

# Logistics Platform (LP) approach in the Stakeholders view

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**Abstract**— This study approaches a perspective on the perception of the stakeholders in the various fields of action, taking as a model the Regional Logistics Platform (RLP). The purpose of this article is to analyze and make feasible the main criteria for the formulation of such a model. The applied methodology was presented the existing procedures of implantation of a model of Logistic Platforms (LP): the influence of the LP in the sustainable development, showing the economic, environmental and social development and the intervening actors. The expected results were: the analyzes with qualitative economic, social and environmental impacts of the infrastructure of a RLP, becoming more relevant when the logistics service is adequate. Nevertheless, in this situation the implications of the construction of the infrastructures and the operation of the logistics equipment have ample reach and, often, almost imperceptible. Implementing and operating a RLP implies a series of positive and negative impacts on the environment of its area of influence which, when not considered, distort expectations of return to stakeholders on the implementation of a RLP. On the other hand, there is a strict relationship between the interests associated with the implementation of an PL, with the horizontal and vertical relations of the intervening actors, enabling an adequate deployment of sustainability indicators, linked to criteria that make performance evaluation of development sustainable development in the Amazon Region to identify the main positive and negative impacts associated with the implementation of a PL in the view of the Stakeholders.

**Keywords**— Logistics platform, Stakeholders, Sustainable Development, modal transport.

## I. INTRODUCTION

With the increasing globalization process, national geographic issues are increasingly being considered and logistics plays a very important role, making organizations more competitive. In this way, the logistic locations that bring together, at the lowest cost, adequate service levels for certain goods, Logistics Platforms (LP) [1] [2] [3].

In the world, there are already some platforms, these are usually linked to seaports, because of their importance in trade relations in the world. In Brazil, although this concept is not yet widely publicized, there are some ports and airports that have the potential to become PL [4-6].

According to [7], the logistics network can be conceptualized as the physical-spatial representation of the points of origin and destinations of the goods, as well as their flows (material, information and financial) and other relevant aspects, in order to logistic system as a whole. The network includes supply, production and distribution logistics, as well as having among these branches logistics operators to maintain a good level of service offered to the customer.

This concern to satisfy the customer, the diversity of production, the pressure to reduce costs and competition between companies made intermodal transport important, for the movement of goods over great distances in the globalized logistics environment.

Green Logistics (GL) is also known as Reverse Logistics, which is the area of logistics that deals with the returns aspects of products, packaging or materials to its production center, as well as the treatment of industrial waste that will be dumped into the environment. Green Logistics is an important reference for organizations in Brazil that want to have a competitive advantage in the globalized market [8].

In Europe, this concern has played a very important role in national and regional policies. For [9], the willingness to act on the organization and movement of goods has made Europeans idealize logistics locations to improve the level of service and to boost costs. These logistic locations are defined below:

- Logistic site: place physically well delimited with the intervention of a single logistic operator;

- Logistic zone: well defined area that groups several logistic sites, offering to several operators and facilities of intermodal branches;
- Logistical pole: a slightly delimited space that groups several sites and logistics areas and exhibits a concentration of logistical activities.

Also according to [9], logistic stowage policies address two types of distinct investments: logistical investments and kinetic investments:

- Logistical investments: they are oriented to welcome activities that value the circulation of goods and integrate the market (final production, inventory management, packaging, labeling, etc.). The logistics zones have this type of planning.
- Investments of a kinetic nature: they are oriented to study the movements, regardless of their causes, aiming to improve the circulation of goods, accelerating and regulating the transport flows, the quality of the infrastructure and the geographical location of the terminals. In these terminals, the customer finds ports, airports, multifunctional parks and shopping centers.

The concept of the Intermodal Logistics Platform (ILP) was developed in France by the Groupement Européen D'intérêt Economique (GEIE) [10], in order to replace the inefficient services provided by cargo terminals. The GEIE conceptualized the platform as being a delimited area where activities related to regional, national and international logistics are carried out by various logistics operators. Its location must be related to various modes of cargo transportation available. Its definition is made through the studies of the flows of the inputs, goods and services, associated to an evaluation of its nodes of supply and distribution, optimizing the cost versus benefit relation.

The unimodal or multimodal LPs were also conceptualized by the Spanish Ministry of Development [3] as points or connection areas of the logistics networks, including transport logistics, in which activities and technical functions of high added value are concentrated. On the other hand, the concept established by the European Platform Association - EUROPLATFORMS - in 1992 [11], describes a logistical platform as a "delimited area, within which different logistics operators handle all processes related to supply logistics and logistics of physical distribution of products, attending local, regional, national, international and global relations." These logistic operators can be owners, tenants of the buildings, equipment, facilities (warehouses, storage areas, maintenance workshops) that are part of the logistics platform [12].

LPs were conceived, inserted and supported by an intelligent information transmission system. In addition, they were designed not to create environmental impacts in their environment and to generate employment and income for the regions that shelter them. One of the main characteristics of the LP is to be an intelligence center that combines intermodality and a pole of reduction of logistics costs. The result of its implementation promotes the increase of efficiency and effectiveness, increasing the business and the technological standard, mainly for the ease of access to new global markets, through the logistics networks.

For [3] [10] defines LP as being: "the meeting place of everything related to logistics efficiency". These LPs operate the transportation logistics infrastructures and infrastructures, important for their dynamism in the global economy, improving the competitiveness of companies, creating jobs and making logistical processes feasible, as there is a growing need for infrastructure to organize to meet its main customers (industrial, commercial and service). Storage and other facilities used in transportation logistics processes focus on the space dimension. Thus, it becomes important to enable these groupings of clients to create the necessary synergy, in order to make the logistics network efficient, effective and effective, facilitating the creation of LPs.

According to [13], LPs are facilities or areas that add commercial and technical functions in the supply chain or distribution chain, creating additional value in logistics operations.

The main advantages of using platforms defined by [10] are:

- Space productivity - should not be located in the center of the city;
- The traffic of cargo vehicles should be limited, mitigating the negative consequences they cause; and
- Economic performance (efficiency) - one should try to bring the manufacturers closer to the conveyors.

