

Transparency and sustainability levels in port and terminal reports

Níveis de transparência e sustentabilidade nos relatórios de portos e terminais

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ABSTRACT

The port sector has been under pressure from stakeholders to improve its environmental management. Port Environmental Performance Indicators (EPIs) rank ports and port terminal performance and promote transparency. This paper analyzes disclosure levels of global and specific Sustainability Report indicators published by Brazilian Public Ports (PPs) and Brazilian Private Use Terminals (PUTs), according to EPIs proposed and developed by the National Waterway Transport Agency. We also sought to measure the degree of informational transparency on institutional websites regarding environmental and sustainability issues and the frequency of published reports between 2017 and 2020. Two indicator blocks were studied, which were Global and Specific EPIs. Although many PPs and PUTs publicize environmental and sustainability actions on their websites, they need to formalize these actions into a single clear report so

society can better access quick and precise information through standardized reports. The research in the sustainability reports showed that some organizations already address the Sustainable Development Goals (SDG). However, the approach is still scarce, representing only 10% of the organizations analyzed for both types.

Keywords: sustainability, environment, environmental performance index, ports.

RESUMO

O setor portuário tem sofrido pressão das partes interessadas para melhorar sua gestão ambiental. Os Indicadores de Desempenho Ambiental Portuário (EPIs) classificam o desempenho dos portos e terminais portuários e promovem a transparência. Este artigo analisa os níveis de divulgação dos indicadores globais e específicos do Relatório de Sustentabilidade publicados pelos Portos Públicos (PPs) e Terminais de Uso Privado (PUTs) brasileiros, de acordo com os EPIs propostos e desenvolvidos pela Agência Nacional de Transportes Aquaviários. Também buscamos medir o grau de transparência informacional nos sites institucionais em relação a questões ambientais e de sustentabilidade e a frequência de relatórios publicados entre 2017 e 2020. Foram estudados dois blocos de indicadores, que foram os EPIs Globais e Específicos. Embora muitas PPs e PUTs divulguem ações ambientais e de sustentabilidade em seus sites, elas precisam formalizar essas ações em um único relatório claro para que a sociedade possa ter melhor acesso a informações rápidas e precisas por meio de relatórios padronizados. A pesquisa nos relatórios de sustentabilidade mostrou que algumas organizações já abordam os Objetivos de Desenvolvimento Sustentável (ODS). Entretanto, a abordagem ainda é escassa, representando apenas 10% das organizações analisadas para ambos os tipos.

Palavras-chave: sustentabilidade, meio ambiente, índice de desempenho ambiental, portos.

1 INTRODUCTION

International economic growth has been driven by globalization and has resulted in greater port demand. Most of the world's wealth passes through ports. Globalization implies political, economic, and social transformations. Ports are largely responsible for globalization effectiveness, especially in economic terms, since they generate trade opportunities and significant increases in imports and exports. This distribution mode is an excellent production integrator, given the low cost of maritime transportation, assembly, and distribution centers for large multinational companies (Garcia, 2012).

The port sector is vital for the global economy. However, with more significant ship flows and operations, ports can cause significant adverse environmental impacts

(Zho et al., 2020; Kegalj et al., 2018). Seaports are complex systems that can cause various environmental issues, e.g., emissions, waste, and noise (Darbra et al., 2005; Siroka et al., 2021).

Three sustainability performance pillars have been established to account for this, i.e., the social, environmental, and economic pillars, and companies use Sustainability Reports (SRs) to report on these issues. Sustainability Reports must provide a balanced and reasonable assessment of sustainability performance, including positive and negative aspects (Santos et al., 2016; Hossain et al., 2020). The Sustainability Reports also report on Port Environmental Performance Index (EPI) indicators, which were created by the Brazilian National Waterway Transport Agency (ANTAQ). The EPI, as a tool, regulates and supervises port activities to diagnose problems and promote proactive environmental policies (Rodrigues, 2014; Puig, et al. 2014; Paiva et al., 2019).

The EPI quantifies and simplifies information to facilitate the public and decision-makers' understanding of environmental issues at ports. The goal is to assess environmental management at port facilities based on defined parameters (Abrantes & Barrella, 2019).

Governments, businesses and society have widely discussed initiatives promoting sustainable development. The global action plan for the United Nations (UN) sustainable development is Agenda 2030. The SDGs require interactions among governments, businesses, and society to achieve a shared level of sustainable prosperity (Khaled et al., 2021).

Among the Indicators that report the sustainability of organizations, the association with the SDGs (Sustainable Development Goals) emerges. Brazil has sought to adapt to the SDG Indicators so that the stipulated global targets are achieved. For this, Public Ports and Private Terminals clearly participate in this adaptation, since they are responsible for a large movement of cargo and people in the country and need investments that make them efficient (Silva, 2018).

The 2030 Agenda, outlining 17 Sustainable Development Goals (SDGs) and 169 targets, aims to enhance organizational efforts in achieving these SDGs. The maritime industry plays a key role in this, promoting social elements such as gender equality and

women's empowerment through global initiatives, focusing on health and well-being in the workplace. Environmentally, the sector has the responsibility to minimize pollution impacts in oceans, ports, and coastal regions, while encouraging funding, research, and development of clean energy solutions. (IMO, 2017).

The sustainability reports are very important for both stakeholders and the ports themselves. They are, therefore, crucial for understanding any adopted strategies at Public Ports (PPs) or Private Use Terminals (PUTs). Furthermore, published information traceability and transparency allow us to understand what needs to be improved to achieve better port-city relationships with mutual benefits for all those involved.

This paper analyzes disclosure levels of global and specific Sustainability Report indicators published by Brazilian Public Ports (PPs) and Brazilian Private Use Terminals (PUTs), according to EPIs proposed and developed by the National Waterway Transport Agency. Additionally, we sought to identify the degree of transparency of the information presented to society regarding environmental and sustainability issues at these organizations.

2 LITERATURE REVIEW

2.1 PORT SECTOR

The Brazilian port system comprises 37 Public Ports (PPs) and 169 Private-Use Terminals (PUTs), managed by various dock companies (Soares & Casaca, 2022; Brandão et al., 2020). PUTs are located outside organized PP management areas, and operate with authorization from ANTAQ.

Ports promote economic stability for a large number of cities, bringing about both positive and negative impacts (Musso et al., 2006; Rodrigue & Notteboom, 2020). Therefore, investments in environmental management are needed to mitigate negative impacts (Domingues et al., 2021).

