










# Port Terminals Assessment: An Empirical Analysis of Requirements of Brazilian National Plan of Port Logistics

Aguinaldo Eduardo de Souza<sup>1,2</sup> , João Gilberto Mendes dos Reis<sup>1,3</sup> ,  
Ataide Pereira Cardoso Junior<sup>1</sup> , Emerson Rodolfo Abraham<sup>1</sup> ,  
Oduvaldo Vendrametto<sup>1</sup> , Renato Marcio dos Santos<sup>4</sup> ,  
and Roberta Sobral Pinto<sup>4</sup> 

<sup>1</sup> Paulista University - UNIP, PPGEF, São Paulo, Brazil  
souza.eduaguinaldo@gmail.com

<sup>2</sup> UNIBR, São Vicente, Brazil

<sup>3</sup> UFGD, PPGA, Dourados, Brazil

<sup>4</sup> UNISA, Universidade Santo Amaro, São Paulo, Brazil

**Abstract.** Brazilian National Port Logistics Plan (PNLP) aims to develop strategic actions to increase operational efficiency in Port systems. The Port of Santos is the largest exporter of grains and has vital importance for the country economy. The present study objective to evaluate among the 13 strategic actions developed by the PNLN which are the most important for port terminals. Therefore, a survey was carried out with managers of all Santos terminals specialize in agricultural products. Our results showed that 75% of respondents highlighted port security as a top priority. Secondly, 62,5% of them point out improvements in operational processes (consolidate paperless port, waterway access, consenting bodies, the efficiency of navigation agents), and finally, 50% of interviewed said that actions to guarantee the accessibility of the vessels are essential.

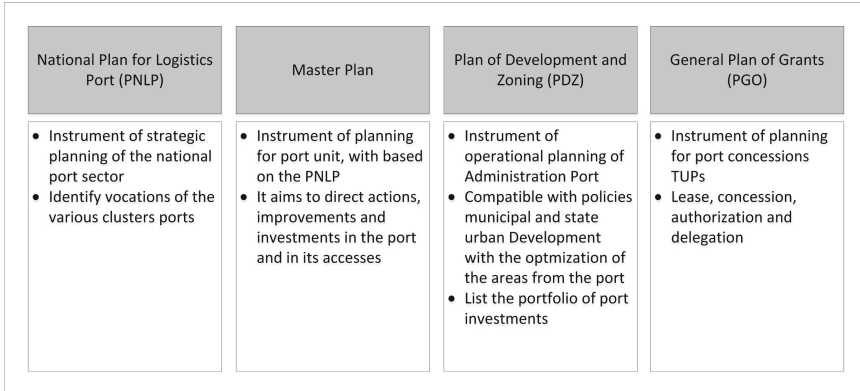
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## 1 Introduction

Brazil is one of the world's leading producers and exporters of soybeans and corn. The country is the largest producer of soybeans with 120 million tons, and comes in third place with corn at 82 million tons, for the 2017–2018-year harvest. Regarding the exporter's ranking by tonnage, it ranks first for soybeans with 76 million tons, and second for corn with 22 million tons [1].

Facing port bottlenecks caused by this high quantity of commodities exported is a challenge. Hence, Brazil developed the National Port Logistics Plan (Plano Nacional de Logística Portuária-PNLP).

Despite the fact that the Brazilian port system has made great strides over the last 35 years, where Law 8.630/93 (that changed the model of cargo handling, administration, and exploration for new ports), and Law 12.815/13 (that provided a new regulatory framework for the sector) [2–6], many challenges still exist [7–9] hereof, in 2014 the Brazilian National Secretary of Ports (SNP) extrapolated the PNLP over the period 2015–2042 [10]. Figure 1 shows the structure of PNLP.



**Fig. 1.** Structural basis of the National Port Logistics Plan. Source: [10]

The PNLP aims to identify vocations from several ports, defining short, medium, and long-term scenarios-by the year 2035, hoping to set and reaching goals through 2042. The main premise is to establish alternatives for intervention in infrastructure and management systems, ensuring an efficient allocation of resources from resource prioritization [10].

The first phase of the PNLP consisted of diagnosing the port sector for 2010–2014, establishing the following areas: economic management, operations, capacity, logistics, and environment. Afterwards, a cargo forecast was made based on demand projections for 2015–2042, as well as the allocation of cargo in ports for horizons through 2020, 2030, and 2042. The third phase defined the strategic objectives: monitoring indicators and goals, definition of strategic actions, and definition of the investment portfolio.

Our proposal in this article was to identify the dimensions of the assessment of port operators (maritime terminals) in relation to the strategic actions defined in the PNLP. Thus, we intended to answer the following question:

- Do the actions of PNLP meet the priority demands of port operators?

To this end, a survey was carried out with the eight terminals specialized in handling grains at the port of Santos.

## 1.1 Port of Santos

Sharing 28% of Brazil's international trade flow, the port of Santos is the main port of the country. Located on the coast of the state of São Paulo (southeast region) in the cities of Santos and Guarujá, it is a public port and has approximately 15 km of geographical extension, 55 maritime terminals, and 65 berths. The Santos port complex in 2018 accounted for 4,046 ship moorings and moved 133 million tons of cargo [11, 12].

