

Analysis of Logistics Infrastructure Characteristics in Amazonas

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Abstract

Logistics is an essential component of economic growth, the development of a country, as the element of production movement and regional trade, in which it directly affects competitiveness. Throughout the history of mankind wars have been won and defeated by the strengths and capabilities of logistics - or lack thereof. Transport infrastructure plays a significant role in the logistics process of a given region, as it impacts transport costs, causing barriers to economic and social development. It is often said that the problem of the Amazon region is not logistics, but lack of infrastructure to serve the region. Thus, this research sought to verify the scenario of distribution logistics in the interior of the Amazon, investments in transport infrastructure in the state of Amazonas. This article aimed to verify the importance of logistics in companies in the State of Amazonas and to analyze the challenges of small and large companies.

Keywords: Logistics in the Amazon; logistical challenges.

1. Introduction

Logistics in the northern region has always been a challenge for companies, due to its distant location and its difficult means of distribution, currently the most widely used mode of distribution is the river squeegee, due to its many rivers that bathe the Amazon.

The absence of logistics infrastructure slows down orders from companies, where conditions are very precarious, a region far from the country's major shopping centers, impeding the development of economic activities in the capital and even more in cities in the interior of the state.

The lack of investment in and maintenance of highways is today an obstacle. Logistics spending is a key

element for businesses.

Second (MARQUES 2010; MACIEL 2018), the conditions of the current transportation and logistics system that serve the municipalities of the interior of the state of Amazonas affect the economic and social development of the region.

The paper seeks to show the main problems occurring in the logistics service in the North region, besides portraying the complexity of the problem, also contributes to the reflection of the problems faced by companies in the region.

2. Methodology

For the elaboration of the article the bibliographical research method was used, through data of articles in the logistics area to present the research objective. A bibliographic review of logistics and modalities was performed.

The documentary analysis made it possible to further highlight the reality of companies in relation to logistics in the northern region of the country.

3. Theoretical References

3.1 Logistics

In the past, logistics involved transporting food and ammunition to troops on the battlefield. At present, it represents the control of management processes, from transportation to the entry of raw materials in companies to the distribution of products to the final consumer.

In the past, wars were long and could take centuries to end, so logistics were needed. It was at the end of the nineteenth century that logistics was introduced as a subject in the United States Naval War College. Until World War I the word logistics was used in terms such as administration, organization, and war economy.

The term logistics came up many years ago, and came to speed up the processes, seeking to be more efficient and effective in the pursuit of cost reduction.

Logistics is intrinsically encompassed by the concept of an area of administration that performs various tasks aimed at planning the collection, locomotion (in its different areas: air, land and sea) and circulation of merchandises. (PEREIRA, 2010).

Logistics is the process of efficiently planning, implementing and controlling product flow and storage, as well as associated services and information, covering from point of origin to point of consumption to meet customer requirements. . (NOVAES, 2001).

In recent years, globalization has put logistics on a new level. With this large increase in the circulation of goods, the pressure to reduce costs and increase sales, companies have turned their eyes to the importance of developing an efficient supply chain (DIAS, 2012).

Physical distribution logistics consists of the business logistics segment that corresponds to the set of operations associated with the transfer of goods from the place of its production to the place of destination. According to WANKE (2011, p. 256), “[...] [is] the development of a system that covers all activities, from the production line to the delivery”.

We note that this type of system is to achieve cost tracking through the logistics structure, avoiding the indiscriminate apportionment of costs.

Thus, it is possible to measure the costs of customer distribution channels and even deliveries. In the case of physical distribution, it is also emphasized that “in relation to costs, they refer to pricing, scenario simulation and cost control”. Prices are essential to the progress of any process. They are formed on the basis of direct costs, however, costs always influence price information. Thus, those responsible for physical distribution operate specific elements, predominantly material in nature: warehouses, transport vehicles, stocks, loading and unloading equipment, among others. WANKE (2011, p. 257),

There are usually two types of markets to plan for. One is end users, who are those who use the product to meet their needs as well as those who create new products, such as industrial consumers. The second market consists of intermediaries who do not consume the product but offer it for resale, usually to other intermediaries or end consumers. They are, for example, distributors, retailers, and end users. 'BALLOU (2008, p.40-41).

As stated by (BOWESOX, 2001) logistics is an effort made by companies that value and care about customer satisfaction, and for that they put in place strategies that build customer loyalty and bring them closer at the lowest price.

