



Importance of the reactivation of the railway system in Colombia and the benefits for the country's foreign trade

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Summary

Globalization creates demanding markets, which makes each country implement new projects that help economic growth and are constantly improving their transport systems. This is necessary to improve their conditions against national and international markets. It is important to understand that if a country integrates its means of transportation, this allows it to optimize times and be more competitive. Multimodal transport has become a trend and having a rail system is very useful, since it helps to reduce costs and increase the quality of transport. This helps to directly promote imports and exports. The transport and logistics service is more relevant to trade than the same geographical location of the countries that are highly exporting, which are supported by an integrated system in their means of transporting cargo, such as in the United States, Russia, and China. In this study, qualitative research is carried out, in which the beginnings and decline in the history of the railway system in the country are observed, for cargo transport and how it has contributed to the economy.

Keywords: logistics, competitiveness, multimodal transport, foreign trade, rail.

Abstract

Globalization creates demanding markets, which forces every country to implement new projects that help economic growth and are constantly improving their transportation systems. This is necessary to improve their conditions against national and international markets. It is important to understand that if a country integrates its means of transportation, this allows it to be more efficient and more competitive. Multimodal transport has become a trend and having a rail system is very useful, since it helps to reduce costs and increase the quality of transportation. This helps to directly promote imports and exports. The transport and logistics service is more relevant to trade than the same geographical location of the countries that yield high exports, which rely on an integrated system in their means of transporting cargo, like the United States, Russia, and China. Using qualitative research, this study investigates the early history as well as the start of the decline of the railway system in the country, concerning freight transport and how it has contributed to the economy.

Keywords: logistics, competitiveness, multimodal transport, foreign trade, rail.

Introduction

This article aims to identify how the rail freight system has positively impacted Colombia and why it is not currently used with the same force as it was in past decades, and thus review evolution based on its origin. In Colombia, the railroad had its beginnings to transport coffee to the ports and then be exported. At some time, approximately in the 1960s, coffee was one of the most exported products in the country and went hand in hand with the use of rail, but this was not continuous since little by little the rail system was no longer a main means of transport, rather road transport was taking more and more strength. Competitiveness between countries goes hand in hand with effectiveness in logistics, Due to its geography, Colombia mainly uses the road transport system, which makes all operations more expensive and with a higher risk of accidents, accidents, and also limits the volume of cargo. Colombia is recognized in Latin America for having higher logistics costs. in transportation, which impacts the country's economy and its competitiveness. (ANI, 2019)

This is why this research aims to present a descriptive analysis of the railway system in Colombia and from there highlight aspects of the problems that this system is currently experiencing as it lost its momentum year after year. Also, it seeks to highlight those relevant impediments presented by the sector and finally consider some possible solutions for a contribution to Colombian competitiveness. The decision to start with this research was to show what role this sector plays in improving efficiency in Colombian logistics since improvement is always sought to intervene in globalization and how competitive Colombia is to trade with other countries.

Theoretical framework

Multimodal transport generates development for a country.

The author Pineda publishes for 2016 an article in which his main research object is to highlight several points about the importance of the reactivation of railways for the country, and how, in the future, this could help improve the country's competitiveness, also highlighting the reasons for the decline of this system, based on an investigation with a qualitative model as it analyzes the decline and evolution of the railway in Colombia and also shows the need for an implementation of resources to put this system back into operation showing significant benefits for the Colombian industry, thus improving the country's foreign trade. (Pineda Jaramillo JD, 2016)

In turn, the writer Pineda intends to identify with his thesis how to train transport to transport loads influences the development of the country and socioeconomic variables that also allow developing a reactivation model to support road transport for goods going for export or they are handled for import. (Pineda Jaramillo JD, 2013)

