present to Latin American countries (and their companies).

Following the analysis of the OECD, we have pointed out that the United States and some European countries are the main exporters of food in the world.

The analysis of the competitive dynamics of the world processed foods market offers conclusions of interest to evaluate the opportunities and challenges for Latin American countries (following OECD studies and other sources) (Liepis, 2011).

- The leading exporters are those from the OECD, with a share of over 70%. Middle low and high income countries (among which are most of the Latin American countries), represent approximately 25%, and their exports are growing at higher rates than developed countries, with performances that stand out as in the case of Brazil and South Africa.
- The European Union is the main exporter, with 58% of the total: this figure is distorted due to the importance of domestic trade in the EU, but even when this element is not considered, its share reaches 27%, followed by the United States with 12%. The larger Latin American countries are relevant players: Brazil (7.6% share), Mexico (2.9%), and Argentina (2.2%). In summary, it may be said that even eliminating the domestic component of the EU, the OECD countries contribute more than 60% of the world food trade.
- The main exporting countries, considered individually, present interesting cases in the European Union: France leads with 5% of the world market; Germany, the Netherlands, and Italy each represent close to 3%.
- Countries in Oceania that are comparable to Latin American countries register interesting performances: Australia with almost 5%, and New Zealand with 4.4%.

It is interesting to analyze the strategies adopted by some leading countries, or with growth ambitions in the sector, to defend and strengthen their sector's leading positions in agri-businesses. The full version of this work (Forteza, 2012) analyzes some strategies that leading countries (such as the European countries and Australia), and new countries entering the business (such as South Africa) are developing to defend and strengthen their positions in the world market. The analysis of international cases shows that both developed and emerging countries want their companies to have key positions in these value chains, including a significant presence in Latin America. In fact, when analyzing international cases some constants may be observed:

- A firm national and territorial strategic will to defend/expand its presence in global value chains.
- Strategies that combine strategic differentiation elements (through innovation, strengthening of brands, certificates of origin), with a search for greater competitiveness (cost competitiveness, search for low cost supply sources), defense/strengthening of key positions in the chains, through investments infrastructure, logistic, and ICT to continue being key trade and intermediation nodes, and finally, but not less important, policies to establish standards, quality control, and environmental and social controls which will have a great impact on the competitive possibilities of emerging countries, and which may be used as non-tariff barriers.
- A strong connection between productive strategies and strategies regarding logistic and ICT infrastructure to:
 - Favor competitiveness of national enterprises.
 - Attract new foreign investments.
 - Hold node or key intermediation market positions: in this case, beyond the example of the Netherlands already mentioned, the strategies of Singapore and the Emirates, especially Dubai and Qatar are of special interest.
- The promotion of development of own multinational companies: from private groups as in the cases of Turkey, India, Philippines and Singapore, to policies for public-private expansion as in the case of China.

As may be imagined, these trends present opportunities for Latin American states. At the same time, all these countries that are outside the region (and their companies) want to strengthen their presence in Latin America, but they present challenges to our capacity to develop companies that are relevant actors in these global value chains. In the next chapter, we will present some cases of opportunities for Latin America and its implications on the demands for investment and institutional strengthening in infrastructure.

Infrastructure: key to strengthen regional positions in global value chains

An analysis framework that integrates infrastructure with value chains

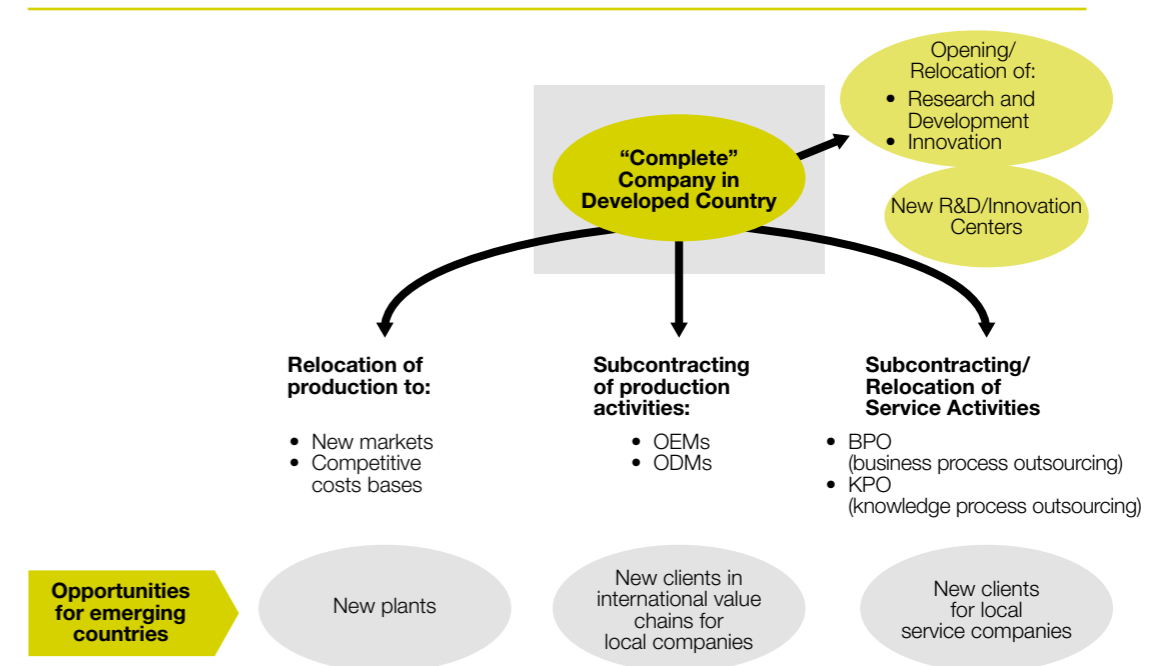
To try to offer a framework for the analysis of these questions, a combination of three concepts for economic and strategic analysis is proposed:

- Global value chains:** This concept, initially developed by economists that studied transformations in industrial sectors (Berger, 2005), points to the analysis of the following subjects: how is production and world trade of goods and services organized, from the original producer to the final consumer, what value added stages make up this chain, which actors carry out these activities, and what are the strategies of entrepreneur actors to capture the most attractive stages of

value generation. The different possible positions in a value chain give place to the appearance of entrepreneurial models that may cover from the “complete” company (which covers all the value stages) up to variables such as those illustrated in *Diagram 3.3, Diagram 3.4 and Diagram 3.5.*

- Designers, brand owners, and chain leaders
- Suppliers of products or modules with different degrees of elaboration (from the OEM, which are limited to production, to the ODM which designs and produces).
- Producers of non-differentiated inputs/outputs.
- Network articulators.

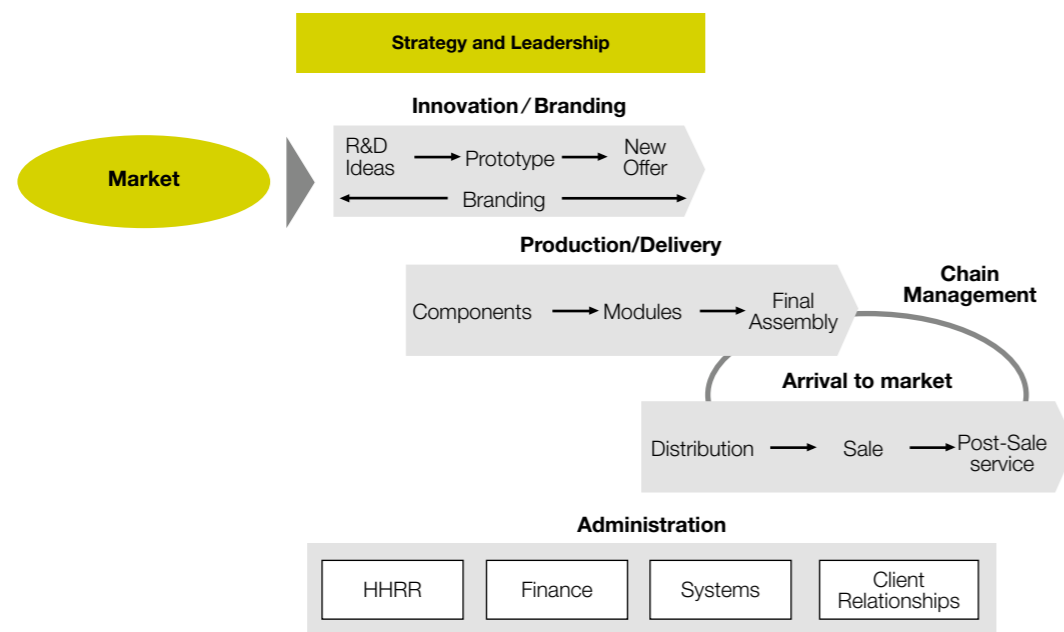
Diagram 3.3 New company behaviors



Source: Own elaboration.

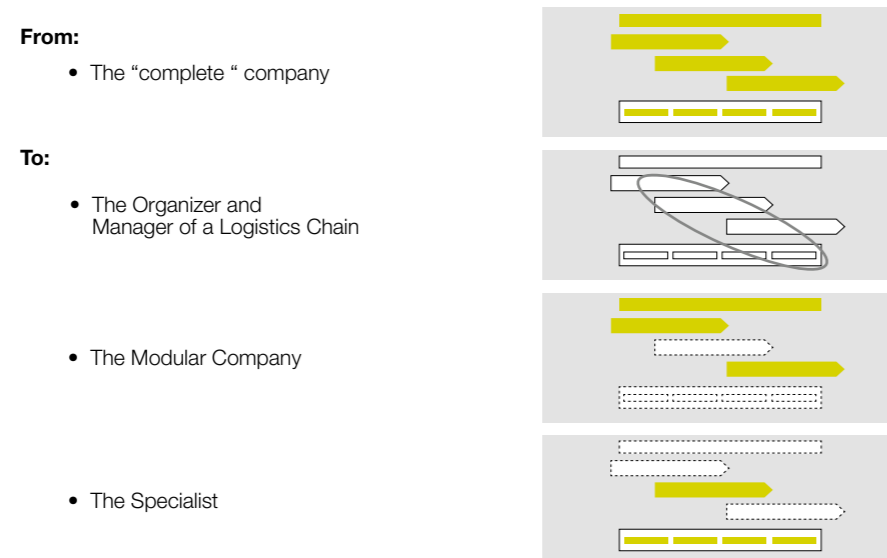
These alternative positionings have been initially studied in depth in industries such as textiles or electronics; in a following section these concepts are applied to the food value chains, on the basis of previous studies (Humphreys, 2006, Giner, 2009).

Diagram 3.4 A “modular” vision of the enterprise and two key decisions: who carries out each activity and where



Source: own elaboration.

Diagram 3.5 New strategic positionings opened to build companies with a global scope



Source: own elaboration.

ii. **The territories, productive districts or clusters:** most of the products and services marketed worldwide, but especially foods (those with the greatest differentiation), originate in a determined territory: for this reason we observe increasing efforts (and commercial and legal conflicts) to impose concepts such as “certificates of origin”, the terroirs, etc. These territories are more or less competitive, to the extent that they can (following Michael Porter regarding his concept of “competitive diamond” (Porter, 2008, Magretta, 2011), and experts from the Italian school, such as Beccatini in their concepts of “Local Productive Districts” (Fortis y Curzio, 2007), develop and effectively combine the following key factors of competitiveness:

- The initial supply of natural, human, and social resources
- The public policies that promote (or do not hinder) the training of competitive entrepreneurs
- Sophistication and demands of the domestic market
- Support industries and facilitators, such as factor markets, availability of financing and, in a key role, infrastructure

iii. **Chains or logistics and information systems:** The transportation and logistics activity chains that enable the connection of different links in the value chain. The evolution of trade already mentioned adds increasing demands for quality supply and performance in a wide range of dimensions that make up the so called soft or “intelligent” infrastructure to the classical notion of a logistic chain with a network of physical facilities for transportation, storage, and transfer:

- Regulations and administrative practices that facilitate/hinder transportation
- Information and communications technology
- Existence of entrepreneur actors that specialize in articulating networks
- Institutions for collaboration
- Quality of entrepreneurial management

All these logistics and infrastructure capacities point toward obtaining a greater competitiveness by “speed” and “differentiation”, in opposition to competitiveness exclusively based on costs. This phenomenon of competitiveness by speed has been analyzed in cases such as the brand textile industry (see the analysis of the Zara case, and the concept of FastFashion), in the electronic industry (see the cases of Apple and Samsung), and has started to be applied in cases of food competitiveness (see, for example, the studies of J. Humphreys, 2007 and G. Gereffi, 2011).

