NOVA SCHOOL OF SCIENCE & TECHNOLOGY

DEPARTAMENT OF MECHANICS AND INDUSTRIAL ENGINEERING

GreenChecker: Proposal of an assessment tool for sustainability and greenwashing awareness.

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Bachelor's degree in Industrial Engineering and Management Sciences

INTEGRATED MASTER'S IN INDUSTRIAL ENGINEERING AND MANAGEMENT

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ABSTRACT

Sustainable development and sustainability are amongst the major concerns in private business, governments, and investment experts. While key concepts are not new, the increased awareness, approaching deadlines, and ever more noticeable consequences of human activities, have all contributed to increase their relevance.

Such concern has motivated experts and agencies alike, into creating initiatives such as the GRIs, ESG and the most notably, the UN's SDGs, which intend to guide society towards a more sustainable future. However, despite the extended amounts of effort, a theoretical consensus on the best methods and practices is yet to be achieved. This is particularly noticeable regarding methods that are practical and accessible, as the existing ones require expert knowledge.

The solution proposed in this thesis applies Content Analysis to companies' sustainability reports, followed by an assessment centered on the SDG framework and existing GRI indicators, to provide a practical and manageable, assessment tool, that measures companies' statements regarding their sustainability performance, and eventual greenwashing levels. The assessment method employed utilizes scales to measure a total 3 metrics, over 2 dimensions. The Commitment dimension addresses the level of effort the company displays in their sustainability report and is divided in two metrics, report type and report scope, which are both utilized in all the 74 sustainability indicators considered. The Performance dimension constitutes an innovative solution as it takes into account the apparent effort measured by the commitment metric and estimates the level of completion of the goals and targets mentioned for each indicator. However, for this dimension, only one metric is utilized in each indicator, between accomplishment and progress, depending on if the indicator is qualitative or quantitative, respectively.

The results achieved provided significant comparative insights on companies' discourse, on the SDGs and greenwashing, allowing to differentiate between performance lev-

els. As such this thesis contributes for the literature with a novel approach and assessment tool which helps bring the sustainability assessment to a wider range of stakeholders.

Keywords: Sustainability, Sustainable development SDG, ESG, GRI, Greenwashing, Sustainability assessment

RESUMO

A sustentabilidade e o desenvolvimento sustentável estão entre as principais preocupações das empresas, governos e operadores financeiros. Embora os principais conceitos não sejam novos, o aumento da sensibilização, a aproximação de prazos e as consequências cada vez mais notórias da atividade humana, contribuem para o aumento a sua relevância.

Resultado desta preocupação, inúmeras organizações e académicos propuseram iniciativas como os GRIs, ESG e particularmente os ODS da ONU, que pretendem guiar a sociedade para um futuro mais sustentável. No entanto, apesar dos consideráveis esforços atribuídos ao tema, ainda não foi alcançado um consenso teórico sobre os melhores métodos e práticas. Isto é particularmente notório no que diz respeito aos métodos acessíveis e de fácil utilização, uma vez que os existentes requerem conhecimento especializado.

A solução proposta nesta dissertação aplica Análise de Conteúdo aos relatórios de sustentabilidade das empresas, seguida de uma avaliação centrada na estrutura dos ODS e nos indicadores existentes da GRI, para fornecer uma ferramenta de avaliação prática que avalia as declarações das empresas sobre o seu desempenho relativo à sua sustentabilidade e eventuais níveis de "Eco-Propaganda" (Greenwashing). O método de avaliação utilizado emprega escalas para medir um total de 3 métricas, distribuídas por 2 dimensões. A dimensão Compromisso aborda o nível de esforço que a empresa demonstra em seu relatório de sustentabilidade e divide-se em duas métricas, tipo de relatório e abrangência do relatório, ambas usadas em todos os 74 indicadores de sustentabilidade considerados. A dimensão desempenho constitui uma solução inovadora, uma vez que leva em consideração o esforço aparente medido pela métrica de compromisso e estima o grau de cumprimento das metas e objetivos mencionados para cada indicador. No entanto, para esta dimensão, apenas uma métrica é utilizada em cada indicador, entre realização e progresso, dependendo se o indicador é qualitativo ou quantitativo, respetivamente.

A solução proposta nesta tese aplica a Análise de Conteúdo aos relatórios de sustentabilidade das empresas, seguida de uma avaliação baseada no quadro dos GDS e nos indica-

dores GRI existentes, para fornecer uma ferramenta de avaliação prática e de fácil utilização, que mede o desempenho do discurso das empresas, relativamente a sustentabilidade, e os níveis de Eco propaganda presentes.

Os resultados alcançados proporcionaram uma visão comparativa e significativa relativamente ao discurso das empresas, sobre os ODS e Eco propaganda, permitindo diferenciar entre vários níveis de desempenho. Desta forma, a presente tese contribui para a literatura com uma abordagem e método de avaliação novos, e possibilita que a avaliação da sustentabilidade esteja disponível para um maior número de partes interessadas.d

Palavras-chave: Sustentabilidade, Desenvolvimento Sustentável, ODS, ESG, GRI, Eco propaganda, Avaliação de sustentabilidade

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ACRONYMS

CA	Content Analysis
CAPS	Constructive Approach for Problem Solving
DG	Doing Good
DnH	Do no Harm
EA	Externally Actionable
EE	Eco-Efficiency
EPA	Environmental Protection Agency
ESG	Environmental ocial and Governmental
GDP	Gross Domestic Product
GRI	Global Reporting Initiative
GSSR	Global Standards for Sustainability Reporting
IA	Internally Actionable
MDG	Millennium Development Goals
SA	Sustainability Assessment
SDG	Sustainable Development Goals
SA	Sustainability Assessment
SDG	Sustainable Development Goals
TBL	Triple Bottom Line Approach
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNGD	United Nations Global Compact

SYMBOLS

A	The relative importance of the first TBL dimension
B	The relative importance of the second TBL dimension
C	The relative importance of the third TBL dimension
X_i	Weighted score of the indicator
i	Indicator
I	The totality of indicators considered in the model.
I_{dg}	The set of DG action type indicators.
I_g	The set of indicators that impact the g component.
I_{ea}	The set of EA indicators.
I_{ia}	The set of IA indicators.
I_{nh}	The set of DNH action type indicators.
I_y	The set of indicators that impact the y TBL component.
g	The specific SDG
s_i	Report scope value of the indicator
p_i	Report progress/accomplishment value of the indicator
t_i	Report type value for the indicator
s_w	The weight of the report scope metric
p_w	The weight of the report progress/accomplishment metric
t_w	The weight of the report type metric
Tf_i	TBL Factor of the indicator

w_i	Indicator Importance
wr_i	Relative Weight of the indicator
w_y	The sum of the importance (w_i) of all the indicators that impact the (y) component.
X_i	Weighted Score of the Indicator
y	One of the TBL components
Z	Overall score
Z_g	SDG Based Score
Z_{gw}	Greenwashing Factor
zr_{dg}	The sum of the importance of the DG type indicators.
zr_{ea}	The sum of the importance of the EA indicators.
zr_g	The sum of the importance of the indicators that impact the (g) SDG.
zr_i	Relative Weight of the indicator
zr_{ia}	The sum of the importance of the IA indicators.
zr_{nh}	The sum of the importance of the DNH type indicators.