Sustainability can be defined via three dimensions i.e., the environmental, social, and economic dimensions (Harris, 2000; Rasoolimanesh et al., 2020). Two conditions must exist for this to be met. The first is having natural resources, i.e., having a natural capacity (Umar et al., 2020). The second deals with social, economic, and political

concerns, i.e., societies supporting generative capacities (Dalevska et al., 2019). Port activities fit perfectly into sustainability concepts, since they are responsible for both economic and social development, in addition to promoting environmental protection (Lam & Yap, 2019). Therefore, sustainable ports, must by definition, achieve these three sustainability dimensions (Garcia, 2012; Alamoush et al., 2021).

The notion that ports and terminals are merely places for loading and unloading ships has been greatly modified in today's conceptualization, which seeks to understand the true role of ports within any system (Cartacho, 2021).

Sustainable development principles are necessary for producing wealth that does not deplete or reduce natural resource availability for future generations, while meeting growing world population demands (Romeiro 2012). Ports play an extremely important role in economic and social development (Carpenter & Lozano, 2020). Thus, there is "consensual damage" for the sector when it causes environmental impacts (Karimpour et al., 2020). Planning and monitoring must occur to generate the lowest possible interference levels with the surrounding port areas (Darbra et al., 2009; ANTAQ, 2011).

2.2 PORT SUSTAINABILITY REPORTS

Port Sustainability Reports provide details on organizational performance, enabling stakeholders to make informed decisions. They disclose impacts on the community, giving insights into corporate actions. Over the past 20 years, the prevalence of these non-financial reports has increased, reflecting an expanded understanding of organizational value including social and environmental aspects. These reports primarily reveal non-financial data, focusing on market-related risks and opportunities.

An organization's Sustainability Report contains information on its social, economic, and environmental impacts, influences stakeholder decisions, and can contain quantitative and qualitative information (Davis & Searcy, 2010). The information contained in the reports must be of such a quality that it allows stakeholders to assess and draw fair and adequate conclusions as to the status of the port (GRI, 2013). An efficient and transparent Sustainability Report is a powerful company tool for showing the world how a port is aware of the problems it faces (Higgins et al., 2020).

Several national and international initiatives have published standards, guidelines, and tools to help address these issues, given the importance of transparently publishing corporate data to meet sustainable development requirements. These include the Global Compact, Ecological Footprint, and the Global Reporting Initiative (GRI) (KPMG, 2020). The GRI guidelines are widely used by companies, given their standardized Sustainability Report content (Boiral & Henri, 2015). However, Sustainability Report research in Brazil has shown that less than half of all publicly traded companies in Brazil publish Sustainability Reports, and clearly lack complete information when they are published (Bertão, 2022).

Regarding the port sector, Sustainability Report are usually published on PP or PUT websites. These reports mostly contain information on economic, operational, socio-environmental, and governance aspects. Furthermore, they highlight difficulties faced over the reported period, in addition to activity developments.

In January 2011, ANTAQ and the Interdisciplinary Center for Transport Studies of the University of Brasilia entered a partnership to create an environmental performance index method for port facilities, i.e., the EPI enacted via Resolution No. 2,650/2012, as a tool for controlling environmental management at ports (ANTAQ [a], 2021; Rocha et al., 2018).

The EPI is defined as “a number that measures the degree of compliance with environmental issues” according to ANTAQ. It compares management and licensing processes at port facilities, and knowledge on the strengths and weaknesses possessed by Port Administrators on their environmental activities. The EPI has been applied using online questionnaires (ANTAQ website) since 2012. Each port has a password to access the system. Once the questionnaires are completed, ANTAQ assesses the indicators, and the ports receive the assessment results (ANTAQ [b], 2021).

The port evaluation results are published in a semi-annual ranking. Values corresponding to the level of compliance are summed to order the ranking. This sum varies from 0 to 100, forming the EPI score. It is worth noting that environmental legislation is very important for comprising this index, since these indicators add up to 85% of the total EPI score (Rocha et al., 2018).mThe EPI comprises 38 specific indicators classified into four categories, i.e., economic-operational, socio-cultural,

physical-chemical, and biological-ecological (Rodrigues, 2014). These four categories encompass the 14 global indicators, and the specific indicators have 3 to 5 attributes used for evaluation (Abrantes & Barrella, 2019).

The economic-operational category comprises indicators related to an organization's structure, the actions they carry, and its response capacity relative to environmental management operations. The socio-cultural category evaluates methods and social actions in the port's environmental logic. Environmental management is defined as an integrated process that considers all environmental quality aspects. Sanitary and health issues are very important here, along with protecting a port's natural resources. The physical-chemical category mainly addresses management actions carried out to mitigate/prevent pollution from port activities (ANTAQ [c], 2021). Finally, the biological-ecological category evaluates issues directly related to organisms in the area surrounding the ports, comprising 1 global indicator, and 3 specific indicators.

3 METHOD

This study was descriptive and quantitative, since we conducted an observational study to identify, record, and analyze the characteristics, factors, or variables related to certain processes (Nunes et al., 2016).

The study was carried out in stages, i.e., selecting the PP and PUT sample, the locations, analyzing the Sustainability Report and website content and informational transparency, identifying the EPI indicators in these reports, creating data tables, and processing and analyzing the data. The sample analyzed the Sustainability Report of 31 PPs and 31 PUTs. The 31 PPs were identified using the 2020 EPI ranking from the ANTAQ website, as per Table 1, representing 83.78% of all Brazilian PPs.



Table 1 2020 EPI PP Ranking

Name	EPI Score 2020	Rank	Name	EPI Score 2020	Rank
Itajaí	99.82	1 st	Vitória	79.23	17 th
Paranaguá	99.29	2 nd	Recife	79.22	18 th
Portuário do Pecém Terminal	99.20	3 rd	Angra dos Reis	78.75	19 th
São Francisco do Sul	96.95	4 th	Niterói	71.86	20 th
Itaqui	96.55	5 th	Natal	70.12	21 st
São Sebastião	95.15	6 th	Salvador	69.83	22 nd
Santos	95.12	7 th	Maceió	67.59	23 rd
Santarém	90.82	8 th	Cabedelo	64.20	24 th
Suape	89.76	9 th	Itaguaí	62.67	25 th
Belém	89.14	10 th	Rio de Janeiro	57.98	26 th
Imbituba	86.73	11 th	Pelotas	52.70	27 th
Vila do Conde	85.93	12 th	Porto Velho	44.68	28 th
Aratu	84.35	13 th	Forno	39.63	29 th
Ilhéus	83.53	14 th	Santana	39.33	30 th
Rio Grande	83.32	15 th	Porto Alegre	31.25	31 st
Fortaleza	79.94	16 th			

Source: Author

The first 31 PUTs in the 2020 EPI Ranking were selected from the ANTAQ website to compare the same number of Ports available from the agency, as per Table 2. This sample represented 21.53 % of all PUTs in Brazil.