For [10] [14] it observes that a platform consists of a set of infrastructures of public and private character. The public entities, in terms of encouraging the dynamism of the economy, end up offering the appropriate infrastructure such as: preparation of urbanization of the land, implementation of transport infrastructure and provision of services offered by public authorities. While those of a private nature concern the construction of the premises within which the goods and the operation and maintenance equipment are treated.

A platform should have a regime of free competition for all interested companies, hence its public character, in addition to understanding common services

for professionals and users' vehicles. However, in some cases, its management can be managed by private initiative through concessions. Its location should privilege some public services in order to facilitate this interaction necessary to carry out the logistics operations.

Although it is impossible to force a company to settle in a LP organized by the public authorities with predetermined rules, they end up being attracted by the concentration of activities and facilities in them. Some companies prefer to be in the vicinity, so as to escape the existing rules, while benefiting from the advantages of their existence [12].

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The concept of ILP was developed in France by the Groupement Européen D'intérêt Economique (GEIE), [10] in order to replace the inefficient services provided by cargo terminals. The GEIE conceptualized the platform as being a delimited area where activities related to regional, national and international logistics are carried out by various logistics operators. Its location must be related to various modes of cargo transportation available. Its definition is made through the studies of the flows of the inputs, goods and services, associated to an evaluation of its nodes of supply and distribution, optimizing the cost versus benefit relation.

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Another definition is given by the Europlatforms - Europe Association of Freight Village [15] which describes a Logistics Platform as a delimited area within which all activities related to the logistics of supply and distribution of goods are carried out by different operators, both for regional, national and international transit. These logistics operators may be owners, lessees of the facilities, equipment (warehouses, storage areas, workshops etc.) that are available in the design of the platform.

For [16] they affirm that LP can be located in the urban perimeters. These platforms function as large

distribution centers built in the subsoil of higher density routes, difficult to reach and poor mobility, especially with congestion and parking problems. This model can also offer consolidation, storage, deconsolidation and delivery services to the respective owners, guaranteeing the level of service established in the contractual instruments.

These Urban Platforms must be within a radius of up to 200 m from the stores that will be serviced. Goods are unloaded on the road, sent underground by lifting equipment, enabling each user (client) to plan to pick up their goods. This should only work where there is enough road space to load and unload the goods, as well as the availability of space for subsoil construction.

In Brazil, the intermodal transport operation is the one that ends up happening through two or more modes, from the origin to the destination of the loads, traveling with specific documents for each modality of transport. In multimodal transport, cargoes are moved through two or more modes, with only one transport document generating a competitive advantage in logistics operations. According to [7], transport in Brazil is more practiced in the intermodal modality, even because the multimodal modality is in the adaptation phase, awaiting some regulations on the following impasses:

- Definition and implementation of a single document for cargo handling;
- Approval of a Resolution of the Treasury Council (CONFAZ) on the unification of the Tax on Circulation of Goods and Services (ICMS) by the States of the Federation involved in the operation;
- Definition of cargo insurance legislation;
- Make the Multimodal Transport Operator Law (OTM) easily accessible to increase the qualifications of companies to become OTMs.

According to [17], LPs are areas where economic activities are organized logistically, with the intense use of optimization and rationality criteria.

For [14] they define the main objectives of the logistics zones:

- Spatial organization - Through which the objective is to discipline the location and arrangement of activities that consume considerable amounts of space, such as areas for product storage, parking and cargo transport maneuvers;
- Avoid the "contamination" of the urban fabric - Especially the periphery, which can be caused by negative impacts caused by facilities and infrastructures of poor aesthetic quality, which, in addition, generate negative externalities such as pollution and degradation of the environment;
- Generate specialized jobs at the local level - Logistic

activities are considered medium and high level activities of specialization and contribute to the generation of specialized jobs, mainly in the area of management at all levels.

Table 1 presents an overview of the main characteristics, classes and aspects of an LP, emphasizing the magnitude of the load movement, observed in the concepts researched in this scientific work. In view of the alternatives presented, the concept of [15] was chosen as a reference, which approaches the concept prioritizing a

well-defined and delimited area, where internally the main logistics operations of supply and distribution of raw materials and finished products are carried out in order to meet operational needs of a local, regional, national, international and global character. The choice was based on the detailing of the segments carried out by the platform, because in the presentation of the other concepts it is perceived that they are summarized, failing to privilege the real functions of a LP.

Table 1 - Summary of the main concepts of LPs.

AUTHOR	CONCEPT
<i>Groupement Européen D' intérêt Economique</i> (GEIE - França) (1996)	It is a delimited area where the activities related to regional, national and international logistics are carried out by several logistics operators.
Ministry of Public Works of Spain (1999)	They are points or areas of connection of logistics networks, including transport logistics in which activities and technical functions of high added value are concentrated.
EUROPLATFORMS (1992)	It is a set of facilities and equipment (infrastructure), where different activities are carried out directly related to local logistics, which can be used jointly by industries and suppliers, and which has a series of complementary services made available of the different platform users. The main function of the platform is to promote transshipment, consolidation and deconsolidation through the exchange of transport modes.
Boudouin (1996)	It is the meeting place of everything concerning logistics efficiency.
Arruda e Bastos (1997)	It is a set of infrastructure of public and private character.
Dalmau e Robusté (2002)	It is located in urban perimeters, built in the subsoil of higher density roads, difficult to reach and poor mobility, especially with congestion and parking problems.
Alavrenga e Novaes (1994)	It is a logistics network that is conceptualized with the physical-spatial representation of the points of origin and destinations of the goods, as well as their flows (material, information and financial) and other relevant aspects, so as to enable the visualization of the logistics system as a whole.

Source Authors, (2019).

In light of the above, it is pertinent to highlight the difference between the concept of LP and Regional Logistics Platform (RLP). The major difference is in the area of physical-spatial delimitation, since on average a LP extends for approximately 105 km<sup>2</sup> [10], while the Regional Logistics Platform may extend for dimensions well above a LP. In this study, the RLP will extend for approximately 5 million km<sup>2</sup>, characterizing the great conceptual difference.