1

INTRODUCTION

This first chapter is dedicated to introducing the reader to the thesis, beginning with a contextualization of the topic and description of important concepts, followed by the motivations that supported this work. Next, the problems and objectives are explained, followed by a description of approach chosen and relevant contributions. Finally, the organization of the document is presented.

1.1 Context and motivation

Sustainable Development (SD) has been one of the most prevalent topics in management studies as of late (Sneddon et al., 2006). Despite such importance, the concept has yet to be definitively defined, as there is still a debate on the precise meaning (Byrch et al., 2007). However, most scholars agree that SD entails development that is concerned with both the needs of the present, as well as the needs of the future (Holdgate, 1987).

Much like a vague question cannot have a solid answer, the existing dispute on the definition of SD, also propagates to the debate of how to achieve it. As such, a definitive and consensual solution for SD is yet to be identified, although some insights have been reached. Undisputed is the fact that private companies and businesses play a vital role in achieving sustainability globally. Indeed, only the private sector is considered to have the right tools, knowledge, and impact required for sustainability, according to mainstream researchers (M. Milne et al., 2009). However, private businesses are self-interested entities, with sufficient influence to shape the discourse around SD and as such, may promote the definitions and arguments that best favor their position (Rambaud & Richard, 2015).

Sustainability Assessment (SA) is an integral part of SD, as a means to measure and quantify performance regarding sustainability, and support decision-making. Yet much like SD itself, it suffers from a large extent of heterogeneity, both in scope and methodology used.

Despite extensive efforts made by organizations and researchers, no theoretical consensus has been reached on the definitive methodologies and procedures to accurately measure SD (Perello-Marin et al., 2022).

To increase the concern and adherence to SD worldwide, the United Nations created and launched, 2015, the Sustainable Development Goals (SDG). These are comprised of 17 Goals, with 169 individual targets, aimed at raising awareness and promoting meaningful change worldwide, across a diverse range of topics and areas. The SDGs provide the most comprehensive framework for SD so far and have been widely accepted by most stakeholders. The extensive scope, while allowing for a thorough take on SD, also greatly increases the complexity of the framework. Additionally, some aspects of sustainability can only be meaningfully impacted by widespread effort, and not solely by individual companies.

The extreme complexity and diversity of the SDGs have greatly hindered the engagement of the private sector with the framework. Social pressure has led to companies adopting the SDGs nonetheless, in more manageable ways, such as referring to them in their sustainability reports. This, however, is often superficial and does not contribute to meaningful change and SD, often being regarded as greenwashing.

With the deadline of the SDGs approaching, less than a decade away, the matter has gained more prevalence. The large majority of stakeholders now considers sustainable performance and SDG compliance as important distinguishing factor for businesses and enterprises. Such an increase in relevance and lack of well-defined methodologies and assessment methods creates an opportunity for the development of new tools capable of assessing companies' performance and compliance regarding the SDGs.

1.2 Problems and Objectives

The end goal of this thesis is to deliver a experiemental model, exploring the creation of a tool, capable of assessing corporate SDG engagement, performance, and greenwashing levels, that can be applied to the large majority of companies and businesses, with relative ease and minimal adaptation. The assessment should provide stakeholders with relevant information, which can be used to support later decision-making processes.

The main difficulties in developing such a tool are three-fold. Firstly, as the SDGs aim to provide an extensive take on SD, they inherit much of the complexity and wide range of areas and topics affected. Such wide scope means that researchers have to deal with different fields of expertise, that have different constraints, concepts, and methods. This results in a high degree of complexity and extreme difficulty in operationalization. Also, derived from such wide scope, the considered metrics may come in a variety of forms, from multiple types

of quantitative data, which can have descriptive or normative, to other assortments of qualitative information. This multitude of data types has to be handled in different manners, according to their nature, furthering the complexity.

Secondly, the different realities of companies, their operations, impacts, and influence, mean that not all SD targets are applicable, in the same manner, or even not at all, to every single case.

Thirdly, and finally, the relevant literature has yet to provide a meaningful consensus on which methods and tools are most appropriate to deal with the SD and SA problems. Also, given the variety of studies previously carried out, with different scopes and objectives, along with all the SD's diversity and complexity mentioned before, means that the methods used, may not be applicable to our work (Silva, 2021). This causes a high degree of difficulty, in selecting the proper approach, methods, and tools, to deal with the challenge presented.

However, in a challenge, lies opportunity. The difficulties mentioned above have resulted in a significant gap in the literature, as currently there are no models proposed, that aim to achieve the goals proposed in this thesis.

1.3 Approach and Contributions

To accomplish the objective of this thesis, a learn-by-doing and doing-by-learning approach was utilized. This approach entails the development of new tools and methods, often supported by the creation of models, which are in turn tested in case studies and samples. The results of said case studies are then to be analyzed and the conclusion withdrawn should form the basis of subsequent research and development.

The selection of this approach allowed us to define the general guidance of the work required for this thesis, and together with the selected methodology, provided a robust, stepwise procedure, that allowed for a coherent study of sustainability and SA. The methodology chosen for this work is based on the adaptation of the Content Analysis (CA) and Constructive Approach for Problem Solving (CAPS) methodologies, and offered the required flexibility, while still providing sufficient theoretical support. As such, the following steps constituted the methodology chosen:

1. Identify a relevant challenge, that presents an opportunity for development: this stage requires the definition of the challenge that will be tackled, and requires a general knowledge of the topic, the major constraints, limitations, and opportunities.
2. Gather in-depth knowledge of the topic, its constraints, and major difficulties: Here, extensive knowledge of the topic is obtained, by performing thorough

literature research, expanding on the knowledge present in the previous stage.

3. Propose a solution: this stage entails the proposal of an adequate solution, which is initiated by the definition of goals and requirements, and results in the creation of a method/tool, realized by the construction of a model.
4. Validate the solution via case studies: Here the developed solution, is tested via application to case studies, The results are analyzed, regarding the proposed goals and requirements, validating the viability of the solution.
5. Identify relevant contributions, applicability, and limitations: The last stage requires the proposed method to be contrasted with the literature and indicate the main contributions and limitations.