Therefore, logistics is mainly aimed at making products and services available at the right time and place, so that customers receive them with quality and at an appropriate cost.

3.2 Modalities of Transport

Transport generally accounts for the largest share of logistics costs, both in a company and in the share of logistics costs involving other factors. ” For these reasons there is an ongoing concern with reducing their costs. We can highlight the various modes of transport, also known as intermodality, and the emergence of logistics operators, that is, integrated logistics service providers, capable of generating economies of scale by sharing their capacity and handling capabilities with various customers. (FIGUEIREDO; 2011)

3.2.1 Road Modal

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).

Road mode is defined as vehicles (cars, trucks, bitrens, trailers etc.) that move across a surface. Its advantages are mutual: mobility, that is, the ability to drive on highways; can be enjoyed on any product transportation; it's fast; no professional deposit required; inhibits management; easy management and can be used in conjunction with other modes (PRESTEX, 2015).

The use of this mode is recommended in cases of transportation where the products have ephemeral character and / or high values. This mode is an advantage as it has agility and availability of roads.

3.2.2 Waterway Modal

The Waterway mode utilizes the largest natural resource available on the planet as the means for locomotion, water. This mode includes waterway transport (inland and lake), called the Inland Waterway and maritime

transport, which is divided into long-distance maritime transport, characterized as international navigation taking place between ports of different countries, and cabotage navigation. This is the national navigation performed between seaports or located in rivers of the same country. In turn, cabotage navigation can be divided into small and large cabotage, according to its scope (ANDRADE, 2007; NOVAES, 2007).

Waterway transport has the following advantages: less environmental impact compared to other modes, less pollutant emissions, less nature degradation, less use of lubricating oils, no tires, almost zero accidents, more economical to implement, lower maintenance costs, increased transport reliability and safety. It is the most competitive modal, but does not work alone, depends on others.

The Waterway modality has as harmful the dependence of adequate places, rigid administration, professional terminals and a large amount of time to the final destination and this, in turn, ends up being one of the screaming bad characteristics (LOGISTICS FOR ALL, 2011).

3.2.3 Air Modal

Air transport is used to transport cargo of high unit value (electronic goods, watches, high fashion, etc.) and perishable goods (flowers, noble fruits, medicines, etc.).

This mode has been showing strong growth in our country, and according to KEEDI (2005) seeks an adaptation to products that are not part of its traditional cargo, mainly through the expansion of aircraft. This can lead to a possibility of reducing freight through the increase in cargo provided by the increased capacity of air vehicles. Its increasingly frequent use has made it an alternative and more naturally thought out mode for transportation.

3.2.4 Rail Modal

Rail transport is low cost, but not very flexible and delivery times are long and variable, and in some cases there is a need to change trains, as there are railways that have narrow gauge, while others have wide gauge. This type of transport is indicated for large quantities of products, long distances and non-perishable and non-fragile products (CALIXTO, 2011).

The rail modal is recognized as having a lower cost than the road modal simply because it consumes a smaller amount of diesel, this mode is limited to existing railways, where there is a possibility of locomotion. products by it, becomes practical considering medium and large distances.

This mode has as main characteristics the transportation of large amounts of cargo over long distances with a lower cost, lower theft rate. This mode has a difficulty regarding its flexibility, because it depends on another mode to deliver the goods at the recipient's door. The cargo transported by this are: cement, lime, ores, fertilizers, corn, wheat, soybeans, among others.

3.2.5 Dutorial Modal

Pipeline or pipeline transport is a type of land transport based on a set of terminals, with propulsion equipment, connected by tubes (CNT, 2012b), the type of product transported receives other names such as: pipeline (natural gas); pipeline (petroleum, fuel oil, diesel, alcohol, ethanol, LPG, kerosene, naphtha, among others); mining ducts (rock salt, iron ore and phosphate concentrate); aquaducts (water) or polyducts (various types of products). It represents 4% of the cargo transportation matrix according to the National

Land Transportation Agency (ANTT).

The pipeline mode can also be divided into pipeline (oil), ore pipeline (iron ore), pipeline (natural gas), poly pipeline (two ores).

Brazil has about 20,000 kilometers of pipeline, and this number will increase by 2015 and PETROBRAS's subsidiary TRANSPETRO controls about 10,000 kilometers.

