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ANALYSIS OF GRESB AND ISO 21929-1 INDICATORS AND WHICH ONES COVER MORE THE SUSTAINABLE DEVELOPMENT GOALS OF THE UNITED NATIONS

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Abstract:
The adoption of certification systems in buildings that make up the portfolio of assets of real estate companies have been growing in recent times, being one of the strategies linked to the Environmental Social Governance (ESG), where their reports are often used as a form of marketing to demonstrate their socio-environmental responsibility. The Global Real Estate Sustainability Benchmark (GRESB) platform is widely used for this context. However, when analyzing its indicators, it was identified that GRESB does not have great coverage of sustainability, when using the Sustainable Development Goals (SDGs) as a metric to identify the level of contribution to sustainability, having a focus majority for GHG emissions, energy consumption, water and waste management. On the other hand, ISO 21292-1 has a set of indicators that have better coverage of sustainability in the environmental, social and economic spheres. This analysis helps to raise the question about the use of marketing in disseminating ESG reports in the real estate sector and what is its real contribution to society through the tools adopted to measure sustainability performance.

Keywords*: Global Real Estate Sustainability Benchmark; Sustainable Development Goals; ISO 21292-1; Responsible Marketing*

JEL Classification: L740, Q56

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ANÁLISIS DE LOS INDICADORES GRESB E ISO 21929-1 Y CUÁLES CUBREN MÁS LOS OBJETIVOS DE DESARROLLO SOSTENIBLE DE NACIONES UNIDAS

Resumen:

La adopción de sistemas de certificación en edificios que componen la cartera de activos de las empresas inmobiliarias ha ido creciendo en los últimos tiempos, siendo una de las estrategias vinculadas a la Gobernanza Social Ambiental (GSA), donde sus informes suelen ser utilizados como una forma de marketing para demostrar su responsabilidad socio-ambiental. La plataforma Global Real Estate Sustainability Benchmark (GRESB) es muy utilizada para este contexto. Sin embargo, al analizar sus indicadores, se identificó que GRESB no tiene una gran cobertura de sostenibilidad, al utilizar los Objetivos de Desarrollo Sostenible (ODS) como métrica para identificar el nivel de contribución a la sostenibilidad, teniendo un enfoque mayoritario para las emisiones de GEI, el consumo de energía, la gestión del agua y los residuos. Por otro lado, la ISO 21292-1 tiene un conjunto de indicadores que tienen mejor cobertura de la sostenibilidad en los ámbitos ambiental, social y económico. Este análisis ayuda a plantear la pregunta sobre el uso del marketing en la difusión de informes ESG en el sector inmobiliario y cuál es su contribución real a la sociedad a través de las herramientas adoptadas para medir el desempeño de la sostenibilidad.

Palabras clave: *Global Real Estate Sustainability Benchmark; Objetivos de Desarrollo Sostenible; ISO 21292-1; Marketing Responsable*

1. Introduction

The adoption of sustainability certification systems has been absorbed by many investors looking for "green investments", considering them as investment strategies linked to the ESG (environmental, social and governance) context. In this circumstance, the sustainability certification systems, such as BREEAM, LEED and DGNB, which address energy and environmental factors of buildings, allow high compatibility with ESG principles, where obtaining sustainability certifications can give the company a significant competitive advantage in the construction sector, given its focus on ESG principles (Mariani, Amoruso, Caragnano & Patruno, 2017; Meshcheryakova, 2022).

Another factor is that this sustainability and ESG actions can impact the value of a company. Thus, analysing the theme to assess how marketing contributes to the company's performance is essential, as it is one of the responsible sectors in publishing sustainability reports and helps define the company with a good reputation among its customers. Therefore, this information about sustainability is valuable for building a sustainable marketing plan and adds value to a company's brand (Servaes &Tamayo, 2013; Hahn & Lülfs, 2014; Calu, Negrei, Calu & Avram, 2015; Viana, Gaio, Belli & França da Cunha, 2021).

Among the ways to publish ESG reports in the real estate market, there is the GRESB (Global Real Estate Sustainability Benchmark), a platform used by sector investors to assess the sustainability performance of the real estate portfolios of global corporations. Its structure has 59 evaluation questions, which are divided into seven groups and address 42 different criteria. It is a voluntary ESG performance reporting system for tangible assets and provides standardized and verified data for capital markets (Mohammadi, 2016a; Devine, Sanderford & Wang, 2022).

However, it has been noted by other researchers that the GRESB indicators focus mainly on the organization and management processes of companies. In contrast, concerning the operation of the buildings that make up the asset portfolios of these companies, the indicators are linked only to energy, greenhouse gas emissions, water consumption and waste (quantitatively calculated) making a more holistic assessment of sustainability performance difficult (Bernegger, 2019). Despite its environmental contribution, it is unclear how it helps achieve the United Nations SDGs and thus considered an effective path to sustainability, including social and economic aspects. Therefore, this study focuses on analyzing two structures, the first, the GRESB, which is used in the real estate area, and the ISO 21929-1, which establishes a set of indicators to assess the sustainability performance of buildings and, thus, understand

which of the 17 Objectives of Sustainable Development that can have a more significant impact on the ESG context of companies in the sector. ISO 21929-1, in this case, is used as a benchmark when analyzing the GRESB, as it provides a framework for creating indicators to achieve sustainability in the construction sector.

1.1 Impact of ESG on company marketing

Given that the main objective of any organization is profit, the emphasis of traditional marketing was on fulfilling consumer needs and, as a result, optimizing the distribution process. The adaptation of conventional marketing to sustainable marketing took place in the context of continuous changes in the economic environment to adopt sustainable conduct. In this way, environmental considerations (meeting the needs of limited resources), technical feasibility and economic competition, and ethics (social equity and avoiding unfair actions) are factors that sustainable marketing offers as alternatives to these needs (Belz & Schmidt-Riediger, 2009; Calu et al., 2015).

