

Transport Logistics Analysis of Amazon Application

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Abstract

The current marketing system faces one of the major challenges of finding strategies for safer logistics, both in quality and practicality to the competitive process that can be applied in the market. Transport infrastructure plays a significant role in the logistics process, as it impacts transport costs, bringing limits to the economic and social development of the region. In terms of transportation logistics in the Amazon, there are still obstacles where companies are constantly seeking to divert or solve such difficulties, since the state has geographical specificities, where its extensive rivers make the flow of production more difficult, so in this way, it is essential to understand how public waterway transportation policies contribute to the logistical bottlenecks of Amazonas. The state of Amazonas maintains about 600 km of state roads, however precariously, making traffic slow, and with the lack of BRs, the state is also penalized. Manaus has BR 174 and BR 210 that connects the municipality to Boa Vista, and BR 319 that connects Amazonas with the rest of the country is not completed and there is no concrete deadline for its completion, given the many difficulties and flaws faced in that region. Regarding transport logistics in the most exclusive North Region in Amazonas, one particularity stands out: the lack of integrated planning for infrastructure that can bring positive results, both social and economic.

Keywords: Transportation infrastructure; Economic and social development; Road transport.

1. Introduction

Logistics and transportation infrastructure are key factors in the socioeconomic performance of a region, and Amazonas, with a diversified conjuncture in terms of road transport, is deplorable that this is not in

accordance with the economic potential of the region and its vast range. importance. The scenario of Brazilian highways is precarious, especially in the Northern Region, paved highways are good indicators that show the limitations that the region faces, compromising the cargo transportation of companies operating in the State, especially in the rainy periods. It is precarious not only in the Amazon, but in the various states of the region, since we have the Transamazônica as a mirror, which should be the Brazilian miracle when in reality it is the nightmare of the various producers who depend on this road for their production flow. And in this extensive area of Amazonas, transport logistics faces major challenges and obstacles to be operationalized and to contribute to the achievement of the objectives of the organizations that operate in it. Transport Logistics in the Amazon are challenges and limitations for the development of the state, and, in the present times, it has assumed a vital role because it has emerged as a differential and strategies tool for companies and to guarantee advantages in their spawning and disposal. products.

Therefore, this paper aims to conduct a research on transport logistics of the Amazon, analyzing its contribution to the logistics process in the state. In this sense, we sought to analyze studies and publications in various forms and modes of transport of the Amazon. According to the results obtained, it can be verified that the concentration of investments in the road mode does not alleviate the problems of flow of the riverside production. The waterway infrastructure is still precarious and needs investments to meet the economic and social development of the region.

Given the reality, both national and state and local, it is evident the importance of having studies such as the one proposed here, in which the cargo transport infrastructure is analyzed. The results obtained seek a better understanding of the context in which the investments are applied, and contribute to overcome the inherent impasses to the economic and social development of the state of Amazonas.

2. Theoretical References

Transport logistics is used by private and public organizations, such as manufacturing, transportation, food, Armed Forces, postal services, oil distribution and others. It is essential that the logistics planning activities are aligned with the manufacturing and marketing functions, so that the company can be effective in delivering and meeting the requirements established by the contractor. In addition, the main factor of logistics is to make goods and services available to the 20 consumers at the moment they are looking for them. (BRAZ, 2004; FERRAES NETO & KUEHNE JR, 2002).

Globalization has widened the distances between factories and consumer centers, as a company not only serves the local market, but also the national and international markets. Therefore, the management of institutional logistics systems uses different modes of transportation so that the distribution of their products reaches their final destination.

2.1 The various forms of transport

The ways in which products are distributed depend on a number of factors, especially in a region such as ours where roads are poor or nonexistent, enforcement on some stretches is not effective and transport is often neglected. The ways in which the various modes of transport relate, whether by force or idea, must be respected depending on the needs and characteristics of the Region, the services are used in a joint action,

which are:

2.1.1 Unimodal

One of the simplest and most well-known forms of logistics is unimodal, i.e. when cargo is transported directly using only one vehicle and only one mode of transport. In this case, there is a transport contract;

2.1.2 Combined or Successive

Uses another vehicle to transport its cargo on a given route, such as the carriage of a road semi-trailer by ship or barge. This type of transport contributes to the optimization in each step of the transport process, from the point of origin, with the collection, until the distribution of the products (BARAT, 2007);

2.1.3 Intermodal or Segmented

Occurs through the transfer of cargo to another mode, without being responsible for the goods. This type of service is used when there are situations of routes that do not include the use of a single mode of transport (FRANCO; KITZBERGER & OLIVEIRA, 2008);

2.1.4 Multimodal

Goods are transported by two or more modes; in which case it involves the integration of responsibilities of the multimodal transport operator from origin to final destination. In this type of service, it is clear to the shipper the entire path that his cargo has traveled (NOVAES, 2007).