4. Study Application

4.1 The distribution logistics service of the interior of Amazonas

According to SOUZA (2011), in his research done in the municipality of Parintins where; “Initially, we sought to know how the goods are transported from the city of origin to the city of Parintins. Thus, the following answer was obtained: 40% of the companies use a boat as a freight transport, the other 60% are divided equally by ferry, truck and plane. ”

Where it was found that the failures in the distribution logistics process, these failures affect business activities along the transport of goods, which showed a high number of losses and consequently damage to goods.

The businessmen of the municipality reported that one of the factors that most impact are the breakdowns in goods and the high cost that carriers charge, according to carriers that charge a higher cost, to maintain the quality of service provided.

It was also reported the difficulty of dialogue with the government regarding the request for improvements in the infrastructure of the airport and the port of the municipality, which contributes to the economic development of the city.

The advancement of the air modality in the market is due to the export demands and the competition between the companies. The market has become very competitive, which makes entrepreneurs have a greater effort, so they end up joining the air mode, although the cost of this mode is higher, but this is the way that the product arrives faster and thus increasing competitiveness among its competitors.

4.2 River passenger transportation: Logistics in the ports and itineraries of the State of Amazonas

In his work BARBOSA, PRADO (2014), he deals with the fluvial transportation of passengers in the state of Amazonas, with an approach in the logistics of ports and itineraries. Bibliographic research reveals how river navigation has stood out in relation to the flow of production and displacement of people in the state over time, because river transportation is the main and most important means of transport in the region. In the port of Manaus Moderna, the starting point of the flow of navigation of regional boats, there is a lack of infrastructure and poor conditions of service to passengers; the boats are old and dirty, they trade dubious hygiene.

And on deck, goods and people occupy the same space, hampering traffic and increasing the risk of accidents from non-compliance with safety regulations. Anyway, it does not offer a comfortable trip. Regional or pleasure boats as they are known do not have their established routes, they stop at various locations for loading and unloading people and cargo; thus, delay the travel, which becomes more tiring. This paper shows the importance of inland waterway transportation, the operation of logistics services in

ports and the determination of the degree of difficulty for passengers to travel between neighboring cities and access to education and health; Finally, the relationship between this type of transport and activities such as passenger traffic, itineraries and safety as a means of guaranteeing economic development, respecting the characteristics of the region.

The interest in conducting the research is subordinated to the importance of river transport in the Amazon region and its representativeness in understanding the operation of regional logistics. Thus, the results of this research published here will be useful for the training of logistics technologists and administrators in the state of Amazonas.

The lack of infrastructure in the ports of the cities of Amazonas, today is one of the main difficulties for passengers who depend on this type of mode to get from their cities to other locations, not only infrastructure but also security; With this occurs the emergence of clandestine ports, where the boats are moored in ravines, without any security.

In order to have a safe transportation and as a suitable structure for users, according to ANTAQ (National Waterway Transportation Agency) it is necessary that the terminals have a suitable structure to facilitate the movement of users who depend on transportation.

4.3 Waterway Logistic Model

Navigating the waterways of the Amazon Region has been causing inconvenience to the government with the demand for increasingly demanding solutions. In significant part of the municipalities of the State of Amazonas the only form of access is by waterway transportation. In the last decades, the lack of efficient strategies to transport the municipalities of the region in adverse events, such as drought or floods that make navigability of rivers difficult, cause the growth of social, economic and environmental impacts. The objective of the present work is to elaborate a modeling to support the decision making about the best configuration of the water transport pillars in order to generate a logistic system that meets the demand. SANTOS (2016)

Waterway transport is a low cost mode, but it is not an efficient mode, not only in costs but also in time to be transported the products. Knowing the great territorial extension of the State, causing that the installed infrastructure is not sufficient, or inefficient to serve some regions.

This deficiency of modal happens from the region's own natural condition: hydrographically rich and of continental geographical proportions. On the other hand, due to the administrative and financial fragility of the responsible institutions.