The main contributions of the assessment method proposed in this thesis are threefold. Firstly, it contributes to the literature, by tackling a specific area that has been thus far, largely neglected. This area corresponds to the research on practical tools and methods for assessing companies' contributions and discourse towards sustainability, and more specifically, the SDGs.

Secondly, the topic of sustainability is a complex one, with extensive amounts of impacts, constraints, and stakeholders, which in turn, have different priorities and agendas. As a result, most research is carried out with similar extensiveness and complexity. The approach presented here is a novel one, pragmatic and practical, which intends to extend the sustainability assessment to a further number of stakeholders.

Thirdly and finally, the model proposed combines already established concepts and notions, with novel metrics for the evaluation of company discourse. This new take on company performance regarding sustainability allowed for a type of evaluation that's yet to be fully explored in the literature. Considering these, the work presented here is expected to contribute meaningfully towards the advancement of the research on sustainability and SA.

1.4 Document Organization

The present thesis is structured along 5 main chapters. First chapter, Introduction, informs the reader about the main motivations behind the work presented, the main challenges and objectives, the approach utilized, and the main contributions if the study.

The second chapter, addresses the literature research carried out, required for obtaining an in-depth knowledge on the relevant topics, which is fundamental for a relevant thesis. It is divided between three subchapters, that, respectively, address the topic of sustainable development, sustainability assessment, and finally the Sustainable Development Goals.

In the third chapter, GreenChecker is developed and proposed as an sustainability assessment method. In it, the methodology utilized to carry out the model's development is

explained, followed by the definition of its requirements and objectives. Next, the model's scope is specified, the indicator framework utilized is chosen and reworked to best fit the purposes of GreenChecker, and the weighting system is explained. Finally, the assessment method is defined, along with the calculations required to deliver the outputs envisaged.

The fourth chapter is concerned with the validation of the model, which was defined by the methodology chosen. As such, a sample is selected, on which GreenChecker will be utilized, to simulate the conditions it is meant to be used. With the application of the model done, the results are analyzed, witch allows for considerations on the models validity to be stated.

The fifth and final chapter presents the conclusions of the study, its limitations, and suggestions for future work.

Additionally, to the chapters, the document contains two annexes, A and B, which presents information on the SDGs, and the reworked indicators and model's application to the sample.

2

LITERATURE RESEARCH

In this chapter the state of the art is presented, by form of the literature research, which is divided into three major sections. The function of this chapter is to provide the reader with the required knowledge of the current literature, principal notions and concepts, and also, the main problems that surround the topic.

In this sense, the first section (section 2.1.1) introduces the reader to the sustainable development topic, which is at the core of this thesis, providing a common background on which further topics explored. Two major schools of thought are introduced, the Triple Bottom Line and Environmental Social and Governance criteria in sections 2.1.2 and 2.1.3 respectively. While these were not strictly necessary for the development of the model, they remain key notions in the sustainability studies, and were import for a more relevant and complete conception of GreenChecker.

The following section (section 2.2.1) introduces the sustainability assessment topic, where the current practices and accepted practices are explained. Three major topics are also introduced, starting by GRIs, in section 2.2.2, introduced the which are one of the most comprehensive indicator framework established, and there for, critical to sustainability assessment. This is followed by the explanation of Content Analysis and the Constructive approach for problem solving, in sections 2.2.3 and 2.1.4 respectively, which were both fundamental in defining both the assessment method employed and the methodology.

Finally, section 2.3 refers to the Sustainable Development Goals, which are one of the cornerstones of the work presented here. The section begins with an introduction to the topic, including the major challenges, and is followed by the current reporting practices.

2.1 Sustainable Development

2.1.1 Introduction and Definition

The growth of humankind as a species leads to the inevitable increase in demand for Earth's resources (Sneddon et al., 2006). Human actions result in cause climate change, loss of biodiversity, and other ecological alterations (Barnosky et al., 2011). Indiscriminate use of natural resources was historically justified by the need to satisfy society's current requirements, supported by a short-term mindset relative to the consequences of such actions (Gardiner, 2006). The lack of a long-term approach to the management of such resources, one that takes into consideration the impact of our species, leads to their exhaustion and consequently threatens our future existence (Rockström et al., 2009).

During the 1960s and 1970s, a growing concern for the human impact on the environment was observed.(Strong & Hemphill, 2008) The need for change was publicly expressed at the United Nations (UN) Conference on Human Environment in 1972, being the first world conference to make the environment the primary concern (United Nations, 2022c). This intent is readily communicated through the opening declaration, as one can read in its second item (United Nations, 2022c):

"The protection and improvement of the human environment is a major issue which affects the well-being of peoples and economic development throughout the world; it is the urgent desire of the peoples of the whole world and the duty of all Governments".

Sustainable Development (SD) was first defined in 1987, in what is often referred to as the "Brundtland Report" (original title: "Our Common Future"), published by the World Commission on Environment and Development (WCED). The WCED originated as a response by the UN General Assembly, to address the growing concerns regarding the impact of human activities on the environment, such as climate change and degradation of the ozone layer. SD was then coined as the term for development which accounts for the needs of future generations when developing solutions for the present ones (Holdgate, 1987).

While generally accepted, the Brundtland definition is commonly criticized by the research community. One argument stands for the fact that the definition proposed in 1987 is far too vague and does not provide an exact meaning and boundaries for the concept. This allows different parties to shape the meaning of SD to best fit their interests and ultimately undermines the goal of SD (Daly, 1990). Some authors point out that the majority of SD research disregards the fact that businesses are self-interested entities, with the ability to shape the world discourse relative to SD and promote the most convenient version of SD (Dobers & Springett, 2010, pp. 36–69; Levy, 1997, pp. 126–147; Welford, 1998, pp. 1–12). Such vulnerability ultimately allows companies to express an apparent compliance towards SD, one which

may not be accurate. Businesses that employ such strategies are able to keep up with changing political and social contexts, without ever enacting meaningful change to their operations and management. Such practices are often referred to as greenwashing (Hopwood, 2009, pp. 433–439; Messner, 2009, pp. 918–938).