Within this subject, a way to report sustainability is the ESG, which makes it possible to generate insight into the impact of activities and thus improve the image of a company, also called the "ESG advertising" effect. From a marketing point of view, the adoption of a sustainability policy would bring similar costs and benefits to those of an advertising campaign; for example, a study conducted by researchers concluded that a strong relationship was identified between a company's reputation and its classifications in social and environmental responsibility, while another study demonstrates that ESG can be seen as a strategic product sold to customers by a company and that this product can bring more positive revenues the earlier it is developed (Albuquerque, Durnev & Koskinen, 2019; Sahut & Pasquini-Descomps, 2015).

Generally speaking, corporate social responsibility brought about by ESG can be seen as a helpful tool for competitive benefits and marketing advantages that drive financial success. ESG reports also benefit brand equity and can improve marketing effectiveness in terms of market share, sales value, and customer and partner satisfaction and retention (Chahal & Sharma, 2006; Du, Bhattacharya & Sen, 2010; Lai, Chiu, Yang & Pai, 2010; Paolone *et al.*, 2022).

1.2 Motivations for the adoption of sustainable buildings by companies

The motivations contributing to adopting sustainable buildings vary; however, there is a relationship between issues of greenhouse gas emissions and commercial buildings, with one highlighting the importance of sustainable labels and their associated ESG benefits. It has been observed that investors are considering and selecting features that align with both their financial goals and purpose, one of them being environmental, social and corporate governance metrics (Brounen, Marcato, & Op ’t Veld, 2021).

On the other hand, while some companies viewed certification as a value-added strategy, as discussed earlier, others believed that purchasing a certified building indicated good property management before purchase. Many follow the "you can only improve what you measure" mindset and that any value-added strategy must include benchmarking and regular monitoring (Christensen, Robinson, & Simons, 2018).

For other authors, the adoption of green buildings is positively impacted by the corporate governance measures implemented to align the interests of shareholders and managers. This shows that effective corporate governance supports green building to improve company performance by promoting positive public relations (Hsieh, Claresta, & Bui, 2020).

1.3 GRESB

Within this connection of sustainable buildings, corporate responsibility and the real estate sector, GRESB, as already mentioned, has a great adoption by companies in the sector, as it is an organization specifically focused on the real estate sector, which helps investors to assess the sustainability performance of real estate portfolios of companies Worldwide. It is considered a voluntary ESG performance reporting framework for tangible assets, which provides standardized and validated data for capital markets. Originated in 2009 in the Netherlands and using a real estate-specific measurement toolkit, it assesses fund/company-level performance for commercial real estate assets and, since 2017,

measures infrastructure assets, that is, the buildings that make up the companies and undergo continuous review to ensure the materiality of the content (Mohammadi, 2016b; Devine et al., 2022).

Another point about GRESB is that it complements international reporting frameworks such as the Sustainable Development Goals (SDGs), Taskforce on Climate-Related Financial Disclosures (TCFD), the Sustainable Accounting Standards Board (SASB), and industry-specific disclosure guidelines and regulations. Region and the Global Reporting Initiative (GRI). Thus, it is noted that investors in the leading institutional investment markets are adopters of GRESB reports, and in the last ten years, there has been a significant growth (Devine et al., 2022).

In other words, GRESB is a pathway for green construction professionals; After being created in response to demand for sustainability data from investors in real estate companies (REITs) and private equity real estate funds, GRESB has helped to connect questions about the sustainability of single buildings to entire portfolios of companies (Kok, 2014).

1.4 Framework ISO 21929-1

The ISO 21292-1 standard does not have such a specific objective as the GRESB (which is for the real estate sector). Its use is more versatile according to the need, and thus to assess the sustainability performance of new or existing buildings, related to its design, construction, operation, maintenance, renovation and end of life, ISO 21929-1:2011 establish a core set of indicators to be taken into account in the use and development of sustainability indicators. The core indicators show how a building contributes to sustainability and sustainable development (ISO 21929-1, 2011).

The ISO 21929-1:2011 standard adapts general sustainability principles for buildings, provides a framework for creating sustainability indicators, establishes a basic set of indicators, explains how to use sustainability indicators, and specifies guidelines for creating a system of indicators. It also identifies sustainability factors that should be considered when defining a basic set of building indicators (ISO 21929-1, 2011).

The study was conducted to understand their stature better to analyze the indicators present in ISO 21929-1 and international systems. It was possible to notice the significant similarity of the current trends in the indicators. The DGNB was the one that fully addressed the fourteen aspects brought by ISO 21929-1. The HQE and LEED systems were the ones that had the minor elements of ISO 21929-1 mentioned in their guides, with eleven of the fourteen elements; this does not mean that they are less efficient, as the BREEAM system, in this one, realized It is said that it brought thirteen of the fourteen aspects of ISO 21929-1, in this way, the adoption of this standard does not deviate from the criteria used around the world in sustainable construction (Bruno Polli, Vaz Duarte Oliveira e Sá, & Pavani Biju, 2022).

1.5 SDGs

Sustainability has been much discussed and intertwined with the United Nations' sustainable goals; in 2017, at the 70th United Nations General Assembly, the Heads of State and governments of 193 nations met and endorsed the resolution entitled "The Agenda 2030 for Sustainable Development". To balance and mitigate the three aspects of sustainable development – economic, social and environmental – that are currently seen as a global emergency, this plan includes 17 Sustainable Development Goals (SDGs) and 169 goals to be completed by 2030.(Serrano-Baena, Hidalgo Fernández, Carranza-Cañadas, & Triviño-Tarradas, 2021; UNITED NATIONS UN, 2015).

In these scenarios, buildings play a significant role in achieving the SDG by direct relationship to positive and negative impacts, such as demographic changes, climate change, water, land use and scarcity of other resources; when not handled correctly, but also positive effects, to generate local jobs and move the economy (Alawneh, Ghazali, Ali, & Sadullah, 2019).