4.4 Container Logistics: A Competitive Advantage for Reducing Retail Operating Costs for Construction Material on the Santos-Manaus Stretch

Container Logistics: A Competitive Differential to Reduce Construction Material Retail Operating Costs on the Santos - Manaus Stretch, which points out that in times of economy and market without frontiers, companies are looking for new alternatives to survive in the face of the strong influence of competition brought about by the advent of globalization. In this scenario, logistics plays a significant role as it enables operations, creating new forms of development and business opportunities. In this study the hypothesis is a statement that logistics acts as a generating factor of effectiveness in organizational processes and as a

strategic differential and competitiveness. Thus, the focus of this research is the strategic management process in the context of the supply chain, as it covers the activities related to planning, procurement, transportation, handling and storage. SOUSA (2016)

Companies need to integrate logistics as a strategic tool for business, the current market is very competitive among companies, where companies must always innovate, have a differential, and logistics is a strategic way, the way the product arrives. For end consumers, product quality is increasingly important in logistics.

4.5 Costs of the logistics chain of bananas produced in Presidente Figueiredo and the registration of prices practiced at the Producer's Fair in Manaus: a case study.

A case study describes the processes carried out in the logistics chain of bananas produced in two sites located in the municipality of Presidente Figueiredo and records the prices practiced at the Producer Fair in Manaus. Some agricultural scholars think about banana particularities, systems theory, logistics history and its systemic approach, cost theory and some costing methods, as well as price and internal and external factors. that influence pricing.

Having as an object of analysis the logistics chain of bananas produced in Presidente Figueiredo and sold at the Producer Fair in Manaus; qualitative approach to the problem; and the instrument was systematic observation. The field work was observed and each of the necessary processes to the banana supply network was recorded, the costs related to each task were aggregated within these procedures and the logistic cost per banana bunch harvested in two was obtained. sites that served as the laboratory for the observations. MACEDO (2009)

Farmers in cities in the interior of the state of Amazonas have a difficult time disposing of their produce to state capital or to other locations. This is due to the fact that the process of distribution of the physical product (Outbound Logistics) in the cities of the state happens through the waterway modal, the rivers of the state of Amazonas are very extreme, bulky, and with that the distribution time of these products is long, and consequently the price of the final product increases.

4.6 Logistics and eco-efficiency in the public slaughterhouse of Parintins-AM

Logistics is an area in constant development and is present in all fields of activity of man. In the agro-industrial sector, in slaughterhouse industries, meat processing chains need the managerial support of logistics to support the development of their activities, seeking a balance between the social, economic and environmental pillars. As a result, this study carried out at the Público Ozorio Melo slaughterhouse in the city of Parintins verified to what extent the processes developed are in line with the principles of ecoefficiency.

Using the monographic investigation method with field research and semi-structured interviews, the main objective of the study was to identify the logistics operation in the establishment, based on the description of the slaughter process, the monitoring and detection of the resulting residues in each stage and finally by investigating the forms of management and destination used by the establishment.

The results showed that although there is compliance with some norms and decrees, the slaughterhouse has some structural and logistical difficulties that depend on many bureaucratic processes for its development. Thus, the suggestions proposed in this study aim to improve the quality of service, as well as the

rationalization of resources and apply efficient management of by-products and waste. PIKANÇO (2017) Logistics procedures we all know are key elements in a development organization, although the difficulties for company improvement depend on the public sector, but we have been able to observe some significant changes.

4.7 Logistics as one of the competitive factors

The study is to discuss how logistics today is fundamental for a good competitive performance in a constantly changing market, where only the best stand out. This concern with logistics becomes essential, because in the search for differentiation, companies always try to get ahead of the competition in all aspects, with the help of software, planning and production management.

The increasingly competitive business environment contributes to logistics seeking this ever-increasing differentiation. Its strategic management of material use and related information efficiently and effectively drives products and services from one source to one destination. MAIA (2012).

According to Alarcón, Antún and Lozano (2012). Logistics has become a key factor in generating value for the product. Maintaining companies' logistics-related competitiveness depends on their ability to develop, implement innovations, recreate strategies in the practice of logistics throughout the supply chain, with the aim of reducing costs and increasing the level of customer service.

Logistic competitiveness is related to: i) the operation of the practical supply chain logistics processes of companies in the region; ii) infrastructure and management of factors for better logistics performance of companies increase the efficiency of the flow of goods.

To be more competitive with logistics, you need to know how you are performing against your competitor, how to improve infrastructure and the elements that increase logistics performance, how to improve process and logistics flow efficiency and quality, thus increasing the level of services by offering differentiation advantages to the customer, but always taking into account the regional characteristics involved.

