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Article

Methodology for Evaluating Sustainable Corporate Logistics in the Context of SDGs 9, 11, and 12

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ABSTRACT

Corporate logistics has shown accelerated growth year after year, making it challenging to structure sustainability in this sector due to the lack of traceability and increased negative environmental impacts. Considering the importance of structuring this sector and the targets of the Sustainable Development Goals, this article proposes a methodology for analyzing sustainable corporate logistics in the context of SDGs 9, 11, and 12, named SustainLogTrack. The article is presented in two sections. Through a narrative review, the first establishes the impacts and potential logistics contributions through each transport mode (road, rail, waterway, air, and pipeline), followed by the correlation between two targets of each SDG analyzed and sustainable logistics. Based on this response framework, section two of the article proposes a methodology for analyzing sustainability reports. The methods developed resulted in 14 indicators and a scoring scheme that allows companies from any sector to be studied in 5 performance bands: non-existent, weak, regular, sound, and excellent. The results achieved can be applied to companies seeking sustainability in their logistics processes and to public managers seeking to identify and invest in the infrastructure necessary to implement sustainable logistics. SustainLogTrack's application is described in a second article.

Keywords: sustainability indicators; urban infrastructure; sustainable logistics; sustainability reports; SustainLogTrack.

RESUMO

A logística empresarial apresenta, ano após ano, um crescimento acelerado que dificulta a estruturação da sustentabilidade nesse setor diante da falta rastreabilidade e do aumento dos impactos negativos no meio ambiente. Considerando a importância da estruturação desse setor e das metas dos Objetivos do Desenvolvimento Sustentável, este artigo propõe uma metodologia de análise da logística empresarial sustentável no contexto dos ODS 9, 11 e 12, denominada SustainLogTrack. O artigo é apresentado em duas seções: a primeira estabelece, por meio de uma revisão narrativa, os impactos e as possibilidades de contribuição da logística através de cada um dos modais de transporte (rodoviário, ferroviário, aquaviário, aeroviário e dutoviário), seguida da correlação entre duas metas de cada um dos ODS analisados e a logística sustentável. Embasada nesse quadro-resposta, na seção dois do artigo é proposta uma metodologia de análise de relatórios de sustentabilidade. A metodologia desenvolvida resultou em 14 indicadores e um esquema de pontuação que permite analisar empresas de qualquer setor em 5 faixas de performance: inexistente, fraco, regular, bom e ótimo. Os resultados alcançados podem ser aplicados às empresas que buscam a sustentabilidade em seus processos logísticos, bem como para os gestores públicos que buscam identificar e investir na infraestrutura necessária para a execução da logística sustentável em sua região. A aplicação da metodologia SustainLogTrack foi realizada em um segundo artigo.

Palavras-chave: indicadores de sustentabilidade; infraestrutura urbana; logística sustentável; relatórios de sustentabilidade; SustainLogTrack.

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Introduction

Since the emergence of the concept of sustainable development, understood as a multidimensional proposal, and the agendas that followed—Agenda 21, Millennium Agenda, and Agenda 2030—numerous challenges have arisen across various fields and sectors of society. These challenges reflect the complexity of development based on sustainability, which, according to Sachs (2009), must consider the multiple dimensions of nature and society, including productive systems within the current economic system.

In this context, as part of the broad challenges of sustainable development, sustainability in logistics processes plays an important role, with direct environmental, social, and economic implications, since the good performance of this sector is correlated with the competitiveness and prosperity of companies (Sun et al., 2022), as well as the reduction of environmental impacts and consequently social benefits. The creation of the Sustainable Development Goals (SDGs) was fundamental for logistics to be structured based on the guidelines established by Agenda 2030 (Huang et al., 2018). From these global and multisectoral agendas (Salles et al., 2024), logistics networks began to consider environmental and social issues (Sidek et al., 2021), rather than focusing solely on cost minimization (Frota Neto et al., 2008).