This debate on the meaning of SD has led to the emergence of two propositions in the relevant literature. One regards sustainability with a reductionist point of view, claiming that global sustainability is dependent on business-level sustainability (Isil & Hernke, 2017). In other words, if the world achieves sustainability in each and every single business, global sustainability is achieved. Some authors also claim that companies have both legitimate and key roles in safeguarding the environment and society (Tregidga et al., 2014). Additionally, existing literature promotes the notion that only companies have the right knowledge and tools required for achieving SD, furthering the importance of companies regarding the topic (M. Milne et al., 2009, pp. 1211–1257). The other proposition suggests SD as a Win-Win situation. According to this scenario, the accomplishment of environmental or social objectives also furthers the accomplishment of financial ones. Such a notion is used by authors to refer to economic growth that doesn't result in environmental degradation (Banerjee, 2003, pp. 134–180). However, the latter proposition is contested by researchers who claim that, in reality, compromises often have to be made, suggesting the existence of trade-offs, which are not accounted for in the Win-Win proposition literature (Hahn et al., 2010, pp. 217–229).

Outside academia, sustainability is often equated to eco-efficiency (EE). The practices of EE are centered around the reduction of resources used, whilst maintaining the amount of value added. Additionally, the concept may be expanded to factor in the production of unwanted waste and pollution (Dyllick & Hockerts, 2002). This approach dominates business management, regarding sustainability, enabling companies to reduce both environmental impacts and costs. Authors point out the similarities between EE and economic measures while providing a broader scope of action than traditional profit maximization strategies, as the justification for such popularity. However, academics argue that EE does not improve the adaptability and diversity of industries and, as such, does not contribute to increasing resilience of the same (Korhonen & Seager, 2008). Additionally, EE often produces results that are short-term based and incremental, instead of effective and long-term improvements, thus not deemed sufficient for solving the sustainability issues (Könnölä & Unruh, 2007, pp. 525–537; Young & Tilley, 2006, pp. 402–415).

Similar to how the definition of a clear objective is fundamental to finding a proper solution, the debate on the meaning of SD also translates to the solutions proposed to tackle the matter. The fluidity of the meaning of SD has led to different opinions on the changes required in our society to achieve global sustainability. Indeed, some authors suggest that

sustainability will require a considerable alteration of the current practices and a substantial improvement in the efficiency of our value chains (Reijnders, 1998). In contrast, the mainstream thinking amongst current literature, suggests that meaningful progress does not require fundamental alterations of our management methods and practices (Tregidga et al., 2014). Studies of this sort, point towards incremental improvements of current methods as sufficient to resolve the issue of environmental degradation and achieve global sustainability (Ählström et al., 2009, pp. 334–346.; M. Milne et al., 2009, pp. 1211–1257).

Currently, the majority of businesses are already integrating sustainability into their practices. This is driven both by the need of improving their public image and reputation amongst the sector and customers and also by the legitimate concern about their impacts on the society and environment (Yadav & Prakash, 2022). This resulted in the widespread availability of sustainability reports. However, researchers point out a lack of resistance or dispute across numerous corporate disclosures. As such, an argument can be made, advocating for increased constructive criticism and testing of the companies' perceived notions of SD, which may have a positive effect by furthering the research of SD and offset the hegemonic position of businesses. The study of corporate reports has been acknowledged as one of the suitable means for providing the all-important antagonisms (Tregidga et al., 2014).

2.1.2 Triple Bottom Line Approach

The Triple Bottom Line Approach (TBL) is accredited to the work published by John Elkington in 1997. The concept arose from the need to find a concrete idea of the meaning of SD (Elkington, 1997). As previously mentioned, the major critique made to the Brundtland definition is the fact of it being too vague of a concept, leaving it susceptible to multiple interpretations (Daly, 1990). Elkington's TBL suggests a management philosophy based on the consideration of three parallel and equally important bottom lines, by elevating the social and environmental responsibility of businesses, to the same plane as their financial obligations (Elkington, 1997). TBL is not acknowledged for the introduction of these concepts, as the idea of environmental and social responsibility of businesses was already understood, but rather for the notion that companies should fulfill the obligations to a greater number of stakeholders (Norman & MacDonald, 2004).

As originally conceived, TBL provided a reporting framework, for businesses to report on the sustainability of their operations, and as such, it was widely embraced by various organizations. The widespread adoption of this framework leads to a significant increase in the number of companies reporting on sustainability (Alhaddi, 2015). Because of this, TBL is accredited for a substantial improvement in the consideration of sustainability in the private

sector's agenda (Braungart et al., 2007, pp. 1337–1348; McDonough & Braungart, 2002, pp. 251–258).

The concept's success was not limited to the corporate setting, as the research community also readily embraced it. This is evident by reviewing the results presented in a study published in 2017. The article in question aimed to perform a critical evaluation of TBL and included a literature review to ascertain the prevalence of the term and the sentiment expressed in each publication, toward the same. To measure the prevalence of the term, the authors proceeded to review articles published between 1997 and 2015, that included the expression "Triple Bottom Line". The search resulted in 2137 peer-reviewed articles and an additional 704 newspaper and magazine references. Figure 2.1 portrays the number of articles, distributed per year of publication, which referred to or addressed TBL. By observing the graph presented, it becomes clear that from the year of the introduction of TBL, the term steadily gained traction and increased in prevalence over the considered period. Next, the article presents the study of the attitude towards TBL in the considered articles. Using computational text analysis, based on word classification models, the authors conclude that only

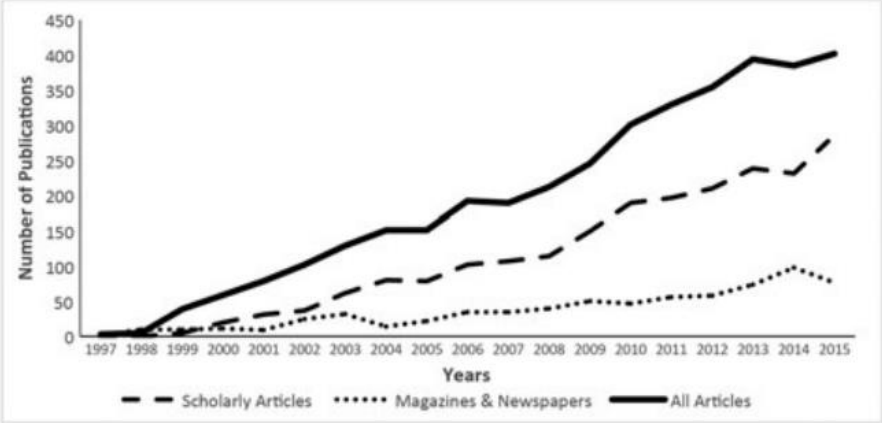


Figure 2.1 Yearly number of publications on TBL

Adapted from: (Isil & Hernke, 2017)

8% of the sample express a negative sentiment when mentioning or referring to TBL (Isil & Hernke, 2017).