## II. CLASSIFICATION AND STRUCTURING

According to [11], according to the European Association of Logistics Platforms EUROPLATFORMS),

there are infrastructures that are operated with one mode of transport, unimodal calls, or others that are operated with more than one mode of transport ( railways, waterways, airways, pipelines and infrastructures), multimodal or intermodal calls, not implying the direct interchange between them, that is, the existence of intermodality.

According to [12], the classification of unimodal platforms are:

- Road Centers or Terminals (RC or RT): platforms consisting predominantly of a service area for trucking companies. Only in certain cases do they include a small logistics area, but always subordinate to those services.



According to the country, these platforms assume different denominations: in Italy, autoporti, in France, centers routiers, and in Anglo-Saxon terminology, truck centers.

- Waterway Centers or Terminals (WC or WT): platforms consisting predominantly of a service area for waterway transportation companies. Only in certain cases do they include a small logistics area, but always subordinate to those services.
- Airline Centers or Terminals (AC or AT): platforms consisting predominantly of a service area for cargo transportation companies. Only in certain cases do they include a small logistics area, but always subordinate to those services.
- Railway Centers or Terminals (RC or RT): platforms consisting predominantly of a service area for rail freight companies. Only in certain cases do they include a small logistics area, but always subordinate to those services.
- Urban Distribution Centers (UDC): platform for grouping, consolidation, deconsolidation of cargo for later urban distribution. These city logistics are usually located in the outskirts of cities and often integrate within a logistics platform as one of their areas.
- Distribution Parks (DP): platforms, usually of a regional nature, equipped with all the necessary requirements to carry out the activities of storage and distribution. This is where the logistics departments of all production companies, distribution companies, logistic operators, storage companies, etc. are established. The dominant functional areas are storage and distribution, with logistics centers for companies and logistics distribution platforms being present. Examples of this type of infrastructure are the Coslada logistics park, or the Botlec distripark at the port of Rotterdam.
- Transport Centers (TC): logistics platforms focused on road transport. They may be metropolitan or inland. They generally have the logistics area and the service support area to service people and vehicles.

Regarding Multimodal Logistics Platforms, still in

accordance with the definition given by Europlatforms, addressed by [11], the following are:

- Port Logistic Activity Zones (LAZ): logistical platforms aggregated to ports and located adjacent to maritime terminal terminals. The development of these platforms allows an extension of the port hinterland, as an area of influence and attractiveness. As an example of port LAZ are: Rotterdam, Barcelona, Valencia, Algeciras and Sines.
- Air Cargo Centers (ACCs) - These are specialized areas for the exchange of air transportation and road or rail transportation with regard to cargo movement. The provision of logistics services in this type of platform occurs in a sequential manner: first the general cargo is treated and then the service rendering activities are processed in addition to the cargo dispatch. As an example, in Europe, they are: Paris-Orly, Frankfurt, Amsterdam-Schiphol and Madrid-Barajas.
- Dry Ports - They are located in a secondary zone and that allows the connection between a port or airport and the respective origin and / or destination. They have a multimodal or intermodal zone and include other functional areas such as customs services. In Brazil there are already several dry ports, also known as the Customs Customs Station (EADI).
- Intermodal or Multimodal Logistics Platform (ILP or MLP): it is a "delimited area, within which different logistics operators handle all processes related to supply logistics and the logistics of physical distribution of products, taking into account relationships local, regional, national, international and global".

Table 2 summarizes the main types of Logistics Platforms detailed earlier.

Table 2 - Types of Logistics Platforms.

TIPOS DE PLATAFORMAS LOGÍSTICAS	
UNIMODAL	MULTIMODAL OR INTERMODAL
<ul style="list-style-type: none"> <li>• Centers or Bus Terminals - CT or CBT;</li> <li>• Waterway Centers or Terminals - WC or WT;</li> <li>• Railway Centers or Terminals - RC or RT;</li> <li>• Airport Centers or Terminals - AC or AT;</li> <li>• Urban Distribution Centers or City-Logistics - UDC or CL;</li> <li>• Distribution Parks or Distriparks - DP or DD;</li> <li>• Transport Centers - TC.</li> </ul>	<ul style="list-style-type: none"> <li>• Logistic Activity Zones - LAZ;</li> <li>• Air Cargo Centrals - ACC;</li> <li>• Dry Ports - DP;</li> <li>• Multimodal or Intermodal Logistics Platforms - MLP or ILP.</li> </ul>

### III. MATERIALS AND METHODS

#### 3.1 EXISTING PROCEDURES FOR THE IMPLEMENTATION OF A MODEL OF LOGISTICAL PLATFORMS

During the bibliographic review two implantation procedures of LP, the French and Spanish models were found. It is observed that there is no explicit

systematization of the models studied, but there are three important segments in both: infrastructure services (administrative, customs, life support, maintenance and telematics), structuring axes (modal transport) and the services offered by logistics operators. Table 3 summarizes the main aspects of the French and Spanish models.

*Table 3 - Summary of the main aspects of the French and Spanish Models.*

MAIN ASPECTS OF THE MODEL	FRENCH MODEL	SPANISH MODEL	COMMENTS
Infrastructure services (administrative, customs, life support, maintenance and telematics)	It is divided into three segments (professional, equipment and organization). The segments serve: reception, information, accommodation, food, banking, travel agency, basic and specific equipment, customs clearing, basic maintenance in vehicles and computer and telecommunications system.	They present segments similar to the French model, such as: administrative centers (information, room rent, registry services, translation, banking system, etc.), as well as hotel services, small maintenance in transport vehicles, customs clearing services and telematic system.	There is a certain similarity in the infrastructure services offered by the two models. There are some basic differences, but in general, it is not enough to de-characterize the segment as a whole.
Structuring axes (transport modes)	Group infrastructure of major transport hubs. It presents in its great majority models of Intermodal Platforms with its respective intermodal terminals integrating the transport by road, rail, waterway, air and pipeline.	It acts as a multimodal distribution supply logistics center. They have several multimodal terminals, that allow to integrate the intermodality between the diverse modes of transport.	It is observed that the two models are characterized by the intensive use of intermodality, that is, integrating the main transport modes through specific terminals.
Logistic Operators (services offered)	It provides supply and distribution logistics services, such as: chartering, brokerage, commercial and customs advice, equipment rental, warehousing and transportation.	Provides supply and distribution logistics services, such as: deconsolidation, consolidation, storage and sorting, finishing operation, quality control, repackaging and labeling.	It is observed that the Logistic Operators offer similar basic services, with some differences, that do not characterize the presented models.