Despite these advances, organizations face difficulties due to the many areas and variables involved in logistics, including strategic, tactical, and operational levels, and more recently, the multidimensionality of sustainability (Qaiser et al., 2017). The correlation between logistics, green logistics, and sustainable logistics is still incipient. Logistics encompasses primary activities such as raw material acquisition, handling and storage of inventory, and transportation of goods (Sun et al., 2022). These activities are associated with manufacturing, transportation, use, and end-of-life product disposal (Frota Neto et al., 2008). Green logistics is a system that seeks to be ecologically correct, associated with circular economy principles in logistics processes (Čižiūnienė et al., 2024), while sustainable logistics covers economic and social issues without environmental losses (Abbasi & Nilsson, 2016).

The concepts of green logistics and sustainable logistics are used interchangeably in the literature (Qaiser et al., 2017). Sometimes, green logistics is considered a subset of sustainable logistics (Čižiūnienė et al., 2024). Qaiser et al. (2017) also state that green logistics is more frequently addressed than sustainable logistics and emphasize the need to also consider social and economic aspects in these processes. Furthermore, logistics evaluation processes in companies allow gaps to be identified and new actions proposed.

Sustainability reports from companies must disclose information about the logistics chain. These documents, published annually on a voluntary basis in Brazil and already mandatory in some European countries, are generally structured based on the GRI methodology with evaluation criteria and indicate both actions taken at present and future plans and projects with targets to be achieved (Porciúncula Júnior & Andreoli, 2023).

For sustainability assessment, numerous tools offer different application guidelines, data, and case study experiences (Ness et al., 2007). Sustainability evaluation consists of analyzing sustainability initiatives, which may be policies, plans, programs, projects, legislation, practices, or activities (Pope et al., 2004). Companies can analyze sustainability through traditional corporate sustainability assessment methods, circular economy assessment, ESG evaluation, and non-financial performance indicators (Blinova et al., 2023).

Despite sustainability assessment being well-established in research and logistics playing an important role in companies in this context, one-third of logistics managers are unaware of the environmental impact of logistics activities (Maji et al., 2023). Besides the limited number of studies on sustainable logistics (Sidek et al., 2021), the evaluation of logistics within companies is also scarcely addressed in the literature. A search of article titles in the Scopus database using the keywords "green logistic" OR "sustainable logistic" AND "assessment" returned 15 documents. Topics covered include: methods to investigate and analyze potential risks of green logistics failure modes (Liu & Li, 2021); frameworks to facilitate green logistics (Shoaib et al., 2022); assessment of factors influencing green logistics (Vithayaporn et al., 2023); simulation methods to understand environmental impacts and costs associated with logistics (Abduaziz et al., 2015); risk assessment and monitoring models (Zhang et al., 2020), among others.

The studies found that detail evaluation methodologies focused on logistics (Lenort et al., 2022) do not consider this analysis within the context of the SDGs.

Considering the difficulty in steering traditional logistics activities toward sustainable green logistics (Shoaib et al., 2022) and the importance of logistics assessment for achieving Agenda 2030, this study aims to contribute by correlating three of the 17 SDGs with sustainable logistics in companies and proposing a methodology to assess sustainable logistics in the context of these three SDGs. These are: 9 - Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation; 11 - Make cities and human settlements inclusive, safe, resilient, and sustainable; and 12 - Ensure sustainable consumption and production patterns (United Nations Brazil, 2025a), based on the analysis of sustainability reports. It is worth noting that other targets from other SDGs may be indirectly involved in the business practices analyzed; however, the focus is on those where companies have full decision-making and action power, which are these three identified SDGs (9, 11, and 12).

The main objective of this article is to answer the question of how to measure, monitor, and compare sustainable logistics practices carried out by companies. This need arises from the complexity of the activities involved, the difficulty in establishing execution standards, and the lack of a tool that allows such evaluation in a clear, objective, and accurate manner.