Table 2 The 31 PUTs in the 2020 EPI Ranking

Name	EPI Score 2020	Rank	Name	EPI Score 2020	Rank
Marítimo de Ponta da Madeira Terminal	99.37	1 st	Portuário Bunge Alimentos Terminal	78.56	17 th
Itapoá Terminais Portuários Port	98.00	2 nd	Aquaviário de Ilha Redonda Terminal and Aquaviário da Ilha Comprida Terminal	78.35	18 th
Portonave - Terminais Portuários de Navegantes	96.26	3 rd	Aquaviário de São Sebastião (Almirante Barroso) Terminal	78.05	19 th
Cattalini Terminais Marítimos	93.64	4 th	Brasco Logística Offshore	77.18	20 th
Ilha Guaíba – TIG Terminal	91.56	5 th	Aquaviário de Madre de Deus Terminal	76.06	21 st
Portuário Privativo da Alumar Terminal	90.24	6 th	DP World Santos	75.84	22 nd
Tubarão Terminal	89.72	7 th	Marítimo Luiz Fogliatto – Termasa Terminal	75.45	23 rd



Açu Port - TMULT and TCAR Terminal	87.55	8 th	Portuário Braskarne Terminal	74.95	24 th
Praia Mole	86.94	9 th	Sudeste do Brasil Port	74.86	25 th
Açu Port - Minério Terminal	86.92	10 th	Regaisificação de GNL da Bahia – TRBA Terminal	74.76	26 th
Portocel - Especializado de Barra do Riacho Terminal	83.57	11 th	Barçaças Luciano Villas Boas Machado Terminal	74.53	27 th
Gregório Curvo Port	81.30	12 th	Aquaviário da Ilha D'Água Terminal	74.46	28 th
Marítimo Ponta Ubu Terminal	80.23	13 th	Ponta da Montanha Terminal	71.88	29 th
Marítimo Dow Terminal	80.23	14 th	Expedição de Grãos Portochuelo Terminal	70.40	30 th
TMB - Marítimo de Belmonte Terminal	79.63	15 th	Integrador Portuário Luiz Antonio Mesquita – TIPLAM Terminal	70.37	31 st
Aquaviário de Angra dos Reis Terminal	79.61	16 th			

Source: Author

We determined the locations of the PP and PUT. The sample analyzed the Sustainability Report of 31 PPs and 31 PUTs. The 31 PPs were identified using the 2020 EPI ranking from the ANTAQ website, as per Table 1, representing 83.78% of all Brazilian PPs. Using Google, searching for “Sustainability Report”, along with the name of the port. We also accessed the websites of the PPs and PUTs, or the managing Dock Companies or Port Authorities to obtain additional information that would be useful for the study, e.g., sustainability issues contained in the mission, vision, and value statements of the organizations. Some sites had a “Sustainability” field, which facilitated access to the most recent reports. This was done for PPs and PUTs in the sample.

We identified other reports not named “Sustainability Reports”, and after analyzing their content we added some to the study. We should point out that we searched for indicators in the versions of the most recent published reports using sample elements that were publicly visible and open.

To analyze the information in the PP and PUT reports, we counted the global and specific indicators according to the number of times they appeared in these documents using keywords related to EPI indicators. The absolute frequency was established for each indicator, and the frequency of citations related to the indicator were ranked. Furthermore, the ANTAQ weights were ranked in terms of priority, and

compared with PP and PUT perception on frequency of citation for specific indicators in their reports.

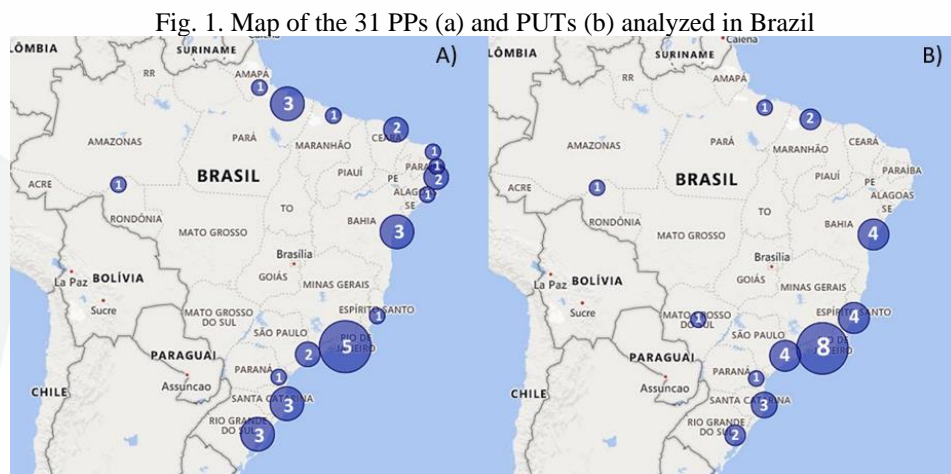
Other characteristics in addition to identifying the EPI indicators in the reports were analyzed, e.g.:

- **The Location of the Port/Terminal:** The States or Regions where the samples were located to subsequently correlate the information.
- **Identify website ownership:** we identified organizations with their own websites, or which had information on the websites of the Port Authorities, to verify the level of informational transparency with the public.
- **Report Type:** we identified the nomenclature used in the reports, since the main objective of this study was analyzing only Sustainability Report that contained environmental information, as per EPI recommendations.
- **Year of Report:** we described and analyzed the year of publication to identify the assiduity of the reports.
- **Port-city relationship approaches as described in the reports:** we sought to identify PPs and PUTs concerned with cities in the surrounding areas using the keyword “port-city”. Only reports with explicit descriptions of this relationship were scored, discarding reports that approached this issue superficially using other words or actions.
- **Sustainable Mission, Vision, and Values:** the mission, vision, and values on the websites and reports were analyzed to identify sustainable characteristics, using keywords “sustainable” and “sustainability”.
- **Approach to the SDGs:** an attempt was made to identify, through the keyword “SDGs”, the approach to the SDG aspects in the Reports. Only those that clearly referred to the objectives or cited the word SDG were scored.