For the author Meisel, his research is based on the search for factors that support the reactivation of efficient rail cargo transport for Colombia, allowing the country to have a multimodal system, and that allows the country to increase its competitiveness in international markets, supporting itself in a descriptive investigation that allows analyzing the current state of the rail system in Colombia. (Valero Farfán, 2013) Meisel, Ramírez, and Jaramillo present a clear discussion analysis for the advances generated by the Government's effort to invest in the expansion of the railway system in Colombia, analyzing and describing



economic progress at annual rates in the period of the 1920s and 1950. (Meisel, Ramirez, & Jaramillo, 2014)

The author Luis Márquez carries out an investigation based on the literature because the subject of the railway is recurrent in many texts, this allows him to collect quite relevant information to deduce and highlight which are the subjects understudy to better compromise the future of cargo transportation by rail in Colombia. (Márquez, 2017)

1. State of the art

Colombia in 1961 opened the Atlantic rail network, this being a significant advance for the country, already at the beginning of the 20th century the Government, seeing the great cost of building more railroads and the high need for topographic research, decided to provide many more resources. To support the roads, which represented for the country not being able to use a multimodal system, this railway system gradually weakened, since of its 3,515 kilometers, only 12% is in operation today, which are just two networks railways: that of the Pacific and that of the Atlantic, administered by the National Infrastructure Agency (ANI), the two networks have been in the process of concessions for approximately 30 years, as several companies attempted to rehabilitate, conserve and operate the railways but poor management did not allow them to bear this responsibility.

For the country's exports through the Atlantic network, the products that benefit the most are coal and coffee. Currently, the Government and the ANI are promoting the reactivation of this system in search of the possibility that the train will regain strength in the country, an example is a coffee that can be transported by train between La Dorada, Caldas and the port of Santa Marta in the department of Magdalena about 288 Tons in a time of 22 hours, which is equivalent to 8 trips of tractors, to then be sent to international markets through the Caribbean Sea. There are great benefits for coffee growers in various departments such as Tolima, Antioquia, Cundinamarca, and the Coffee Axis, so they will be able to have lower costs and there will be greater connectivity to get to the port easier. (ANI, 2018)

Chemicals, corn, sugar, paper, and some raw materials are transported to the Pacific rail line. (ANI, 2018). The rail system has several advantages, some of which can be, the fact that it can transport more volume in a single route, minimize freight costs, there is also less ecological impact at the time of its operation, and the risk of accidents is much lower than the ground transportation. There are examples of developed countries such as the United States, Russia, and countries in Europe that significantly use their railways, connecting different modes of transport, transporting goods that go for circulation within the country, and also to be exported. Some of the reasons why Colombia has gradually stopped seeing the railroad system as an important transportation option is due to the lack of confidence because the country's industry is not used to using the railroad, Thinking about a low frequency in this service generates uncertainty since all operations are managed over time by level of service and the most significant is the failure that Colombia has in road infrastructure, the country has a great challenge there because it is characterized by having a slow transport due

to the poor quality on the roads, applying this railway network would need areas for loading and unloading the merchandise, building terminals, having appropriate routes, this implies that Colombia must seek how to be more competitive and achieve having more participation in the international economy. The solution is not to limit the construction of roads since not all products are going to be viable for rail transport, but to be able to integrate all transport systems and generate growth in the economy. Since all operations are managed over time by level of service and the most significant is the failure of Colombia in road infrastructure, the country has a great challenge there as it is characterized by having slow transport due to poor quality in Roads, applying this railway network would need zones for loading and unloading merchandise, building terminals, having appropriate routes, this implies that Colombia must seek to be more competitive and achieve greater participation in the international economy. The solution is not to limit the construction of roads since not all products are going to be viable for rail transport, but to be able to integrate all transport systems and generate growth in the economy. Since all operations are managed over time by level of service and the most significant is the failure of Colombia in road infrastructure, the country has a great challenge there as it is characterized by having slow transport due to poor quality in Roads, applying this railway network would need zones for loading and unloading merchandise, building terminals, having appropriate routes, this implies that Colombia must seek to be more competitive and achieve greater participation in the international economy. The solution is not to limit the construction of roads since not all products are going to be viable for rail transport, but to be able to integrate all transport systems and generate growth in the economy.