For this purpose, the research construction—both methodologically and in the presentation of results—is divided into two sections. Section I will establish the links between sustainable logistics and the SDGs, as the proposed methodology will be based on SDGs 9, 11, and 12. The results from this phase will be used in Section II for developing a methodology to analyze sustainable logistics based on corporate sustainability reports, denominated SustainLogTrack.

Theoretical Framework and Methodology

Correlations Between Sustainable Logistics and the SDGs

Methodology

Initially, the connections between logistics and the designated SDGs were established, and the questions were defined along with the search keywords for each created indicator.

Evaluating the targets proposed by the SDGs is one way to monitor the progress of sustainability aspects across various business sectors. Sustainable logistics fits into this context and can contribute to positive outcomes. However, when searching through all the targets of the 17 SDGs, the term "logistics" was not found in any of them, and "transport" is linked only to SDG 11, related to sustainable urban mobility (United Nations Brazil, 2025c). Therefore, it was necessary to determine the SDGs indirectly related to logistics, identifying those connected to industry, cities, and production: SDGs 9 (Industry, Innovation, and Infrastructure), 11 (Sustainable Cities and Communities), and 12 (Responsible Consumption and Production) (United Nations Brazil, 2025d). The relationship of the other SDGs with logistics is not nonexistent but rather subjective, and sustainable logistics can contribute to achieving them through progress on the targets of SDGs 9, 11, or 12.

From a narrative literature review, the correlation between sustainable logistics and two targets from each of the selected SDGs was identified. Secondary data sources, freely accessible, were considered, prioritizing articles on the topic, as well as books and government websites. Two research databases were used: Scopus and Web of Science. The searches used generic keywords related to the topic: sustainab* and logistic. The search period was from 2013 to 2023, and article selection for this theoretical framework took into account the most cited papers, as well as abstract reading and relevance to the subject.

The narrative review, conducted qualitatively, does not aim to address all research gaps but rather to identify patterns in discourse, themes, and general analyses. The goal was to identify studies related to business logistics activities linked to sustainability practices, contributing to Agenda 2030. The intention was not to reproduce or exhaust the topic but to clarify the impact of sustainable logistics on achieving the SDG targets, which, according to Silva (2019), is accomplished through a narrative review.

Linkages between SDGs 9, 11, and 12 and Sustainable Logistics

Based on the concepts raised about sustainable logistics, Table 1 was developed with a focus on transportation, the logistics activity with the greatest impact on sustainability. The characteristics of each mode of transport are shown, along with the operational impact on sustainability and the ways companies can implement impact reduction measures in their logistics operations.

From the analysis of Table 1, common actions were identified that can be adopted regarding any of the five transport modes to reduce the negative impact of logistics activities on sustainability. Among them are: a) encouraging the use of multimodality, since each mode is utilized in the segment where it is most efficient (Kramarz et al., 2021); and b) developing local suppliers, as the distances traveled become shorter, reducing emissions proportionally (Greene et al., 2020).

It is important to promote the use of cleaner fuels. For example, the option of using electric vehicles, advocated since 1984 by Randi Lover as one of the alternatives to avoid the climatic consequences of fossil fuels (Lovelock, 2006). One alternative is the use of electric vehicles, which can contribute to energy efficiency in operations and reduce pollutant emissions in the logistics chain (Feng et al., 2022). However, this requires charging points in various locations, which are still not as widely available in the country as fossil fuels: 10,622 charging stations nationwide in 2024, with an irregular geographic distribution, most located in São Paulo (1,764), followed by Brasília (986), and Rio de Janeiro (619) (ABVE, 2024). This number is insufficient if the entire fleet were to migrate to electric technology.

Law No. 14,600, of June 19, 2023 (Brazil, 2023), clearly states the State's responsibility regarding infrastructure and assigns to the Ministries of Ports and Airports and of Transport the national transport policy; the national traffic policy; and the formulation of policies and guidelines for the execution and evaluation of this infrastructure.