4 RESULTS

We analyzed the 31 PPs and PUTs in the 2020 ANTAQ ranking. For PUTs, only the first 31 were analyzed for comparison with PPs, to maintain a similar sample reference base. Figure 1 (A) shows that most analyzed PPs were from the Northeast

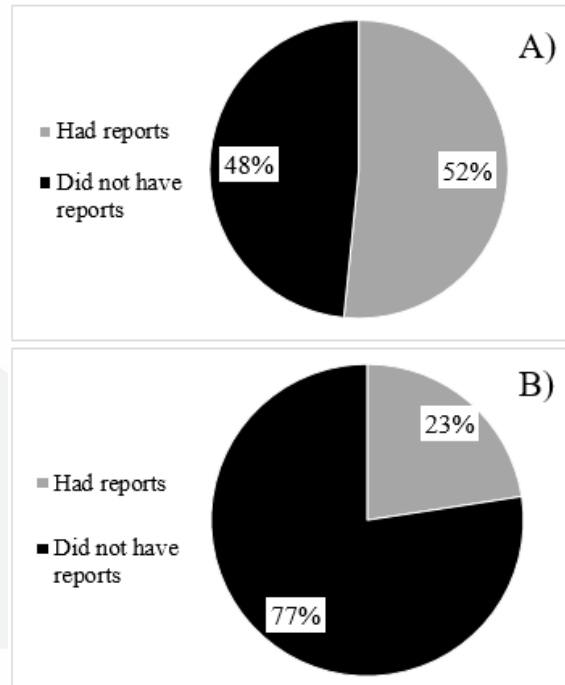
region of Brazil (Table 1). Regarding the PUTs, Figure 1 (B) shows that most were concentrated in the Southeast region of Brazil. The Southeast region stands out the most with respect to the PUT EPI rankings, since 52% of the 31 first-placed and analyzed PUTs were located in this region (Table 2).



Source: Author

Regarding the Sustainability Report, 52% of the PPs published reports (Figure 2 (A)). Only 56% used the words “Sustainability Report”. We observed the use of other names like “Environmental Report”, “Annual Activity Report”, “Management Report”, etc. Only reports with suitable analysis content for our study were counted. Regarding the year of report publication, only 56% published reports in 2020, while the rest had published reports in previous years, e.g., 2017 or 2019.

Fig 2. Published Reports: A) PPs; B) PUTs



Source: Author

For PUTs, we observed that only 23% had published reports, as per Figure 2 (B), and only 57% used the words “Sustainability Report”. Other wording included “Integrated Annual Report” and “Environmental Agenda”. Regarding year of report publication for published reports only, 86% published reports in 2020, and only 14% (only one terminal) published a report in 2017. When comparing standard PP publications, PUTs were more assiduous in making public reports.

Finally, regarding categorization per region, as per Table 3, we observed that the Northeast Region had the highest percentage of published reports considering all the organizations surveyed. Considering PPs only, we noted that most publications came from the Northeast region. Regarding the PUTs, the Center-West had the most publications. The North did not have any PPs or PUTs that published a report.

Table 3 Published Reports per region in Brazil

Tipo	Region				
	Southeast	Northeast	Central West	North	South
PP	63%	82%	0%	0%	29%
PUT	25%	0%	100%	0%	33%
All	38%	53%	25%	0%	31%

Source: Author

When analyzing the reports and the information made on the PP and PUT websites, we noticed that many spoke about their environmental and social actions despite not publishing this in their reports. We see here the importance of formally publishing standardized information using Sustainability Report, which are the best way of making information transparent and easily identifiable for all.

To analyze the EPI indicators in the sustainability reports, or equivalent reports, we first sought to identify the frequency of occurrence of global and specific indicators in the reports. Tables 4 to 8 give all the necessary data for the analyses, in addition to the weights of each indicator as per the EPI, to make associations between frequency and weight. The tables were classified in descending order according to the total absolute frequency, i.e., the sum of the absolute frequencies of the PPs and PUTs.

Table 4 Frequency of occurrence for global indicators at PPs and PUTs

Global Indicators	Weight	Ranking Weight	Absolute PP Frequency	Absolute PUT Frequency	Total Absolute Frequency	Ranking Frequency
Public health	0.025	12th	16	7	23	1st
Environmental Agenda	0.039	9th	15	7	22	2nd
Environmental Governance	0.217	1st	16	5	21	3 – 4th
Environmental Education	0.05	7th	16	5	21	3 – 4th
Safety	0.16	2nd	15	4	19	5 – 6th
Solid Waste Management	0.08	5th	13	6	19	5 – 6th
Port Operations Management	0.098	4th	13	5	18	7th
Monitoring Water	0.039	10th	11	5	16	8th
Biodiversity	0.049	8th	12	3	15	9th
Monitoring Air and Noise	0.015	14th	8	6	14	10th
Condominium Management of the Porto	0.11	3rd	11	0	11	11 – 12th