1. Methodology

The methodology of this research is qualitative, which helped the collection of information to explain the concepts and determine the state of the railway system in Colombia and how the reactivation of this can help in the growth of the country. According to (Cresswell, 2014) "Research today requires multidisciplinary work ... reinforces the need to use multimodal designs." (Hernandez, Fernandez, & Baptista, 2014) The state of the railways is described, pointing out some events in the history of the railway and as little, by little, it ceased to be the main means of transportation, the objective is to highlight the benefits of a multimodal system for the country's economy. He wants to explain the positive impact that the reactivation of this system would have.

During the 19th century, the use of steam would help improve the quality of life of the population, after the industrial revolution, the locomotive was developed allowing the transport of previously impossible cargo volumes, facilitating the local and international approach of the countries, Colombia was not Immune to all this revolution since, in 1835, approximately 10 years after the commercial line of England was officially established, in Colombia a law was issued for the first time that spoke of granting railway concessions to cantons that are territorial entities that subdivide a municipality or a department, in this case



of Panama and Portobello and thus begin with the development of a railway that would link the Atlantic and Pacific oceans. For the year 1852, the first section was built to put the railway in Colombia into operation, materializing a firm illusion of progress, and visualizing itself as a modern and prosperous nation, the main origin for the use of the railway in Colombia was to go from the capitals of the most important cities to the Magdalena river since it was a base river for navigation and already for the Pacific it was sought to unite cities such as Popayán or Cali towards the port of Buenaventura, and then all those main ports because it was a base river for navigation and already for the Pacific, it was sought to unite cities like Popayán or Cali towards the port of Buenaventura, and then all those main ports because it was a base river for navigation and already for the Pacific it was sought to unite cities like Popayán or Cali towards the port of Buenaventura, and then all those main ports like Cartagena, Santa Marta, Barranquilla, they even had railroads to link these ports with the Magdalena River. Then several railroad construction began in Cundinamarca, (Ferrocarril de la Sabana) and also in Antioquia so that Medellín could have a connection to the waterways. Several cities undertook the construction of their routes, seeking to get out of isolation due to the difficult geography of the country, to improve communication with the rest of the country. The railroad was born in an era where there were neither planes nor cars for transportation, long afterward the roads practically became independent and formed their independent network of the railroad and became, so to speak, the enemies of the railroad, As the car transport companies looking for the roads, the railway began to decline and there was no one to coordinate these two types of transport since each one has a specialty for cargo, Colombia left its important cities in the interior of the country creating a great challenge how to approach those centers such as Bogotá, which is 1,000 km from the sea, Colombia with a network of railways - ports - production centers, it would be necessary to find that the railroad reaches the ports and there is an exchange because the railroad is really 7 times cheaper than road transport, the railway track is narrower than the road track, and as it is guided it has the advantage that it does not need additional areas of mobility. A train can carry what would take 100 trucks of 6 axles, it saves time and fuel. In the 1920s, the railroad was unrivaled, since its contribution to the economy was very significant, some roads had begun to be built, but by 1929 the volume of passengers and cargo transported by the railroad was considerable. Started construction like the Line tunnel, more or less in 4 years, 17 million pesos, compared to 25 million, compensation from Panama. There were many projects to unify the disconnected sections or extend others. As the case of the Pacific railroad extending from Popayán to Pasto, but a year later in 1930 the economic crisis changed the world recession, and Colombia changed, and those hopes of the progress of the railroad were affected. They moved to the railroad, and turning to the importance of the railway system at that time, providing the most important means of transport for cargo and people, the vehicles were taking away that role and little by little they were taking over the transport market and Thus, they offered a service that lowered costs and gave greater access to users. For the railway system, the administration issue was not adequate, there was a certain condescension in some contractors, which led to the arrival of external investors and thus financed projects, but this caused the segments that were being built to increase costs enormously, after these bad processes the Government decides to create in 1954 the company Ferrocarriles Nacionales de Colombia (FCN, and thus be able to count on a single entity to administer Central, Magdalena, Santander, and Pacific roads, which were formed by the unification of the state-

owned railways, also the departmental railways and private railroads that had been nationalized. This company was until 1991 because it began to have financial problems and the decision was made to liquidate it, in that same year the conformation began to create a company that owned this infrastructure, which would become the Colombian Company of Railways – FERROVIAS, with the function of managing much better and restoring what remained of the National Railways, an end that was not fulfilled as expected. These economic losses left by bad administrations,