Table 1: Mode, Impact, and Improvement Methods

Characteristics of the Mode	Direct Impact of Operation on Sustainability	Direct Way to Reduce Impact
Road		
Wide variety of goods transported, door-to-door delivery, ideal for last mile, route and schedule flexibility, low infrastructure cost, high cost per ton transported (Ballou, 2007).	Use of polluting fuels such as fossil fuels, fragmentation of biomes by highways (Costa et al., 2019), and high social impact on workers' quality of life (Vreden et al., 2022).	Use of routing and route optimization technology (Zantalis et al., 2019); encouragement of biofuels and clean energy use.
Rail		
Medium variety of products transported, generally low-value goods, high load capacity, low route flexibility, use of fossil fuels, high infrastructure cost but low maintenance, low cost per ton transported (Ballou, 2007).	Use of polluting fuels and high noise pollution (Peplow et al., 2021).	Use of clean transport technologies such as electric energy or magnetic propulsion (Pinto Neto et al., 2020).
Waterway		
Wide variety of goods transported, depends on other modes for delivery and receipt, medium flexibility of routes and schedule, high tonnage capacity, low infrastructure and cost per ton transported, requires water bodies, making it dependent on local geography (Ballou, 2007).	Use of polluting fuels (Van et al., 2019) and contamination of water bodies due to ballast water discharge.	Encourage use of less polluting fuels (Van et al., 2019) and ultraviolet filtration before ballast water discharge (Rivas-Zaballos et al., 2021).
Air		
High variety of products transported, generally high-value goods, low cargo volume capacity, high route flexibility, use of fossil fuels, high infrastructure, maintenance, and cost per ton transported (Ballou, 2007).	Use of polluting fuels, high CO2 emissions (Tarr et al., 2022), and high noise pollution (Filippone et al., 2019).	Encourage use of fuels less polluting than aviation kerosene (Gualtieri et al., 2022) and use software to adjust routes at each airport to reduce noise pollution (Filippone et al., 2019).
Pipeline		
Low variety of products transported, generally liquids, gases, and oils, low-value goods, high load capacity, continuous transport, inflexible routing, low energy consumption, high infrastructure cost but low maintenance, low cost per ton transported (Ballou, 2007).	Operation impact is near zero, but construction can cause environmental problems and lack of maintenance can cause accidents (Novoselov et al., 2019).	Use of maintenance technology to prevent leaks of generally polluting products transported by pipelines (Chalgham et al., 2020).

SOURCE: Compiled by the author, 2025.

Thus, companies depend on state investment to have adequate infrastructure and options for more than one transportation mode in different regions to carry out their logistics operations. Ideally, for a company to achieve its logistics objectives, all five modes should be available: road, rail, air, pipeline, and waterway. However, this depends on geographic characteristics, since waterways rely on rivers, lakes, seas, or oceans, which affect the transportability of the region (Rodrigue 2024).

This is one of the challenges imposed on the State regarding the enforcement of current legislation on transport infrastructure. The legislation sets guidelines for entities, both public and private, concerning logistics, but clearly only for reverse logistics. Law No. 12,305, of August 2, 2010 (Brazil 2010), established the National Solid Waste Policy (PNRS), highlighting objectives focused on public health, environmental quality, the proper final disposal of waste when recycling or reuse is not possible, as well as encouraging waste prevention, reduction, and treatment.

Twelve years after its publication, a period considered long, Decree No. 10,936, of January 12, 2022 (Brazil 2022), was issued to regulate the National Solid Waste Policy. This decree established the responsibilities of each party involved in managing Brazil's solid waste, notably the shared responsibility among all actors in the production chain (manufacturers, importers, distributors, retailers, transporters, the State, and consumers) to ensure the proper execution of waste disposal and its management. Another important aspect is the monitoring of waste management through transport manifests, registration in a public system to track practices, and oversight of related activities.