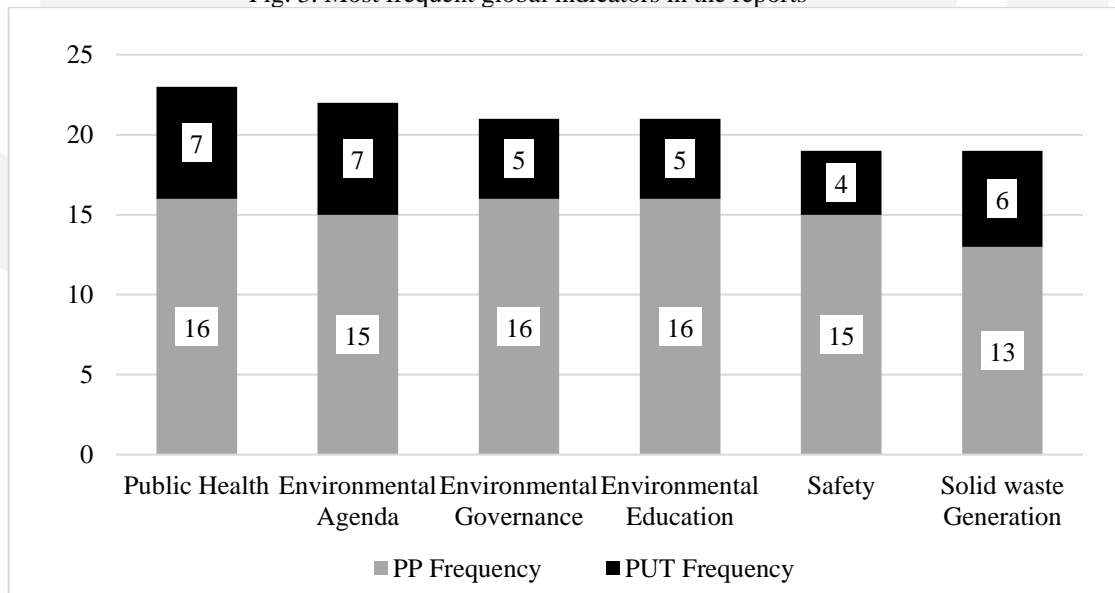
Monitoring Soil and Dredged Material	0.025	13th	7	4	11	11 – 12th
Energy Management	0.028	11th	2	5	7	13th
The Costs and Benefits of Environmental Actions	0.068	6th	0	0	0	14th

Source: Author

Table 4 allows us to identify the main global indicators that appear most frequently in the reports, accounting for total absolute frequency. We can see that the “Public Health” indicator, which appeared most, was ranked 12th according to the EPI weight rankings. “Costs and Benefits of Environmental Actions”, was 6th in the EPI weight rankings, but was last here, with a total frequency equal to zero.

This allows us to identify that the degree of importance attributed to certain EPIs is not exactly the same among the PPs and PUTs. However, the 1st and 2nd places in the Weight Ranking were within the first 6 global indicators, indicating that PPs and PUTs are not far off from the Weights set by the EPI (Figure 3).

Fig. 3. Most frequent global indicators in the reports



Source: Author

In addition, as shown in Figure 3, it is observed that the frequency proportion of PUT is considerably lower in relation to that of PP, which reflects the low dissemination

of Reports by the PUTs. The only global indicator that appears more frequently in the PUTs is “Energy Management”, reinforcing the need for PPs to invest more in this sector.

Specific indicators were classified according to the following categories: economic-operational (Table 5); socio-cultural (Table 6); physical-chemical (Table 7) and biological-ecological (Table 8).

Table 5 Economic-operational specific indicator frequency of occurrence

Specific Indicators	Weight	Ranking Weight	Absolute PP Frequency	Absolute PUT Frequency	Total Absolute Frequency	Ranking Frequency
Local environmental agenda	0.018	16th	15	6	21	2 – 3rd
Institutional environmental agenda	0.01	25th	13	7	20	4 – 5th
Publishing port environmental information	0.004	34th	15	5	20	4 – 5th
Risk prevention and emergency response	0.108	2nd	15	4	19	6 – 7th
Port environmental licensing	0.117	1st	13	4	17	8 – 9th
Environmental audits	0.05	6th	14	3	17	8 – 9th
Ship waste removal actions	0.065	5th	13	2	15	10th
Environmental training and skill building	0.016	18th	10	2	12	14th
Container operations with dangerous goods	0.033	11th	6	3	9	16 - 17 – 18th
Quantity and qualification of professionals in the environmental nucleus	0.033	10th	7	1	8	19 - 20 - 21 - 22 – 23rd
Terminal solid waste management plans	0.011	23rd	8	0	8	19 - 20 - 21 - 22 – 23rd
Voluntary certifications	0.007	32nd	1	7	8	19 - 20 - 21 - 22 – 23rd
Environmental accidents	0.036	9th	5	2	7	24th
Environmental performance controls of Port Authority leases and operators	0.038	8th	6	0	6	25 – 26 – 27th
Reduced energy consumption	0.019	15th	1	5	6	25 – 26 – 27th
Terminal emergency plans	0.015	20th	6	0	6	25 – 26 – 27th



Environmental licensing for companies	0.026	13th	5	0	5	28 – 29th
Oceanographic/hydrological/meteorological/climatological databases	0.016	19th	3	1	4	30 - 31 - 32 – 33rd
Terminal environmental education programs	0.008	30th	4	0	4	30 - 31 - 32 – 33rd
Generating clean and renewable energy at the ports	0.006	33rd	1	2	3	34th
Terminal environmental audits	0.008	29th	1	0	1	35th
Accounting for environmental costs in the budget	0.068	4th	0	0	0	36 - 37 – 38th
Voluntary company certifications	0.004	35th	0	0	0	36 - 37 – 38th
Ship power supplies	0.002	38th	0	0	0	36 - 37 – 38th

Source: Author

According to Table 5, it was observed that the “Supplying Energy to Ships” Indicator came in last in both Rankings, and was not present in any report studied here, showing that this service is not offered to ships.

Table 6 Socio-cultural specific indicator frequency of occurrence

Specific Indicators	Weight	Ranking Weight	Absolute PP Frequency	Absolute PUT Frequency	Total Absolute Frequency	Ranking Frequency
Promoting health actions	0.008	31 st	16	7	23	1 st
Promoting environmental education actions	0.05	7 th	16	5	21	2 – 3 rd
Having health contingency plans at the port	0.017	17 th	11	3	14	11 - 12 – 13 th

Source: Author

Table 6 showed that the “Promoting Health Actions” indicator, which appeared first in the Total Frequency Ranking, was 31st in the EPI Weight Ranking.



Table 7 Physical-chemical specific indicator frequency of occurrence

Specific Indicators	Weight	Ranking Weight	Absolute PP Frequency	Absolute PUT Frequency	Total Absolute Frequency	Ranking Frequency
Solid waste management	0.08	3 rd	13	6	19	6 – 7 th
Environmental water body quality	0.025	14 th	10	4	14	11 - 12 – 13 th
Atmospheric pollutants (gases and particulates)	0.011	24 th	8	6	14	11 - 12 – 13 th
Disposing of dredged material for dredged areas	0.012	21 st	4	4	8	19 - 20 - 21 - 22 – 23 rd
Noise pollution	0.004	37 th	4	4	8	19 - 20 - 21 - 22 – 23 rd
Environmental liabilities	0.012	22 nd	5	0	5	28 – 29 th
Actions to reduce and reuse water	0.01	26 th	2	2	4	30 - 31 - 32 – 33 rd
Rain drainage	0.004	36 th	4	0	4	30 - 31 - 32 – 33 rd

Source: Author

Table 7 shows that the specific indicators of the physical-chemical category are well aligned in relation to the Rankings (total frequency and weight), except for the indicator “Noise Pollution” which is in the penultimate place in the weight ranking and 23rd in the ranking total frequency rating.