In summary, an analytical framework will be used, that combines the three concepts developed previously (global value chains, territorial competitiveness, and quality or “intelligence” of the logistics chain), to apply them to illustrative cases of food

trade. To show how these three levels of analysis are connected, three representative examples of positions in the value chain will be used, corresponding to increasingly ambitious positionings.

Case 1. Basic infrastructure for commodity exports

First Positioning: Producer/exporter of grains with little or low additional processing (which may include the production of flours or oils) (see Diagram 3.6). This strategic positioning, which appears to be the simplest one, demands an infrastructure which may be assimilated to that of minerals or other commodities, but with a higher level of demands as a result of the local fragmentation of agricultural production. In summary, to be able to build or sustain a solid competitive positioning in a value chain, it is necessary to have the following infrastructure, capacities, and institutions:

- Capacity to gather and store production: good local roads, high quality transportation connections, and storage capacities.
- Transportation to large capacity and quality ports.
- Storage facilities with capacity, reliability, and good accesses.
- Ports with adequate depth of water, high quality navigable routes.
- High quality maritime connections and the following stages up to destination in industrial or final consumption.
- Demands on the territories focused on the existence of good support and innovation institutions, and dissemination of agricultural technology, etc.
- Telecommunication needs to enable sales strategies and high speed coverage of positions.

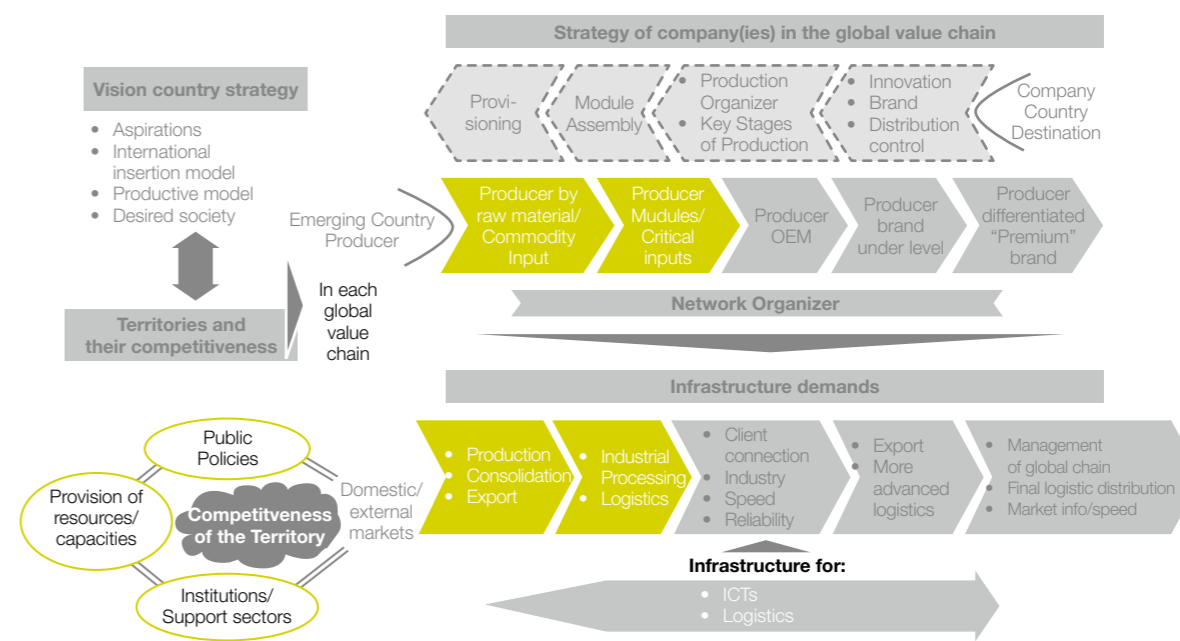
It may be observed that even in this case, which seems to be the simplest one, the aspiration to fully participate in the world market brings strong repercussions in the demand for physical infrastructure, and also in the institutions that make up a competitive territory and the capacities to transmit information (for a more detailed analysis, see the “Los Grobo” case, Forteza and Diaz Hermelo, 2008). When the cases of Argentina and Brazil are analyzed in what follows, this analytical framework will be applied in more depth.

Grain exports of the Southern Cone and their infrastructure needs.

The growth prospects of food trade and the dynamics of the growth of grain trade compared with the higher growth potential of foods with more value added, such as oils, meats, and milk products has been pointed out before. However, the growth of grain trade will be important, and the countries of the Southern Cone (especially Argentina, Brazil, Paraguay, and Uruguay) will be the main actors together with the United States and Canada.

The successes registered in the past 10 years in the export of soy beans from the Southern Cone may lead us to think that the infrastructure solution is adequate; in some way, the internal transportation, storage, and port transfer systems have faced

Diagram 3.6 Positioning 1: grain producer / exporter



Source: own elaboration.

the exponential growth of traffic. However, a detailed analysis of the grain logistic chains in the region points out several important bottlenecks (for a more detailed analysis on this subject, see Rebizo and A. Tejada Rodríguez, 2011):

- **Shortage of infrastructure in rural roads and in storage facilities:** although part of this deficit has been covered by the adoption of the “silage bags” (which in Argentina enabled the addition of a static capacity of 40 million to 70 million tons), a key innovation for its impact on the logistic dynamics and the arbitration capacity of the producers.
- **Deficiencies in the tranches that go from the storage facilities to the ports:** appearance of deficiencies in the routes, in the vehicle park, and in an excessive dependence on automotive transportation due to the deficiencies in railroad transportations and, in the cases of new potential areas in Argentina, Paraguay, and Brazil, the virtual inexistence of transportation networks.
- **Inadequacy of navigable routes:** In the Plata Basin, due to the limited depth available north of Rosario, in the Uruguay River, the bottleneck of the Martin Garcia Channel, and in Brazil the limited use of the rivers in the Amazon Basin. In all cases, there are shortages in river transportation by barges.

What is the impact of these infrastructure deficiencies? An analysis is proposed for two very well differentiated cases: i) The Humid Pampa in Argentina and, ii) the new production frontiers in North Eastern Brazil. The two cases present origin situations regarding supply of factors, existence of infrastructure, availability of service providers, that is, they have very different levels of “infrastructure and supplier density”.

In Argentina’s Humid Pampa, in the past two decades there has been a real technological revolution: the adoption of direct sowing methods, the massive adoption of soy beans, and the appearance of network production models (see study on the evolution of the sector, the detailed case of the Los Grobo Group, Forteza and Diaz Hermelo, 2008), have enabled an unimaginable expansion of production and exports. In the area of Rosario, the favorable conditions for investment in private ports and processing facilities in the 1990’s generated a processing and transfer infrastructure which is among the deepest in the world. This new production system was supported by a poorly developed road infrastructure, low quality railroad connections, and a truck park which grew rapidly, but is still old on average.

The combination of exponential production growth and exports (went from 70 million tons in 2002 to 100 million in 2011), with a poor quality infrastructure, currently generates a series of significant costs:

- High transportation costs.
- Route congestion, accidents, and saturation of port accesses.
- A disproportionate expansion of truck transportation, with negative economic and institutional repercussions.

Beyond those short term costs, the challenge is how this almost saturated system will respond to the prospects of future growth: the world demand prospects and expansion of cultural areas and crop yields enable the analysis of the needs on the basis of a production of over 130 million tons in 2020. These projections present a challenge for the advance of Argentina: that of creating planning and climate investment conditions to enable the generation of investments to achieve these flows. An analysis of the existing studies and the vision of the sector’s leading operators allow us to point out the following investment needs, which considered as a whole, will require a real revolution in planning, allocation of resources, and public-private cooperation to satisfy a traffic growth of close to 40%:

- Expansion of rural roads and substantial improvement of the large road transportation axis that connect the Humid Pampa with the Litoral and Bahia Blanca ports.
- Investment in the main railroad corridors (FC Belgrano, FerroExpreso Pampeano, Nuevo Central, ALL Central, etc.).
- Deepening of the navigable routes at least up to Santa Fe, and develop an efficient river transportation system.
- Expansion of port capacities and port accesses/impact on urban areas.

- Information technology and integration capacities with futures markets to optimize the flows according to the evolution of the markets.

Finally, all this infrastructure transformation will not be possible without improved institutional capacities for planning, judicial frameworks to promote private investment and PPP, and financing to renew the fleets. When the opportunities to increase the export of flours are incorporated, new needs are added, such as improving the transfer capacities of containers and better maritime connections, which will be the great bottlenecks for the export of greater value added products.

In the case of the areas in the North of Brazil, especially the areas of Maranhão, Piauí, Tocantins and the Mato Grosso, the productive and social systems are very different: the production areas have recently incorporated by displacing cattle raising areas or directly starting production in non-agricultural areas. Here there is no population density as is the case of the Humid Pampa: these are areas of recent settlement, with an explosive growth of new cities, where infrastructure is in the construction stage. In this case, the production model does not have a network configuration such as the previous case, but a greater concentration with large owners, smaller rental market, and larger presence of big Brazilian and transnational companies.

These new areas offer potential production increases: the areas sown in the mentioned places may grow by at least 10 million hectares, with which Brazil would become the largest producer and world exporter of soy beans. In this case, the greater investment needs may be summarized as follows (see more detailed studies: WEF 2011, OECD 2011, Exame 2012):

- The expansion of the North-South Railroad from the port of São Luiz; a project led by the Vale mining company, which brings up subjects related to political economy due to the dual use of the network.
- Expansion of the São Luiz port and investment in new ports in the Northern Coastal Area.
- Investment in road and railroad connections between the production areas of Mato Grosso and the North-South Railroad.
- Road connections of the southern areas of the port of Ilhéus, also including the road connection to Santarém.

As may be observed, the problems in this area of Brazil are very different: added to the vicinity of new railroad or road transportation corridors (which in some cases suggest special issues of coexistence with the transportation of minerals that also grows very fast in the region) is the scarce “density” of the social and entrepreneurial system: the population is low, qualified human resources do not go to that region, and there is no supplier framework or market relationships that constitute a network model. Consequently, the operators in the area are forced to be much more integrated in the storage plants, in trucks, and even in own ports to be able to build economically feasible corridors.

Case 2. Integrated infrastructure for high value foods in global chains

Second positioning: producer/exporter of processed foods of intermediate value for an international buyer that leads the chain, or the evolution toward own brand exports. In this case, this may be applied to several products in which Latin America currently is and may increasingly be a world actor, such as cattle meats, pork, poultry, and fish farming. Increasingly ambitious positionings may also be imagined: from the very simple case of a producer who sells a non-differentiated product to an exporter, the intermediate case of a producer who sells consumption goods to a company which will distribute them with its own brand, and the more advanced case of the producer/exporter who reached the destination market with his brand, and eventually, his own distribution.

In this case, as may be seen in *Diagram 3.7*, the demands for infrastructure and territorial competitiveness are rapidly increasing:

- Even for the simple positioning of spot exporter, the producer must manage a more complex logistics chain, with increasing demands for processing capacity, stock management, and specialized facilities such as cold facilities or facilities with sanitary/customs protection.

- The territory must offer more developed capacities, among which the following stand out: local differentiation (or “certificate of origin”), a wide network of production and equipment suppliers, chambers and associations, organizations for innovation, and cooperation capacities among producers. As may be observed, the typical needs of a more dense and effective cluster generate rapidly.
- The institutional and information demands are increasing: the capacity for sanitary control and compliance with the processes demanded by purchasers or destination countries, the availability of information regarding markets, and telecommunication capacities, become facilitators (or limiters) of a successful international insertion.