This overwhelming positive sentiment, while often interpreted as a good sign for the TBL framework, may also be interpreted as an academic oversight. Indeed, some researchers accuse the research community of passiveness, when it comes to performing a critical and unbiased analysis of the model (Norman & MacDonald, 2004, pp. 243–262). Among the work made to critically analyze the TBL Framework, some academics claim that the explosive adoption of TBL speaks more of its faults rather than its benefits. Such researchers, point out that the TBL while trying to resolve the well know the issue of SD (as mentioned before, too

vague of a definition and therefore susceptible to interpretation), suffers from the exact same problem (Norman & MacDonald, 2004, pp. 243–262). This ambiguity, in turn, allows businesses to publish reports using the most convenient definitions or interpretations and effectively greenwash their operations, hence the widespread acceptance (Rambaud & Richard, 2015). Such notions are consistent with other arguments that point towards a lack, or even complete absence, of tools and methods to measure and aggregate non-financial data, and subsequently judge businesses' performance on the social and environmental spectrums (Norman & MacDonald, 2004, pp. 243–262).

An article published in 2015, after analyzing the TBL, argues that the framework is severely limited, and does not provide adequate solutions for real-world applications. Particularly, in situations, where the optimal solutions for accomplishing financial objectives do not coincide with the ones which achieve the best social or environmental results. The article also describes the TBL as an extension of traditional management practices and criticizes its success as detrimental to the development of new methods for reporting on environmental and social impacts (Rambaud & Richard, 2015).

Due to the prevalence of such criticism, TBL has fallen out of favor as a reporting tool. The concept remains relevant, however, as it is widely regarded as a synonym for SD (M. J. Milne & Gray, 2013). The consideration of the 3 equally important dimensions, Economy, Society, and Environment, is the most predominant notion of sustainability, in current management practices (Tregidga et al., 2018).

2.1.3 ESG Criteria

Environmental, social, and governance (ESG) criteria have experienced unprecedented development in recent studies (Alda, 2021). ESG, while not synonymous with SD, it is closely related to it. ESG focuses mainly on how decisions are made by companies' stakeholders, while sustainability is concerned about the actual impacts of such decisions (Chen et al., 2021).

ESG criteria, while not universally established, are coherent towards a common set of principles, which are at least partially considered, if not fully, in mainstream literature and ratings. These principles are also directly compatible with SD literature, which also upholds them in most studies and frameworks (Alda, 2021; Chen et al., 2021, pp. 75–85; Cornell, 2021). Such principles can be divided among the three components of the ESGs, and some common examples are (Erhart, 2022; IBERDROLA, 2021; Jang et al., 2022):

- Environmental Principles: these focus on the reduction of emissions, better use of water sources, circular economy, waste management, reforestation ef-

forts, impacts on biodiversity, energy consumption, and efficiency, among others.

- Social Principles: these focus on topics such as the inclusion of vulnerable social groups, human rights, effective training of employees, health and safety of the operations, contributions to the economy, gender equality, etc.
- Governance Principles: there relate to the corporate governance system, remuneration of employees, data security, supply chain management, compliance, etc.

Increasing amounts of researchers publish studies where the effects of ESG ratings are related to financial performance and investing viability (Shanaev & Ghimire, 2022). Simultaneously, evermore publicly traded companies are being assessed according to ESG criteria, by various organizations (Chen et al., 2021). Currently, mutual and hedge funds, with a combined value of up to US$30tn, have implemented strategies that consider ESG criteria, which relate to 30% and 50% of the American and European markets, respectively (Caldeira dos Santos & Pereira, 2022). Researchers argue that incorporating ESG assessments into investment decisions has a positive impact on risk management and provides enhanced sustainable long-term gains (Chen et al., 2021).

Despite such relevance, current ESG studies fail to provide a consensus, and therefore, solid conclusions, as some of the results presented are mixed and often contradictory (Cornell, 2021). One of the appointed justifications, for such inconsistencies, is the undefined nature of the ESG criteria (Erhart, 2022). ESG criteria rely on informal definitions and indicators, meaning that, each organization may apply its own definitions and metrics, which provide divergent ESG ratings and conclusions (Cornell, 2021).

Researchers have identified insufficient efforts by the research community, to establish adequate frameworks that provide an integrated materiality matrix, based on ESG metrics. Such work would contribute towards improved consistency, as universal, or industry-based metrics and indicators could be established for ESG evaluations (Caldeira dos Santos & Pereira, 2022).

Santos et al. (2022) have expanded on the concept by testing the feasibility and application of such a materiality matrix, through a quantitative–qualitative, multiple-case study, with exploratory purposes. The study proposed a materiality matrix, derived from multiple sources of ESG indicators, such as GRI, EPA, and UNCTAD, tailored specifically for the ESG rating of commercial ports. The proposed matrix, portrayed in table 2.1, encompasses a multitude of topics, across the three ESG groups. The ESG score method chosen, based on the materiality matrix, was applied to three different ports and was able to provide a valid comparison between analyzed ports. However, the authors point out that the conclusions that can be drawn from such results, do not indicate actual performance towards SD, and should

rather be interpreted as a proxy for the risk score for investing, which is consistent with mainstream literature (Caldeira dos Santos & Pereira, 2022).

Table 2.1 - ESG materiality matrix

Adapted from: (Caldeira dos Santos & Pereira, 2022)