Table 8 Biological-ecological specific indicator frequency of occurrence

Specific Indicators	Weight	Ranking Weight	Absolute PP Frequency	Absolute PUT Frequency	Total Absolute Frequency	Ranking Frequency
Synanthropic animals	0.029	12 th	10	0	10	15 th
Monitoring flora and fauna	0.01	27 th	7	2	9	16 - 17 – 18 th
Exotic/invasive aquatic species	0.01	28 th	8	1	9	16 - 17 – 18 th

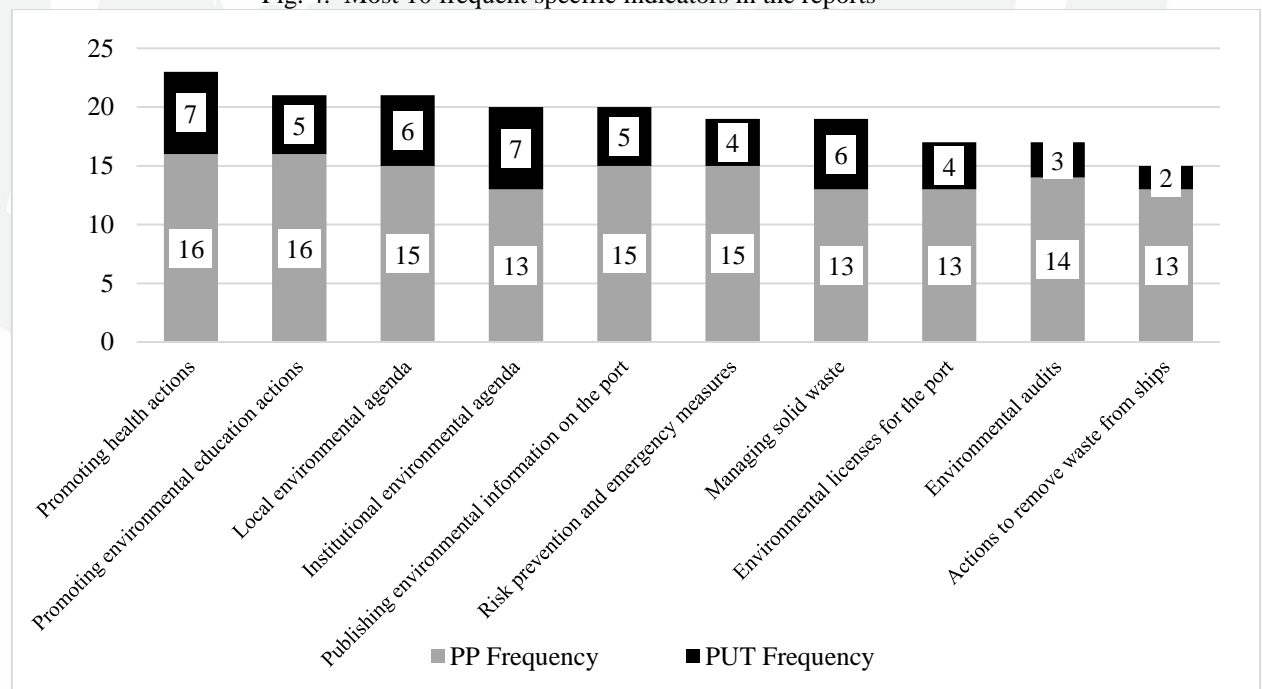
Source: Author

Table 8 showed that the “Synanthropic animals” indicator needs special attention in the dissemination of data in the PUTs reports, since they have considerable relevance in the weight ranking and do not appear in any of the reports analyzed in this research.

Furthermore, we observed that PUT frequencies were considerably lower than PP frequencies, reflecting low report dissemination in the selected sample. The only global indicator appearing more frequently for PUTs was “Energy Management”, reinforcing the need for PPs to focus more on this.

Regarding specific indicators, we identified the top 10 specific indicators appearing most in the reports (Figure 4). Generally, the degree of importance given to specific indicators is in line with the degree of importance attributed by the EPI weights. The indicators in the first 7 EPI Ranking positions were among the 10 main specific indicators, except for the “Accounting for environmental costs in the budget” indicator, which was 4th in the EPI Weights Rankings, and last in the Frequency Rankings. Thus, both PPs and PUTs need to pay special attention to accounting for and publishing environmental costs within their budgetary limitations, since no report published this information.

Fig. 4. Most 10 frequent specific indicators in the reports



Source: Author

Figure 4 shows the same specific indicator frequency distortion as the global indicator frequency distortion that occurred in Figure 3. This distortion is noticeable



especially for “Actions to remove waste from ships”, at 13 occurrences for PPs, and 2 for PUTs.

The PPs and PUTs were observed separately after the general indicator analyses with their corresponding weights to identify which had the highest indicator frequency compared with their respective positions in the EPI 2020 Ranking. Table 9 was classified in descending order according to indicator frequency to conduct this analysis.

Table 9 Specific indicator frequency present in PP reports

Name	EPI 2020 Ranking	Specific Indicator Frequency
<i>Itaquí</i>	5 th	23
<i>Santos</i>	7 th	23
<i>Rio de Janeiro</i>	26 th	23
<i>Fortaleza</i>	16 th	21
<i>Imbituba</i>	11 th	20
<i>Suape</i>	9 th	19
<i>Salvador</i>	22 nd	18
<i>Cabedelo</i>	24 th	18
<i>Ilhéus</i>	14 th	17
<i>Niterói</i>	20 th	17
<i>Itaguaí</i>	25 th	17
<i>Aratu</i>	13 th	16
<i>Paranaguá</i>	2 nd	14
<i>Angra dos Reis</i>	19 th	14
<i>Portuário do Pecém Terminal</i>	3 rd	10
<i>Recife</i>	18 th	10
<i>Natal</i>	21 st	0
<i>Maceió</i>	23 rd	0
<i>Itajaí</i>	1 st	0
<i>São Francisco do Sul</i>	4 th	0
<i>São Sebastião</i>	6 th	0
<i>Santarém</i>	8 th	0
<i>Belém</i>	10 th	0
<i>Vila do Conde</i>	12 th	0
<i>Rio Grande</i>	15 th	0
<i>Vitória</i>	17 th	0
<i>Pelotas</i>	27 th	0
<i>Porto Velho</i>	28 th	0
<i>Forno</i>	29 th	0
<i>Santana</i>	30 th	0
<i>Porto Alegre</i>	31 st	0

Source: Author

Table 9 shows that Itajaí Port, which was first in the 2020 EPI Ranking, had 0 specific indicators, since it does not publish a Sustainability Report. By contrast, the *Rio de Janeiro* Port, which was 26th in the EPI Ranking, had the most indicators (23). This

shows that many PPs still need to improve the way they publicly disseminate information, despite being evaluated positively in the EPI.