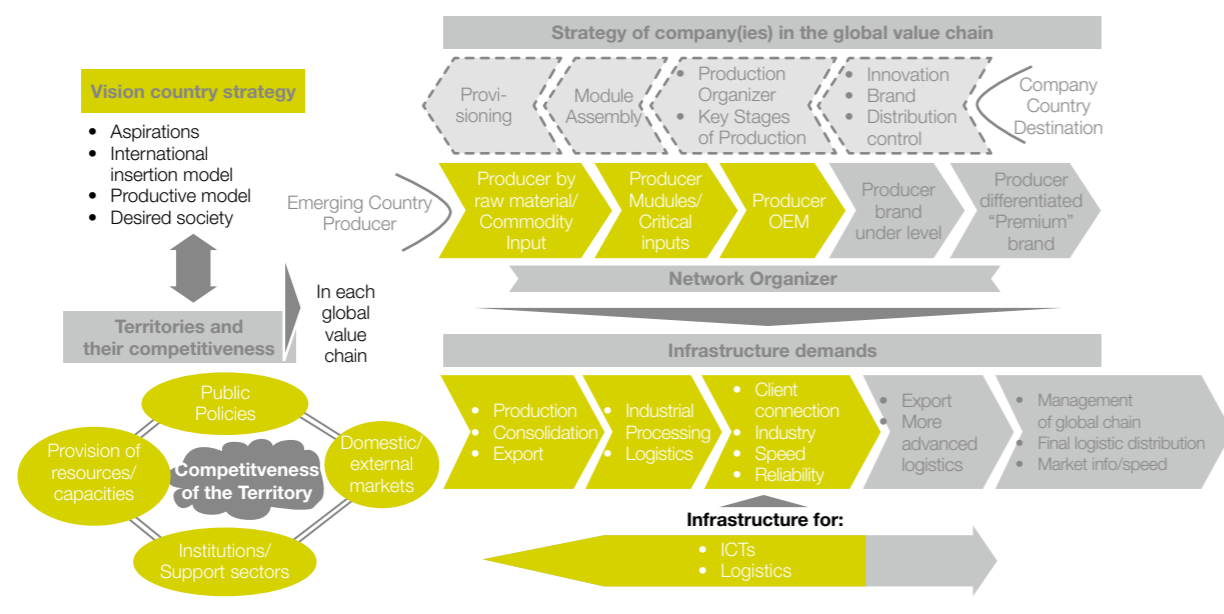
On the road to participating as an exporter for a leader of the chain, or exporter with own brand, the demands for infrastructure and logistic capacities are exponentially increasing: it is not about managing a logistics system up to the export port, but a real logistics chain up to the final client (or work with a supplier/partner that may offer these services).

The case of Chile: Building institutions and infrastructure and logistic capacities to offer a complete logistic services sector and contribute to gain positions in the processed foods markets.

Chile is a case of success in its growth strategy: the country is frequently among the 30 first positions of the ranking such as the WEF’s competitiveness, the World Bank’s Business Climate, and several Institutional Quality rankings. The growth model has delivered good results regarding growth and reduction of poverty (although lower in the reduction of inequality), and the quality of education (measured by the PISA results of the OECD has been improving).

To address the subject of defining the next stage of the country’s growth model, the National Council of Innovation for Competitiveness was created (CNIC for its acronym in Spanish), which between 2005 and 2007, prepared a first competitiveness plan and a national innovation strategy which recommended investment in 11 priority clusters (CNIC, 2010), among which several agribusinesses stand out. Later, during this current government, the Foundation for Innovation in Agriculture (FIA for its Spanish acronym) jointly with the World bank carried out an exercise to build a vision of the Chilean agriculture for 2030, where a new ambitious image is set out “that of a quality producer of a wide range of foods and fibers”. The vision is based on a framework of value chains to propose that “through the application of information and communication technologies, investment in agricultural technology, and training of its labor force, Chile has been able to develop value chains with an attractive profitability, well integrated from the production stage up to the final markets, and to remunerate its participants at levels which are comparable with the rest of the economy. In a very illustrative manner, the name of Chile is used to express the desired attributes of Chilean agriculture: C: Clean; H: Healthy and Wholesome; I: Information-based and Internationally Integrated, L: Learning-Oriented, E: Efficient and Equitable.

Diagram 3.7 Positioning 2: Producer of intermediate value foods for leaders of the chain



Source: own elaboration.

This vision states ambitious exporter growth objectives for seven clusters: fruits, pork meats, wines, horticultural products, cereals, and forestry products.

Added to the advance of the definition of the Innovation and Competitive Agenda, together with the work mentioned in the agribusiness sector, is a strategy to strengthen the Logistic Platform, published in 2010 (Innovation and Competitiveness Agenda 2010-2020), which states a series of objectives that emphasize tangible results for the competitiveness of the exporting sectors (CNIC 2011), (Recommendations to Strengthen the Logistics and Transportation Platform, 2010): i) Reduce by 50% the logistic cost gap with the average of the OECD countries, from 18% to 14% of the value of national production, ii) Increase administrative efficiency in the export logistic chain, reducing the gap with Norway and New Zealand, iii) Reduce the lead time of national exports by 2.5 days on average (closing the gap with Australia), and iv) Promote multimodal transportation by using a combination of railroad and maritime transportation at levels comparable to those of New Zealand.

These objectives have also been used in the analysis of some agribusiness value chains such as agribusiness, fruits and foods, with a global objective of becoming “leaders in the food export logistics chain”, and proposes a vision for the country and for each of the mentioned chains. For example, the analysis carried out for the processed foods chain, and the recommendations emerging from the 2030 Vision generate a demanding agenda which is quite consistent with the proposed analysis framework (for more details, see Arvelález et al., 2012).

Case 3. Advanced infrastructure to orchestrate networks and manage brands

Third Positioning: The seller with own brand foods or horticultural products with coverage of the global market: This is the position with the greatest potential to capture value and the greatest demands for entrepreneurial sophistication and infrastructure and institutional capacities. It may be applied in several highly differentiated markets in which Latin American producers participate or have the possibility of increasing their presence, such as high value fish and meat products, wines, horticultural products, and even flower growing as has been very successfully demonstrated in Colombia. In this case, the demands are increasing on the capacities and the differentiation of the territory (similar to wide ranging French wines, Scottish salmon or Italian food products) as well as on the capacities needed to generate a global logistics chain. In addition, in this case sometimes it will be necessary to manage logistic chains in the destination markets. As these markets also require competition in speed and response capacity, the information needs (and therefore ICT) are increasing. At the same time, the public institutional and public-private cooperation capacities become a fundamental competitive requirement (see Diagram 3.8).

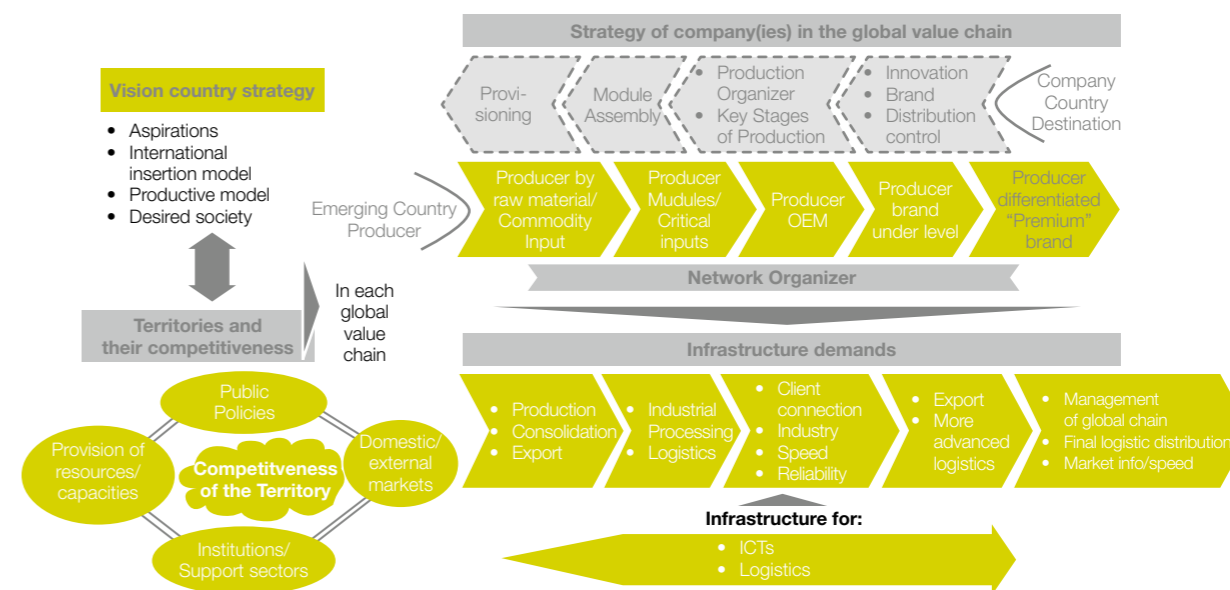
The case of Colombia: From the successes in some segments of the international market arises a new frontier in the development of presence in agribusinesses

Colombia is an interesting case to apply the concepts developed in this chapter. The country has been able to show positive results regarding growth even in the

most difficult two previous decades. At the same time, Colombia has developed an international insertion model showing significant successes, especially in the field of agribusinesses and activities related with flower growing. In the cases of coffee and flowers, the country has achieved a differentiated positioning, has created a “country brand”, and has generated important volumes of exports and job creation.

An illustrative example of best practices in the development of differentiated positioning in the international market is the flower growing activity (for a more detailed analysis of the sector and its evolution, see Cadavid, 2009). Currently Colombia is the main supplier of fresh flowers to the United States, and is among the first suppliers of the European Union. The sector represents almost 5% of the agricultural employment and is labor intensive, generating close to 200,000 jobs, considering direct and indirect employment.

Diagram 3.8 Positioning 3: seller of own brand foods



Source: own elaboration.

More recently, the sector has evaluated its competitive situation and economic performance (facing challenging factors such as the revaluation of the local currency and the subsequent increases in costs measured in USD, and the increases in air transportation costs). As a result of this exercise, a 2015 Vision was prepared for the sector, combining proposals to advance toward a greater participation in the global value

chain through a larger differentiation of products (looking to migrate to higher price and quality segments) and destinations (looking to increase the presence in European and Asian markets). In summary, this strategy for the sector's next development stage tries to complete the transition from a business model based on productive advantages (land, climate, and low cost labor) toward competitive advantages (seeking for new varieties, development of service activities, and market diversification).

As has been pointed out in previous cases, this strategy is increasingly demanding regarding infrastructure and management capacities for a new integrated logistics; several of the proposed initiatives are aimed at this:

- Building a country brand.
- Research and local development, and activities for the acquisition of technology for the production of new varieties aimed at the higher segments of demand.
- Improvements in infrastructure, as for example: i) Joint activities to establish the presence of exporters in destination markets, as the case of the creation of a joint operation in Miami, ii) The improvement of the transfer and storage facilities in Colombia, iii) Agreement to reduce the incidence of air transportation costs, and iv) the systematic search for innovations in transportation and logistics, as the case of the Merlin Project, led by Asocolflores, which confirmed the feasibility of using maritime transportation toward new target markets, such as Europe and Japan (DNP, 2010).

It has been proposed to integrate the case of flower growing in the broad perspective of Colombia's National Strategy and in the initiatives regarding infrastructure and logistics. The current administration has published a 2010-2014 National Development Plan. The initiative seeks to accelerate growth and improve the country's social indicators, and has a highly interesting component regarding the international insertion ambitions: the definition of a Productive Transformation Policy seeking to guide the innovation efforts to: i) existing sectors with the potential to reach a world class size and efficiency by increasing productivity and competitiveness, and ii) new sectors, intensive in knowledge, that enable high levels of value added and sophistication, among them, this analysis: agricultural, emphasizing chocolate markets, confectionery and its raw materials, pork meats, palm, oils and vegetables, and shrimp.