Group	Section	Metrics	Source	Type	Unit
Environmental	**Emissions**	Air pollutant emissions	PM10_Concentration	Numerical	PM10 (µg/m3)
		Environmental management system	EMS_Presence	Boolean	Yes/No
	Resources	Energy consumption	Energy_Consumption	Numerical	MWh/oper.
		Effluent management	Dangerous_Waste	Numerical	Δ%/yr
			Ndengerous_Waste	Numerical	Δ%/yr
			Effluent_Treatment	Numerical	Δ%/yr
		Natural resources protection	Biodiversity_Programs	Boolean	Yes/No
		Environmental reports	Environmental_Reports	Boolean	Yes/No
Social	**Regional Dialogue**	Regional development planning	Regional_Plans	Boolean	Yes/No
		Social development	Cultural_Participation	Boolean	Yes/No
		Social actions	Regional_Sponsorships	Boolean	Yes/No
			Social_Communication	Boolean	Yes/No
			Social_Actions	Boolean	Yes/No
		Useless areas management	Useless_Areas_Destination	Boolean	Yes/No
	Collaboration	Diversity and inclusion	Diversity_Inclusion	Boolean	Yes/No
			Genre_Ethiny_Share	Numerical	Percent share
			Management_Positions	Numerical	Percent share
		Career development	Training_Schedule	Boolean	Yes/No
	Health and Safety	Work conditions	EV.Wages_Benefits	Boolean	Yes/No
			Employment_Programs	Boolean	Yes/No
		Health and safety	Safety_Programs	Boolean	Yes/No
			Accidents_Incidents	Numerical	Δ%/yr
Governance	**Management**	Financial performance	EBITDA_Margin	Numerical	Δ%/yr
			Net_Operating_Income	Numerical	Δ%/yr
		Operational performance	Variation_VesselArrival	Numerical	Δ%/yr
			Variation_CargoThroughput	Numerical	Δ%/yr
		Data management	Data_Policy	Boolean	Yes/No
		Ethics and corruption	Ethics_Policy	Boolean	Yes/No
			Corruption_Cases	Numerical	Integer
			ThirdParties_Profile	Boolean	Yes/No
	Board	Share distribution	Board_Diversity	Boolean	Yes/No
		Regionality	Regional_Board_Members	Boolean	Yes/No
			Stakeholder_Members	Boolean	Yes/No
	Presence	Intermodality and connectivity	Rail_Access_Share	Numerical	Percent share
			Road_Access_Share	Numerical	Percent share
			Waterways&Pipeline_Access_Share	Numerical	Percent share
		P&D	P&D_Programs	Boolean	Yes/No
		Internationalization	International_Relations	Boolean	Yes/No

2.2 Sustainability Assessment

2.2.1 Introduction and Definition

Sustainability Assessment (SA) is used in the literature to refer to any methodologies, frameworks, tools, or methods, which have the purpose of assessing or furthering sustainability performance (Moldavska & Welo, 2019). Authors define SA as a tool to support decision-making, which aims to further the contribution to sustainable development (Moldavska & Martinsen, 2018). Waas et al., (2014), identifies four distinct purposes for SA: Gathering adequate information for decision-making; social education; structuring complexity; operationalization, and forum for participation, debate, and deliberation.

SA, as an extension of SD, has to handle the abstractness, complexity and extensive range of areas and topics, implied in sustainability. Thus, Sustainability Indicators become a

fundamental tool in SA and SD decision-making processes (Singh et al., 2012). The contributions of SI, for SD and SA, are five-fold (Waas et al., 2014):

First and foremost, SI provides the ability to systematically structure the complex information required for SA. Effectively, SI turns the abstract concept of sustainability into observable and measurable variables and notions. Secondly, the implementation of SI allows for a shift in discourse, from abstract notions and interpretations to tangible and operationally meaningful concepts, facilitating the practical application of sustainability. Thirdly, SI can contribute to an increase in debate and learning by key stakeholders, by increasing the visibility and tangibility of the problem of SD. Ultimately, SI can contribute to a change in decision-making principles, namely, changing the way society measures progress. Fourthly, SI enables the communication of sustainable performance and, as such, contributes to an increase in the accountability of businesses, promoting also benchmarking. Fifthly and finally, SI frameworks allow the identification of knowledge and data gaps, allowing for the continuous improvement of SD notions and concepts.

SI can be distinguished into different categories, according to their characteristics. Authors distinguish between quantitative and qualitative indicators, based on the type of data they provide. While quantitative indicators provide numerical, quantifiable measurements, as their name suggests, qualitative indicators provide non-numerical insights, such as descriptions and initiatives. While in other studies, indicators are considered quantification tools, in SD and SA, both types are required and have proven to be complementary, as many human interactions cannot be directly quantifiable.

Indicators can also be discerned between, objective and subjective. While the first type derives from individual judgments, that cannot be verified by instruments and measurements, the latter is based on observable measurements, that can be verified by third parties.

Additionally, indicators can also be distinguished between normative and descriptive, if they provide a comparison or a description of a particular situation, community, and expert, based on their origin, which can be from a top-down or bottom-up approach, and finally, ex-ante if they provide support for choosing different alternatives by anticipating impacts, or ex-post if they relate to impacts after decisions and implementations.

Authors suggest that SI frameworks must be evaluated on an experimental basis, that is, they have to be judged based on the results of their implementation/use provided, instead of by analytical or technical aspects (de Jesus Pacheco et al., 2019).

Both the development and implementation of SA are not without challenges. Current SA methodologies and tools, face the challenge of being able to differentiate between the level of implementation of sustainability-improving measures and the actual sustainability

performance of an organization. The development of new SA tools and methods must also account for the different structures and realities of businesses. For instance, utilizing a common set of SI to evaluate sustainability performance may fail to adjust for such differences and potentially neglect relevant issues or highlight less important ones. Nonetheless, a different set of SI may lead to organizations cherry-picking ones which might be more favorable and influence the conclusions/results of said methodology/tool (Moldavska & Martinsen, 2018).

A substantial effort has been made by several organizations and other entities to develop appropriate methodologies for SA. Several proposals have been made by the research community, both models, tools, and methods, yet no theoretical consensus has been achieved on a definitive or superior method for proper and accurate SA. SA researchers then face the challenge of identifying the best approach and method for handling particular situations and new challenges (Perello-Marin et al., 2022). However, regarding the SA of private companies and businesses, it has been widely accepted that the evaluation of companies' sustainability reports is both essential and adequate, for evaluating corporate performance and stance, regarding SD (Singh et al., 2012).

(Rotmans, 2006) suggests an approach for developing SA tools and methods based on learn-by-doing and doing-by-learning techniques. The authors argue that new SA methods/tools must be first developed, then applied to case studies and the conclusions derived from said studies, shall help as the basis of subsequent developments. As such, it is paramount that the results, experiences, and feedback are made available, so that they may be factored into future studies.

2.2.2 Global Reporting Initiative Indicators

The Global Reporting Initiative (GRI) is an international organization that strives to aid companies to identify and tackle their impacts on sustainability, by providing a common language between organizations and governments. Such language is achieved via the creation of a wide range of indicators, meant for companies to measure, and publish the impacts of their operations (GRI, 2022).

Sustainability indicators have been pointed out by authors as a fundamental tool for SD and across the literature, there are examples of the use of GRI indicators on SA models/methodologies. The GRI indicators are the most widely accepted and utilized sustainability indicator framework, across both the research community and management studies. Authors have used the GRI indicators to systematically categorize and index companies' disclosures on sustainability reports (Marimon et al., 2012; Rosati & Faria, 2019a; Truant et al., 2017).

Notably, the GRI, along with the United Nations Global Compact (UNGC), established one of the first attempts at providing a meaningful link between companies' externalities and impacts on the SDGs, through the introduction of the Global Standards for Sustainability Reporting (GSSR). The GSSR provides a comprehensive structure, composed of 192 individual indicators, that feature a direct linkage to SDG impacts (Perello-Marin et al., 2022; Pizzi et al., 2021; SDG Compass, 2022).