Accessibility and the existence of the economic influence zone are the two main factors drawing cargo to the port of Santos. Five states make up the primary area of influence of the Port (São Paulo, Minas Gerais, Mato Grosso, Mato Grosso do Sul, and Goiás), which together represent 67% of Brazil's gross domestic product [13].

## 2 Methodology

In order to identify the dimensions of the PNLP adopted for grain terminals in Port of Santos, we conducted a survey following three stages.

**First:** a literature review was performed to understand the goals, strategic actions and structure of the National Port Logistics Plan - PNLP.

**Second:** we conducted a survey with managers of eight terminals specializing in agricultural commodities shipping. They operate with soybean, soybean meal, and corn. These terminals have a static capacity of 1,281 thousand tons and are located five of them on the right bank of the port (Santos) and three on the left side (Guaujá) (Fig. 2).

**Third:** we applied a questionnaire to terminal managers based on the thirteen strategic actions developed by the PNLP (i.e., objectives and operations indicators) regarding five distinct areas: economic management, operations, capacity, logistics, and environment (Fig. 3).

## 3 Results and Discussion

The survey results are presented in the Fig. 4.

Around 75% of respondents pointed out that port security was a high priority. The international Ship and port facility security (ISPS CODE) has been the basis of a comprehensive system of mandatory protection for international maritime transport [15]. Following the Sept. 11 attacks in New York, at the request of the United States, world ports had to take special security measures. In Brazil terminal inspections and certificate concessions are responsibilities of the National Commission for Public Safety in Ports, Terminals and Waterways - CONPORTOS, following the international code of the International Maritime Organization - IMO [16].



Fig. 2. Location of the eight terminals in the Port of Santos. Source: [14]

Questions
1. Automate operational procedures ?
2. Consolidate the use of the Paperless Port for the release of vessels and cargoes ?
3. Deploy ISPS in the port facilities of public ports ?
4. Ensure operating conditions for waterway accesses ?
5. Harmonize the Paperless Port (PSP) with the Single Foreign Trade Portal ?
6. Implementing the Traffic Management System for Vessels in Brazilian ports ?
7. Modernize the processes of agreement ?
8. Promote the resolution of port 24 hours ?
9. Reduce non-operational time before start-up and after and after completion of cargo handling operations of docked ships ?
10. Simplify long-course navigation processes ?
11. Simplify your home navigation processes ?
12. Stimulating the search for efficiency by navigation agents ?
13. To regulate the economic of the zones of practice and services of cabotage ?

Fig. 3. Questionnaire questions. Source: Adapted of [10]

The main representatives of the port terminals report that international drug traffic is the main concern related to port security. The Port of Santos has been the main route of drug traffickers to the European continent [16].

Around 62,5% of respondents highlighted operational actions (e.g., consolidated paperless port, waterway access, consenting agencies, efficiency of navigation agents).

	Main Results	%
Very strong Very strong Extremely strong	Deploy ISPS in the port facilities of public ports	75.0
	Consolidate the use of the Paperless Port for the release of vessels and cargoes	62.5
	Ensure operating conditions for waterway accesses	62.5
	Modernize the processes of agreement	62.5
	Stimulating the search for efficiency by navigation agents	62.5
	Ensure operating conditions for waterway accesses	50.0
Not importance Equal importance	To regulate the economic of the zones of practice and services of cabotage	50.0
	Automate operational procedures	37.5
	Harmonize the Paperless Port (PSP) with the Single Foreign Trade Portal	37.5
	Simplify long-course navigation processes	37.5

**Fig. 4.** Results. Source: Authors

Among these actions highlight the Paperless Port (PSP) that is a support system to facilitate the analysis and release of documents in Brazilian ports. This means that documents are converted into a single electronic document, the Virtual Single Document (DUV) [17]. According to the PNL, the deadline to regulate the use of the Paperless Port system in Brazilian ports is until [10].

And half of the interviewed 50% cited actions that guarantee accessibility to the vessels. As effective actions, 236.9 million reais were invested in dredging in 24.6 km in the access channel of the Port of Santos [18].

In one minor issue, 50% indicated the regulation of practical and cabotage issues. In spite of the importance of cabotage in the operations of the world ports [19, 20] the low importance here refers to the fact that the grains arrive from the producing states by rail and road, in addition the terminals only dispatch cargoes to the international market.

Eventually, around 37,5% of managers noted the desirability of automated operational procedures, harmonizing the paperless port and foreign trade portal, along with the long-haul navigation process.

## 4 Conclusions and Outlook

Although the port operators seek to improve processes to increase operational efficiency, the results presented indicate that among the strategic actions proposed by the PNL security (i.e., international shipping and port facility security code) was highlighted as the main priority.

The goal for ISPS code deployment will be sought in 100% of the national ports until 2025. As for the improvements in operational processes, SNP has established five years (2015 to 2020) as a global goal. However, to date there is no governmental data that measures the results, which is the main limitation of the present study.

For future work, we intend to analyze the results of the PNL strategic actions.

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