2.3 Modalities of Transport

Transport is a point of connection of a logistics chain, implying the search for efficiency of integration between two or more modes, and it must be coordinated and managed as a system in routes or corridors, implying the removal of any physical, operational obstacles. or institutional (BARAT, 2007). In addition, each mode of transport has its own peculiarities and specific mode of transportation: such as Road, Rail, Waterway, Air and Waterway. These modes can be used separately or combined with each other.

2.3.1 Road

As its name implies, transport is usually by road and the cargo is packed in trucks, trailers, vans, medium vehicles, etc. The highway modal had its expansion with the end of World War II, mainly due to the flexibility achieved from the door-to-door delivery service, along with the intercity movement speed (CLOSS & BOWERSOX, 2007).

According to Novaes (2007), the advantage of the modal road is that it reaches almost the entire national territory, except very remote locations that do not have economic expression to demand this type of service. For Goebel (1996), in addition to these advantages, he also mentions that this type of modal provides: higher travel speed; shorter loading time due to the vehicle's ability to allow its quick departure; ease of replacement of the vehicle with another due to the occurrence of incidents; and possibility of dispatch of cargo in installments. However, it has a higher operating cost compared to rail and river modes; impacts road service level, especially during harvest periods when it causes major road congestion; and has lower

load capacity.

2.3.2 Rail

The cargo is transported by rail, i.e. by rail, packed in closed wagons and also often on platforms; The rail modal is the one used for ground transportation performed on railroads built for this purpose, that is, its space for transmission is not divided with other modes (RONÁ, 2002; KEEDI & MENDONÇA, 2000).

Rail transport is geared towards large volumes of cargo, making it attractive when transporting low value-added products takes a long distance. The aforementioned modal is used as a competitive advantage for the transportation of ores, steel products and bulk agricultural products (ANDRADE, 2007).

The rail modal is more efficient in relation to fuel consumption and other direct operating costs, to operate units that have higher load capacity, as well as low freight value compared to the road, suitable for transporting large and medium-sized vehicles. homogeneous shipments (NOVAES, 2007; GOEBEL, 1996). However, the disadvantages of modal range from the need for longer travel time, high cost, when there is the need for transshipment, low flexibility and use subject to availability of rolling stock (GOEBEL, 1996).

2.3.3 Fluvial or Lacustrine Waterway

In this mode, the cargo is transported by vessels that normally navigate in rivers, lakes and lagoons, using the largest natural resource available on the planet as the means for locomotion, water.

This mode has the advantage of being able to handle very large loads, and such transport uses two types of vessels: those offshore, designed for use in oceans and large lakes, and diesel-powered barges, operating in rivers and canals, having greater flexibility. This ability to transport large volumes / tonnages with a low variable cost contributes to this mode being required under conditions of low freight rates and when speed is not the primary point. In addition, it features high energy efficiency and high economies of scale for large long distance batches; has minimal maintenance and implementation cost; and is characterized by its low consumption of diesel oil, making it more economical and less polluting.

Compared to the building of road and rail modes, the construction of the waterway infrastructure requires low environmental impact, since the waterways use an existing road, that is, the river itself. (CLOSS & BOWESOX, 2007; ANDRADE, 2007; SILVA & DACOL, 2007; COSTA & PADULA, 2009).

However, the disadvantages are the limitation on speed and range of operation, and additional transport by rail or land is required when the origin and destination of the cargo are adjacent to the waterway. Another aspect considered disadvantageous concerns both the large number of handling, increased the likelihood of damage, and the need for ports with adequate infrastructure to meet the size of vessels. It is noteworthy that its effectiveness depends on the conditions of the infrastructure provided (CLOSS & BOWESOX, 2007; ANDRADE, 2007).

The situation of the Brazilian ports is not satisfactory, because the low investments impact in their productivity regarding the cargo handling, because while in international standards forty containers are handled per hour, in Brazil the most efficient terminal cannot reach twenty seven containers. per hour. Although the Brazilian coast has a number of sea and river ports, port operations occur with certain restrictions, such as congestion, excessive bureaucratic processes, arrival and departure delays, etc. (WANKE, 2010; SILVA, 2009).