4. Results and Findings

The level of development of a country could be measured in the way it mobilizes its mobilization load since this speaks first of its productive capacity, it also allows evaluating its logistics processes and positioning it in the competitiveness index.

Graph 1: Movement of national cargo by mode of transport.

AÑO	TERRESTRE	FERROVIARIO			FLUVIAL	AÉREO	CABOTAJE	TOTAL
		Concesiones (sin incluir carbón)	Carbón	Total				
2002	84.019	ND	31.032	31.032	3.480	122	532	119.185
2003	99.782	37	42.744	42.781	3.725	132	928	147.348
2004	117.597	317	45.865	46.182	4.211	129	588	168.707
2005	139.646	308	48.919	49.227	4.863	135	400	194.271
2006	155.196	314	49.394	49.708	4.025	138	509	209.576
2007	183.126	375	52.829	53.204	4.563	137	454	241.484
2008	169.714	236	58.236	58.472	4.953	123	372	233.634
2009	173.558	254	59.144	59.398	4.070	109	364	237.499
2010	181.021	366	66.659	67.025	3.691	119	353	252.209
2011	191.701	204	74.350	74.554	3.650	124	646	270.029
2012	199.369	20	76.780	76.800	3.474	127	388	280.158
2013	220.309	97	76.684	76.781	2.968	149	774	300.980
2014	232.480	174	42.733	42.907	2.858	163	601	279.009
2015	235.112	230	47.705	47.935	3.524	179	969	287.719
2016	234.451	643,1	54.650	55.293	3.938	185	1.786	295.653
2017	233.964	15,9	50.419	50.435	5.200	177	3.563	293.339
2018	243.171	23,1	47.533	47.556	5.039	176,7	4.352	300.296

Source: Superintendencia of Transport, National Infrastructure Agency (ANI) Pacific Rail Network. 2019.

In the previous graph, it is evident that in 2018 the transport of total cargo of goods was 300,296,000 tons, of which 243,171.00 tons were transported by land, and only 47,556,000 tons were utilizing active railways highlighting that it is practical to transport only coal, and the remaining 9,567.7 tons represent the transport of river, cabotage, and air cargo. In the last 10 years, a growth of more than 200% has been seen about the increase in cargo by land (highway), clearly standing out as the main means of moving goods in Colombia.

And another big problem is the transit times as a consequence of the deficiencies in the road infrastructure, and not least those restrictions for vehicles that want to circulate at night. In summary, that survey highlighted that the biggest problem for competitiveness in the country's international business is internal land freight. And if this problem is investigated a little, these freights are affected by the lack of road infrastructure, although there is an alternative to improve this aspect and they can have road concessions and PPPs (Public-Private Associations) these companies are considered very important because They are considered a mechanism that seeks to achieve the competitiveness that the country requires. The country has structured several public-private concessions, (DNP DN, 2020)

There is a logistical backwardness in the country, the cost of freight for national cargo exceeds the average of the countries in Latin America. Many times it is more expensive to transport national cargo than international freight. It is very important that as the Government promotes the growth of the country so that the market expands to new countries, exports are boosted. They should also bear in mind that companies need guarantees that allow them to have tools to solve these international operations without being so affected by competitiveness.

