

# Impact and Analysis of Civil Works in Order to Improve the Colombian Logistic Performance Index

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## Abstract

The main objective of this research focuses on showing the challenges that Colombia has in the field of infrastructure and civil works, as fundamental pillars associated with the logistic performance index. This specific analysis starts by showing the current state of the country, how it is located at the regional level (Latin America) and worldwide. This strategic analysis is focused on identifying how to take advantage of the different recommendations that are reflected in the national competitiveness report 2017 - 2018 issued by ANALDEX, not only to improve the future results of the logistic performance index, but also in order to improve the internal processes that the Colombian industry has; all this attempting to fulfil the markets' needs, to reduce travel times and operating costs, to promote a sustainable economic system at the business level within the global economic framework.

**Keywords:** Competitiveness, Logistics Performance Index, Civil works, Infrastructure, Investment.

## INTRODUCTION

When evaluating the logistic performance index of Colombia compared to the other countries of Latin America, it is clearly evident the low logistic performance according to the classification shown in 2017 by the National Association of Foreign Trade (ANALDEX in Spanish), occupying the 12th place out of 18 countries that compose the region. Multiple factors reflect that phenomenon, problems of efficiency and effectiveness in the customs, the difficulties to contract shipments at competitive prices, the lack of tracking and location of the goods, and of course the high deficiencies in the area of infrastructure and civil works; it is here where the country is farthest away from achieving improvements in internal processes in order to obtain higher profits and obtain higher levels of positioning in international markets. This is why the inclusion of improvements in all construction processes in Colombia must be supported and financed, so that this way Colombia can start competing with leading countries in the provision of services and in the elaboration of products [1-2][7].

It must be taken into account that logistics performance and infrastructure go hand in hand so in this way depending on their behavior can affect or can favor small, medium and large companies [6]. In turn, economic growth allows the level of general construction to be greater in order to have better transport networks and with this the internal competitiveness of the region can be improved, so that a sustainable economic style is generated for the interested industries [9]. For this year

the private competitiveness council presented the national competitiveness report 2017 - 2018, where it is possible to see the comparative at the level of civil works in all fields of Colombia with the rest of the Latin American region and how it is located in each of the items to be evaluated, whether road, port, railway or infrastructure in general in the country, also showing what is the behavior in terms of service quality. According to the report, if one want to improve the overall competitiveness of the nation it must be expanded the coverage of transport so that the set of variables that optimize the times and costs of the trips are smaller, making the supply chain faster from the moment when the supply or raw material is received until it is delivered to final consumers. On the other hand, the WEF (World Economic Forum) emphasizes the general infrastructure of the country where its position is 109 among 137 countries worldwide and suggests that in order to achieve improvements in this type of results, current conditions must be improved and the development of transport ways such as rail and road, in turn the quality of the service goes hand in hand to achieve what is being proposed [4].

In the future, the challenge is not only to improve current qualifications, but also to provide better services attempting to increase local competitiveness, describe the internal challenges to be faced and how these helps to improve the processes of the interested companies, in order to obtain an optimal economic system for national economic development.

## MATERIALS AND METHODS

To begin with, the projection of investment for infrastructure in civil works will be analyzed in the coming years, later the work areas that the infrastructure uses to improve the internal processes of the national industries in search of the improvement in the position of the index of logistics performance will be described, additionally, the description of local behavior in terms of infrastructure quality will be made, making a comparative with reference countries worldwide together with an analysis of investment in transport infrastructure for the improvement in civil constructions.

Finally, the National Competitiveness Report 2017 - 2018 provides certain recommendations for finding prompt solutions to what is currently lived, besides this will describe each of them and define what is the socioeconomic impact of these processes, not only to improve the state of the internal infrastructure but also to improve the industrial and commercial conditions of the country [4].

## RESULTS AND DISCUSSION

### Investment in infrastructure

Currently the local policy says that infrastructure is an economic projectile that must be supported so that key benefits for the industry can be obtained [3]. In this way, a sustainable economic system is created that meets all the requirements of the market in general. According to the DPN (Department of National Planning), see Table 1, the distribution of resources over time is illustrated, this investment will be made by the public sector and this contribution will be divided into primary sectors that help the development of sustainable economic systems.

### Presentation of work areas

To improve internal industrial processes and in turn create a self-sustainable economic system, the private competitiveness

council illustrates in Table 2 the different types of indicators that will help project the creation of such systems, but not before being realistic and accepting Colombia is not a pioneer in any of these analytical models and that from now on, projects must be created, executed and supervised that not only improve the rating given in the corresponding indicator, but also encourage the continuous improvement of the local business system, with the only goal of being more competitive worldwide. The World Economic Forum and the competitiveness index are responsible for evaluating processes periodically, they yield comparisons between regions and individual traceability. Finally, to improve the internal systems and the challenges that are arising for this new period, it is good to identify the best-positioned countries in the region and analyze what their success factors are, not only to adopt them locally, but to optimize them, in order to overcome pioneer countries in the implementation of these processes.