Another factor is that companies from different areas have used the 17 SDGs to disseminate their ESG reports, including the real estate and construction sector. There is an intuitive connection between SDGs and ESG. According to the survey, the SDGs were mentioned in sustainability reports by at least 70% of the top 100 corporations in 2020 in different regions, including Asia, North America, Europe and Latin America (Jonsdottir, Sigurjonsson, Alavi & Mitchell, 2021; Bose & Khan, 2022).

2. Methodology

2.1. Content analysis

For the analysis of the GRESB and ISO 21292-1 guides, the qualitative content analysis methodology developed by Bardin (2000) was chosen, but it was necessary to adapt it for this study following the steps below:

• Pre-analysis: Content organization phase with skimming of the GRESB guide and establishing order of documents for analysis based on indicators 21292-1 (Silva & Fossá, 2015).

• Exploration of the material: Coding and categorization of the material, dividing the contents of the GRESB Guide by groups derived from the ISO 21292-2 indicators (Silva & Fossá, 2015).

• Results final treatment: Process of understanding the results obtained by the previous phase, which is summarized by analyzing each group individually (Silva & Fossá, 2015).

The software Atlas.ti was created to analyse vast amounts of qualitative data and has been applied in various fields of study. It has recently been used in content analysis, and it is possible to get six different kinds of results from it: 1) A research project's entire data can be collected and managed by the hermeneutic unit; 2) Primary records derived from field notes and interview transcripts with illustrations and audio; 3) Quotations, such as pertinent quotes from documents or interviews; 4) Codes, which enable the creation of a priori or a posteriori analyses, for example using Bardin's methods; 5) Memos, which allow the researcher to describe the history of their research and record their interpretations; 6) The network view makes it easier to see the results as graphs (Klüber, 2014; Bruno Polli et al., 2022)

2.2 SWOT analysis

SWOT was developed at Harvard Business School in the early 1950s to examine case studies. Many academics and strategic planning experts adopted SWOT analysis after the 1960s and since then, SWOT analysis has been employed in various disciplines and circumstances, showing its validity and accuracy. Examples include education, industry and agricultura (Balamuralikrishna & Dugger, 1995; Hoskisson, Hitt, Wan & Yiu, *et al.*, 1999; Madsen, 2016; Adem, Çolak & Dağdeviren, 2018; Benzaghta, Elwalda, Mousa, Erkan & Rahman, 2021).

SWOT analysis is a popular method for analyzing and positioning a company's resources and environment in four areas: Strengths, Weaknesses, Threats, and Opportunities. The internal (controllable) variables that support or prevent the ability of organizations to execute their objectives are called strengths and weaknesses (Dyson, 2004; Samejima, Shimizu, Akiyoshi & Komod, 2006; Phadermrod, Crowder and Wills, 2019).

Other researchers have used this methodology in the context of sustainability, as it has a simple and easy-to-apply approach, making it possible to identify the positive and negative points that can impact strategies (Rocha, 2016; Freitas & Zhang, 2018; Bruno Polli, 2020). In the present study, the SWOT analysis will be used to analyze the GRESB indicators in the context of measuring the sustainability performance of buildings, that is, to verify the points that the set of these indicators bring to the sustainability area, thus presenting a vision on the same.

2.3 The SDG 'wedding cake'

The model theorized by Rockström & Sukhdev in 2016 emerged as a new way of looking at the economic, social and ecological aspects of the Sustainable Development Goals (SDGs), with the justification that all sustainable development goals are directly or indirectly linked to sustainable and healthy food, as shown in Figure 1 (Rockström, 2016; Fassio & Tecco, 2019).

This sustainability model's progress shifts from an anthropocentric to an ecocentric perspective, and it acknowledges that the biosphere dimension is what encompasses and underpins all social and economic plans (Rockström, 2016; Fassio & Tecco, 2019).

Therefore, the series of relationships connect the different SDGs through the construction and management of buildings. Some are more evident: objective 3.9 Effects of chemicals, air, water and soil contamination, for example, are directly linked with emissions derived from materials, construction process and operational phase. Through these relationships, it is possible to classify the contributions to the SDGs as significant, moderate and low.

Although this methodology was developed for sustainable food, its objective is suitable for this study since it helps demonstrate sustainability differently, where the "wedding cake" makes it possible to recognize that the economy must serve society while acting within the biosphere area. In this context, it is possible to notice the real contribution of the indicators coming from GRESB and ISO 21929-1 and to understand what level of contribution to the sustainable development of society.

Figure 1. SDG wedding cake

Source: Rockström (2016)

3. Results

3.1 Results of Qualitative Analysis of GRESB content based on ISO 21929-1 indicators

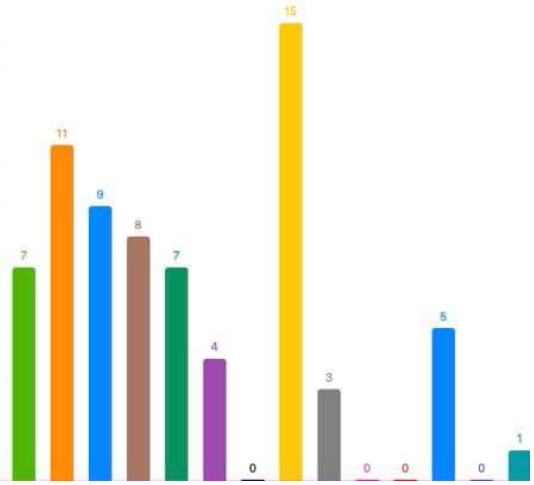
The first results identified in the qualitative content analysis were in the Development category in the GRESB guide, where the integration of ESG requirements in the construction phase activities, according to GRESB, can help to mitigate the negative impact and, at the same time, contribute to the environmental efficiency of the buildings in the operational phase. In general, this category evaluates the efforts of the entity/company in relation to ESG issues during the design, construction and site development of new buildings and not a roadmap on how it should be built, such as sustainability certification systems (GRESB, 2021).