4.8 Fluvial transport by mixed vessels in the Amazon: an analysis of the Manaus-Coari and Manaus-Parintins stretch

Transport in the Amazon is essentially fluvial and it uses vessels to move both cargo and passengers. However, this system has been operating to this day, without proper regulation, with few technological investments and presenting social and environmental difficulties. Thus, the aim of this thesis is to establish a system of sustainable indicators for the Amazonian river transport sector using the Manaus-Coari and Manaus-Parintins stretches as a case study. Thus, an indicator called the Amazon River Sustainability Index - ISTFAM was proposed and generated through the Principal Component Analysis (PCA) method.

The results showed that the weights obtained in the indicators and aspects were satisfactory to those obtained in the ranking of the vessels, being able to portray the reality of the mixed vessels in these sections. It was also found that the system is not in balance in the social, environmental and economic aspects, but also needs to consider the political (state participation) and cultural (local habits and customs) aspects to ensure its fullness and, therefore, guarantee the sustainability. Ferreira (2016)

River transport is the most used in the state of Amazonas, used for transportation of people as well as cargo,

transport in the regions is characterized as mixed. There are many irregularities in this environment, such as excess passengers, illegal cargo transportation, documentation of overdue vessels.

5. Analysis of Results

The situation of logistics infrastructure delays the economic development of companies. The process of product distribution is always difficult, when we talk about companies in the northern region, because it is the logistics complexity of the region and the distance, since transportation is considered a cost means in all commercial and industrial activities.

The commercial area of any company in the northern region, transportation is essential for the results achieved in the end-consumer service and for the company's suppliers and employees.

This highlights the role of transport in integrating all parts of logistics and the creation of flexible logistics chains with a high quality value to meet the demands of each company.

Without progress in logistics in recent years, Amazonas loses mainly in productivity and competitiveness. Although the waterway transport is more accessible, as was mentioned during the research, this mode is much more complex, because the delay in the delivery of the product, because we know that some parts of the rivers that cover the state of Amazonas are often difficult to traffic.

The transport infrastructure is centralized in the city of Manaus, powered by the industries of Manaus Industrial Pole, where it gathers most economic activities, generating high cargo movement in the region. Cargo transportation is very important for the Manaus Industrial Hub, for input inputs and for the final products outburst, whether for national or international markets.

Transport plays an essential role in the link between production and consumption, allowing for an integration of production versus consumption, contributing to economic growth, not only for companies, but also for suppliers, employees and consumers.

With the logistical difficulties in the region, the distance from major shopping centers in Brazil and suppliers, consequently the prices of companies' products increase. The greater the complexity of moving materials, the higher the final price for the consumer, as the harder the logistics process for the company, the higher the process costs.

Logistic efficiency is important for global trade and is related to the development, economic growth of the country. However, it needs political and governmental desire and needs to be standardized by public policies, because the costs are very high and reflect a lot on the cost of products, competitiveness and survival of companies in the market.

6. Final Considerations

We understand that logistics is a key element in stimulating the development of commercial activities. When it comes to logistics in the northern region, the complex challenges of the region always come into the agenda. be it physical or geographical challenges.

The present study analyzed the current situation of the lack of logistics transportation infrastructure in the State of Amazonas.

Evidencing that the waterway modality, despite being more viable in

costs, and being more used, due to the lack of infrastructure on the roads of the State of Amazonas. Planning an efficient transportation system will help to increase market competitiveness. Improving transport services, lowering the cost and price of products placed on the most distant markets, such as in the northern region of the country, thus making the region more competitive with other products in large regions of the center of the country. Therefore, it is necessary to make improvements in the implementation of the structures of the logistics processes of the State of Amazonas, capable of contesting the geographic problems of the region.

6. REFERENCE

ALARCÓN, Rodrigo; ANTÚN, Juan P.; LOZANO, Angélica. Logistics competitiveness in a megapolitan network of cities: A theoretical approach and some application in the Central Region of México. Elsevier,

[S.I.], *Procedia – Social and Behavior Sciences* 39, p. 739-752, 2012.

ANDRADE, Antonio Rodrigues de. A informação como suporte para o planejamento e para formulação de políticas no setor de transporte. Tese de Doutorado do Programa de Engenharia de Transportes, Universidade Federal do Rio de Janeiro – UFRJ, Rio de Janeiro, 2007.

BALLOU, Ronald H. Logística empresarial: Transporte, Administração de Materiais e Distribuição Física; Tradução Hugo T. Y. Yoshizaki – 1. Ed. – 20. Reimpr.- São Paulo: Atlas, 2008.