The agricultural sector has a special importance in the plan, due to its impact on already defined variables, as actors in a strategic vision: the life improvement of the rural population and the restitution of lands and reparation to displaced farmers, pointing toward an effective recovery and increasing integration of the national territory. The agricultural sector has registered an interesting dynamism in the past decade, added to a reorientation process of its productive structure toward new segments, such as fruits, biofuels, horticultural products, and livestock products. The analysis of the competitiveness of the agricultural sector identified a series of bottlenecks for the sector's development toward the new desired configuration: low productivity and competitiveness of some agricultural subsectors, and low use of

agricultural technology, limitations to expand and diversify markets, low capacity to face exogenous factors and stabilize investments, difficulties of the rural population to develop their productive potential, regional imbalances, and the limited availability of infrastructure for the transportation and marketing of agricultural products. The report assigns a high impact to the latter: "Most of the competitiveness achieved in the farm is lost in the transportation and marketing process". It cites the case of palm oil, where these values represent between 25% and 33% of production costs. As the objective is to make the agricultural sector the "engine of growth", seven strategic guidelines are defined, implying a broad vision of productive, regional, and social development. These strategic guidelines, added to the results of the demands of other target sectors, consolidate in an "infrastructure for competitiveness" plan, where special emphasis is placed on the development of transportation and logistic services, together with initiatives that are aligned with the principles that we have developed throughout this document:

- A special emphasis on "principles of good governance" for the sector, in order to improve public management to "strengthen governance and transparency".
- Institutional strengthening aspects and policies and regulations of the transportation sector.
- Development of infrastructure for competitiveness and regional integration.
- Coordination of investments in the transportation sector with those of the mining, agricultural, and public services sectors, to develop a comprehensive vision of investments and allocation of resources.
- Development of new mechanisms to finance infrastructure.

These strategic guidelines materialize in a series of quantitative goals and are defined in more detail in a plan for the infrastructure and transportation sectors. The approach presented in this case covers from the identification of the priority development sectors –as is the specific case of flower growing and agriculture in general– to the definition of strategic guidelines for activity, the identification of infrastructure and logistics as an "engine of growth", and the integration of all these strategic imperatives in a National Transportation Plan. These elements configure an integrated cycle of vision development, plans, and institutions that is at the cutting edge of the best international practices pointed out before. It will be interesting to continue the analysis to observe the quality of the implementation of other best practices, and to what extent they are able to contribute to accelerate growth and social development in Colombia.

An agenda for agribusiness infrastructure

From the strategic vision to the infrastructure and logistics requirements

This analysis started by presenting the historical opportunity offered to several Latin American countries in coming decades: achieve economic and social development or, at least, face a sustainable trajectory in that regard. It has been pointed out that

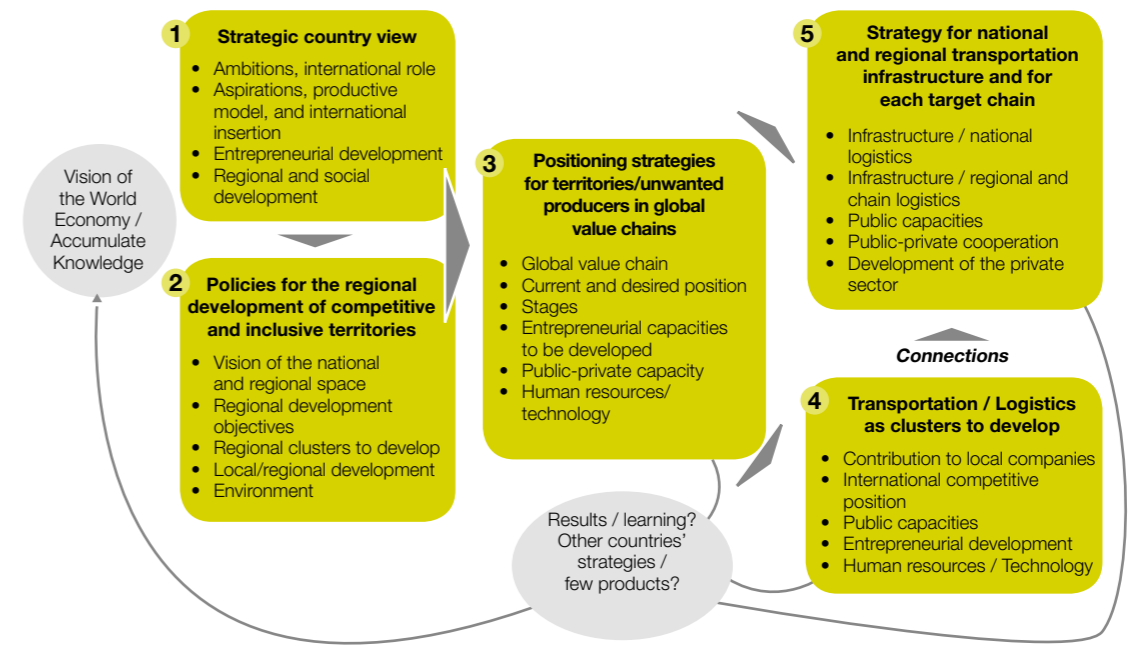
the evolution of the configuration of the world economy and of developed and emerging societies generates demands for natural resources, foods, manufactures, and services that the countries of the region have (or are close to having) the capacities to address. After brief considerations regarding competitive opportunities for manufactures and services, the analysis has focused on the opportunities regarding foods with diverse degrees of processing and value added. At the same time, the analysis has confirmed the highly positive growth trends of the world demand in coming decades, and the increasing demands for Latin American basic foods exports. However, world trends also generate an important challenge: the segments with the most dynamic growth will be those of the clients with increasing value added, and in general, these segments are dominated by developed countries where Latin American nations (except for a few mentioned cases) are not important players or with growing participations. Examples of the policies that several developed and emerging countries are carrying out to ensure their dominant position in the future have been highlighted, and how these national strategies are complemented by the strategies of companies in their countries. Work advances on the principle of a strategic imperative for the region: the need to build more relevant and attractive positions in global value chains of processed foods, horticulture and flower growing.

A framework for the analysis has been adopted, which combines five levels of analysis:

- i. The national strategy.
- ii. The strategies for the development of territories (productive poles or clusters).
- iii. The positions sought in the value chains.
- iv. The entrepreneurial capacities, strategy, innovation, marketing, and operation of logistic chains.
- v. The infrastructure needs to compete in these value chains, adopting a wide definition of “infrastructure”:
 - Physical infrastructure.
 - Equipment.
 - Regulations and policies that affect/promote effectiveness in the use of the infrastructure.
 - The development needs of key components for “intelligent infrastructure”: information and communications technology, energy, human resources training, and management and cooperation capacities between public and private actors.

To illustrate and apply this analysis model, four real cases of productive development and their implications on the needs for this “broadly defined” infrastructure

Diagram 3.9 Infrastructure to progress in the value chains



Source: own elaboration

have been analyzed: Grain exports in Argentina and Brazil, processed foods in Chile, and flower growing (and its new competitive frontiers) in Colombia. Following is a synthesis of the learning that can be extracted both from the analysis of the international cases and from the detailed study of the three Latin American cases. To organize the results of their analysis and contribute to the proposal of key elements that should be included in an agenda for the development of infrastructure for competitiveness and inclusion, the analysis model presented in *Diagram 3.9* is proposed, which has five key components.

It has been proposed that the national infrastructure and logistics strategies for competitiveness be prepared (as demonstrated by the best practices analyzed here) as a continuous planning and learning process based on a solid analysis work, discussion among key actors, and proposals in the five key components described below:

1. **The country's strategic vision:** It has been observed in Europe, South Africa, and some Latin American cases that societies invest efforts and social dialogue forms to formulate a vision for their countries. In general, these visions have some noteworthy components:
 - A formulation of growth and development ambitions, and of presence in the global economy and society.

- A definition of the “desired society”, with variables that are more related to social indicators, income participation, institutional quality for regional development, and relationship with the environment.
 - Some definitions, or at least master lines regarding the desired productive and international insertion model.
2. **Regional and territorial development policies for competitiveness and inclusion:** An increasingly accepted principle in the theory and practice of development indicates that the strategic vision of a society may only materialize if it translates into regional development components or productive poles, which implies generating proposals regarding which productive activities are going to be developed/promoted, how they intend to compete internationally, where they will be located in the national space and, therefore, what “local societies” will be built. Box 3 details CAF’s approach to promote local development.
3. **Positioning strategies in global value chains for the desired productive territories/poles:** As a result of the second component, a limited number (in general less than 10) “productive poles/clusters/ engines of growth” should have been identified regarding where the public-private development efforts will be placed. It is important to highlight two observations: i) to be effective, this process must not invent “winners or national champions”, but build on the existing capacities and international presence that already shows some level of advance, and ii) the key analysis does not consist in defining segments, as for example “fruits”, “pork meats”, or “flowers”, but rather what positioning in the global value chain is desired; from one extreme as supplier of undifferentiated commodities with little or no access to final clients, to the other extreme, representing the consolidation of a player with a differentiated product, brand, premium or “adequate” prices, and a complex and international management of the value and logistics chain management.
4. **Development strategies of a transportation/logistic cluster:** In some of the mentioned cases (such as the Netherlands, Singapore, Chile, and Colombia), the transportation/logistic activity has been defined as one of the key phases to defend, strengthen (as in the case of the Netherlands, a historical example in the sector), consolidate (as in the case of Singapore, with its ambition of becoming an important hub in the South East Asia region), or, as we have seen in the cases of Colombia and Chile, as one of the priority sectors for development. In this case, a specific development agenda must be developed for this cluster.
5. **The national, regional, and local infrastructure, transportation, and logistics development strategy:** Demands for infrastructure in the productive sectors (with their positions in global value chains), added to other demands for infrastructure, such as urban transportation, connection/inclusion of remote/

less favored areas of the national space, will articulate in a strategy that must have several characteristics:

- i. It support the strategic vision of society.
- ii. It contribute with social, territorial development, and development of the desired value chains objectives.
- iii. It is designed at various levels: national, regional, and of the territory/productive pole to be developed.
- iv. In line with the broad definition of infrastructure, it incorporates elements such as information and communications technologies, energy, and the use of critical resources such as water.
- v. It adds social variables and those that consider the impact/defense of the environment; a key subject in the food value chains analyzed is that the green/healthy characteristic is a competitive differentiator, and in some cases, a decisive obstacle to be able to compete.
- vi. Quality of administrative processes and business climate variables: We have pointed out that in these value chains the variables “speed”, “traffic times” and “reliability” are key competitive elements. Regulations or customs and tax processes may facilitate or hinder the functioning of these value chains, and must be fully incorporated in any strategy.
- vii. Every infrastructure and transportation strategy must respect the institutional capacities and planning and cooperation processes at the following levels:
 - Public, national, regional, and local sectors.
 - Between public and private sector.
 - Between private companies.
 - The capacities to develop by the companies of the productive pole

A permanent cycle of results evaluations and generation of knowledge

Finally, every infrastructure national strategy must include, given the need to achieve results in a world increasingly characterized by its volatility and speed of changes, institutional capacities for the evaluation of results, of competitive intelligence, and analysis of other experiences, to complete a continuous cycle of learning and continuous improvement in the policies, plans, and processes linked to infrastructure and logistics.

To be able to capitalize on the multiple opportunities offered by the world market of greater value added foods, Latin American countries should advance in the implementation of planning, investment, and development processes of an “intelligent

infrastructure” that enables the achievement of the desired objectives. This chapter has analyzed the case of foods; a similar analysis could be prepared regarding the positioning opportunities in global value chains of manufactures and services, which probable will reflect that the development of these activities will consider requirements regarding intelligent infrastructure that in some cases will be specific to these activities, and in others, common to all the selected productive activities. The countries of the region that develop these capacities for planning, productive development, and public-private cooperation, will surely advance faster toward the economic and social development objective that, for the first time in many decades, appears to be at reach for these societies.

Box 3. Local development: toward a new protagonism of cities and regions

Evidence on the territorial development patterns in Latin America indicates the existence of important disparities at the production, income, and welfare levels in the countries. Except for the case of some basic welfare indicators (for example illiteracy or infant mortality), these gaps do not show a decisive trend toward reduction in time. The Economic and Development Report (RED for its acronym in Spanish) titled “Local development: toward a new protagonism of cities and regions” seeks to contribute to the understanding of these local and regional development patterns and identify options of public policies which, with a large participation of the governments and sub-national institutions in the design and execution, to make economic growth compatible with a balanced development of the territories within the economies.