The application of the law throughout the national territory faces different scenarios across regions. The existence of this law does not guarantee the effective operation of reverse logistics by companies, and in loco monitoring is difficult to implement. This should be one of the most considered aspects since the resources available on the planet are finite, and indiscriminate use without regard for the well-being of future generations may prevent these generations from enjoying those resources (Hejer et al. 2015). Truly sustainable development brings this vision of solidarity synchronically with the current generation and diachronically with future generations (Sachs, 2009). In this context, Philippi Jr et al. (2014) emphasize the importance of the cultural values of a society for implementation.

Historically, development was constructed without considering its impact and consequences (Fernandes 2008). The author clearly exposes what is found in most current urban centers: an existing reality without adequate planning regarding the effects of its structure, as well as its use, on the environment where it is located. It is not possible to undo everything that has been done and start over in all cities; adaptation based on current knowledge and technologies is necessary.

There are points worth highlighting regarding urban concentrations and sustainability, but what is directly linked to logistics is the fact that urban centers are not self-sufficient in producing inputs, goods, food, and any material necessary for their existence (Sotto et al. 2019). This reality requires planned logistics for efficient supply and distribution between origin and destination points. Competitiveness and efficiency of the activity directly affect delivery results and its environmental impact (Ellram et al. 2020). Due to the interdependence among cities regarding inputs, this work must also be done collaboratively. All municipalities or countries, across various sectors, must be equally focused on these resources. However, one of the greatest challenges in considering sustainable logistics lies in the measurement and evaluation of sustainability. Table 2 shows two convergent targets for each of the selected SDGs related to sustainable logistics.

Table 2: SDGs 9, 11, and 12 and their relationships with sustainable logistics

Targets directly related to logistics	Contribution of the logistics sector to achieving the target
SDG 9: Industry, Innovation, and Infrastructure	
9.1: Develop affordable, quality, sustainable infrastructure with a social focus. 9.4: By 2030, foster the use of clean, environmentally sound technologies and ensure the necessary infrastructure is available (United Nations Brazil, 2025b).	Promote the use of biofuels (Kovačić et al. 2022), whenever available; invest in new routing technologies that allow activities to be carried out with less environmental impact (Zantalis et al. 2019); and value the sector's workforce (Kębłowski et al. 2022).
SDG 11: Sustainable Cities and Communities	
11.3: Increase inclusive and sustainable urbanization, with urban planning favoring community participation, being integrated and sustainable. 11.6: Reduce the per capita environmental impact of cities (United Nations Brazil, 2025c)	Companies should be encouraged to adopt sustainable practices in their supply chains, just as they develop their products sustainably. Emphasis on mobility practices (Melo et al. 2018), technologies for routing efficiency (Zantalis et al. 2019), and multimodality (Kramarz et al. 2021).
SDG 12: Responsible Consumption and Production	
12.3: By 2030, halve food loss at all stages of the supply chain, from production to consumption, including transportation and storage. 12.5: By 2030, reduce waste generation (United Nations Brazil, 2025d).	Reduce losses during food distribution, which can occur more frequently when the chosen mode is not appropriate or when packaging is not properly sized for the product operation (Bell & Horvath 2020).

SOURCE: Compiled by the author, 2025.

The fulfillment of these objectives by companies depends on government investments in infrastructure (Kervall & Pålsson, 2023). Brazil has a logistics infrastructure that favors almost exclusively the road modal, which is generally unsustainable and has a high impact on pollution levels (Sotto et al., 2019), as well as favoring the concentration of industries and distribution centers in large urban centers. According to Salles et al. (2022), there is also in Brazil a predominance of social capital related to the automobile, seen as a synonym for economic prosperity and social advancement. These aspects hinder the sustainable execution of logistics activities, since there is no option for multiple modals in all regions, preventing the use of multimodality (Kramarz et al., 2021), and distribution centers end up being large warehouses with a high impact on the regions where they are located (Lim & Park, 2020).

It must be considered that in the various Brazilian regions there are large variations in infrastructure and logistics availability, a situation similar to that found in developing countries (Arvianto et al., 2021). Companies operating nationally face a plurality of situations to be managed, which creates complexity in monitoring and improvements, as strategies and planning that work in one region may not be executed in another.