BOWERSOX, D. J; CLOSS, D. J. Logística Empresarial: o processo de integração da cadeia de suprimentos. São Paulo: Atlas, 2007.

Brandão Barbosa, E. y Pereira Prado, A.: "Transporte fluvial de passageiros: logística nos portos e itinerários do estado do Amazonas", en *Observatorio de la Economía Latinoamericana*, Número 194, 2014.

CALIXTO, F. Logística: Um enfoque prático. São Paulo: Saraiva, 2011.

CLOSS, David J; BOWERSOX, Donald J. Logística Empresarial: O processo de Integração da Cadeia de Suprimento. (1ª Ed.) – 5ª reimpr. São Paulo: Atlas, 2007.

CNT. Atlas do Transporte. Brasília: CNT: SEST e SENAT, 2006.

CNT. Plano CNT de Transporte e Logística 2011. [S.I.]: CNT, 2011b.

DIAS, Marco Aurélio P. Logística, transporte e infraestrutura: armazenagem, operador logístico, gestão via TI, multimodal. Marco Aurélio P. Dias - São Paulo: Atlas, 2012.

FERREIRA, Márcio Antônio Couto. Transporte fluvial por embarcações mistas no Amazonas: uma análise do trecho Manaus-Coari e Manaus- Parintins. 2016. 164 f. Tese (Doutorado em Ciências do Ambiente e Sustentabilidade na Amazônia) - Universidade Federal do Amazonas, Manaus. 2016.

KEEDI, Samir. Transportes, unitização e seguros internacionais de carga: prática e exercícios. 3. ed. São Paulo: Lex Editora, 2005.

Logística de contêineres: Um diferencial competitivo para diminuir os custos operacionais no varejo de material de construção no trecho Santos- Manaus.2016-
Shttp://ppgpep.propesp.ufpa.br/ARQUIVOS/dissertacoes/Dissertacao2016-PPGEP-MP-
MariaAparecidaLimadeSousa.pdf.

MACEDO, Fernando Antonio Ferreira. Custos da cadeia logística da banana produzida em Presidente Figueiredo e o registro dos preços praticados na Feira do Produtor em Manaus: um estudo de caso. 2009.

124 f. Dissertação (Mestrado em Contabilidade e Controladoria) - Universidade Federal do Amazonas, Manaus, 2009.

Maciel, Jussara Socorro Cury - Diagnóstico da Logística e Infraestrutura do Transporte Hidroviário de Cargas no Amazonas- 2018-

Maia,Alex,Henrique;Rodrigues,Demetrios,doSantos;Pimenta,Emerson,César;Meleti,Helder,Giolo;Pereira ,Weverton,Hygor, Nunes;Cervila,Antônio,Soares. LOGÍSTICA COMO UM DOS FATORES COMPETITIVOS. Centro Universitário de Franca. 2012.

Marques, A. O, Macêdo, C. S, Kuwahara, N. e Santos, A. B. (2010): A influência do Sistema de Transporte Hidroviário na Logística dos Apis do Amazonas,

NOVAES, Antônio Galvão. Logística e Gerenciamento da Cadeia de Distribuição. Rio de Janeiro: Campus, 2001.

NOVAES, Antonio Galvão Logística e gerenciamento da cadeia de distribuição: Estratégia, Operação e Avaliação. 3ª ed. rev. Rio de Janeiro: Elsevier, 2007.

O SERVIÇO DE LOGÍSTICA DE DISTRIBUIÇÃO DO INTERIOR DO AMAZONAS- Souza.Paulo Augusto Ramalho (2011)

PEREIRA, Humberto. Modais de transportes. Artigos, 2010.

Picanço, Manuelle: Logística e ecoeficiência no matadouro público de Parintins-AM. UNIVERSIDADE

DO ESTADO DO AMAZONAS. 2017

PRESTEX. Modais de transporte de carga no Brasil – Conheça os 5 principais. Prestex, 2015.

SANTOS, José Teixeira de Araújo Neto. Modelo Logístico Hidroviário. 2017. 81 f. Dissertação (Mestrado em Engenharia de Produção) - Universidade Federal do Amazonas, Manaus, 2017.

WANKE, Peter. Logística empresarial: a perspectiva brasileira. São Paulo. Atlas, 2011.

<https://www.bloglogistica.com.br/mercado/os-desafios-da-logistica-na-amazonia>.