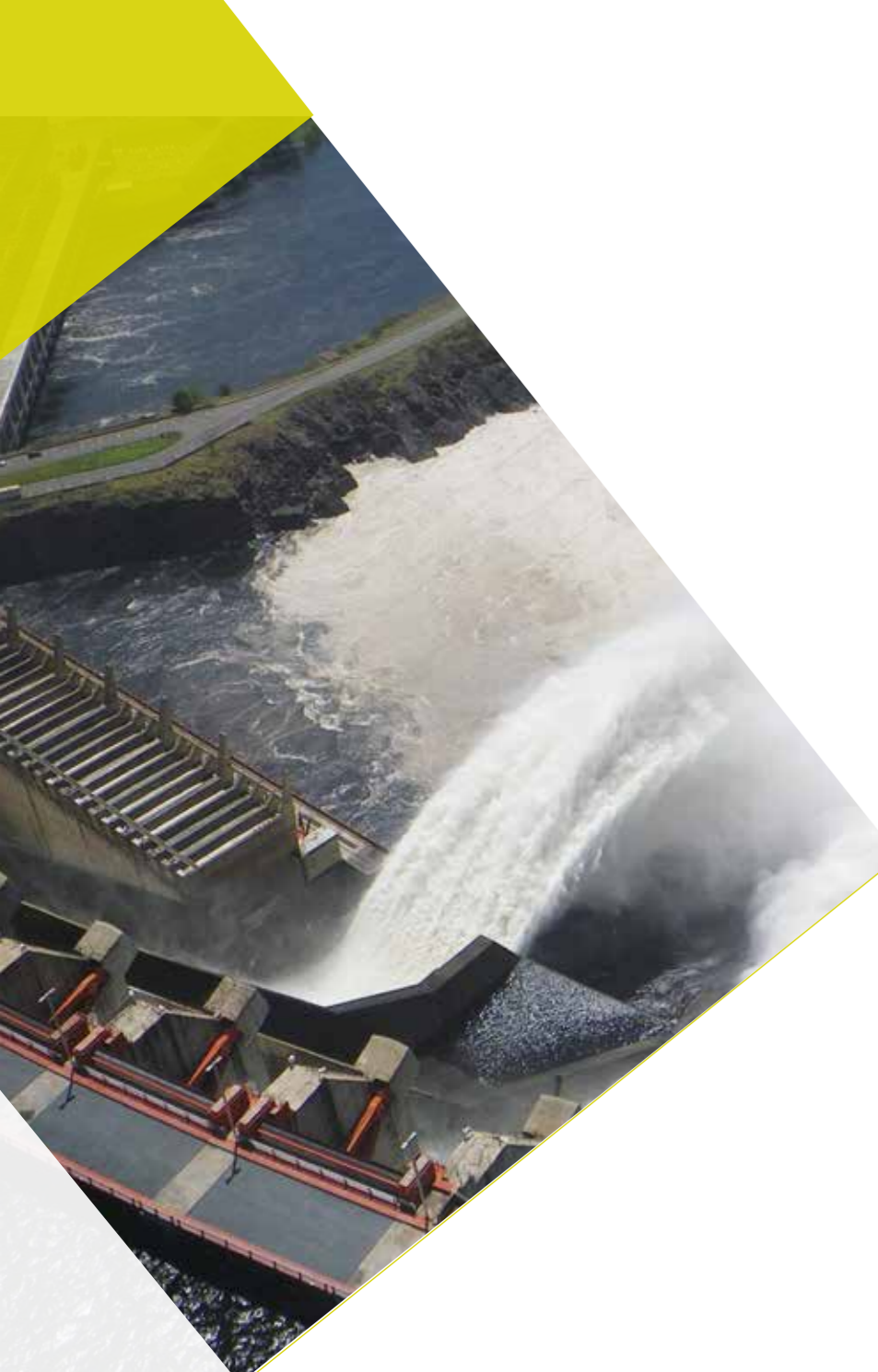
The report highlights the role of local and regional governments in molding these institutions and policies. Their closeness to the actors of the productive process and the families that benefit directly from public services, enables them to obtain information and capacity to generate agreements and consensus that can make the public decision making process more efficient, as well as strengthen the response of the private sectors involved. The deepening of the decentralization processes which has taken place in Latin America over the past twenty years, has widened the space of sub-national governments to structure this type of local and regional development strategies. In this regard, the cases of the territories and cities-region (for example Medellin in Colombia and Rafaela in Argentina) stand

outs, as they have been very successful in promoting the productive of their enterprises and industries, and the quality of life of their inhabitants. In general, this success has been more due to factors that are susceptible to control by the population and the authorities than to factors which are exogenous to the locality and region, such as climate, natural resources, closeness to navigable routes, among others. In particular, the efforts at a local level have been focused on improving the quality of labor (human capital accumulation), on attracting investments of enterprises and industries through the promotion of clusters and/or productive chains, and on strengthening the development of institutions and public policies which, in addition to providing economic and social infrastructure, also facilitate the exchange of ideas, the participation of citizens, and transparency in collective decision making.

The analysis of these experiences suggests that a successful local development strategy must be comprehensive; that is, must act on all the determinants while at the same time, focus from the territory. For this reason, sub-national governments play a key role in its design and management. This role goes beyond the formal powers regarding expenditures, taxes, and regulations established by the decentralization regime. In this regard, the management of local development involves, on the one hand, promoting a quantitative and qualitative diagnosis on the present and future potentials of a locality or region. This diagnosis must analyze the opportunities and threats that emerge from the national and international context. A second step is to take conscience of those opportunities and threats by public and private actors that act on the territory (including the higher levels of government). In the third place, the objectives, actions, and initiatives must be reached by consensus, and must be reflected in strategic medium and long term plans. Finally, the initiatives must be implemented and developed, and the results must be evaluated. As may be appreciated, all of this process to manage local development demands a strong leadership and interaction capacity between the different members of the community.

In summary, what makes a locality more or less competitive is the presence of a “soft institutionalism”, made up of citizen assemblies, neighborhood associations, entrepreneurial chambers, study centers, among others, which facilitate the interrelation between different interests and enables the expression of demands and liberation of information in addition to generating cooperation instances and generation of trust. At a local level, the possibility of generating this institutional fabric is favored by the physical closeness between the diverse actors. The existence of this insti-

tutional framework allows the public decision making process to be much more effective and that it may successfully respond to the threats and opportunities generated by technological change and the trends of the national and international economy. The reduction of the income gaps and other variables that affect the quality of life requires the provision of goods and services, both public and private, whose production technology implies the use of local inputs such as human capital and institutions that cannot be easily supplied from the central level of government. This explains the fundamental role played by territorial actors.



Investment and performance indicators

The challenge of estimating investment in infrastructure

How much are we investing? A pending assignment for decision making

Numerous studies show that a greater quality and coverage of infrastructure networks have a positive effect on economic growth and the reduction of economic and social inequality and poverty. Investment on basic infrastructure — which enables expanding coverage and the efficiency of associated services— has multiplier impacts on aggregate demand. It transmits its effects on consumption and investment, and persists in the long term, constituting a necessary condition for development. Infrastructure networks and their services constitute the backbone of the productive structure of countries and their markets. They are also an important instrument to increase the welfare of the population by making possible a greater economic and social cohesion, a better connectivity and articulation of the territory, and an effective spatial and regional integration.

National accounts present important limitations to obtain disaggregate data of investments in infrastructure at a sectorial level.³ The lack of a good information base makes decision making difficult, particularly in the public sector. Due to this difficulty, the works of diverse economists published in the first half of the 2000's were

3. Only the gross capital formation account in the national accounts provides information regarding infrastructure, but it is not disaggregated at the sectorial level desired in this report.

pioneers in studying the behaviors of investment in infrastructure in Latin America, analyzing mainly its impact on growth, development, and income distribution, making the best possible estimates.⁴ Simultaneously, this line of work started to be developed at ECLAC, trying to improve the quality of the estimates.⁵

With the purpose of contributing to address the challenges of infrastructure in the region in the best possible way, CAF agreed with ECLAC on a progressive work program, which consists in developing a data base on public and private investment in the countries of the region; the work started with 10 countries, estimating the investment figures for 2008, 2009, and 2010. For 2014, all countries are expected to be covered, advancing and complementing the existing estimates. To achieve this objective, the available information in the official data sources of the countries was compiled and systematized (starting by those which offered the greatest facility to obtain information) and interviews in the different ministries were carried out.

The methodological challenge of estimating public and private investment in infrastructure

The estimate of investment in infrastructure entails several challenges at a conceptual and methodological level. A first challenge is to define the sectors to be included in the survey. This report selected four sectors of the economic and social infrastructure of each country (excluding in the latter the infrastructure in health, education, and housing). Specifically, the sectors included are:

- **Energy:** generation, transmission, and distribution of electricity; transportation and distribution of natural gas.
- **Drinking water and sewage:** provision of drinking water and sanitation services (sewage system) by networks.
- **Telecommunications:** fixed telephony, cellular, satellite services, and connectivity to internet and multimedia services.
- **Transportation:** roads, mass urban transportation, railroad transportation (infrastructure and rolling stock), ports, and airports.

The adopted definition is focused on the infrastructures that provide services (especially those that are not tradable internationally). For this reason, the data should not be considered as the total public investment in each country. For example, it excludes the economic infrastructure made by private companies aimed at the production of oil and gas, and the refining and petrochemical sectors.

A second immediate challenge emerges from the need to combine the criteria to register expenditures and investments from the diverse national sources, which requires a detailed review of the financial information governmental systems and

4. Marianne Fay and Mary Morrison, and César Calderón and Luis Servén
5. Several works from Ricardo Sánchez, Patricio Rozas and Daniel Perrotti

budgetary classification, to ensure a minimum homogeneity of the surveyed data.⁶ The registry of private investment in infrastructure, which has increased in the past decades, constitutes a third challenge. The availability of information is limited, and in this first stage the scope has been partial. Except for the cases of Colombia and Mexico, the main source has been the data base of projects with private participation published by the World Bank and the PPIAF.⁷

A last and relevant challenge is the registry of infrastructure investment carried out with the resources of sub-national governments (state, provincial, municipal), which is significant in several countries and promoted by the advance of the administrative decentralization in many of them. In many cases these are programs partially financed by the national administrations, so the survey includes as a minimum the capital transfers carried out by central governments. There has been a partial advance in this stage, and it is expected that the complete results will be published in the IDeAL 2013.

In summary, this is a progressive process where a first step has been taken. Even though the achievements are incomplete (the information still does not cover all the countries and needs to be refined), the work is innovative due to the technical precision of its purpose and the scope that is sought.

The first results for 10 countries

The following graphs summarize the investment estimates for ten countries for this edition of the IDeAL; as mentioned before, this figures may undergo some adjustments in future reviews. The nations included concentrate more than 80% of investment in infrastructure in Latin America. The first two graphs present the estimates for all the countries jointly, for 2008, 2009, and 2010, discriminating by sector and public or private origin, in one case expressing the investment in current Dollars and in the other as a percentage of GDP. The two graphs show the investment by country, considering all the sectors jointly, including the same three years and discriminating private or public origin; one of them expresses values in current Dollars and the other as a percentage of GDP. *Annex 1* includes the tables with estimated values. An independent publication (CAF-ECLAC 2012) includes tables and graphs by sector, presents investments both in current Dollars as well as in values corrected

6. The official institutions that generate information on public investment in the countries under study have been identified. Among the institutions that were considered were the Ministries of Economy, Finance, and Treasury in each country. A main tool used were the Integrated Systems for Financial Administration in the countries that offered the access base to the public and the periodical publications generated by the consulted institutions. At the same time, interviews via telephone, e-mail, and face to face were carried out for the countries where the information was incomplete or attached.
7. *Private Participation in Infrastructure Database*, in <http://ppi.worldbank.org/>

by purchasing power, and details the sources consulted. A first reading of the results shows some interesting trends:

- Total investment has grown by 17% between 2008 and 2010 in current values; it fluctuates around 3% of GDP (does not include all the infrastructure items, could be larger).
- The sector with the highest share in investment is transportation (54%); its relevance is growing. It is followed by telecommunications (20%), energy (18%), and drinking water and sanitation (8%).
- Private participation represented half of the investment in 2008 and 2009, and reached 34% in 2010.
- In the three year period analyzed, private participation reached 8.5% in drinking water and sanitation, 20.7% in transportation, 65.8% in energy, and 93.4% in telecommunications.
- The sector that promotes public participation the most is transportation (more than 90% of public investment in 2010).