2.2.3 Content Analysis

Content Analysis (CA) is a scientific method for extracting useful information from different sources of Human communication. Particularly useful for written text applications, CA offers a way to infer conclusions from sources where the information required may not be explicit.(Baxter, 2020) Additionally, CA provides a systematic approach for condensing substantial amounts of text into useful, predefined content categories based on the coding previously established (Perello-Marin et al., 2022). In CA, the code is defined as the category or attribute which will be used to group different text units in the analytical process (Baxter, 2020).

The existing literature distinguishes two types of CA, quantitative CA, and qualitative CA. The first type is concerned with the occurrence of predetermined code, both in existence and frequency. The latter is concerned with the meaning and context of the information presented (Lindgren et al., 2020).

The methodology of CA is described by a set of consecutive steps, similar to any deductive research process. Baxter, J defines the methodology as follows (Baxter, 2020):

1. Theoretical rationale: initial formulation of the study and the relation between the notions and concepts which will be empirically studied later.
2. Conceptualization and Operationalization: this step, consists of relating the theoretical propositions to the available data.
3. A priori development of code definitions: in this stage, the coding is defined. The coding is the basis on which the interpretation of the available data is carried out. In its most rigorous form, this step is performed before prior knowledge of the contents of the data that is to be analyzed, reducing the probability of any biased coding. However, in some cases, this rule is not abided by researchers. To ensure consistency and statistical validity, the definition of coding must be mutually exclusive, meaning, each unit of code must be unique from others and each text unit must also be relatable to one, and only one code.
4. Sampling: in this step, the data sources which will be considered in the study are selected. Sampling is required, as considering all the possible sources of data is often impractical or impossible even.

5. Application of code definitions to the sample: the coding is applied to the source data. This step can be performed by researchers themselves, or by computer programs. Good practice, although not strictly necessary, entails the exemplification of key coding choices.
6. Tabulation and Reporting: this is the final step, and consists of organizing, presenting, and discussing the results. Often, if applicable, regression analyses are used to validate the statistical relevance of the results.

As CA is reliant on the observations and interpretations of researchers, it presents an amount of subjectivity that must be accounted for when withdrawing conclusions from the study. To help mitigate this situation, authors suggest that CA studies should be performed by multiple researchers, separately, and their analysis should be compared via the calculation of the reliability coefficient. The reliability coefficient, which can be calculated using the equation 1, should be above 80% in most studies (Miles & Huberman, 1994). Note that, agreements refer to situations where researchers agree on the classification of a text unit and disagreements mean that different classifications were assigned to the same text unit.

$$reliability = \frac{number\ of\ agreements}{total\ number\ of\ agreements + disagreements} \quad (1)$$

CA is firmly present in studies of SD and SA. Its versatility and capability of condensing extensive sources of text warrant its heavy use when analyzing companies' discourse on sustainability (Nunhes et al., 2020; Vieira Nunhes et al., 2021). Indeed, there are use cases in the literature of CA being used for analyzing sustainability reports to withdraw conclusions on companies' engagement with SD (Chen et al., 2015; Perello-Marin et al., 2022; Pizzi et al., 2021). Additionally, CA is also used by researchers for the aggregation of targets and indicators, furthering its usefulness in SD and SA studies (Calabrese et al., 2021; van Zanten & van Tulder, 2018).

2.2.4 Constructive approach for problem-solving

The Constructive Approach (CAPS) is an approach to problem-solving. The principle behind CAPS is solving an identified problem, by means of proposing and testing new solutions. As such, it heavily relies on the construction of models, diagrams, and tools. The essential components of CAPS, as illustrated in figure 2.2, are the solution proposed, and its relation to the practical knowledge, practical functionality, and theoretical constructs (Kasanen et al., 2003).

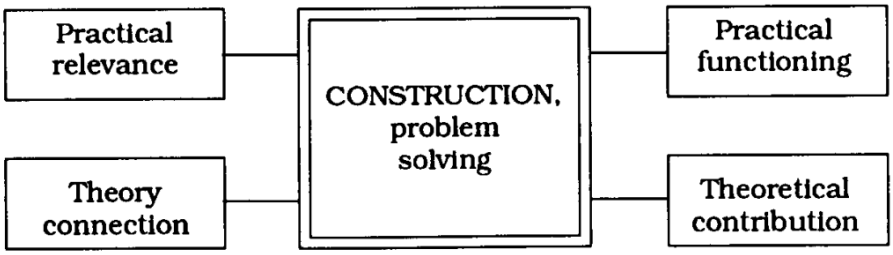


Figure 2.2 - Components of the CAPS

Adapted from: (Kasanen et al., 2003)

This research approach does not imply a strict order of steps, as the use may vary from case to case, however, most researchers adhere to a procedure similar to the following (Kasanen et al., 2003):

1. Identify a relevant challenge with research potential
2. Obtain a general and comprehensive understanding of the topic
3. Develop a solution
4. Establish the viability of the solution
5. Identify theoretical connections and research contributions of the solution
6. Explore the scope of applicability

While not widely mentioned in the literature, CAPS's notions and principles are extensively used throughout the research community, especially in areas such as technical sciences, mathematics, operations analysis, and clinical medicine (Kasanen et al., 2003). Authors identify the main perks of CAPS, as its versatility and gradual acquirement of knowledge and enrichment of the study (Perello-Marin et al., 2022).

The CAPS is also present in sustainability studies, where it proved to be an effective approach for developing an SA model. Through its use, the researchers were able to identify the initial elements of the framework being developed (Perello-Marin et al., 2022).

2.3 Sustainable Development Goals

2.3.1 Introduction to the SDG

The Sustainable Development Goals (SDG) are the backbone of the UN´s 2030 Agenda for Sustainable Development, approved by all UN members in 2015. Their goal, as expressed by the UN in the third item of the 2015 resolution, is: To end poverty and hunger everywhere; to combat inequalities within and among countries; to build peaceful, just, and inclusive societies; to protect human rights and promote gender equality and the empower-

ment of women and girls, and to ensure the lasting protection of the planet and its natural resources (United Nations, 2022b).

This initiative was built on top of the accomplishments of the preceding Millennium Development Goals (MDG), which were approved in the year 2000. The MDGs were proposed as the guidelines for sustainable development for the 2000-2015 timeframe, establishing a total of 8 goals to tackle the main challenges faced by mankind. Despite receiving criticism, they are attributed an overall positive impact on the world, by providing a workable framework for implementing changes, a structure for peer pressure between countries, and key notions for measuring the advancements in the most troubled communities (Kroll, 2015). One of the shortcomings of the MDG, pointed out by the research community, is the narrow scope of the objectives proposed as they were centered mainly on poverty and human development and, as such, focused mainly on developing countries (Cling & Delecourt, 2022).