In terms of the indicators that ISO 21929-1 addresses in its structure, analyzed within the scope of GRESB, it is noted that part of the integration of ESG requirements in the construction phase, as shown in Figure 2. However, most environmental, social and/or economic indicators were not found in the GRESB scope, such as accessibility, cost, adaptability, maintainability and servility. Regarding aesthetic quality, GRESB scores, but regarding the preservation of buildings or land that are of historical, heritage or cultural importance.

Other categories such as Material Selection Requirements, Embedded carbon disclosure, Energy efficiency requirements, Strategies for water conservation, Strategies for waste management, Health and Welfare also have item scores similar to the indicators ISO 21929-1 addresses in its structure.

Figure 2. GRESB content analysis (integration of ESG requirements into construction phase activities)

		1 GRESB Docum... 65	Totais
1-Emissions to air	7	7	7
2-Use of non- renewable resources	11	11	11
3-Water consumption	9	9	9
4- Waste generation	8	8	8
5-Change of land use	7	7	7
6-Access to services	4	4	4
7-Accessibility	0		0
8-Indoor conditions and air quality	15	15	15
9-Adaptability	3	3	3
10-Costs	0		0
11-Maintainability	0		0
12-Safety	5	5	5
13-Serviceability	0		0
14-Aesthetic quality	1	1	1

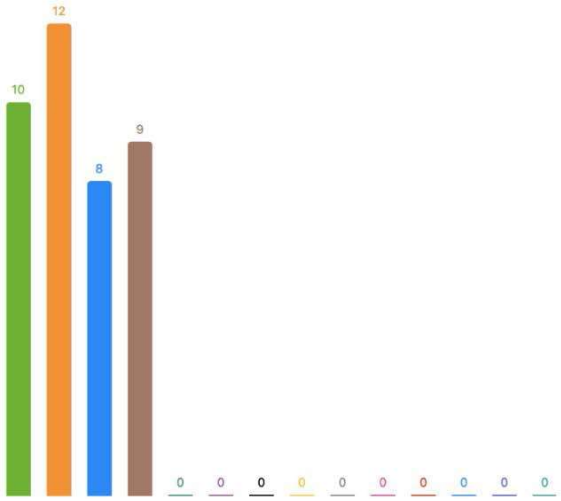


Source: own elaboration.

One point noted is that while GRESB awards scores on the items described above for the construction phase, with at least ten indicators out of the fourteen that ISO 21929-1 addresses, the categories linked to building performance present only four of the fourteen indicators, which are Energy, Greenhouse Gases, Water and Waste, as shown in Figure 3. In other words, there is an inconsistency in the GRESB scoring criteria, between what is awarded in the construction phase and what is awarded during the use phase, in addition to the fact that the performance data are exclusively linked to the environmental pillar. It is possible to notice neglect of the social and economic pillars.

Figure 3. GRESB content analysis (building performance)

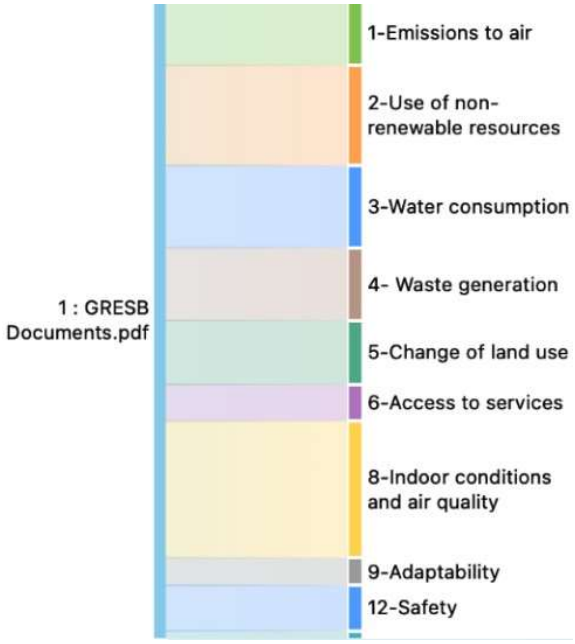
		1 GRESB Docum... 39	Totais
1-Emissions to air	10	10	10
2-Use of non- renewabl...	12	12	12
3-Water consumption	8	8	8
4- Waste generation	9	9	9
5-Change of land use	0		0
6-Access to services	0		0
7-Accessibility	0		0
8-Indoor conditions and...	0		0
9-Adaptability	0		0
10-Costs	0		0
11-Maintainability	0		0
12-Safety	0		0
13-Serviceability	0		0
14-Aesthetic quality	0		0
Totais		39	39



Source: own elaboration

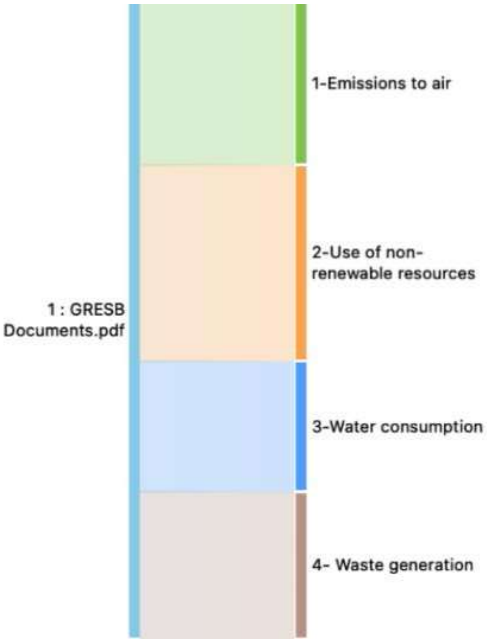
This comparison between what is awarded during the construction phase and what is awarded during the use phase can be seen in Figures 4 and 5, where the mismatch between the criteria can be seen.