Sustainable logistics practices, such as recycling and reusing waste as inputs in other supply chains, are valid and must be considered in operation planning, which is one of the principles of the Brazilian Agenda 21 — the well-known 3 Rs: reduce, reuse, and recycle. In these three aspects, logistics will carry out the operation through reverse logistics activities. The focus on recycling is urgent and must always be taken into account, especially due to the scarcity of natural resources and the possibility of generating energy from waste (Antiqueira & Sekine, 2020). This energy generation highlighted by the authors is one of the opportunities, along with the sale of waste to other production chains, that logistics has to generate revenue for companies, contributing to SDG 12.

Section II: Analyzing Sustainable Logistics

Methodology

Section I presented the impacts and possibilities for improvement of each transportation modal (road, rail, waterway, air, and pipeline) and the correlation between two targets of each of the SDGs 9, 11, and 12 with sustainable logistics. Having identified these links, this section presents the methodology for constructing indicators that involve sustainable logistics in their production chains through sustainability reports.

Development of analysis indicators

Although the SDGs have their own indicators, to analyze companies' actions related to sustainable logistics, it was necessary to develop specific indicators, since logistics is not directly identified in these targets. Table 2, which specified the contribution of the logistics area to achieving the targets, served as the basis for constructing these indicators. Figure 1 establishes the steps followed in this stage.

By following the steps described in Figure 1, we arrive at Table 3, where the first column indicates the targets of each SDG in which direct correlations with logistics were found in Section I. The second column presents the indicators developed for verification in the sustainability reports of the selected companies. The third column describes what is sought for each indicator. Finally, the fourth column lists the keywords used for searching in the sustainability reports.

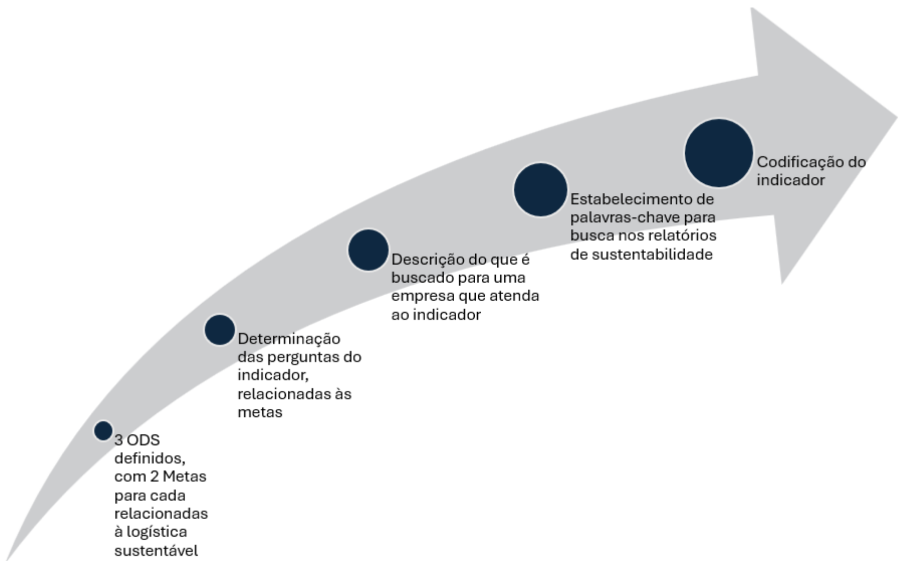

Figure 1: Steps for constructing the indicator framework. Source: Own elaboration, 2025.

The indicators were coded to facilitate the construction of the analysis, and the coding consists of the following format: the SDG number + L (referring to logistics) + a letter of the alphabet, to sequentially identify each indicator, since the same SDG may have more than one indicator for analysis. The indicators are detailed in Table 3.