Fonte: Autores, (2019).

It is important to note that the comments made earlier emphasize the main aspects of the procedures surveyed in the literature that define the French and Spanish models. However, such procedures present restrictions that can be explained by the following examples: difficulty of physical space for expansion, lack of compliance with environmental legislation, depth of draft at the terminals, among others. If these models were applied in the Amazon Region, we would have at least two major constraints: the first would be to attend to Brazilian environmental legislation and international pressures, mainly from NGOs, and the second would be to study the best scenario to implement the most appropriate model.

The model to be implemented in the Amazon Region would only be feasible if it met the criteria of Sustainable Development (SD). The other constraint would be to choose the best scenarios for applying the model, this choice should be compatible with the most appropriate scenario. Given these constraints, it would be pertinent to develop a new model for the Amazon Region that would meet the potential of the French and Spanish

models, along with the environmental and alternative scenarios suggested for the Amazon Region.

### 3.2 THE INFLUENCE OF LOGISTICAL PLATFORM IN SUSTAINABLE DEVELOPMENT

The term "sustainability" has become known since the publication of the Brundtland Commission report, Our Common Future (CMMAD, 1991) [18], but today the term has become common and banal. Sustainability in a simplified way means "the ability of a system to reproduce itself over a period of time [19].

Sustainable development is based on the interaction of three development criteria: economic (growth, market expansion, profit maximization and externalization of costs), social (satisfaction of basic human needs, increased equity, community participation in policy decisions and use of appropriate technologies) and ecological (respect to environmental capacity, conservation and recycling of resources and reduction of effluents), forming a triad with sustainability in the center [19].

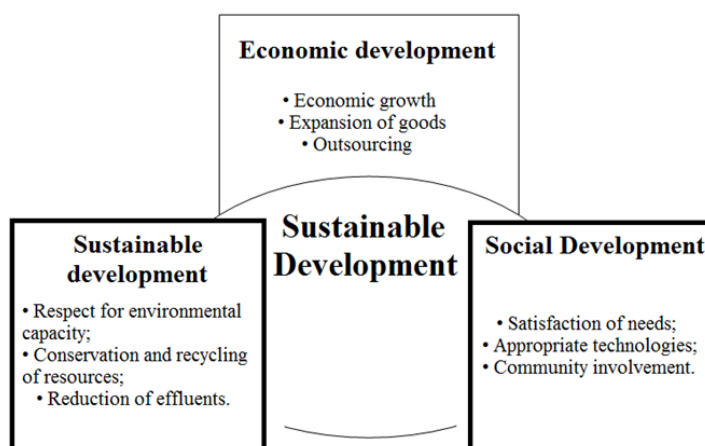


Fig.1 - Sustainable Development.

Source: Adapted by the authors [19].

For [20] he argues that development to be sustainable must be related to ethics and politics, based on the arguments of Amartya Sen and Aristotle, which addresses two basic questions: human motivation and the evaluation of social achievements. The basic questions support that "growth is a necessary condition, but not at all sufficient to achieve a better life." It highlights the need for economic growth without negative environmental and social externalities. In addition to indicating the mobilization of internal resources as a way to generate sustainable activities and taxes on luxury goods to subsidize low wages.

For [21], he argues that the concept of sustainability must be applied locally, based on the planning of the community itself, such as the need for basic inputs and protection of primary resources. The actors [22] reinforce the need to prioritize geographic and cultural dimensions and place, as a prerequisite of any attempt in this direction, the possibility of access to goods and services as raw material and energy.

For [22], it conceptualizes sustainability as "conscious control of the process of social metabolic reproduction by freely associated producers (with self-control), in contrast to the unsustainable and structurally



established characteristic of adversaries." That is, the opposition between cooperation and dispute.

Already [24] shows the need for changes and questions the current development pattern (linear - input of raw material versus output of products and waste), which is maintained not only by the depredation of natural resources but, above all, at the expense of the concentration of capital, immediate return and a contingent of marginalized individuals of the system.

In Brazil, the logistics segment can be considered of fundamental importance to the consolidation of sustainable development projects for any region, especially for our Amazon Region, but it is pertinent to point out that the region does not yet have a well defined sustainability policy.

The Ministry of Transport has as a reference for guidance and evolution of its environmental policy the precepts of sustainable development, contributing for future generations to enjoy the natural resource base available in our country.

Based on the basic concepts of sustainability presented in the Brazilian Agenda 21 - Bases for Discussion, and the results of studies carried out within the framework of the Organization for Economic Cooperation and Development (OECD), which concluded by a conceptualization of environmentally friendly transportation logistics sustainability, will be characterized the sustainability of transport logistics in the Brazilian case. This characterization will constitute a reference for a harmonized sectoral action, aiming at the integration of the public transport policies with those of other sectors and with the planning and planning of the territory based on the paradigm of sustainable development.

The discussion on environmentally sustainable logistics involved links between environmental protection objectives at the local, regional and global levels that could be expressed in numerous environmental quality parameters. The OECD project has two benchmarks: (a) that strategies for environmentally sustainable transport logistics to be successful require a qualitative concept and a set of targets that can be quantified; and (b) quantified targets are small in number and reflect critical values and trends of environmental quality [25].

The OECD project has adopted the following definition for environmentally sustainable transport logistics: "it is transport logistics that do not endanger public health or ecosystems and meet mobility needs consistently with (a) the use of resources renewable levels below their regeneration rates and (b) the use of non-

renewable resources at levels below the development of renewable substitutes".