Figure 4. GRESB structure for construction phase based on ISO 21929-1



Source: own elaboration.

Figure 5. GRESB framework for use phase based on ISO 21929-1



Source: own elaboration.

3.1. Results of GRESB SWOT analysis based on ISO 21929-1

After concluding the qualitative analysis of content in the GRESB structure, based on the 14 indicators of ISO21929-1, it was possible to identify which are considered, which are absent, and which are little addressed in its structure. However, to understand the indicators that the absence or presence of the cause on the sustainability of the buildings was used, the SWOT Analysis was used, which makes it possible to classify the initial results in Points: Strong, Opportunity, Weaknesses and Threats.

Strength: A "strength" or strength is something that has a positive implication, that it is possible to add value or offer the organization a competitive advantage, being tangible and controllable assets supporting an Opportunity or overcoming a Threat (Sarsby, 2012). In this context, four indicators fall into this category: Air emissions, Use of a non-renewable resource, Water consumption and Waste management. It is understood that because they are the only indicators awarded to the user during the construction and performance phase of buildings by GRESB. It thus makes the administrators and investors of this sector who use GRESB provide sufficient criteria on an ongoing basis for being considered from the construction phase and monitored in the use phase, allowing to obtain the foreseen benefits in Table 1.

Opportunities are considered external factors over which the organization has no control but are helpful. Opportunities can be tangible (products and resources) or intangible, such as improving reputation or increasing influence (Sarsby, 2012). In the context of this study, it is understood that those indicators are considered for the construction phase of the GRESB users but that they do not have continuous monitoring of their performance in the use phase; if there were monitoring of these data, they could obtain the expected benefits. In Table 2, in addition to improving the image of the building, ensuring better performance in general.

Weaknesses mean the business cannot seize an opportunity or is vulnerable to a threat, product or service features detrimental to growth. In the context of the study, it is understood that those indicators are not awarded by GRESB in the construction and use phase but do not any security that they are present in the buildings and thus enjoy the benefits generated (Table 3). However, it is something internal that can mitigate, but it will entail more costs for not considering it, such as Adaptability, Accessibility, Maintenance capacity, Servility and Costs.

Threats in the context of the study, it is understood the indicators that are not considered in the construction or use phase and that have an outside influence, such as safety. Since these are broader local

situations, it is impossible for the building to control the environment in which it is inserted and the Aesthetic Quality, a subjective character of the people who live around it, feeling visual discomfort or not by the inserted building. Threats, even if they are external and there is no control over them, it is necessary for the organization to consider contingency plans, ensuring that it is not entirely taken by surprise if something happens. However, these two indicators are not considered in the construction phase, much less in the use phase, it becomes something without control. It prevents the expected benefits from being obtained, as shown in Table 4.

Table 1. GRESB SWOT Analysis Strengths

Indicator	Aspect	Reason	Benefits	Contribution to the SDGs
Emission to air	Environmental	A third of energy-related carbon dioxide emissions comes from the construction industry. Global carbon emissions currently account for 40% of emissions in Europe, 39% of emissions in the US, 60% of emissions in Hong Kong, about 20% of total emissions in Australia and 25% of total emissions in Latin America (Evidence and Lessons from Latin America, 2013; Australia Department of Industry and Science (ADIS)., 2015; Environment Bureau of Hong Kong (EBHK), 2015; Lu and Lai, 2020).	With the development of new technologies and markets, restrictions on greenhouse gas emissions can also present opportunities for companies to stand out among competitors. (EFFAS, 2009).	**Significant**: 3.9 Effects of chemicals, air, water and soil contamination, and 13.2 Climate protection measures in guidelines, strategies and planning **Moderate**: 14.1 Avoiding marine pollution, and 14.3 Avoiding sea acidification **Low**: 15.1 Conservation of terrestrial and freshwater ecosystems (DGNB, 2020; UN and GRI Standards, 2022).
Use of non-renewable resource	Environmental	The use-phase primary energy consumption will account for the most significant life-cycle consequences. Depending on the type of construction, shape and specification, the use phase can be as little as 30% of the energy user's life cycle. (Dodd and Cordella, 2021a).	Operating costs and sensitivity to changes in energy supply and prices are directly impacted by energy efficiency. An overall reduction in primary energy consumption will generally positively affect air quality (EFFAS, 2009).	**Significant**: 7.2 Proportion of renewable energy; 7.3 Energy efficiency; 12.2 Use of natural resources and 12.4 Ecologically correct handling of chemicals and waste (DGNB, 2020; UN and GRI Standards, 2022).
Water consumption	Environmental	Around 21% of the water abstracted in the EU for public supply is used in buildings. Each EU citizen directly uses an average of 160 L of water per day. The demand for water in urban environments is increasing due to the trend toward larger urban populations (Dodd and Cordella, 2021b)	Operating costs can be reduced by reducing the demand for potable water and wastewater. In addition, the high rate of wastewater recycling and the use of nearby resources (wells, rainwater) contribute to independence from price and supply variations (D. G. für N. B. DGNB, 2020)	**Moderate**: 6.3 Improvement of water quality and 6.4 Efficient use and sustainable extraction of water **Low**: 6.5 Implementation of integrated water resources management (DGNB, 2020; UN and GRI Standards, 2022).
Waste Management	Environmental	One of the main waste streams produced in the EU, representing 25-30% of all waste, is construction and demolition waste. (RCD) (Donatello, Cordella, and Dodd, 2021).	Reducing waste has a positive impact on the environment and lowers construction costs at the same time (BREEAM, 2018)	**Moderate**: 3.4 Reduce mortality from non-communicable diseases and promote mental health, and 3.9 Reduce illnesses and death from hazardous chemicals and pollution 12.5 Sustainably reduce waste generation **Low**: 6.3 Improvement of water quality, wastewater treatment and safe reuse 12.4 Responsible management of chemicals and waste (DGNB, 2020; UN and GRI Standards, 2022).