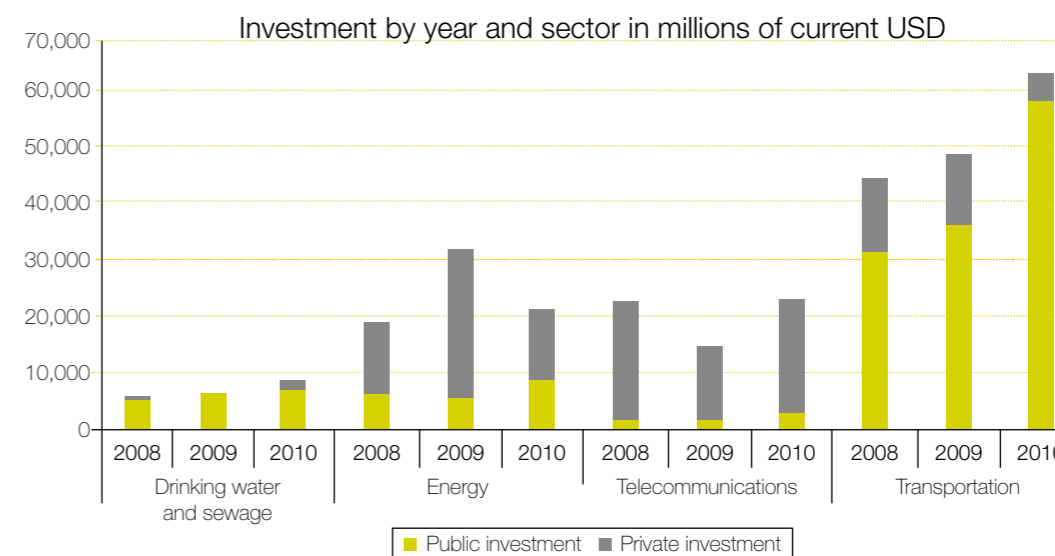
Some warnings regarding the values presented should be noted (which as stated above will be subject to refining):

- The survey reflects the public investment corresponding to the central level for the ten covered countries in a comprehensive manner. However, the data from the national administrations of Chile and Uruguay must be considered as preliminary (in the latter case it is possible that the computation of public enterprise investments may be still incomplete).
- In the case of public enterprises, investment was estimated as the variation of non-financial assets in the respective enterprises' balance sheets (for example in Uruguay for the energy and water sectors). This approximation could be underestimating the total volume, as it only considers the investments already carried out and not those that are being processed.
- Investments have been partially surveyed in the sub-national jurisdictions for only four countries (Argentina, Colombia, Guatemala, and Peru). The data includes transfers from the central governments to finance infrastructure investments of the state and municipal governments, but in general omit those carried out with their own resources.⁸ In the remaining cases, the information gathered is exclusively national. The underestimations of total investment could be relevant for the cases of Brazil and Mexico, but it will be definitively corrected in the next stages of the work.

8. For the case of Argentina, there was an estimate of the investment made with own resources by the provinces based on the available public information, http://www2.mecon.gov.ar/hacienda/dncfp/provincial/info_presupuestaria/gasto_FIN_FUN/fin_fun_total_serie_APNF.php

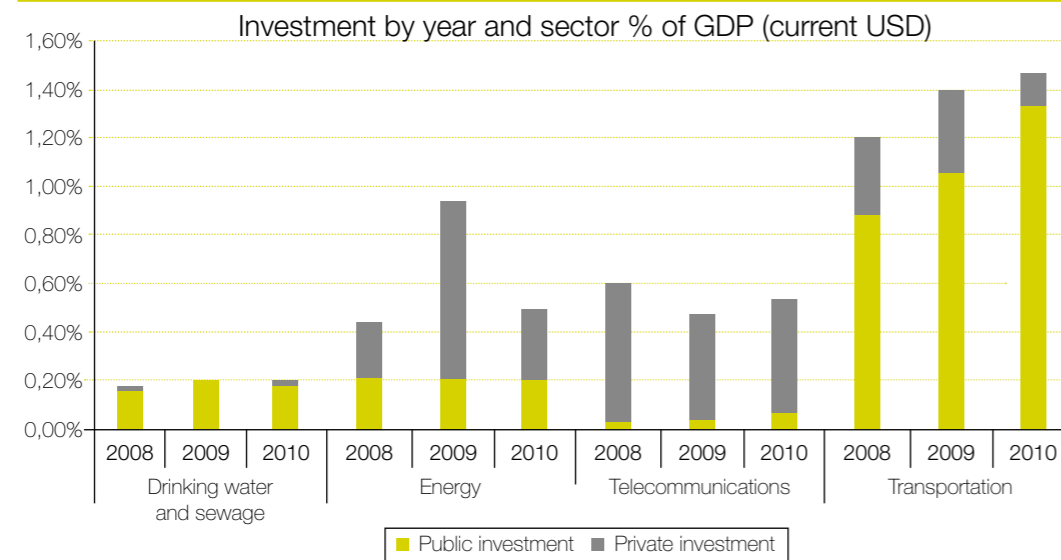
- With the exception of Colombia and Mexico, the data bases prepared by the PPIAF and the World Bank were used for the estimates of private investment. This base considers the transfer of public assets to the private sector as investment (even though it does not mean new infrastructure, which is the object of the intended estimate). This problem is very limited for the period under analysis (2008-2010) as the large privatizations in Latin America took place in the decade of the 1990's. In coming deliveries, the data base of the World Bank will be completed and corrected with information obtained in each country.
- Given the nature of Public Private Associations, it is likely that in some cases there might be double computations of investments in a given project. In fact, the portion financed by the governments will appear registered in the public investment and also as private investment when the PPA are completed accounted for in the World Bank base. The details to be obtained from the different projects will enable the clarification of these difficulties in coming publications.

Graph 4.1 Investment by year and sector. All countries (2008-2010)



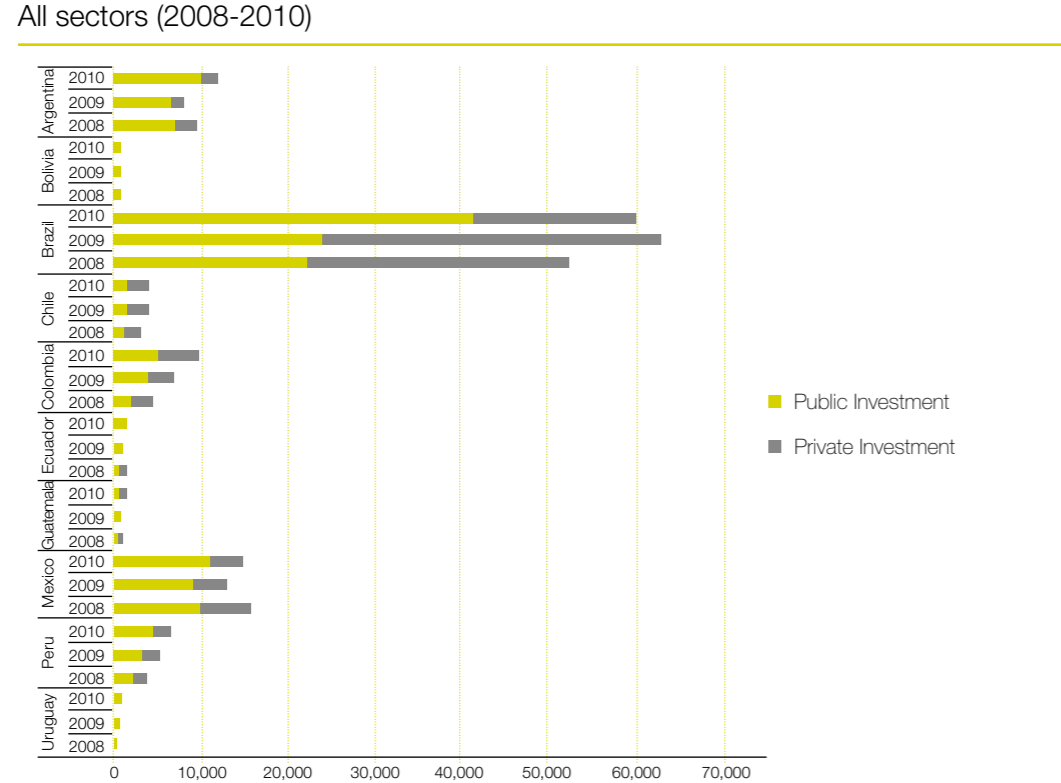
Source: own elaboration.

Graph 4.2 Investment by year and sector. All countries (% of GDP, 2008-2010)



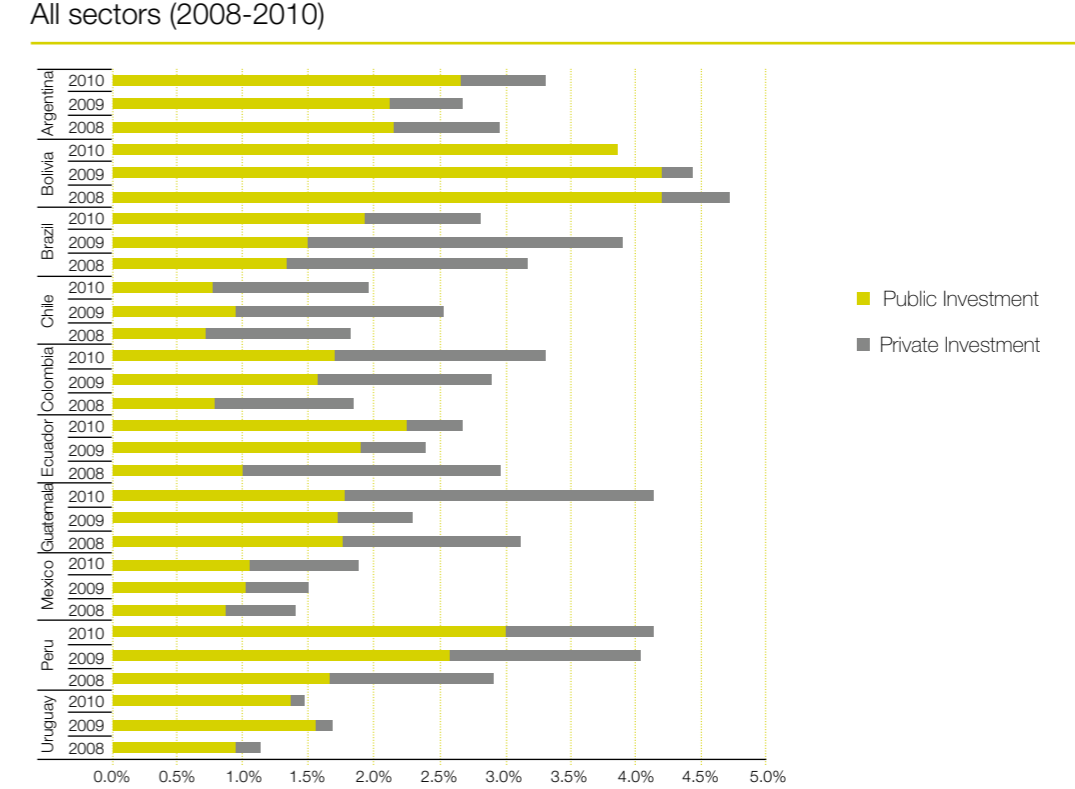
Source: own elaboration.

Graph 4.3 Investment in infrastructure by country in current Dollars. All sectors (2008-2010)



Source: own elaboration.

Graph 4.4 Investment in infrastructure by country in % of GDP. All sectors (2008-2010)



Source: own elaboration.

Indicators of comparative performance

Just as in the 2011 IDeAL, this version includes a synthesis of the most representative infrastructure indicators in Latin America in *Annex 2*, updating its values according to the availability of data. Three indicators have been added, regarding telecommunications (effective rates per minute in mobile telephony, digitalization index, and the HH competitiveness index in the fixed wide band market) and one referring to the management of water resources (water availability, measured in m³/per capita/year).