Table 3: Indicators for the analysis of sustainability reports

Code	Indicator	Details	Keywords searched
9LA	Does it promote the use of clean energy?	It takes into account both energy used in operations and support for clean energy projects	Biofuels, clean energy, green fuel, renewable energy
9LB	Does it invest in new routing technologies?	It takes into account routing systems for goods transport and supply chain management	Routing, delivery software, tracking, traceability, monitoring
9LC	Does it value workers in the sector?	It takes into account the existence of internal policies focused on employee development (diversity and inclusion policies, career plans, roles and salaries, training, courses, etc.)	Employee, worker, staff, team, internal community
9LD	Does it invest in social and community programs?	It takes into account investments through projects that promote better living conditions for society	Social, community, corporate social responsibility
11LA	Does the company apply sustainable multimodality?	It takes into account investments in sustainable multimodality across the entire logistics chain, including raw material transport or product delivery using different transport modes	Transport, delivery, modal, freight, modes, multimodality
11LB	Are the used packaging materials recyclable, biodegradable, or compostable?	It takes into account packaging used for finished products or consumed in internal/external processes	Packaging, recyclable, biodegradable, compostable, box, waste, reverse logistics
11LC	Are suppliers local?	It takes into account the hiring of local suppliers (same city, state or country as the company). For local workforce, it corresponds to the same region as the workplace municipality	Suppliers, third parties, local workforce
11LD	Are there internal policies for optimizing natural resource use?	It takes into account company actions regarding preservation and reduced consumption of (water, energy, raw materials, among others) and whether these are shared with employees	Natural resources, inputs, raw materials, training
11LE	Are there policies for proper waste management?	It takes into account recycling and reuse policies, both for waste generated in production and for waste from marketed products that return to the company	Recycling, reuse, separation, solid waste

Code	Indicator	Details	Keywords searched
11LF	Is there a policy for controlling atmospheric pollutants?	It takes into account internal or supported policies for emission reduction, as well as carbon credit purchases for impact offsetting	Carbon footprint, carbon, emissions, greenhouse gases, climate change
11LG	Are practices in place to verify suppliers' compliance with environmental and social issues?	It takes into account supplier chain tracking and compliance analysis with environmental and labor legislation, both in selection and monitoring of supplier actions in these aspects	Supplier selection, social responsibility, suppliers
11LH	Does the company invest in research and development?	It takes into account investments tied to innovation and technology for product/process improvement	R&D, research and development, innovation, technology
12LA	Does the company provide training or information to consumers on reducing consumption?	It takes into account external communication of reduction practices, both for the company's marketed products and collective behavior regarding other products and conscious use according to needs	Consumer, information, conscious consumption, reduction, awareness
12LB	Are transport personnel trained to avoid waste?	It takes into account training conducted on proper product handling practices, such as adequate manipulation and placement during transport and movement	Training, capacity building, waste
SDGs	Is the report structured around or does it mention the Sustainable Development Goals?	It takes into account whether reports mention the Sustainable Development Goals and if this content forms part of the document structure	SDGs
GC	Does the report mention the United Nations Global Compact?	It takes into account whether reports mention the Global Compact	Global Compact

SOURCE: Compiled by the author, 2025.

Establishing the Scoring Criteria

For each of the indicators defined in Table 3, the companies to be analyzed must be evaluated on a scale from 0 to 4. This scale was specifically designed for this analysis methodology, since other scales—such as from 0 to 10—would make it difficult to differentiate scores objectively, as would Likert scales, which require clear and objective criteria to distinguish between levels. Under these conditions, if the report does not mention any of the keywords (or if the keywords mentioned do not answer the question), a score of 0 (nonexistent) is assigned. If there is mention but no specification of projects, plans, or programs, a score of 1 (weak) is given.

A score of 2 (regular) applies if projects, plans, or programs are specified. If the report specifies projects, plans, programs, and results, it receives a score of 3 (good). Finally, if the report specifies projects, plans, programs, results, and includes a history of at least the past three years of implementation, the highest score of 4 (excellent) is assigned. It is worth noting that if the company presents one or more historical records regarding any of the information related to the analyzed indicator, the score of 4 is established.