Source: own elaboration.

Table 2. GRESB SWOT Analysis Opportunities

Indicator	Aspect	Reason	Benefits	Contribution to the SDGs
Land use change	Environmental	It is essential to use the land and soil carefully and in a way that minimizes the impact on them. Less development, cheaper wastewater costs and an improved microclimate are the benefits of saving on land use that reduce the impact on that land at the local level (DGNB, 2020)	Controlling ecological impacts linked to soil and habitat change will contribute to gaining local community approval for new ventures and will not affect this issue for future revenue and market share (SASB, 2018).	**Moderate**: 15.3 Soil quality protection **Low**: 11.5 Impact of catastrophes (DGNB, 2020; UN and GRI Standards, 2022).
Access to services	Social	Ensuring nearby amenities meet your daily needs will increase building users' satisfaction with the location (DGNB, 2020)	The perception that a land emits significantly impacts how people feel about a building and the area around it, as well as whether or not the building can make a positive contribution to the neighbourhood (DGNB, 2020)	**Significant**: 11.6 Reduce the environmental impact of cities, and 11.7 Provide access to safe and inclusive green and public spaces (DGNB, 2020; UN and GRI Standards, 2022).
Internal conditions and air quality	Social	Most of the more than 10,000 liters of air that many Europeans breathe every day is indoor air, as they spend a large part of their time inside buildings (more than 90% of them) (Dodd and Cordella, 2021c)	A healthy indoor environment has a significant impact on people's health. The future may see even more time spent indoors due to comfort or the need to shop online and work from home, which lessens the need for commuting. (Dodd and Cordella, 2021c)	**Significant**: 3.4 Reduction of premature death, promotion of good health/well-being; 3.9 Effects of chemicals, air, water and soil contamination, and 12.4 Environmentally friendly handling of chemicals and waste **Moderate**: 3.4 Reduce mortality from non-communicable diseases and promote mental health **Low**: 7.3 Double the improvement in energy efficiency (DGNB, 2020; UN and GRI Standards, 2022).

Source: own elaboration.

Table 3. Weakness SWOT analysis of GRESB

Indicator	Aspect	Reason	Benefits	Contribution to the SDGs
Adaptability	Economic	Designers can identify actions with the potential to reduce future risks and liabilities by simulating and evaluating future scenarios for a building's thermal comfort and resilience and using climate estimates for 2030 and 2050 created by scientists. Therefore designing more climate-proof buildings requires a focus on adaptation measures that can incorporate into buildings now or, if necessary, can be included in the future (Dodd and Cordella, 2021d)	The ease with which a building can be modified to meet evolving needs contributes to greater user satisfaction, extended building life, and lower lifecycle expenses. Flexibility and adaptation reduce the risk of eviction and help a building succeed economically in the long term (DGNB, 2020).	**Moderate**: 11.3 Inclusive and sustainable urbanization **Low**: 8.4 Improve resource efficiency in consumption and production; 12.2 Sustainable management and use of natural resources, and 12.5 Substantially reduce waste generation (DGNB, 2020; UN and GRI Standards, 2022).
Accessibility	Social	The degree of accessibility of a built environment determines how much citizen participation is possible and whether it encourages or discourages people from engaging in certain activities. However, depending on an individual's functional limitations, certain features may present accessibility challenges. (Hammel *et al.*, 2015; LARSSON, 2016; Martin Ginis *et al.*, 2016).	If the principles of barrier-free construction have already been incorporated into the planning of the works, this forecast will essentially eliminate the costs that the building adaptation would require, as well as the complexity of the work that these modifications would involve. Buildings with barrier-free designs are most attractive to all user groups, especially those with cognitive, sensory and motor impairments (DGNB, 2020)	**Significant**: 8.5 Appropriate work for all men, women, people with disabilities, and 10.2 Inclusivity facilitated 11.7 Access to public spaces and green spaces (DGNB, 2020; UN and GRI Standards, 2022).
Maintainability	Economic	Maintainability is utilized during the use phase, but it is essential to understand that construction efficiency is a direct result of the design phases, which are thought of as the beginning of a building's life cycle. From these phases, it is possible to reduce the environmental and economic impacts over time. (Menezes and Ferreira, 2002; Aris, 2006; DelArco and Minto, 2009)	Making the right choices reduces your building's long-term operating, maintenance, and usage while lowering its long-term environmental and financial implications (Menezes and Ferreira, 2002; Aris, 2006; DelArco and Minto, 2009).	**Low**: 11.3 Inclusive and sustainable urbanisation (DGNB, 2020; UN and GRI Standards, 202
Servility	Economic	Building elements require an arrangement of functional capabilities, i.e. having a specific capability, from a spectrum of functional capability themes, for each type of role (Antonioli, 2003).	Through Servility, the information necessary for the Administration to plan strategic and tactical actions is made available. This allows Facility Management to meet users' needs by providing the support services required to perform its functions efficiently (Antonioli, 2004).	**No direct contribution to Sustainable Development Goals (SDGs) of United Nations (UN)** (DGNB, 2020; UN and GRI Standards, 2022).
Costs	Economic	By estimating life cycle costs, important information can be provided to investors, asset managers, occupiers and homeowners, who may want to understand the costs associated with maintaining and administering a home throughout the mortgage term and organizations of residents responsible for the community costs of maintaining apartment blocks (Dodd, Donatello and Cordella, 2021).	Buildings that consume less energy and water can leverage their savings to capitalize on their value and factor them into property valuations and investment decisions, plus a life- cycle costing point of view helps customers and designers thinking about how initial capital expenditures and usage stage costs report to each other (Dodd, Donatello and Cordella, 2021).	**Low**: 8.4 Improve resource efficiency in consumption and production; 12.2 Sustainable management and use of natural resources, and 12.5 Substantially reduce waste generation (DGNB, 2020; UN and GRI Standards, 2022)