Annexes

Annex 1. Estimates of regional investment in infrastructure

<i>All sectors: millions of current USD</i>										
Country	Indicator	2008			2009			2010		
		Public	Private	Pub. and Pri.	Public	Private	Pub. and Pri.	Public	Private	Pub. and Pri.
Argentina	Investment in USD	7,094.5	2,628.8	9,723.2	6,571.3	1,669.5	8,240.8	9,842.0	2,051.2	11,893.2
	% of GDP	2.2%	0.8%	3.0%	2.1%	0.5%	2.7%	2.7%	0.6%	3.2%
Bolivia	Investment in USD	700.1	86.3	786.4	730.6	37.4	768.0	757.2	n.d.	757.2
	% of GDP	4.2%	0.5%	4.7%	4.2%	0.2%	4.4%	3.9%	n.d.	3.9%
Brazil	Investment in USD	22,122.1	30,403.8	52,525.9	23,982.5	38,977.2	62,959.7	41,258.0	19,070.1	60,328.1
	% of GDP	1.3%	1.8%	3.2%	1.5%	2.4%	3.9%	1.9%	0.9%	2.8%
Chile	Investment in USD	1,235.9	1,876.8	3,112.6	1,517.9	2,555.6	4,073.5	1,571.8	2,417.6	3,989.4
	% of GDP	0.7%	1.1%	1.8%	0.9%	1.6%	2.5%	0.8%	1.2%	2.0%
Colombia	Investment in USD	1,911.0	2,612.2	4,523.2	3,717.1	3,096.1	6,813.2	5,006.1	4,575.0	9,581.1
	% of GDP	0.8%	1.1%	1.9%	1.6%	1.3%	2.9%	1.7%	1.6%	3.3%
Ecuador	Investment in USD	548.3	1,062.1	1,610.4	987.5	259.1	1,246.6	1,319.7	238.6	1,558.3
	% of GDP	1.0%	2.0%	3.0%	1.9%	0.5%	2.4%	2.3%	0.4%	2.7%
Guatemala	Investment in USD	689.7	531.7	1,221.4	652.4	206.3	858.7	677.9	971.0	1,648.9
	% of GDP	1.8%	1.4%	3.1%	1.7%	0.5%	2.3%	1.8%	2.4%	4.1%
Mexico	Investment in USD	9,645.8	5,824.6	15,470.4	9,121.1	4,038.2	13,159.3	10,951.9	8,465.9	19,417.9
	% of GDP	0.9%	0.5%	1.4%	1.0%	0.5%	1.5%	1.1%	0.8%	1.9%
Peru	Investment in USD	2,157.3	1,609.6	3,766.9	3,339.9	1,910.7	5,250.6	4,736.7	1,756.8	6,493.5
	% of GDP	1.7%	1.2%	2.9%	2.6%	1.5%	4.0%	3.0%	1.1%	4.1%
Uruguay	Investment in USD	298.5	52.9	351.4	486.9	44.7	531.6	556.2	41.7	597.9
	% of GDP	1.0%	0.2%	1.1%	1.6%	0.1%	1.7%	1.4%	0.1%	1.5%
10 Countries	Investment in USD	46,403.2	46,688.7	93,091.9	51,107.2	52,794.9	103,902.1	76,677.4	39,587.9	116,265.3
	% of GDP	1.2%	1.2%	2.5%	1.5%	1.5%	3.0%	1.8%	0.9%	2.7%

<i>Transportation- millions of current USD</i>										
Country	Indicator	2008			2009			2010		
		Public	Private	Pub. and Pri.	Public	Private	Pub. and Pri.	Public	Private	Pub. and Pri.
Argentina	Investment in USD	3,218.5	331.0	3,549.5	3,319.0	5.9	3,324.9	4,435.8	n.d.	4,435.8
	% of GDP	1.0%	0.1%	1.1%	1.1%	0.0%	1.1%	1.2%	n.d.	1.2%
Bolivia	Investment in USD	514.5	n.d.	514.5	533.4	n.d.	533.4	599.0	n.d.	599.0
	% of GDP	3.1%	n.d.	3.1%	3.1%	n.d.	3.1%	3.0%	n.d.	3.0%
Brazil	Investment in USD	19,076.9	9,967.1	29,044.0	19,906.0	8,550.3	28,456.3	37,279.8	1,440.8	38,720.6
	% of GDP	1.2%	0.6%	1.8%	1.2%	0.5%	1.8%	1.7%	0.1%	1.8%
Chile	Investment in USD	1,144.0	260.1	1,404.1	1,430.5	290.0	1,720.5	1,306.3	823.0	2,129.3
	% of GDP	0.7%	0.2%	0.8%	0.9%	0.2%	1.1%	0.6%	0.4%	1.0%
Colombia	Investment in USD	1,235.9	619.8	1,855.7	2,901.2	1,183.2	4,084.4	3,882.4	1,497.4	5,379.8
	% of GDP	0.5%	0.3%	0.8%	1.2%	0.5%	1.7%	1.3%	0.5%	1.9%
Ecuador	Investment in USD	487.7	n.d.	487.7	872.4	n.d.	872.4	676.4	n.d.	676.4
	% of GDP	0.9%	n.d.	0.9%	1.7%	n.d.	1.7%	1.2%	n.d.	1.2%
Guatemala	Investment in USD	598.8	n.d.	598.8	548.4	n.d.	548.4	588.6	n.d.	588.6
	% of GDP	1.5%	n.d.	1.5%	1.5%	n.d.	1.5%	1.5%	n.d.	1.5%
Mexico	Investment in USD	4,169.2	1,614.5	5,783.7	4,440.2	1,146.7	5,586.9	5,591.7	1,200.2	6,791.9
	% of GDP	0.4%	0.1%	0.5%	0.5%	0.1%	0.6%	0.5%	0.1%	0.7%
Peru	Investment in USD	1,521.3	439.0	1,960.3	2,397.2	827.8	3,225.0	3,520.4	127.0	3,647.4
	% of GDP	1.2%	0.3%	1.5%	1.8%	0.6%	2.5%	2.2%	0.1%	2.3%
Uruguay	Investment in USD	139.3	n.d.	139.3	150.0	n.d.	150.0	192.7	n.d.	192.7
	% of GDP	0.4%	n.d.	0.4%	0.5%	n.d.	0.5%	0.5%	n.d.	0.5%
10 Countries	Investment in USD	32,106.1	13,231.5	45,337.6	36,498.1	12,003.9	48,502.0	58,073.0	5,088.4	63,161.4
	% of GDP	0.9%	0.4%	1.2%	1.1%	0.3%	1.4%	1.3%	0.1%	1.5%

Telecommunications: millions of current USD

Country	Indicator	2008			2009			2010		
		Public	Private	Pub. and Pri.	Public	Private	Pub. and Pri.	Public	Private	Pub. and Pri.
Argentina	Investment in USD	42.0	1,580.0	1,622.0	241.8	1,319.4	1,561.2	843.1	1,728.3	2,571.4
	% of GDP	0.0%	0.5%	0.5%	0.1%	0.4%	0.5%	0.2%	0.5%	0.7%
Bolivia	Investment in USD	49.0	66.3	115.3	36.2	37.4	73.6	8.8	-	8.8
	% of GDP	0.3%	0.4%	0.7%	0.2%	0.2%	0.4%	0.0%	0.0%	0.0%
Brazil	Investment in USD	588.1	10,828.2	11,416.3	477.2	7,135.6	7,612.8	599.5	9,068.1	9,667.6
	% of GDP	0.0%	0.7%	0.7%	0.0%	0.4%	0.5%	0.0%	0.4%	0.5%
Chile	Investment in USD	3.2	1,311.2	1,314.4	13.7	1,341.7	1,355.4	28.1	1,317.1	1,345.2
	% of GDP	0.0%	0.8%	0.8%	0.0%	0.8%	0.8%	0.0%	0.6%	0.7%
Colombia	Investment in USD	194.5	1,692.3	1,886.8	256.4	1,296.8	1,553.3	330.7	1,679.7	2,010.4
	% of GDP	0.1%	0.7%	0.8%	0.1%	0.6%	0.7%	0.1%	0.6%	0.7%
Ecuador	Investment in USD	-	1,062.1	1,062.1	2.6	259.1	261.7	16.5	238.6	255.1
	% of GDP	0.0%	2.0%	2.0%	0.0%	0.5%	0.5%	0.0%	0.4%	0.4%
Guatemala	Investment in USD	7.1	525.0	532.1	7.4	206.3	213.7	5.0	213.0	218.0
	% of GDP	0.0%	1.3%	1.4%	0.0%	0.5%	0.6%	0.0%	0.5%	0.5%
Mexico	Investment in USD	28.3	3,648.1	3,676.4	16.1	2,891.5	2,907.5	219.4	5,673.0	5,892.4
	% of GDP	0.0%	0.3%	0.3%	0.0%	0.3%	0.3%	0.0%	0.5%	0.6%
Peru	Investment in USD	3.5	842.4	845.9	21.8	683.8	705.6	20.5	641.9	662.4
	% of GDP	0.0%	0.7%	0.7%	0.0%	0.5%	0.5%	0.0%	0.4%	0.4%
Uruguay	Investment in USD	-	52.9	52.9	-	44.7	44.7	-	41.7	41.7
	% of GDP	0.0%	0.2%	0.2%	0.0%	0.1%	0.1%	0.0%	0.1%	0.1%
10 Countries	Investment in USD	915.7	21,608.5	22,524.2	1,073.3	15,216.3	16,289.6	2,071.6	20,601.4	22,672.9
	% of GDP	0.0%	0.6%	0.6%	0.0%	0.4%	0.5%	0.0%	0.5%	0.5%

Energy - millions of current USD

Country	Indicator	2008			2009			2010		
		Public	Private	Pub. and Pri.	Public	Private	Pub. and Pri.	Public	Private	Pub. and Pri.
Argentina	Investment in USD	2,985.5	717.8	3,703.3	2,008.2	344.3	2,352.5	3,327.6	322.9	3,650.5
	% of GDP	0.9%	0.2%	1.1%	0.7%	0.1%	0.8%	0.9%	0.1%	1.0%
Bolivia	Investment in USD	83.8	20.0	103.8	82.1	-	82.1	70.8	-	70.8
	% of GDP	0.5%	0.1%	0.6%	0.5%	0.0%	0.5%	0.4%	0.0%	0.4%
Brazil	Investment in USD	689.5	8,781.1	9,470.6	867.7	23,276.5	24,144.2	729.1	8,345.6	9,074.7
	% of GDP	0.0%	0.5%	0.6%	0.1%	1.4%	1.5%	0.0%	0.4%	0.4%
Chile	Investment in USD	n.d.	305.5	305.5	10.0	923.9	933.9	39.9	277.5	317.4
	% of GDP	n.d.	0.2%	0.2%	0.0%	0.6%	0.6%	0.0%	0.1%	0.2%
Colombia	Investment in USD	350.2	300.1	650.3	455.1	616.1	1,071.3	632.7	1,397.9	2,030.6
	% of GDP	0.1%	0.1%	0.3%	0.2%	0.3%	0.5%	0.2%	0.5%	0.7%
Ecuador	Investment in USD	11.5	n.d.	11.5	76.8	-	76.8	610.5	-	610.5
	% of GDP	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%	1.1%	0.0%	1.1%
Guatemala	Investment in USD	6.8	-	6.8	4.3	-	4.3	5.7	758.0	763.7
	% of GDP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.8%	1.9%
Mexico	Investment in USD	3,146.9	562.0	3,708.9	2,808.7	-	2,808.7	2,896.2	799.7	3,695.9
	% of GDP	0.3%	0.1%	0.3%	0.3%	0.0%	0.3%	0.3%	0.1%	0.4%
Peru	Investment in USD	189.6	328.2	517.8	228.3	399.1	627.4	306.1	868.1	1,174.2
	% of GDP	0.1%	0.3%	0.4%	0.2%	0.3%	0.5%	0.2%	0.6%	0.7%
Uruguay	Investment in USD	88.6	-	88.6	252.4	-	252.4	267.4	-	267.4
	% of GDP	0.3%	0.0%	0.3%	0.8%	0.0%	0.8%	0.7%	0.0%	0.7%
10 Countries	Investment in USD	7,552.4	11,014.6	18,567.0	6,793.8	25,559.8	32,353.6	8,886.0	12,769.7	21,655.7
	% of GDP	0.2%	0.3%	0.5%	0.2%	0.7%	0.9%	0.2%	0.3%	0.5%