Within this project, the types of transport logistics impact on the environment were classified into three categories: local and regional impacts of atmospheric emissions, global impacts of atmospheric emissions and local and regional impacts not resulting from atmospheric emissions. Next, six environmental sustainability criteria were established to meet transport logistics: reduction das emissões de óxidos de nitrogênio de fontes de transporte, de forma a permitir o alcance de padrões de qualidade do ar para dióxido de nitrogênio, ozônio e deposição de nitrogênio:

- Reduction of emissions of volatile organic compounds (VOCs) at such a level in order to avoid excessive levels of ozone; reduction of emissions of carcinogenic volatile organic compounds to an acceptable level of risk;
- Reducing emissions of particulate matter to levels that prevent air contamination;
- Control of carbon dioxide emissions, in order to meet per capita values consistent with internationally established targets;
- Control of vehicular noise and traffic so that the levels resulting from exposure pose no health risk or cause serious discomfort;
- Adequate land use, so that the area of influence of transportation systems meets the objectives and constraints of ecosystem protection.

In the continuity of these studies on transportation logistics, consensus was reached on the issue that sustainability will only be achieved through a set of measures that includes both technological development contributions and significant changes in transportation activity, in order to environmental variables necessary for the sustainable development model for the Amazon Region.

The implementation of a Logistics Platform is important for the sustainable development of a region, but one must consider the economic, social and environmental influence when designing transport infrastructure projects. In this sense, the environmental variable added a new component to the infrastructure management process, which aims to complete the circle of interfaces of the transport logistics segment, which already worked on social, technical, and economic conditions associated with sectoral enterprises. Environmental feasibility becomes the criterion for decision-making on transport systems, together with the criteria of economic, technical and social feasibility.

Environmental variables will be considered in all phases of development of the transportation logistics

system: planning, design, implementation and operation. The importance of the environmental feasibility of transport logistics infrastructure lies precisely in the fact that it is considered in the planning phase, when different alternatives are used to meet the demand for transport. Thus, the viable alternatives from the environmental point of view are defined, as well as the conditioning factors of this feasibility. Decisions taken on the basis of this criterion and in association with the other criteria mentioned above will trigger a process of environmental analysis in the subsequent stages of design, implementation and operation of transport systems [25].

This principle is directly related to the principle presented below, since the environmental feasibility of a transport logistics undertaking implies the adoption of environmental considerations and respect for the needs of the environment.

In accordance with Law No. 10233 of June 5, 2001, infrastructure management and the operation of land and water transport will be governed, *inter alia*, by the principle of compatibility of transport logistics with the preservation of the environment environment, reducing the levels of noise pollution and atmospheric contamination, soil and water resources. The preservation of environmental quality becomes an objective of transport logistics actions, determining the development of transport solutions that promote the said compatibility with the preservation of the environment.

The relationship between transport logistics and the environment is multiple and involves transport infrastructure, vehicles and associated factors of accessibility and mobility; the users of the transport system and the populations affected positively and negatively, by the implantation and operation of the infrastructure and the transport logistics services; the characteristics and conditions of the environment under direct and indirect influence of transport. The achievement of the balance of this relationship starts with the commitment of all parties to the need to preserve the environment, as well as the recognition that transport demands deserve a response from the transport segment.

Currently, Brazilian environmental legislation basically contemplates all possibilities for preserving environmental quality, providing for preventive, corrective and compensatory instruments related to the consequences of interventions in the natural and environmental resources of the country.

Programs to control the emission of vehicles and to rationalize the use of oil and natural gas derivatives are examples of successful initiatives to reconcile transport logistics with the preservation of air quality.

The environmental licensing system has evolved and presented positive results, not only in the implementation of measures of environmental control of transport logistics projects, but also in the change of culture within the transportation sector, in order to introduce greater awareness of the need to internalize variables in studies and transport activities.

The practices and norms regarding each modality of transport logistics will be adapted and improved, in order to incorporate the environmental consideration in detail. Consequently, analyzes of transport logistics investments are also reviewed, with the objective of quantifying and accounting for the environmental costs associated with the projects.

Thus, a network of new relationships and new opportunities, as well as constraints and constraints, is perceived for sectoral development compatible with the preservation of environmental quality. This intricate network leads to the need to structure these relationships and their treatment, through an environmental management system that works in a coordinated and continuous way, taking into account the intervening actors and an evaluation system that can measure the level of sustainable development required for each physical space chosen to be the object of PLs implementation [26].

### 3.3 INTERVENING ACTORS

According to [27], in the new contemporary world business environment, the interests of shareholders, customers, suppliers share space with the demands of society, government, private initiative and logistics operator. And for this group, the so-called stakeholders, who are responsible for generating value from new ventures. Meeting the needs of stakeholders is no longer an option and becomes a strategic differential.

There are different definitions in the literature for the term stakeholders. The authors [3] [10] [28] [29] adopt more comprehensive classifications, considering stakeholders all persons or "stakeholders." Regardless of the existing classifications, it can not be denied that there are more stakeholders related to the company (the so-called primary) and those that are not directly influenced or affected by the business actions (the secondary ones) [29]. The first group includes shareholders, employees, customers, suppliers, the community and the environment, among others. Among the secondary stakeholders, one can cite as an example the media and pressure groups.

According to [28], when studying this subject, it is necessary to understand that there is an interdependent

network of relationship between organisms and the stakeholders. This interdependent relationship network will define the interaction of its various components and will be responsible for business gains or losses, according to the performance of the company.

In the studies conducted by [3] [10] [12] [16], some stakeholders were identified, directly or indirectly, with the implementation of LPs, such as: government, society, investors, unions, private sector, NGOs, logistics, employees, competitors, financial agents and partners etc.

#### IV. RESULTS

The choice of the stakeholder to be adopted depends on the criteria considered and the relative

importance assigned to each of them, which requires a significant research effort to reach the most characteristic group of the area investigated. For the purposes of exemplification and with the studies cited above, table 2.4 was elaborated containing four criteria for the choice of the stakeholders that will be approached in the present work. The criteria chosen were: importance, impact, level of power and level of interest, in accordance with the studies of [10]. The score was elaborated taking into account three levels of intensity: high (3), medium (2) and low (1) [30]. The result of the evaluation can be seen in the last column of table 4.