Table 4. Threat GRESB SWOT analysis

Indicator	Aspect	Reason	Benefits	Contribution to the SDGs
Security	Social	Hazardous incident risks are also part of the safety and security topic. This topic may therefore be added to this criterion in a later version. The subjective perception of safety by building users can be increased, for example, by ensuring adequate visibility and lighting in external areas, a clear path layout and technical safety equipment. These measures serve to prevent hazards and reduce attacks and accidents (D. G. für N. B. DGNB, 2020).	Uncertainty and anxiety restrict freedom of movement. Measures that increase the sense of security also often help to reduce the possibility of insecurity (D. G. für N. B. DGNB, 2020)	Low: 11.7 Provide access to safe and inclusive green and public spaces 3.4 Reduction of premature death, promotion of good health/well-being (DGNB, 2020; UN and GRI Standards, 2022).
Aesthetic quality	Social	The aesthetic impact can be linked to visual disturbances caused by the perception of landscape interventions as a result of artificial features that, due to their size, style or separation from the surrounding environment, have a distressing effect. On the other hand, the idea of aesthetics comes from theories of design, which connect concepts from philosophy, psychology and art with descriptors linked to landscapes that were later applied to landscape situations (Pachaki, 2003; Tveit, Ode and Fry, 2006).	The way users and visitors view the building and its surroundings, as well as the building's ability to make a positive contribution to the neighbourhood, are both significantly influenced by the site's reputation. Therefore, it is crucial that a building not only meets the practical requirements but also projects a positive image to maximize its economic and social quality (DGNB, 2020)	Moderate: 8.2 Diversify, innovate and upgrade for economic productivity 8.3 Promote policies to support job creation and growing enterprises (DGNB, 2020; UN and GRI Standards, 2022).

3.2 The SDG 'wedding cake' for GRESB and ISO 21292-1

By identifying the contribution that the indicators derived from the structure of ISO 21292-1 and GRESB (Project Phase and Operation Phase), it is possible to notice which Sustainable Development Goals are positively affected. Table 5 presents the results of this analysis.

Table 5. Contribution to the SDGs

Aspects ISO 21292-1	**Indicators GRESB**		SDGs									
			3: Good Health and Well-Being	6: Clean water and sanitation	7:Affordable and clean energy	8: Decent work and economic growth	10: Reduced inequalities	11: Sustainable cities and communities	12: Responsible consumption and production	13: Climate Action	14: Life below water	15: Life on land
	Design phase	Operation phase										
Air emissions	Development: ESG Requirements	Performance: GHG								●	◗	⊘
Use of non-renewable resources	Development: ESG Requirements	Performance: Energy			●				●			
Water consumption	Development: ESG Requirements	Performance: Water		◗								
Waste generation		Performance: Waste	◗	⊘								
Land use change	Development: ESG Requirements							⊘				◗
Access to services	Development: ESG Requirements							●				
Accessibility						●	●	●				
Indoor conditions and air quality	Development: ESG Requirements		●		⊘				●			
Adaptability						⊘		◗	⊘			
Costs						⊘			⊘			
Maintainability								⊘				
Security	Development: ESG Requirements		⊘			◗		⊘				
Maintenance								⊘				
Aesthetic quality						◗						

(●Significant); (◗Moderate); (⊘Low)
Source: own elaboration.

With the SDG 'wedding cake' methodology adapted to the context of this study, it becomes easier to identify the contribution of GRESB and ISO21292-1 to the SDGs. The reduction goals highlight how urgently the construction industry has to implement climate protection measures. They also offer a crucial connection for making instantaneous contributions to the SDGs. One of the metrics used in both frameworks aids in establishing goals and benchmarks for carbon emissions generated while building and operating new or existing structures. In this way, both GRESB and ISO 21292-1 have conditions of contributions at the biosphere level, as shown in Figures 6, 7 and 8.

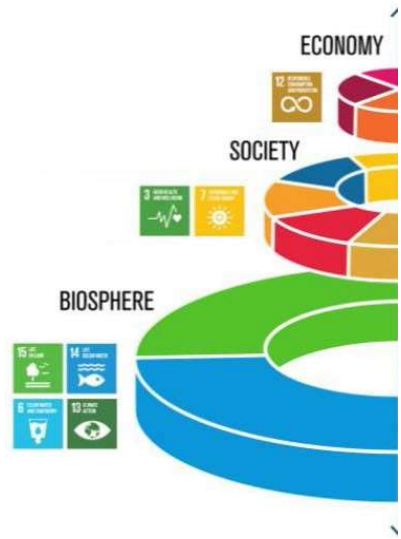
Figure 6. ISO 21292-1 SDG 'wedding cake'

Source: Adapted from Rockström (2016).

Figure 7. GRESB (Design phase) SDG 'wedding cake'

Source: Adapted from Rockström (2016).

Figure 8. GRESB (Operation phase) SDG 'wedding cake'



Source: Adapted from Rockström (2016).

By observing the management and consumption of materials, one can assess and understand the impact that a building has on the environment. For example, land and oceans can be polluted due to soil acidification and over-fertilization, resulting in forest decline and increased fish mortality, in addition to effectively reducing resource use, are impacts that can be caused in the production of primary material for civil construction, by contributing to the responsible consumption of material and waste management, GRESB and ISO 21292-1 contribute to these objectives that have an order of Economy, Society and Biosphere.

The sustainability approach must not only examine each building in individually, detached from the surroundings that make up the environment. This relates to the way they are designed, assessed, or both. Having the appropriate infrastructure, access to services and transportation networks are all critical. Through indicators, ISO 21292-1 offers ways to view entire cities, towns, business districts and manufacturing centres from a broader perspective; such indicators were not found in the GRESB framework.