**Table 1:** Public investment in infrastructure Figures DNP vs. Ambitious scenario Total 2012 - 2020

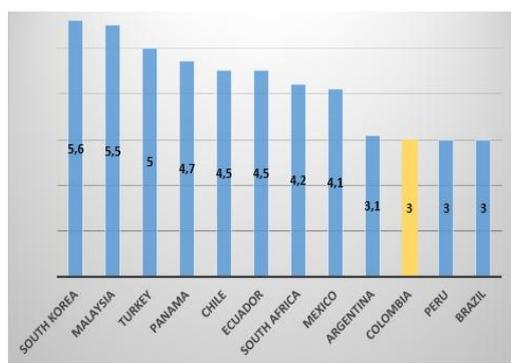
| Sector               | Public         | Private        | Total          |          |
|----------------------|----------------|----------------|----------------|----------|
|                      | \$ Millions    | \$ Millions    | \$ Millions    | Weighted |
| Housing              | \$ 17.471.098  | \$ 15.828.201  | \$ 33.299.299  | 12,6     |
| Public Investment    | \$ 9.872.992   | \$ 8.944.584   | \$ 18.817.576  | 7,1      |
| Urban Transportation | \$ 11.016.187  | \$ 3.000.000   | \$ 14.016.187  | 5,3      |
| Mines and Energy     | \$ 18.215.399  | \$ 31.683.387  | \$ 49.898.786  | 18,8     |
| Transport            | \$ 82.205.182  | \$ 66.602.968  | \$ 148.808.150 | 56,2     |
| Total                | \$ 138.780.858 | \$ 126.059.140 | \$ 264.839.998 | 100%     |
| % from GDP           | 1.7 %          | 1.6%           | 3.3%           |          |

**Table 2:** Profile of Colombia in terms of logistics performance

| Indicator                 | Col Colombia Value 2017 | Latin America Ranking | Best country in Latin America 2017 (Value) | Source |
|---------------------------|-------------------------|-----------------------|--|--------|
| Infrastructure in general | 3,11                    | 13 DE 17              | Chile (4,73)                               | WEF    |
| Road network              | 3,02                    | 14 DE 17              | Chile (5,21)                               | WEF    |
| Railway network           | 1,53                    | 7 DE 9                | Panamá (4,46)                              | WEF    |
| Port Infrastructure       | 3,84                    | 8 DE 17               | Panamá (6,17)                              | WEF    |
| Air Infrastructure        | 4,14                    | 9 DE 17               | Panamá (5,95)                              | WEF    |
| Road Density              | 0,16                    | 3 DE 6                | México (0,2)                               | IMD    |
| Quality of air transport  | 6,47                    | 2 DE 7                | Chile (7,67)                               | IMD    |

### Logistic Performance (Quality of infrastructure)

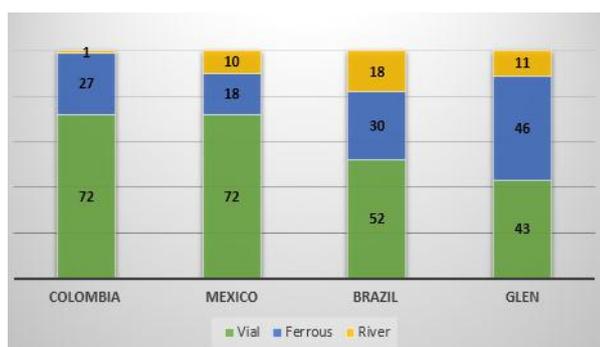
The infrastructure sector is very important for the rating given by the World Bank in the logistic performance index, specifically in the field of infrastructure quality. Currently, it can be seen clearly that Colombia does not have a relevant growth index in this aspect, instead it has a tendency to deteriorate in its results, this fact reflects the lack of implementation of policies associated with the search for innovation and improvement of competitiveness in this sector. Fig. 1 shows the location of Colombia with respect to some reference countries in terms of the concept of infrastructure quality, it can clearly be seen that despite the investments made by the state, no significant results or improvements have been observed in this aspect yet [4].



**Figure 1:** Quality of infrastructure Colombia and reference countries 2016 [4].

### Investment in infrastructure

The poor results in recent years in terms of infrastructure quality go hand in hand with the lack of multimodal transport throughout the national territory; at the local level, the dependence of land transport is very large, about 73% of national transport is used in this area. The problem is not the percentage, but the long travel times from one point to the other, while 25.5% is by rail [4]. What has been said above illustrates that the greatest investment in infrastructure is oriented towards road networks. While investment in roads has reached levels above 1% of GDP, on the other hand, investment in the development of other modes of transport, such as rail and river transport, has been minimal, see Fig. 2.



**Figure 2:** Internal load transported by different modes, percentage of cargo transported. Colombia and reference countries, 2014. [4].