According to Costa & Padula (2009), Brazil has a considerable waterway system, but it is underutilized due to the low usability of its roads, as the country has 43 thousand km of rivers, of which only 28 thousand km are navigable and only 10,000 37 km are used. However, navigable rivers require, due to their locality, dredging, terminal construction, damming, lock construction, winding river channels, improved road, rail and sea access. In addition to interventions in the rivers and construction of infrastructure in the waterways terminals in order to make it economically viable. Waterways also require investments in signaling, renewal and increased supply of equipment and fleet, as well as logistics capacity.

Among the Brazilian regions that most favor geographically the development of the waterway modal is the Northern Region, but its cargo transportation system is precarious, without conditions for efficient cargo transshipment. It is noteworthy that, because this part of the country has extensive waterways, transport by rivers plays a fundamental role in the development of the region. However, in some areas of floodplain the system used becomes the bi-modal, or better known as road-river. (Costa & Padula, 2009; Maciel, 2006).

2.3.4 Air - one of the most expensive modes, for transporting high value products with agility and safety. The air mode is the transport system that uses air for its displacement, having as its main characteristic to reach large distances in a short time. It occupies a very important space in the cargo transport sector, mainly internationally due to its greater safety and reliability, carrying high unitary value cargo such as consumer electronics, watch, high fashion etc., and perishables such as flowers, noble fruits, etc., (ANDRADE, 2007; NOVAES, 2007; RIBEIRO & FERREIRA, 2002).

With globalization, air transport has gained prominence, obtaining a growing demand from users despite the fact that freight is significantly higher compared to road transport, as markets have been expanded and consumers are demanding fast delivery of their goods. The supply chains have spread all over the world. However, the unreliability of shippers, to the detriment of the requirement of timely deliveries, induced the export and distribution of products through the air transport mode (NOVAES, 2007; RIBEIRO & FERREIRA, 2002).

This mode has the advantage of high speed, easy reach of distances, security against theft, damage and loss, as well as reduced inventory costs. However, when compared to other types of transport, the air is presented: more costly; higher fixed costs related to aircraft; handling and loading system; variable costs, spent on fuel, labor, maintenance, besides causing greater environmental impact (RIBEIRO & FERREIRA, 2002; SILVA & DACOL, 2007).

2.2 Cargo Transport Infrastructure

With regard to infrastructure, it has to imply access rights, both of vehicles and organizational units of transport that provide services for their own use as third parties, in the latter situation when the service charge is charged. Transport can also be conceptualized as a connection point of a logistic chain, this link implies the search for the efficiency of integration between two or more modes, and they must be coordinated and managed as systems in routes or corridors, consisting in the removal of any physical, operational or institutional barriers (CLOSS & BOWERSOX, 2007; BARAT, 2007).

The economic and legal characteristics of modal or multimodal systems are determined by the nature of the infrastructure and may cover urban and freight transport. Freight transport infrastructure is considered as the main support for logistics, i.e. when transport infrastructure conditions present bottlenecks will

impact the efficiency of the logistics process (CLOSS & BOWERSOX, 2007; BARAT, 2009).

The importance of transportation infrastructure is measured by financial indicators: cost, revenue and profit. Transportation contributes about 64% of logistics costs, 4.3% of revenues and can double the profit on certain occasions. Transportation costs are the main factor in the costs of the logistics process and, in some cases, their elevation is associated with the conditions of their infrastructure. In addition to the above mentioned indicators, there are others that measure the impact of infrastructure on the improvement of a given Region, such as the economic and social one (WANKE, 2010; CHOPA & MEINDL, 2003).

2.2.1 Indicators for Analysis of Transport Infrastructure Investments

The indicators are used to measure the level of development of a given region, especially those designed to ascertain the impact of freight transport infrastructure investments on economic, social and developmental aspects, using quantitative and qualitative data. In general, quantitative data are those based on numerical data and can be measurable and reliable; in turn, qualitative data are based on only perceptions of reality (BRAGA, 2008).

Regional development is driven by the transportation system: while the economic aspect links the production and consumption of goods; The social aspect is responsible for providing the conditions of comfort and well-being to society, also enabling the quick access of people, as well as their quality of life (TEIXEIRA, 2002).

Braga (2008) with another line of reasoning proposed a national transport model for Brazil composed of four modules:

- Transport Infrastructure Module;
- Regional Development Potential Characterization Module;
- Territorial and Space Module
- Impacts module.

Despite the changes suffered the need to invest in other modalities has emerged, the road mode remains the one that has the highest percentage of participation in the transport matrix.

Brazilian Air Modal This mode has been undergoing a restructuring, due to the new companies operating in the country and those older companies that went through a process of bankruptcy or financial crises, caused largely by the bad practices of corporate governance (MELO FILHO, 2008).