Chart 2: Current state of the railway network in Colombia

Red férrea inactiva a cargo de INVÍAS	km	Red férrea concesionada a cargo de la ANI	km
Facatativá - Neiva	310	Red Férrea del Pacífico	
Espinal - Picalaena	47	Buenaventura - Cali	174
Facatativá - La Dorada	162	Cali - Cartago	173
La Dorada - Buenos Aires	177	Cartago - La Felisa	111
Soacha - Alicachín	7	Zarzal - Tebaida	40
Zipaquirá - Lenguazaque	57	Subtotal red del Pacífico	498
Lenguazaque - Barbosa	117	Red Férrea del Atlántico	
Puerto Wilchez - Bucaramanga	118	Chiriguana - La Loma - Cienaga	207
Cartago - Manizales	111	Cienaga - Santa Marta	38
La Tebaida - Pereira	74	Subtotal red del Atlántico	245
Cali - Popayán	159	Total	743
La Felisa - Alejandro López	47		
Alejandro López - Envigado	136	Tramos por concesionar (administrados por la ANI)	km
Cabañas - Envigado	167	Bogota - Belencito	257
Total	1.689	La Caro - Zipaquirá	19
		Facatativá - Bogotá	40
Red férrea privada	km	Bogotá - Soacha	18
Cerrejón	150	La Dorada - Chiriguana	522
Paz de Rio	39	Grecia - Cabañas	34
Total	189	Ramal Capulco	4
		Total	894
		Total red a cargo de la ANI	1.637
Total red férrea nacional	3.515		

Source: National Highways Institute - INVÍAS, National Concessions Institute - INCO, Civil Aeronautics, and Ministry of Transport, (2018)



When speaking of international competitiveness, Colombia is in the process of improvement, when compared to developed countries such as the United States, which relies on its multimodal networks to be more efficient in its logistics operations, in keeping with its delivery promises. The country is indeed implementing projects in the reactivation of sections, it has working railroads in Boyacá, Caldas, Antioquia, Santander, Cesar, Cundinamarca, and Magdalena. Currently, the National Infrastructure Association (ANI) manages 4 routes totaling 1,619 kilometers of stretches of which 1,121 km are in operation. As for the concession of the section from Santa Marta to Chiriguaná, it is in charge of Ferrocarriles Del Norte de Colombia (FENOCO) with a length of 245 km, allowing the largest amount of Coal in the country to be exported. For the section from Bogotá (Cundinamarca) to Belencito (Boyacá), the route is 318 km and allows the transport of inhabitants of the area, the loading operation that starts from Bogotá to Sogamoso is already beginning to carry additional cement in the corridor from La Dorada, Caldas to Chiriguaná, Cesar, the 521 km extension allow connecting the center of the country with the ports of the Atlantic Coast. Multimodal transport has also been supported by the Port of Capulco located on the Magdalena River, which connects the ports with the port of Barranquilla, and Santa Marta. (Mintransporte, 2019). The loading operation that starts from Bogotá to Sogamoso is already starting to carry additional cement in the La Dorada corridor, Caldas to Chiriguaná, Cesar, the 521 km extension allows connecting the center of the country with the ports of the Atlantic Coast. Multimodal transport has also been supported by the Port of Capulco located on the Magdalena River, which connects the ports with the port of Barranquilla, and Santa Marta. (Mintransporte, 2019). The loading operation that starts from Bogotá to Sogamoso is already beginning to carry additional cement in the La Dorada corridor, Caldas to Chiriguaná, Cesar, the 521 km extension allows connecting the center of the country with the ports of the Atlantic Coast. Multimodal transport has also been supported by the Port of Capulco located on the Magdalena River, which connects the ports with the port of Barranquilla, and Santa Marta. (Mintransporte, 2019).