Drinking water and sanitation - millions of current USD

Country	Indicator	2008			2009			2010		
		Public	Private	Pub. and Pri.	Public	Private	Pub. and Pri.	Public	Private	Pub. and Pri.
Argentina	Investment in USD	848.4	n.d.	848.4	1,002.2	n.d.	1,002.2	1,235.5	n.d.	1,235.5
	% of GDP	0.3%	n.d.	0.3%	0.3%	n.d.	0.3%	0.3%	n.d.	0.3%
Bolivia	Investment in USD	52.8	n.d.	52.8	78.9	n.d.	78.9	78.6	n.d.	78.6
	% of GDP	0.3%	n.d.	0.3%	0.5%	n.d.	0.5%	0.4%	n.d.	0.4%
Brazil	Investment in USD	1,767.6	827.4	2,595.0	2,731.7	14.8	2,746.5	2,649.7	215.6	2,865.3
	% of GDP	0.1%	0.1%	0.2%	0.2%	0.0%	0.2%	0.1%	0.0%	0.1%
Chile	Investment in USD	88.7	n.d.	88.7	63.7	n.d.	63.7	197.5	n.d.	197.5
	% of GDP	0.1%	n.d.	0.1%	0.0%	n.d.	0.0%	0.1%	n.d.	0.1%
Colombia	Investment in USD	130.5	n.d.	130.5	104.3	n.d.	104.3	160.3	n.d.	160.3
	% of GDP	0.1%	n.d.	0.1%	0.0%	n.d.	0.0%	0.1%	n.d.	0.1%
Ecuador	Investment in USD	49.1	n.d.	49.1	35.7	n.d.	35.7	16.4	n.d.	16.4
	% of GDP	0.1%	n.d.	0.1%	0.1%	n.d.	0.1%	0.0%	n.d.	0.0%
Guatemala	Investment in USD	77.0	6.7	83.7	92.4	n.d.	92.4	78.5	n.d.	78.5
	% of GDP	0.2%	0.0%	0.2%	0.2%	n.d.	0.2%	0.3%	n.d.	0.3%
Mexico	Investment in USD	2,301.4	n.d.	2,301.4	1,856.2	n.d.	1,856.2	2,244.6	793.0	3,037.6
	% of GDP	0.2%	n.d.	0.2%	0.2%	n.d.	0.2%	0.2%	0.1%	0.3%
Peru	Investment in USD	442.9	n.d.	442.9	692.5	n.d.	692.5	889.7	119.8	1,009.5
	% of GDP	0.3%	n.d.	0.3%	0.5%	n.d.	0.5%	0.6%	0.1%	0.6%
Uruguay	Investment in USD	70.7	n.d.	70.7	84.5	n.d.	84.5	96.1	n.d.	96.1
	% of GDP	0.2%	n.d.	0.2%	0.3%	n.d.	0.3%	0.2%	n.d.	0.2%
10 Countries	Investment in USD	5,829.0	834.1	6,663.1	6,742.0	14.8	6,756.8	7,646.8	1,128.4	8,775.2
	% of GDP	0.2%	0.0%	0.2%	0.2%	0.0%	0.2%	0.2%	0.0%	0.2%

Annex 2. Infrastructure indicators in Latin America

Country	Quality of port infrastructure (2011)	Connectivity index of maritime transportation (2011)	Paved road network over total network (%)	Deaths /100,000 Inhabitants (2008)	Energy consumption (highway transportation / total of the economy) (2009) (%)	Railroads Longitude (in kms) (2010)	Railroads (tons-km) (million) (2010)
Argentina	3.7	30.6	30.0	10.3	16.6	25,023.0	12,025.0
Bolivia	3.1	N/C	7.9	11.3	32.3	2,866.0	1,060.0
Brazil	2.7	34.6	5.5	18.6	24.0	29,817.0	267,700.0
Chile	5.2	22.8	22.5	10.6	20.9	5,352.0	4,032.0
Colombia	3.4	27.3	14.4	12.6	20.7	1,672.0	11,884.0
Costa Rica	2.3	10.7	26.0	7.9	29.9	278.0	79.9
Cuba	N/D	6.6	49.0	12.5	4.0	5,075.6	1,351.0
Dominican Republic	4.4	22.9	49.4	14.5	17.5	142.0	N/D
Ecuador	3.8	22.5	14.8	13.9	38.3	965.0	N/C
El Salvador	3.8	12.0	26.0	21.8	16.9	283.0	N/D
Guatemala	4.3	20.9	34.5	4.7	20.7	332.0	N/D
Honduras	5.1	9.4	20.4	13.7	23.0	75.0	N/D
Mexico	4.0	36.1	35.3	5.1	28.2	26,704.0	71,136.0
Nicaragua	2.7	8.4	11.6	9.2	16.7	N/C	N/C
Panama	6.4	N/C	42.0	12.7	18.1	76.6	N/D
Paraguay	3.4	0.0	50.8	13.8	26.6	36.0	N/D
Peru	3.5	21.2	13.9	12.3	29.4	2,020.0	900.5
Uruguay	5.1	24.4	10.0	4.4	22.9	2,993.0	284.0
Venezuela	2.5	20.0	33.6	22.6	26.5	806.0	81.0

Country	Passengers Transported Air Transportation (2010)	Cargo (millions of tons/ km Air Transportation (2011)	Vehicles / 1,000 Inhabitants (2007)	Fuel prices Super USDC / liter (2010)	Emissions of CO2 (millions of tons) Total transportation sector (2009)	Total electricity coverage (%) (2009)	Electricity consumption (KWh per capita) (2009)
Argentina	10,030.497	237.0	314	96	37.9	97.2	2,758.8
Bolivia	1,916.055	14.0	68	70	6.2	77.5	558.3
Brazil	77,254.946	1,029.0	209	158	147.0	98.3	2,206.2
Chile	10,233.736	1,422.0	174	138	20.5	98.5	3,283.0
Colombia	15,110.895	1,599.0	71	141	20.0	93.6	1,047.0
Costa Rica	862.484	16.1	166	114	4.4	99.3	1,812.5
Cuba	1,746.854	19.8	38	172	1.5	97	1,347.6
Dominican Republic	NC	2.5	128	123	5.2	95.9	1,358.2
Ecuador	4,461.304	133.0	57	53	14.4	92.2	1,115.4
El Salvador	2,150.109	17.5	54	92	2.6	86.4	845.1
Guatemala	506.400	2.6	98	95	6.0	80.5	548.1
Honduras	602.200	17.5	95	104	3.0	70.3	678.3
Mexico	13,607.685	317.0	276	81	147.3	97.0	1,942.8
Nicaragua	61.031	0.5	58	109	1.5	72.1	459.5
Panama	7,365.594	52.0	141	85	3.0	88.1	1,735.5
Paraguay	606.220	0.2	91	128	3.8	96.7	1,056.0
Peru	6,130.087	205.0	68	141	14.6	85.7	1,135.7
Uruguay	744.179	0.2	200	149	2.8	98.3	2,670.9
Venezuela	5,881.013	5.5	147	2	51.7	99	3,151.6

Country	Loss of electricity in distribution (billion KW/Hr (2009)	Installed capacity (millions of KW) (2009)	Exports of ICT goods (% of total goods exported) (2010)	Imports of ICT goods (% of total goods imported) (2010)	Expenditure in ICT (% of GDP) (2008)	Per capita expenditure in ICT (current Dollars) (2008)	Wide band internet subscribers / 100 inhabitants (2011)
Argentina	17.98	32.07	0.1	9.1	4.83	397.60	10.53
Bolivia	1.06	1.54	0.0	3.4	4.86	83.61	0.71
Brazil	79.80	106.21	1.0	9.5	5.28	433.25	8.56
Chile	6.40	15.52	0.4	8.2	5.11	515.22	11.65
Colombia	8.41	13.54	0.1	9.6	4.7	254.39	6.94
Costa Rica	0.99	2.49	19.9	17.7	6.17	404.86	8.68
Cuba	2.53	5.52	N/D	N/D	N/D	N/D	0.04
Dominican Republic	1.68	2.97	2.3	4.8	N/D	N/D	3.99
Ecuador	2.44	4.94	0.1	6.3	5.26	213.46	4.22
El Salvador	0.71	1.50	0.3	5.6	N/D	N/D	3.31
Guatemala	1.29	2.67	0.9	6.8	N/D	N/D	1.80
Honduras	1.48	1.70	0.1	6.3	8.60	156.78	0.03
Mexico	42.45	59.33	20.2	19.2	4.55	465.71	10.62
Nicaragua	0.72	1.10	0.1	4.8	N/D	N/D	1.79
Panama	0.91	1.82	9.6	9.6	5.47	371.43	7.92
Paraguay	3.13	8.82	0.1	27.0	N/D	N/D	0.96
Peru	2.69	7.98	0.1	7.4	3.43	153.55	3.49
Uruguay	1.13	2.52	0.1	6.4	4.30	415.24	13.47
Venezuela	33.62	24.85	0.0	7.6	3.53	396.81	0.87

Country	Internet users / 100 inhabitants (2011)	Fixed telephone lines / 100 inhabitants (2011)	Mobile telephone lines / 100 inhabitants (2011)	Mobile phone rates per minute (USD-1Q'12)	Digitalization index (2011)	Broadband market index (HH, 2011)
Argentina	47.70	24.87	134.92	0.14	35.36	1,348
Bolivia	30.00	8.72	82.80	--	18.92	5,860
Brazil	45.00	21.88	123.18	0.10	30.20	2,120
Chile	53.89	19.49	129.71	0.09	41.48	3,343
Colombia	40.40	15.19	98.45	0.05	34.02	2,015
Costa Rica	42.12	31.54	92.20	--	29.43	2,684
Cuba	23.23	10.60	11.69	--	--	--
Dominican Republic	35.50	10.38	87.22	--	26.22	6,513
Ecuador	31.40	15.07	104.55	0.06	25.88	3,866
El Salvador	17.69	15.25	125.85	--	25.94	3,492
Guatemala	11.73	11.02	140.38	--	20.64	--
Honduras	15.90	7.86	103.97	--	18.33	--
Mexico	36.15	17.15	82.38	0.06	33.69	4,076
Nicaragua	10.60	4.90	82.15	--	--	10,000
Panama	42.70	15.19	203.88	--	27.01	8,555
Paraguay	23.90	5.55	99.40	0.11	20.86	5,817
Peru	36.50	11.08	110.41	0.08	28.84	8,220
Uruguay	51.40	28.55	140.75	0.09	36.39	9,122
Venezuela	40.22	24.91	97.78	0.18	25.69	3,228

Country	Gas piping (km)	Improved sanitary installations (% of population with access) (2010)	Availability of drinking water (% of population with access) (2010)	Water availability (m ³ /per capita/ year) (2009)
Argentina	29,401	90	97	6,889.2
Bolivia	5,330	27	88	31,053.5
Brazil	13,514	79	98	28,036.7
Chile	3,064	96	96	52,135.7
Colombia	4,801	77	92	46,261.0
Costa Rica	N/C	95	97	24,483.8
Cuba	41	91	94	3,384.6
Dominican Republic	N/C	83	86	2,143.5
Ecuador	5	92	94	30,291.2
El Salvador	N/C	87	88	2,881.3
Guatemala	N/C	78	92	7,781.3
Honduras	N/C	77	87	12,876.6
Mexico	16,594	85	96	3,650.7
Nicaragua	N/C	52	85	33,221.1
Panama	N/C	69	93	42,577.8
Paraguay	N/C	71	86	14,822.1
Peru	1,526	71	85	56,179.1
Uruguay	226	100	100	17,638.6
Venezuela	5,347	91	93	25,451.0

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