It is emphasized that the indicators should be analyzed quantitatively. Thus, the scores assigned consider only the presence or absence of the variable analyzed, but not its quality or sufficiency. Content analysis is a technique commonly found in the literature in many studies that examine sustainability reports (Landrum & Ohsowski 2017; Torelli et al. 2019; Jayarathna et al. 2021) to position each report within the stages of corporate sustainability (Landrum & Ohsowski 2017). Considering that the research focuses on the analysis of business logistics rather than the company's overall sustainability performance, the proposal develops an innovative methodology with indicators specifically formulated based on the three selected SDGs (9, 11, and 12).

Results and Analysis

The main outcome of this research was the development of a methodology to analyze sustainable logistics as reported by companies in their sustainability reports, named SustainLogTrack. This is an important milestone, as each company carries out its logistics activities differently, and this methodology aims to establish a standardized form of evaluation and even comparison.

To achieve this, it was essential to establish a clear link between the selected SDGs (9, 11, and 12) and sustainable logistics, since this connection is not explicitly clear in the SDG targets (United Nations Brazil, 2025a). With this relationship established, the creation of 14 objective evaluation indicators, scored on a scale from 0 to 4, enables the quantitative assessment of a qualitative and non-standardized subject reported by companies.

The results obtained through the application of SustainLogTrack generate averages and scores for both the companies and each individual indicator, enabling companies to identify areas for improvement through an external perspective. In addition, it highlights weak indicators in scoring that public managers can use to assess the reality of their territories regarding infrastructure availability for a more effective implementation of sustainable logistics.

By maintaining a historical record, it is possible to identify progress or even regression of the indicators concerning the company or sectors involved in the analysis and their contributions to the 2030 Agenda goals. Since logistics is not a standardized activity across all companies, it requires objective and quantitative aspects for a comprehensive sector evaluation, aiming to make sustainability genuinely present in its operations.

Conclusions

By establishing a connection with the Sustainable Development Goals, this research demonstrates that logistics, despite being one of the activities with the highest financial costs and environmental impact in companies, is not clearly described in any of the current global development agenda targets. Directing specific goals to this sector within the existing SDGs is fundamental, as organizations often structure their sustainability planning based on the SDGs.

Given this finding, the greatest contribution of this research lies in the potential of the proposed methodology, SustainLogTrack. Decision-making in sustainability needs to be based on an accurate diagnosis of the real situation, since solving a problem presupposes that it has been previously recognized. Specifically, for a company to achieve an effectively sustainable logistics chain, it is necessary to identify gaps and then propose improvements accordingly.

The reproducibility potential of the methodology is also noteworthy, as it can be used to analyze sustainability reports or any other data sources that meet the developed indicators, regardless of company size or sector. The methodology may also serve as an internal auditing tool, since the classification criteria through scoring allow analysis of the company's strengths and weaknesses in the context of sustainable logistics. Public managers can benefit from the methodology's results to identify the region's structural needs, which may enable local companies to achieve good indicators and sustainable logistics.

The SDGs analyzed here in the logistics context include only three of the 17 goals in the 2030 Agenda. It is highlighted that the indicators developed in this research may be adapted to other company areas beyond logistics or that logistics itself could be analyzed in the context of other SDGs through newly established links. These actions reinforce the need for logistics to be addressed more thoroughly in Sustainability Agendas and emphasize the complexity of the area, involving many internal and external agents who are part of the company's responsibility chain.

In Brazil, many sustainability standards are not yet legally required, and the regulation of external suppliers regarding socio-environmental issues is left to the contracting party. Simple and accessible methodologies that identify specific sustainability situations and contexts (which are transversal to business areas and sectors) contribute alongside many other measures necessary to achieve the goals set out in the 2030 Agenda. The methodology was applied considering the sustainability reports of companies comprising the Sustainability Index of the Brazilian Stock Exchange, and the results will be published in a subsequent article.

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