2.3 Public Policies for Transport Infrastructure

More succinctly, it can be said that the formulation of public policy constitutes programs and actions created from governmental purposes, which will produce, through their results, the necessary changes in the country in which it was implemented. In this context, 38 have the policies focused on transport infrastructure that are formulated and implemented in each country, according to their needs and local reality (SOUZA, 2002). Brazil has as its main policies the National Logistics Plan - PNLT, the Multiyear Plan - PPA and the Growth Acceleration Program - PAC which will be described in the following topics.

2.3.1 National Logistics Plan

PNLT The National Logistics and Transport Plan (PNLT) was created by the Ministry of Transport - MT together with the Ministry of Defense - MD through the Center of Excellence in Transport Engineering - CENTRAN, beginning to the elaboration work in February 2006 ending December 15, 2006 (PASSOS, 2007).

Conceptualized as a plan that covers the Federal, National and State spheres, having indicative character with operations in the medium and long term, it is associated with the process of socio-economic development, not being seen only as a list of projects and actions. Due to its involvement with the entire logistics chain associated with various types of transport, it is characterized as a multimodal plan (MT & MD, 2007).

In turn, the objective of the National Logistics and Transport Plan, as Perrupato (2006) is to develop, formalize and perpetuate a database and analysis tools, under the logistic perspective, to support the planning of public and private interventions in transport infrastructure and organization, so that the sector can contribute to the achievement of the country's economic, social and ecological goals, in the medium to long term horizons, towards sustainable development.

Abreu et al. (2008) also affirm that beyond these PNLТ objectives in question is also the fact that the process of planning in the Transport Sector is resumed from the involvement of all modes used in transport, also containing the considerations regarding logistics costs and the need for a balance in Brazil's cargo matrix.

3. Materials and Methods

The method used for this work had as approach the qualitative and deductive research, being the object of study the Transport Logistics in Amazonas, this method starts from the general through theories or laws to reach a conclusion and to understand the variables that generate or directly affect the problem. It was sought as steps of this method, the deepening about the knowledge of the problem, using data collections from various exploratory studies that were made through bibliographic research, by means of consulting articles, direct contacts, academic and technical papers relevant to the theme. . In the direct contacts were contacted people who provided possible and useful data or suggestions to the article, to compare the reality cited by the interviewees, we sought to have as a knowledge base the reading of works with the theme in question.

4. Analysis and Discussion of Results

Representing the proposed model and its evaluations, the research studies (PLANOAMAZON) record five axes that would depart from Manaus as follows:

I- The North Axis, would make the road connection through BR-174, between Manaus (AM) and Boa Vista (RR), and could go to Venezuela, reaching the seaports of Caracas or Puerto La Cruz; or by diverting to Guyana, where it would also reach Georgetown Sea Port. In both cases it would be possible to reach the Caribbean, Central America and NAFTA countries.

II- The South Axis, would include the connection between Manaus and Cuiabá (Matogrosso) via Porto Velho (RO), and can be made by waterway through the Madeira River, connecting Manaus to Porto Velho and, from this point, to Cuiabá through BR-364 . Or by road, connecting Manaus to Porto Velho via the

BR-319, in recovery, and from this point going to Cuiabá. One more consideration should be given to reaching Cuiabá via a road-to-river route from Manaus via Santarém via the Amazon River and from Santarém to Cuiabá via BR-163.

III- The East Axis presents a waterway linking Manaus to Macapá and the Santana Free Trade Zone in Amapá, establishing from this point a maritime corridor reaching North Atlantic (NAFTA, EU) and South Atlantic ports (Brazilian Coast, Uruguay and Argentina) and, finally, the East Atlantic, reaching the countries of Africa.

IV- The West Axis contemplates the fluvial transportation from the city of Manaus, through the Amazon and Marañon river to Puerto América in Peru. From there it would follow by road to the maritime ports of the Free Trade Zone of Paita, in Peru, accessing the sea routes to Chile, Alaska, the West Coast of the United States, Japan, and Pacific countries such as New Zealand and Australia.

V- The Radial Structure proposes the idea of integrated transport logistics in the State composed of a rod fluvial structure, where it is possible to establish a network capable of promoting not only interregional integration, provided by the axes, but also intraregional, linking the dynamic center to the main ones. inland municipalities. From a focused vision for the development of transportation in the Amazon, we intend to resemble the living standards of these regions, because with the distortions that occurs mainly in the interior of the Amazon, it is necessary to promote socioeconomic integration.