Table 10 analyzes each PUT terminal individually and classified in descending order according to indicator frequency to perform the analysis.

Table 10 Specific indicator frequency present in PUT reports

Name	EPI 2020 Ranking	Specific Indicator Frequency
<i>Açu Piort - TMULT and TCAR Terminal</i>	8 th	19
<i>Açu Port - Minério Terminal</i>	10 th	18
<i>Gregório Curvo Port</i>	12 th	18
<i>Portonave - Terminais Portuários de Navegantes</i>	3 rd	12
<i>Portocel - Especializado de Barra do Riacho Terminal</i>	11 th	12
<i>Portuário Bunge Alimentos Terminal</i>	17 th	12
<i>Brasco Logística Offshore (Gupo Wilson, Sons)</i>	20 th	7
<i>Marítimo de Ponta da Madeira Terminal</i>	1 st	0
<i>Itapoá Terminais Portuários Port</i>	2 nd	0
<i>Cattalini Terminais Marítimos</i>	4 th	0
<i>Ilha Guaíba – TIG Terminal</i>	5 th	0
<i>Portuário Privativo da Alumar Terminal</i>	6 th	0
<i>Tubarão Terminal</i>	7 th	0
<i>Praia Mole Terminal</i>	9 th	0
<i>Marítimo Ponta Ubu Terminal</i>	13-14 th	0
<i>Marítimo Dow Terminal</i>	13-14 th	0
<i>TMB - Marítimo de Belmonte Terminal</i>	15 th	0
<i>Aquaviário de Angra dos Reis Terminal</i>	16 th	0
<i>Aquaviário de Ilha Redonda and Aquaviário da Ilha Comprida Terminal</i>	18 th	0
<i>Aquaviário de São Sebastião (Almirante Barroso) Terminal</i>	19 th	0
<i>Aquaviário de Madre de Deus Terminal</i>	21 st	0
<i>DP World Santos</i>	22 nd	0
<i>Marítimo Luiz Fogliatto – Termasa Terminal</i>	23 rd	0
<i>Portuário Braskarne Terminal</i>	24 th	0
<i>Sudeste do Brasil Port</i>	25 th	0
<i>Regaseificação de GNL da Bahia – TRBA Terminal</i>	26 th	0
<i>Barcaças Luciano Villas Boas Machado Terminal</i>	27 th	0
<i>Aquaviário da Ilha D'Água Terminal</i>	28 th	0
<i>Ponta da Montanha Terminal</i>	29 th	0
<i>Expedição de Grãos Portochuelo Terminal</i>	30 th	0
<i>Integrador Portuário Luiz Antonio Mesquita – TIPLAM Terminal</i>	31 st	0

Source: Author

Table 10 shows the same situation that occurred for the PP comparison. We observed that Ponta da Madeira Maritime Terminal, which was in first position according to the 2020 EPI Ranking, had 0 specific indicators, and does not publish reports. Despite this, the TMULT and TCAR Terminals (Açu Port) and Portonave,

which were 8th and 3rd, respectively, in the 2020 EPI Ranking, had good indicator frequencies in their reports.

We observed some other characteristics when researching the PP and PUT websites and reports. The websites were analyzed to identify the level of informational transparency. We also sought to verify the sustainable characteristics in the information disclosed in the reports and websites by identifying specific approaches. Table 11 better stratifies the data analysis. To analyze the level of transparency and the sustainable nature of the information disclosed by Public Ports and Private Terminals, the following criteria were used: own website or company website; Porto-city approach in the Reports; sustainable approach in describing the mission, vision, and values; approach to the SDGs in the Reports. All the information was arranged in Table 11, which better stratifies the analysis of the data, which were located both on the websites of the Ports and Terminals and in the Reports released by them.

Table 11 Level of transparency and sustainable characteristics for PPs and PUTs

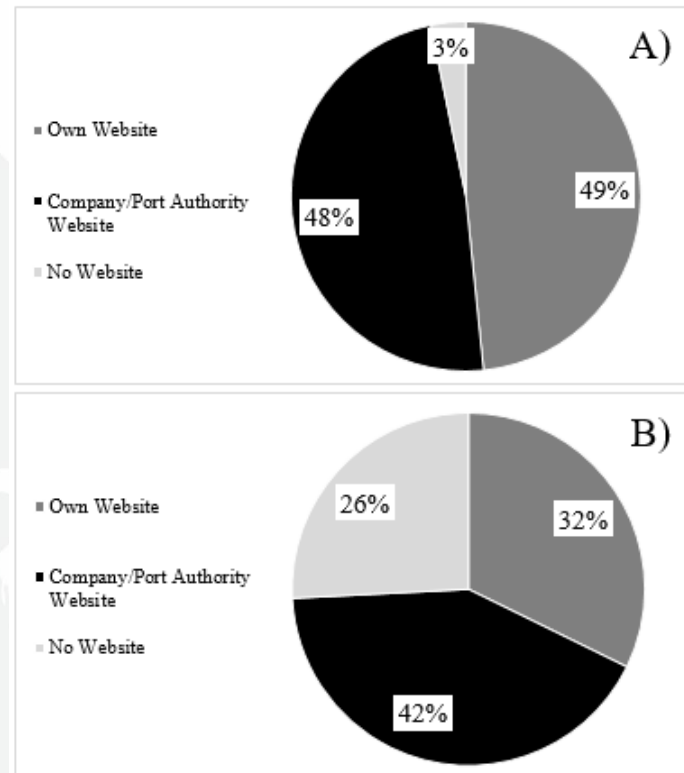
	Total Analyzed	Own Website	Company Website/Port Authority	No Website	Port-city Approach – in the SR	Sustainable Approach in the Mission, Vision, and Value Statements	SDG Approach in the SR
PP	31	15	15	1	13	19	3
PUT	31	10	13	8	0	9	3

Source: Author

Figure 5 shows the degree of informational transparency in the published information related to environmental and sustainability aspects. We observed that only 3% (one organization) of the PPs did not have websites, while 49% had their own websites, i.e., they only contain information about the organization itself. The other 48% had information published on Dock Company and Port Authority websites, without complete and specific information on their own websites. Regarding the PUTs, 26% did not have websites of any kind (either their own websites or websites in conjunction with Port Authorities), and those that did, mostly used websites in conjunction with Port Authorities. We observed that PPs are more transparent in disseminating information to

society, and provide more credibility with respect to the appearance of their websites, with information clearly presented on them.