### Analysis of Recommendations

#### 1. To design and implement a multimodal transport policy.

In order to improve the current state of transport at the national level, the need to implement a new transportation system is created, this time more inclined to the multimodal part so that it can be an additional alternative to what the country currently has. In the first instance, it must be known that Colombia has a master plan for intermodal transport that aims to integrate the entire national territory. Attempting to be able to significantly boost trade, reduce costs and adapt and improve the quality of networks, a new multimodal transport policy is needed. But how could it be implemented in a local system? By including the phases of the execution of the project, determining the specific needs in both physical and financial resources, investigating and controlling which are the factors that must be improved within the system so that this way legal support can be provided with the aim of implementing the new system in a short time [4].

In the background, reference is made to the improvement that must be performed in the contracting of third parties in a regulated manner, this in order to have a direct control of the primary needs of the processes and how the financial part thereof is managed. The new policy should incorporate the logistics mission and foreign trade to be pioneers in the processes of implementation and execution of projects in a strategic manner. These substantial improvements will make the Colombian industry obtain a series of benefits such as: the reduction of operation and transportation costs, the updating of information in the sector to generate continuous improvement with emphasis on its use, generating a lower environmental impact, increase the income of net profits of the interested companies and finally increase the regional progress of the places close to the industries.

#### 2. To continue with the modification of 4G roadway meshes throughout the national territory,

during the last years the country has had a notable advance in the construction of 4G roadway meshes, the Pan-American road and the Route of the Sun are the most outstanding in this appearance. In the future, Colombia has the challenge of increasing this type of executions attempting to improve road construction throughout the national territory in order to communicate more directly to all ports of reception of raw materials with the most important manufacturing centers in the country, in this reference is made to the center of the country and the region of Antioquia. One of the most important issues to receive this type of plans is financing, so that these can be done, previously the national bank covered about 50% of these executions and the rest was by banks and the government, if Colombia in a macro way to expand these road meshes in all its territory, the financing should increase considerably, that is why it should make a financial inclusion of the public and private sector of the country, since these will also benefit directly from the suggested adjustments [10].

But it is not just to seek investment, the success of these mega projects throughout the country is linked to a risk prevention system that allows to act before time against an eventuality presented. This is due to the fact that projects such as the Route

of the Sun had several delays at the time due to not having structured a system like the one that is being suggested; it is here where public participation helps that this type of events tend to diminish and the delivery time of them is the agreed one and they do not have to ask for one or more extensions to be able to deliver what was previously requested [8].

Finally, two factors will be mentioned that will allow the projection of these plans to have a better reception in the whole community. The first of them emphasizes the reduction of tax evasion, which will allow the financing to have more support at the moment in which it is required and the second one is the compensation to the communities close to the elaboration of these projects, better known as previous consultations. Taking into account all the existing society close to the areas of execution, allows to be careful of them and look for a common good in which both entrepreneurs and communities earn in a certain way.

**3. To continue with the modernization of airports and ports,** for Colombia the modernization of other means of transport is important since the income received will tend to increase in a future time. Currently, Colombia is working on the adaptation of 17 main airports aiming to expand coverage and solve some current problems that have to do with capacity, with this emphasis is placed on the physical capacity of the place. The incorporation of new technologies will provide a better service and provide better bases so that the profits that are thought to obtain are larger than those expected by the companies involved. In the modernization of said merchandise import and export centers, the human factor is important, which is why the expansion of coverage will allow a greater hiring of personnel so that an increase in the promotion of jobs is presented.

On the other hand, the ports that are the main receivers of merchandise and raw materials in the country are found. This is where, in many cases, the supply chain for a large number of companies associated with the use of this type of construction begins, that is why the expansion of the main receiving channels in the country must be prompt with the purpose of obtaining a greater ability to receive and send finished products, this is one of the most important challenges that the national government must have to be able to improve in future commercial events [5].

**4. To implement mechanisms to optimize traffic in the corridors of the country,** one of the problems that most afflicts the Colombian community in general is traffic, whether at the local, regional or national level. Currently in Colombia the implementation of new logistics management is becoming increasingly strong, currently in the entire national territory there are only 6 of these systems, being a totally insufficient amount against the internal needs of the country. Basically, these systems are in charge of finding out what the disadvantage factors are at the moment and starting from there, an anticipated solution to the presentation of these facts is sought [4].

At a general level, analytical solutions that take into account all the factors that influence this system are valid to be able to find

quick solutions to the problem that is being experienced, because if all the existing variables are taken into account, more effective alternative models can be created [11].

## CONCLUSIONS

In order for Colombia to improve in the future the ratings of the different performance indices, it should group all the sectors interested in seeking the necessary changes to be able to provide a better state in terms of infrastructure, investment and compensation of all the work carried out in the future. That is why the participation of sectors such as the public and the private sector is becoming increasingly strong in the planning and execution of projects aimed at improving the internal system of road networks and the different transport systems available at present. It is a priority that the country focuses on realizing a restructuring and modification of elements such as railroads and the optimal use (based on the planning and adequate investment) of maritime and fluvial transportation, seeking to take advantage of the geographical characteristic of this region, in such a way that all the sectors involved in these industrial and commercial activities benefit.

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