In Colombia, land transport is the most representative, trucks and tractors are the ones that transport cargo the most, followed by rail transport, but it is due to the large volume it transports (mainly coal), and lastly, river, air, and cabotage transport. In the Government of President Juan Manuel Santos as an initiative to strengthen progress in the country's road infrastructure, airports, ports and railways, and seeking to make them sustainable in the long term, he bet on designing the Intermodal Master Plan (PMTI) that establishes that he will intervene on five routes in the next two decades to make this type of transport again the protagonist. In total, more than 1,769 kilometers would be operated by Pmti. \$ 208 billion, by 2035, is required for the Intermodal Transportation Master Plan - PMTI (ANI, 2015)

Chart 3: Investment necessary to intervene with PMTI projects in Colombia

Intervención red vial 19.500 km	\$182 Billones
Construcción aeropuertos 31 Aeropuertos	\$16 Billones
Rehabilitación red férrea 1.800 km	\$10 Millones

Source: PMI Report, Intermodal Transportation Master Plan, ANI National Infrastructure Agency.

It is expected that for the decade of (2015-2025), development will be achieved for three railway projects, a track for the Pacific train that would be 410 kilometers and an investment of approximately 2.7 billion. There is another project and it is the Bogotá-Belencito project that would have 257 kilometers of \$ 700,000 million to develop, and Dorada-Chiriguaná would be 522 kilometers with a budget of \$ 700,000 million. For the period (2025-2035), the idea of this important project is to have 580 kilometers, for the Carare railway line 420 kilometers with an investment of \$ 5 billion, and the remaining 160 kilometers for length and an investment of \$ 1 billion for the train from San Juan del Cesar and Puerto Dibulla. (Guzmán Pinilla, 2016)

1. Conclusions

When developing this work, relevant information was collected about the history of the railway system in Colombia, its impact from the beginning to the present, as was the decline of this means of transport after being the most important in the country. Currently, only the Chiriguana-Santa Marta section is in service, being under concession in the Atlantic network sector, and the private railroads of Cerrejón and Paz de Río. This article recognizes the importance of Public-Private Associations (PPPs) as a key instrument for considering attracting new investments to rail freight transport. This is why Colombia has allowed taking into account, in terms of legislation, support for PPPs, so that projections in the railway sector can be carried out. Among the main points to support these projects is the rehabilitation of the corridors through administrative contracts, in addition to evaluating those private initiative projects by PPPs that may be for different purposes, the Government must develop plans for these activities, analyze the policies that exist and how to reinforce them so that plans for logistics improvement for Colombia can be carried out. Evaluate those investments that contribute to these ideals, since to start the execution of said plans it is evident that there are funds that make this possible and could be one of the main shortcomings of the State. Issues such as the profitability and financial situation of public and private entities, It is then the Government the main person in charge to name which of all the projects that are proposed are viable based on the studies that are carried out depending on how much demand falls on this means of transport. It is important to highlight that Colombian logistics has many drawbacks that leave us behind, compared to logistics in other countries, much remains to be done in this area, to increase exports and thus be able to promote the growth of national GDP. One of the realities of the country is that companies assume very high logistics costs to cover operations when they export, and in their final prices they must include almost 15% for all the logistics costs that are generated, this is a risk to compete in the outside market. Also, there is an evident backwardness in the road, rail infrastructure, maritime and fluvial, is that there is no comprehensive relationship for developments in the total coverage of the Colombian territory, which is why it is very important those initiatives that seek to strengthen other types of transport such as rail and river, a key example This is why large loads could be handled by the Magdalena River, and how the trains would give connectivity since the productive apparatus is located in the center of the country while other more competitive countries have them closer to their ports. It is necessary that the Government increase investments destined to the country's infrastructure, not only for the railway system, but also for the river system, we know that the Government has sought for Colombia to expand its market and stand out internationally, but it must also make government changes and initiatives to have a stronger market, is that entrepreneurs need to be motivated, for example, small producers could take advantage of economies of scale, and give importance to those products to export such as coffee, corn, sugar, bananas, and flowers. Entrepreneurs need to see the reactivation of the railway as a great option to improve logistics costs, and not cling so much to ground transportation that, although it is very expensive, it is the only possibility at the moment for the transport of cargo for long stretches in the country. and give importance to those products for export such as coffee, corn, sugar, bananas, and flowers. Entrepreneurs need to see the reactivation of the railway as a great option to improve logistics costs, and



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