Table 4 - Criteria for choosing Stakeholders.

SELECTION	CRITERION 1	CRITERION 2	CRITERION 3	CRITERION 4	RESULT
<i>Stakeholders</i>	The importance of stakeholders in the success of the project.	The impact on the project if the stakeholders are not included in the project.	The level of power that stakeholders have to block or prevent project progress.	The level of interest that stakeholders have to help project progress.	Evaluation
Clients	2	1	1	1	5
Providers	2	3	3	2	10
Investors	3	3	2	3	11
Syndicate	1	1	3	1	6
Private initiative	3	3	3	3	12
ONGs	1	1	2	2	6
Government	3	3	3	3	12
Society	3	3	3	3	12
Shareholder	3	3	3	2	11
Logistic operator	3	3	3	3	12
Employees	1	1	1	2	5
Financial Agent	2	2	2	2	8
Competitors	1	1	1	1	4
About us	2	1	1	1	5

Source: Authors, (2019).

It is observed that the stakeholders that had the best evaluation were the following: society, government, private initiative and logistic operator, confirming the main bibliographies consulted [15].

It is important to highlight the representativeness of the community members in the public hearings during the presentation process of the LP implementation model, as well as to charge the government with a strong enforcement action through regulatory agencies, creating policies, guidelines and regulations.

The implementation of a LP imposes a series of associated interests on the actors involved, as well as allowing a series of sustainability indicators to be deployed. The following will be presented in a very brief way as if they give these associated interests.

Society should play an important role in discussions at public hearings, in order to resolve the social, environmental and economic issues arising from the implementation of a LP.

The government acts in the formulation of policies, guidelines and regulations, mainly in the operational, social, environmental and economic issues arising from the implementation of a Logistics Platform.

The private initiative must meet the requirements of the government regulatory agencies, in order to guarantee the needs discussed with society, so that the social, environmental and economic decisions arising from public hearings can be monitored by stakeholders.

It is known that the logistics operator (concessionaire) is part of the private initiative, but they have an important role, because it will operate the logistic complex taking into account the requirements of the government regulatory agencies. The gains of these interests associated with the intervening actors can be translated in the strengthening of the organizational image, in the fidelity to the brand of the offered services, in the access to new markets and capitals, in the greater commitment and motivation of the employees in producing, in the reduction of conflicts and in the financial return to shareholders and investors.

The following is a brief summary of the definition and importance of the actors involved [27].

#### 4.1 SOCIETY

In Sociology, a society is the set of people who share goals, tastes, concerns and customs, and that interact among themselves constituting a community. Society is the object of study of the social sciences, especially Sociology.

It is also called a partnership or association the grouping of people for the performance of private activities, being reserved for the first expression to the meeting for business purposes and the second for the set that aims at social outcomes regardless of financial benefits, according to articles 53 and 981 of the Code Civil.

A society is a group of individuals that form a semi-open system, in which most of the interactions are made with other individuals belonging to the same group. A society is a network of relationships between people. A society is an interdependent community. The general meaning of society refers simply to a group of people living together in an organized community.

The origin of the word society comes from the Latin *societas*, a "friendly association with others". *Societas* is derived from *socius*, which means "companion," and thus the meaning of society is closely related to that which is social. It is implicit in the meaning of society that its members share mutual interest or concern about a common goal. As such, society is often

used as a synonym for the collective of citizens of a country governed by national institutions that deal with civic welfare. check out

Finally, people from various nations united by traditions, beliefs or common political and cultural values, are sometimes called societies (eg, Judeo-Christian, Eastern, Western, etc.). When used in this context, the term acts as a means of comparing two or more "societies" whose representative members represent alternative, competing, and conflicting worldviews.

#### 4.2 GOVERNMENT

Government is the highest instance of executive management, generally recognized as the leadership of a state or a nation. Usually the government or cabinet is called to all the executive directors of the State, or ministers (hence also called the Council of Ministers).

The form or regime of government can be Republic or Monarchy, and the system of government can be Parliamentary, Presidentialism, Constitutionalism or Absolutism. A nation without a Government is classified as anarchic.

It can be said that form of government is a concept that refers to the way in which the institution of power is given in society and how the relation between the conclusion of the system of government, on the other hand, is not confused with the form of government, since this term refers to the way in which powers are related.

#### 4.3 PRIVATE INITIATIVE

The definition of the concept and scope of the "entrepreneur", especially in relation to its condition of "organized" activity (article 966), which, consequently, allows to frame societies as simple or entrepreneurs has been one of the topics on which raised the greatest controversy.

Much has been discussed about art. 966 in the new Civil Code, which defines the "entrepreneur", that is, "It is considered an entrepreneur who carries out professionally organized economic activity for the production or circulation of goods or services." Still, in its single paragraph, we have the following hypotheses of exclusion "It is not considered an entrepreneur who exercises an intellectual profession, scientific, literary or artistic, even with the help of auxiliaries or employees, unless the exercise of the profession constitutes element of business ". This definition is the complete reproduction of the provisions on the same subject in the Italian Civil Code, which, as we know, was the paradigm for the new Brazilian Business Law.

The term "entrepreneur" leaves the field of status or personal qualification and has a legal definition. With that, the word becomes precarious to define those who are part of a society or are owners of a business of their own. Nevertheless, we know how difficult it will be, and even impossible, to make such a change in such deeply rooted customs.

In conclusion, economic activities are no longer classified as commercial or civil, and the term "individual firm" ceases to exist. The definition becomes, for those who carry out the activity individually, as an entrepreneur or autonomous. For those who join, the definition becomes simple society or business society. In both cases the lucrative purpose is indispensable.

#### 4.4 LOGISTIC OPERATOR

The origin of the term logistic operator, as it is called in Brazil, comes from the concept of outsourcing logistics services (outsourcing), which emerged in the United States in the 80's and nowadays heavily disseminated in European countries as Third-party Logistic Provider - 3PL or Logistic Provider. According to [31], the term 3PL began to be used as a synonym for "subcontracting elements of the logistics process".