As a Transport evaluation, you cannot rule out any options, as alternatives often do not receive the necessary attention. Still talking about the product flow axes, the IIRSA Regional Integration Initiative for Regional Integration of South America has already distinguished the Amazon Axis as a multimodal transportation system that connects the ports of the Pacific region with the Brazilian ports of Manaus, Belém and Macapá. This interconnection of the Pacific Ocean with the Atlantic would occur through the Huallaga, Marañon, Ucayali and Amazonas rivers in Peru; Putumayo and Napo in Ecuador; Putumayo, Colombia; and Iça, Solimões and Amazonas, in Brazil.

5. Amazon Logistics

The creation of an integrated policy to overcome logistical challenges in the Amazon is identified as an essential strategy for the region's development. The Amazon suffers from an "Achilles Heel" that resides precisely in the absence of a long-term structural plan that keeps the state in geographical isolation with the rest of Brazil. The need for agile, safe and affordable transport mechanisms to acquire inputs and dispose of capital and state products.

Logistics is critical from any perspective of our region; it is the way cargo and people are transported as we are far from the big markets. But the movement between cities and poles is precarious, because in the matter of waterways we do not have, for example, adequate ports are almost zero and the highway is totally unmanaged. The problem with logistics is strategic planning and infrastructure.

Due to its geographical location, in the Amazon, about 70% of all goods circulating in the region are transported by sea. Although there are long stretches of rivers with potential for navigation, only one waterway runs regularly formed by the Madeira and Amazon rivers. In addition, the sector faces major difficulties such as the constant lack of river dredging, signaling and river cargo theft.

“In the case of the Madeira River, which is the most navigated with cargo, it would need dredging and permanent signaling, since the beds are unstable. But overall, all the rivers in the region have these needs. ”

6. Application of Research

According to Gilvan Huosell Ramos - Logistics, until recently, existed to continue operations born in more developed regions, such as the South and Southeast of the country, essentially. The logistics centers acted in the northern region as simple regulatory warehouses which generated additional costs for the parties involved in the supply chain process. (April 2012)

And yet, with the great fiscal revolution in the country, the states of the northern region have had a certain industrialization, are now very competitive in distribution and are creating their own logistics that in the medium term will have nothing to envy the big centers.

According to Professor José Alberto Machado - to overcome the unique challenges of the Amazon it is necessary to create an integrated policy that will make logistics become an essential strategy for development in the region. “We are experiencing the same situations without major changes, with the aggravation of cargo theft. The great drama of our state is not having a plan for the next 20 years, it is nonexistent in the long run on a structural basis. Only one deal is made here and there, just for momentary measures. ” August 2017.

And according to Machado - Without advances in logistics in recent years, Amazonas loses mainly in productivity and competitiveness. “For example, we could have a distribution center at our airport like Panama City, a reference in Central America. With that, we would have competitiveness mechanisms to get to other regions of the country and even international destinations fast. From this, there would be tourist flights that in our geographical point of view would be logical and affordable. ”

Ballou (2008, p.42) says that the task of moving the product does not necessarily end when the goods reach the customer. Goods may be returned by the customer if, for example, the wrong product has been delivered, or the product is damaged. In any case, the logistics administrator should establish procedures and prepare for the storage of goods returned from the delivery sites. Similar arrangements should be made for products that have become obsolete while still in stock. They must be settled or returned to the factory for rework. ’

According to the Uniemp Institute (2007) ‘the development of logistics innovations is focused on the modernization of the ports, the handling of containers, the distribution logistics service of the interior of Amazonas. SOUZA et al Electronic Journal of Administration (Online), v. 10, n.2, edition 19, jul-dec 2011 5 storage yards, cargo traceability systems, integrated management software that monitor each stage of transportation, including fuel consumption. There are also vehicle innovations, such as trailers that adapt to both road and rail, as well as various types of technological implements. ’

7. Conclusion

Analyzing all the problems faced in transport logistics in Amazonas, especially in road transport, an ideal solution seems distant, because it is up to those who experience logistics in essence, to look for possible ways of improvements and outputs to be able to perform this distribution of cargo. The great impact and influence that transport infrastructure has on the logistics and socioeconomic development of a region can

be verified, and in order to improve these inadequate and inefficient points, a change of concepts and follow-up involving the public power is necessary. , since it has its share of responsibility, because it is necessary that governments, both federal and state, in addition to private initiative, engage in the search for new solutions and alternatives. Implementing measures to improve cargo outlets, adjust road infrastructure, establish a road plan, considering all development areas with a road and waterway network, create rest and guard points for trucks on the country's major highways, and thus a positive point, because with the conclusion of the paving of the BR 319 that connects Manaus to Porto Velho, it would be a favorable point in the flow of products from Manaus to other states, and thus the state's potential would be enriched through the adequacy in transport infrastructure and logistics.

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