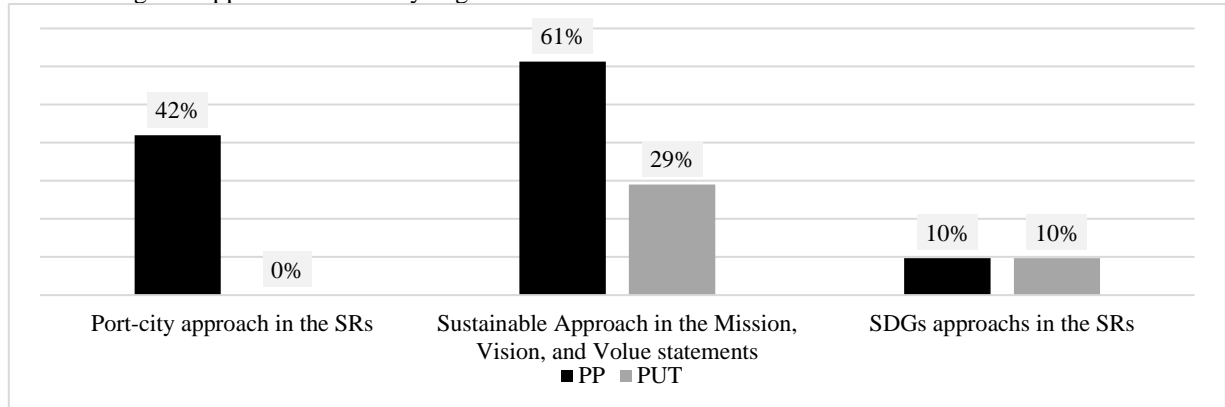
Fig. 5. Transparency in disseminating information: A) PPs; B) PUTs



Source: Author

After analyzing the level of informational transparency among PPs and PUTs, we identified their sustainable characteristics, i.e., compliance with the three sustainability pillars (economic, social, and environmental). We identified some chosen approaches on their websites and analyzed reports (Figure 6).

Fig. 6. Approaches for analyzing the sustainable characteristics of the PPs and PUTs



Source: Author

The port-city approach is widely reported on websites given the growing importance of establishing harmony between ports, cities, and the environment. We noticed that PPs contributed to this harmony, since 42% had this type of approach in their reports. Regarding the PUTs, none addressed the port-city relationship in their documentation. During this study we observed that some PPs and PUTs disseminated certain content on this relationship on their websites, but did not clarify or address it explicitly in their reports, and so were not counted in the sum.

An organization's mission, vision, and value statements are used to direct decision-making and indicate behavior that an organization should follow. We observe how much PPs and PUTs converge to promote sustainable development by identifying sustainable approaches in these statements. PPs are considerably more committed to pursuing these objectives, since 61% had mentioned sustainable approaches, practically twice that of PUTs.

The research showed that some organizations already address the SDG theme and list which objectives they are fulfilling and seeking throughout their activities. Therefore, an analysis of these documents was carried out and concluded that the percentage of Ports and Terminals that addressed the SDGs in their Reports was the same, showing that both are at the same level of concern regarding the global goals of the 2030 Agenda. However, the approach is still scarce, representing only 10% of the organizations analyzed for both types.

5 CONCLUSION

Our results showed that 52% of Public Ports (PPs) and 23% of Private Use Terminals (PUTs) published reports in 2020. We noticed that PUTs started to be evaluated by ANTAQ's EPI after 2017, and this might be the cause of the discrepancy regarding informational disclosures on environmental aspects relative to PPs. The Northeast region of Brazil had the highest percentage of publications among the PPs and PUTs located there.

Analyzing the global EPI indicator frequency in sustainability reports, we concluded that the “Public Health” indicator appeared the most, suggesting that organizations are concerned with their workers to always maintain safe working environments, and are concerned with having qualified people develop activities in the work environment, as per ANTAQ's EPI. The “Promoting health actions” specific indicator appeared most in the Reports aligning with the most frequent global indicator. We observed that the degree of importance that PPs and PUTs attributed to the indicators was in line with the weights stipulated by the EPI.

The 2020 EPI Ranking analysis allowed us to conclude that some PPs and PUTs in the top rankings did not publish Sustainability Reports or other relevant information to stakeholders, like the Itajaí Port and the Ponta da Madeira Maritime Terminal, for example. This was not true of Rio de Janeiro Port, for example, which had the highest Sustainability Report indicator frequency, but was ranked 26th in the 2020 EPI ranking. This suggests that PP or PUT ranking, according to ANTAQ's criteria, does not necessarily equate to guaranteed commitments for publishing Sustainability Report. Although many publish environmental and sustainability actions on their own websites, they need to clearly formalize these, since standardized reporting will benefit society by offering it quick and clear information. One suggestion would be to adopt a GRI-type standard at all Brazilian PPs and PUTs.

Despite the importance of establishing harmonious relationships between ports and cities, PP Sustainability Report did not address this issue much, and no PUT Sustainability Report addressed this issue in the period analyzed. Regarding sustainable approaches contained in the mission, vision, and value statements of these



organizations, 61% of all PPs, and 29% of all PUTs mentioned something related to this topic.

Regarding the Sustainable Development Goals established in the 2030 Agenda, it was noted that, despite converging on this path, PPs and PUTs still need a broad investment in technology to be better aligned with global goals. However, it was noted throughout the research that a part of the PPs and PUTs evaluated already addressed the SDGs in their Reports, thus showing the importance that this topic has been gaining.



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