In the literature, several definitions of logistic operators have emerged in the last years, among them, that of [32], which states that logistic operator is the logistics service provider that has recognized competence in logistics activities, performing functions that can encompass the entire logistics process of a client company or only part of them.

Finally, it is observed that other authors use different criteria to characterize the 3PLs. According to the authors [33], some are stricter, requiring that, to be classified as 3PL, a logistics service provider must carry out a wide range of activities in an integrated manner, having the capacity to carry out projects, operation and management, as well as own long-term contracts with its customers. Other authors are less strict and consider that any company that performs some logistic activity, under contract, for third parties, with capacity for planning, operation and management, should be considered a logistics operator or a 3PL.

#### 4.5 SUSTAINABILITY INDICATORS AS PERFORMANCE MEASURES

In the 1980s, it was realized that economic growth should be more socially fair and more compatible with the preservation of the natural resource base. To this global objective, it was called "sustainable development". Sustainability may mean concluding different program

objectives at the same time. Social and environmental economic concerns should be analyzed and dealt with jointly [34].

At the end of the 1980s, there were proposals for the development of indicators that could meet environmental needs. Such proposals for the creation of indicators have the central objective of providing a basis for formulating national policies and global agreements, as well as strengthening decision-making, taking into account the interests of public and private sector stakeholders. The proposal of the indicators still seeks the interaction between the anthropic activity and the environment and give the concept of sustainability more grounding and applicability [35].

The development of environmental and sustainability indicators have three types of approach. The first part deals with biocentric issues, consisting of the identification of indicators that deal with the biological, physical-chemical or energy aspects of the ecological balance of ecosystems. The second part deals with economic aspects, prioritizing monetary assessments of natural capital and the use of natural resources. The third part seeks to balance the aspects of the economic system and the quality of human life, and in some cases can contemplate aspects of the political, cultural and institutional system. It is important to note that this research will focus on the third strand [36].

The indicators constructed from the perspective of the third strand are, as a rule, interaction models of anthropic activity / environment that can be classified into three main types: state, pressure and response.

State indicators seek to describe the present physical or biological situation of natural systems, pressure indicators attempt to measure / evaluate the pressures exerted by anthropic activities on natural systems, and finally the so-called response indicators seek to assess the quality of policies and agreements formulated to respond to and minimize human impacts [37].

The great difficulty found in the indicators is the lack of systematized information and the difficulty of comparing data produced based on different sources / methodologies, creating difficulties in the measurement of sustainability indicators.

It is important to highlight that the emergence of the indicators considered in the third strand can only be understood as an integral part of a process of refinement of sustainability indicators.

Since the late 1950s, the world has been measuring economic development through GDP. However, in the 1990s, Pakistani economist Mahbub ul Haq developed an



indicator that could measure wealth, literacy, education, life expectancy, birth rates and other factors for the various countries of the world. This index came to be called the Human Development Index (HDI). The UN has been using this index annually since 1993 by the United Nations Development Program.

It should be noted that both the HDI and its improved versions, the so-called third-generation indexes, are not the most adequate to measure sustainable development, since it does not address environmental issues.

Among the recent attempts to develop synthetic indexes of sustainability and sustainable development, we highlight the Environmental Sustainability Index (ESI), developed by the Universities of Yale and Columbia with the support of the World Economic Forum. The premise of the ESI is to analyze and evaluate environmental sustainability over time and identify the determinants of "environmental success" and long-term sustainability.

The main problems encountered in sustainability indices and indicators are: absence or fragility of the conceptual design, fragility of the criteria for choosing the representative variables and lack of clear criteria for integrating the data used.

The formation of the municipal sustainability indexes is composed of four groups of indexes, namely: quality of the environmental system; quality of human life; anthropogenic pressure; and political and institutional capacity.

The indicators and variables used in the municipal sustainability index were selected based on the work of [37-43], in addition to the matrixes of the project Biodiversity, Population and Economy [44] and critical review by some specialists.

The main criteria adopted in the choice of sustainability indicators were [44]:

(1) Relevance

- The variable's ability to translate the phenomenon. This criterion directly measures the phenomenon;

(2) Local grip

- Capacity of the variable (or indicator) to capture phenomena produced that can be transformed at the local level;

(3) Availability

- Coverage and timeliness of data;

(4) Variable capacity

- Allow time comparisons.

Taking into account that the main objective of the previously mentioned criteria is to create compatible indicators for the region studied, an additional criterion used in the choice of variables and indicators was the possibility of calculating them to other locations, such as continents, states, mesoregions, microregions, municipalities and districts.

Table 5a and 5b describe the composition of the indicators used in the thematic indexes of human life quality, anthropogenic pressure and political-institutional capacity.

Table 5a - Thematic indices and indicators.

THEMATIC INDEXES	INDICATORS	COMPOSITION OF INDICATORS
QUALITY OF HUMAN LIFE	Quality of housing Life conditions	Percentage of subnormal dwellings Longevity Index - HDI Education index - HDI
	Income Environmental health and safety Health services	Income index - HDI Index of deaths in traffic accidents Index of deaths from respiratory diseases Index of deaths from parasitic diseases Homicide death rate Index of water supply Sanitary installation index Garbage collection service index
ANTHROPIC PRESSURE	Urban pressure  Industrial pressure Agricultural pressure	Population pressure rate Housing density per room Number of vehicles per capita Urban energy consumption Industrial Energy Intensity Density of crop and passage in the municipality Average growth rate of crops and passages in the last 10 Rural energy intensity

Table 5a - Thematic indices and indicators.

THEMATIC INDEXES	INDICATORS	COMPOSITION OF INDICATORS
	Vegetal cover	Proportion of area occupied by forests and planted forests and area occupied by forests and natural forests in establishments Vegetal cover

Source: Authors, (2019).

Table 5b - Thematic indices and indicators.

THEMATIC INDEXES	INDICATORS	COMPOSITION OF INDICATORS
INSTITUTIONAL CAPACITY	Political-administrative autonomy	Fiscal autonomy Public indebtedness Election weight Higher level employees
	Municipal management public	Informatization Urban policy councils and decentralization Urban management tools Environment Council Number of municipal conservation units
	Environmental management	Environmental NGOs Political-electoral participation Written press Press release
	Information and participation	

Source: [45], adapted by the authors, (2019).