Lastly, one factor observed is to ensure that buildings establish the conditions for equal treatment of people of any gender and the inclusion of people at all stages of life. The accessibility and comfort of users in this context are essential for objectives delimited by the SDGs. In this way, it is noted that indicators in this area are not found in the GRESB structure. In contrast, ISO 21292-1 presents criteria that ensure this area, which directly influences the level of Society.

1. Discussion of results

Among the results found in this study analyzed with other results from other researches carried out by different authors, it is possible to notice meaningful connections, initially due to the greater concentration of environmental aspects and lesser allowance for social and economic measures by GRESB, which is

similar to what occurs in sustainability certification systems, which despite having similar criteria, have different weights for weighting, with a greater focus on environmental aspects (Gertis, Hauser, Sedlbauer & Sobek, 2008; Giama & Papadopoulos, 2012).

The difference in this comparison mentioned above is that the sustainability certification systems assign different weights between the aspects; on the other hand, the GRESB does not present part of the social and economic criteria in its structure or only subsidizes specific indicators for the construction phase, but not for the monitoring continuity, through consideration of the operating phase. This kind of neglect can result in the current sustainable performance of buildings. It was found in an investigation to compare the expected and actual energy consumption of LEED buildings after certification found that about 50% of the buildings performed worse than the rated building. In this context, the lack of consideration for the operational phase of buildings was identified, that energy modelling and the lack of knowledge in green technology have an impact on the operational performance of certified buildings, which shows the importance of continuous monitoring (Turner & Frankel, 2008; Ozcan Deniz, 2017).

Still on this subject of imbalance or omission of social and economic criteria identified in the GRESB structure, in other studies, evidence was found to show the evolution of how sustainability is treated by certification systems, in the temporal analysis shows that more significant consideration for aspects of environmental issues are a matter of necessity since the most critical problems of society are in this aspect, but this weighting has been changed over the years, and in the future, it is expected that the social aspects will become the most considerations for the systems of sustainability certification, in this way it can be reflected in the GRESB directly (Wen, Hauser, Sedlbauer, & Sobek, 2020).

This omission or smaller indicators that the GRESB has in its structure can be seen from another perspective, such as neutrality not to influence architects to adjust their mentalities to design with a focus on the evaluation points or the high-level requirements already demanded by the sustainability certification systems, which makes the design phase difficult; however, the high condition of the criteria can be seen that buildings that have met the strictest sustainability requirements and this undoubtedly increases its value (Szymański, Winiecka-Kowalczyk & Nowotarski, 2014; Espenhein & Jensen, 2017).

1.1 Reflection in markting through the indicators GRESB and ISO 21292-1

The link between the use of sustainability factors linked to marketing consists of the set of activities designed to produce and facilitate the commercialization of any product or service, a definition widely also used for green marketing, where the intention to satisfy human needs, however, a minimal impact on the environment, however social and economic issues (from the point of view of society and not of the company) is necessary for its consideration so that it is not just green marketing (Dalmoro, 2009).

The contributions to the SDGs are good metrics to realize the real support for sustainability. The SDG 'wedding cake' results made it possible to notice the significant contributions that the GRESB and ISO 21292-1 indicator bring and the secondary contributions (moderate and low). It is clear that GRESB has a more environmental appeal; during the operational phase, the indicators used are linked to the biosphere level. These indicators such as GHG performance, energy, water and waste have social and economic contributions, as can be seen in Figures 6, 7 and 8, however the lack of specific indicators for social and environmental aspects raises questions about the real level of sustainability and ESG company that many use when adopting GRESB to monitor the performance of the buildings that make up the asset portfolio. On the other hand, the indicators that ISO 21292-1 have better coverage of SDGs, which can thus be said to have better coverage of sustainability.

These differences between the indicators show a significant relevance of the attentive look when the subject is socio-environmental responsibility is in the differentiation between what is advertising with an ecological focus, whose message corresponds to the real practice, and what is ESG, used exclusively for profit (Tavares & Ferreira, 2012).

2. Conclusion

Although the classic definition of sustainability addresses the environmental, social and economic pillars in a balanced way, it was possible to conclude with this study that it does not occur through the criteria presented in the GRESB structure because through the analysis using the 14 aspects of ISO21929 -1 it was possible to identify that GRESB addresses only a few sustainability criteria, both in the design phase

and in the use phase. The SDGs' results to understand the sustainability coverage level evidence this conclusion.

Another factor that can be noted is the non-continuity of some indicators addressed in the design phase but omitted in the use phase; this indirectly does not contribute to the actual projected sustainability performance since monitoring does not occur, making it possible to cause damage to building users.

The GRESB brings the ESG context to the real estate area, and despite its relationship with sustainability certification systems, it is identified that the way sustainability is addressed to ensure adequate performance in the environmental, social and economic spheres can be considered vague, since many indicators that are discussed in ISO21929-1 and which are also addressed in certification systems are not discussed in the GRESB framework.

At this point, a possible solution would be an adaptation of the indicators, such as the fourteen aspects of ISO21929-1, as there is not a large number of indicators as in certification systems and that are criticized by some builders for making the design phase difficult. Still, at the same time, it addresses essential criteria in the environmental, social and economic sphere of sustainability.

Finally, the most used made in this study are from the perspective that SDGs are widely used in ESG reports and that many companies have ESG as marketing to attract the so-called green consumer, one that includes in its decision-making criterion the option for products that are concerned with sustainability and the environment, the fact that GRESB does not address more profoundly social and economic criteria in its structure, brings up the idea that a critical look, about socio-environmental issues, will only be solidified from the mobilization of interested parties. This issue with the commitment and ethics of the parties involved in the process of development, production and obligation of an ESG policy becomes paramount for them to be propagated in communion with the real contribution to the Sustainable Development Goals (SDGs) and true urgency in conserving the environment, supporting society and economically viable. After all, promoting a culture of consumption of greater responsibility is one of the pillars for forming a sustainable community.

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