It is observed a relationship between the indicators presented previously with the intervening actors chosen for the purpose of this study. The thematic indexes addressed in the definition of the indicators previously proposed (human quality of life, anthropic pressure and institutional capacity) are directly or indirectly related to stakeholders, society, government, private initiative and logistic operator. Some examples can be cited: the Living

Conditions (HDI) indicator relates to the intervening government and society actors, the indicator Industrial Pressure (Industrial Energy Intensity) relates to actors intervening government, private initiative and logistic operator among others. Table 6 presents a matrix with the main relationships between stakeholder actors and related indicators.

Table 6 - Main relationships between the stakeholders and the indicators.

Atore stakeholders	Indicators
Society	• Living conditions (HDI); Health service; Income; Urban pressure.
Government	• Living conditions (HDI); Health services; Quality of housing; • Industrial pressure; Public administration.
Private initiative	• Industrial pressure; Information and articulation; Income; Environmental health and safety.
Logistic operator	• Industrial pressure; Environmental health and safety; Income; Environmental management.

Source: Authors, (2019).

The calculation methodology was tested four times, by different methods of standardization, by assigning weights to the variables, using the techniques of

multivariate analysis. This methodology can be tested in the Amazon Region or in the capitals of the six states of the region, contemplated in the proposal of this research.

Finally, there is a close relationship between the interests associated with the implementation of a Logistics Platform, with the horizontal and vertical relations of the intervening actors, allowing an adequate deployment of sustainability indicators, linked to criteria that make the performance evaluation of sustainable development possible to identify the main positive and negative impacts associated with the implementation of a Logistics Platform.

#### 4.6 POSSIBLE IMPACTS (POSITIVE AND NEGATIVE) ASSOCIATED WITH A DEPLOYMENT OF REGIONAL LOGISTIC PLATFORM

Some positive impacts can be evidenced with the implementation of the Regional Logistics Platforms, according to [3]:

- Rationalize logistics activity, ordering the continent, region, state, mesoregion, microregion, municipality and district, contributing to the formalization of new businesses;
- Encourage intermodality, valuing existing structures and networks, boosting intermodal transport;
- Promote environmental gains by reducing pollutant emissions (CO<sub>2</sub>) and concentrating activities that are dispersed and poorly located;
- Contribute to the sustainable development of the region and some specific territorial areas, generating jobs and new forms of wealth creation;
- Increase competitiveness by promoting infrastructure that enhances sustainable development, turning the geographical situation into a competitive advantage;
- Improve the flow of accessibility and mobility of cargoes and people among the geographical areas served by the Regional Logistics Platform;
- Provide all the necessary infrastructure to streamline the flow of imports and exports;
- To create new jobs, specialized, demanding the increase in technical qualification, in the upper secondary courses, in the upper and post-graduate courses (specializations, MBAs, masters and doctorates) in order to improve the training of this specialized workforce;
- Develop ecotourism potential and related activities, such as commerce, restaurants, hotels, etc.

However, there are negative impacts that can be observed in the implementation of the Regional Logistics Platforms, as [3]:

- Locating the Logistics Platform in an appropriate place, in case this does not occur there will be a loss of space productivity - it is aberrant to carry them out in the city center;

- Preferably limit the traffic of cargo vehicles and the negative externalities they cause; and
- To demonstrate the operational (efficiency, effectiveness and effectiveness) performance of the Regional Logistics Platform - if this does not happen, companies will distance themselves from the logistics complex.

It is observed that the main impacts (positive and negative) are directly related to the correct performance of the intervening actors (society, government, private initiative and logistic operator). The correct implementation of the objectives of a Regional Logistics Platform presupposes the direct participation of the intervening actors, in the incessant search for the positive impacts arising from the implementation.

In the implementation of a Regional Logistics Platform, it is extremely important to supervise the regulatory agents of the government in order to ensure that policies and guidelines are duly complied with.

Performance indicators, in turn, are appropriate instruments to measure phenomena, including allowing time comparisons, which facilitates decision-making by taking into account the interests of public and private sector stakeholders, minimizing the appearance of negative impacts, to the detriment of strengthening of positive impacts, resulting from the implementation of a Regional Logistics Platform (RLP).

The infrastructure of a RLP facilitates the realization of the productive and social activity of individuals and organizations. By providing conditions for economic growth, it becomes essential to development, even if it is not in itself sufficient to guarantee it.

Among the challenges of investing in public infrastructure of a RLP are the identification and measurement of qualitative impacts of an economic, social and environmental nature. The greater the number and intensity of the expected positive and negative impacts, the more significant the need for evaluation, through performance indicators, becomes. It is worth mentioning that the logistic operations of a RLP take place in a specific space, within a specific geographic area and that its use is related to the movement of goods and services between two distinct points. In this context, it is fundamental to know both the vision of the idealizers and the opinion of the possible beneficiaries / users of the projects (intervening actors). This counterpoint aims to improve the harmony between both designers and users, providing a favorable environment for choosing the best projects from the point of view of society and government as a whole. Such procedures should aim to complement

the traditional cost-benefit analysis, seeking results that reflect the different natures of the positive and negative impacts caused by the projects of a RLP.

## V. CONCLUSIONS

Finally, the concern with qualitative economic, social and environmental impacts of the infrastructure of a RLP becomes more relevant when the logistics service is adequate. In this situation the implications of the construction of the infrastructures and the operation of the logistics equipment have ample reach and, often, almost imperceptible. Implementing and operating a RLP implies a series of positive and negative impacts on the environment of its area of influence which, when not considered, distort expectations of return to stakeholders on the implementation of a RLP.

On the other hand, there is a strict relationship between the interests associated with the implementation of a Logistics Platform, with the horizontal and vertical relations of the intervening actors, enabling an adequate unfolding of sustainability indicators, linked to criteria that make the performance evaluation of the possible to identify the main positive and negative impacts associated with the implementation of a Logistics Platform, in the view of the Stakeholders.

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