In order to satisfy the goals proposed for the SDG, they were created with a broader scope in mind, introducing new areas that were previously disregarded (by the MDG), namely, economic inequality, sustainable consumption, innovation, climate change, and gender inequality (Lamichhane et al., 2021). To accommodate this new, larger scope of action, a total of 17 goals (SDG) were created (United Nations, 2022a):

SDG 1 has the title "End Poverty in all its forms, everywhere" and focuses on addressing the problems of communities with severe economic difficulties and reducing the inequalities between them and the rest of the population.

SDG 2 is titled "End hunger, achieve food security and improved nutrition and promote sustainable agriculture" and aims to guarantee universal access to food and improve food security worldwide, focusing especially on the most vulnerable populations.

SDG 3 is titled "Ensure healthy lives and promote well-being for all at all ages" and addresses the most prolific health problems around the world, once again, focusing on the most afflicted communities, promoting the reduction of the disparity in access to healthcare, between developing and developed countries.

SDG 4 has the title "Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all" and is centered around providing universal access to meaningful and quality education across all spectrums of the population.

SDG 5 is titled "Achieve gender equality and empower all women and girls" and aims to eliminate the discrimination against all girls and women and reduce both the inequalities and differences in opportunities, between the male and female genders.

SDG 6 is titled "Ensure availability and sustainable management of water and sanitation for all" and tackles the water and sanitation topic, promoting the improvement of lacking infrastructure and the protection of important water resources.

SDG 7 has the title "Ensure access to affordable, reliable, sustainable, and modern energy for all". This SDG focuses on the development of the global energy network, promoting improvements in efficiency, and sustainable/renewable sources and ensuring universal access to such energy infrastructure.

SDG 8, titled "Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all", aims to develop the world economies, by promoting productivity, innovation, labor rights, and reinforcement of the capacity of economic and financial institutions.

SDG 9 has the title "Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation" and promotes scientific and technological development and increases the resilience of the industrial and supply chain infrastructure.

SDG 10, with the title "Reduce inequality within and among countries" is centered around combating the differences between countries and between the various social layers.

SDG 11 is titled "Make cities and human settlements inclusive, safe, resilient and sustainable" and is focussed on addressing the problems surrounding human settlements and increasing the sustainability and living quality of cities.

SDG 12 has the title "Ensure sustainable consumption and production patterns" and promotes sustainable management, production, and consumption practices.

SDG 13 is titled "Take urgent action to combat climate change and its impacts" and is focussed on mitigating and preventing climate change, as well as its effects and consequences.

SDG 14, named "Conserve and sustainably use the oceans, seas and marine resources for sustainable development", tackles the main problems afflicting our marine environments, such as wildlife degradation and pollution.

SDG 15 has the title "Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss" and focuses on maintaining and restoring terrestrial ecosystems and natural resources.

SDG 16 is titled "Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels" and is focused on tackling the inherent problems in human societies, namely criminality and corruption.

SDG 17, named "Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development", is centered around developing and strengthening partnerships to enable the implementation of the 2030 Agenda worldwide. It covers seven

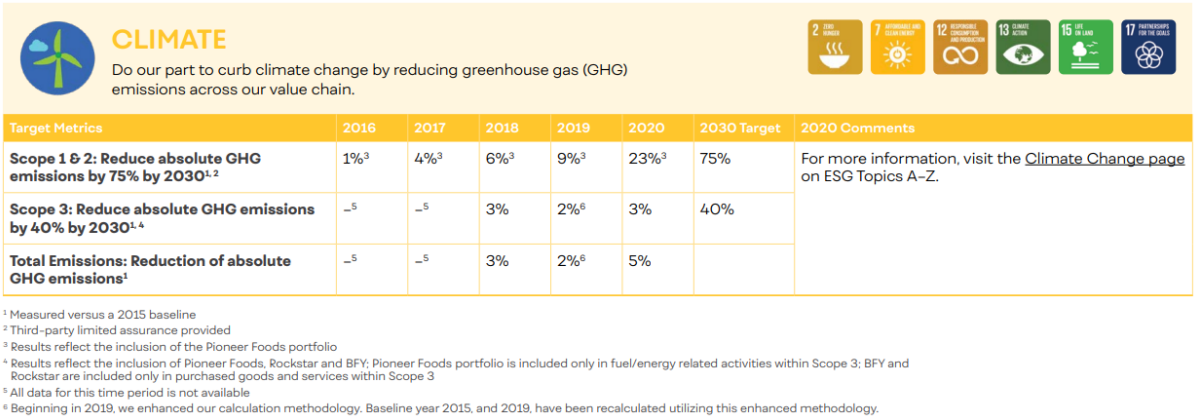
topics: Finance, Technology, Capacity Building, Trade, Systemic Issues, and Data Monitoring and Accountability.

Each one of the SDGs has several targets, which in turn have specific indicators and deadlines. In total, there are 169 different targets are spread across the 17 goals, supported by 231 unique indicators (See Appendixes A.1 to A.16, for a complete listing of all the goals, targets, and indicators) (United Nations, 2022a). Figure 2.3 illustrates all the SGD created.

With such a comprehensive scope of action, the SGD cannot be accomplished through government policies alone. The engagement of companies and the mobilization of their respective technological and financial capacity is instrumental to achieving the UN's 2030 Agenda (United Nations, 2022b). As expected, a large number of businesses have adopted the SDG and begun to present their sustainability efforts as compliant with the SDG, often portraying the logos and icons of the initiative (Rendtorff, 2020). An example of such integration is sown in figure 2.4, where one can see a table adapted from PepsiCo's 2020 "Sustainability Performance Metrics", with the relevant SDG logos on the top right corner.

Given that the achievement of the SDG is reliant on a collective effort from society, both from governments and private companies, one can expect different roles to be taken by different entities. Indeed, businesses and governments have different capabilities for contributing to each SDG. As such, the SDG can be separated into two types: Internally Actiona-

Figure 2.3 - Sustainable development goals



CLIMATE

Do our part to curb climate change by reducing greenhouse gas (GHG) emissions across our value chain.

Target Metrics	2016	2017	2018	2019	2020	2030 Target	2020 Comments
Scope 1 & 2: Reduce absolute GHG emissions by 75% by 2030[1,2]	1%[3]	4%[3]	6%[3]	9%[3]	23%[3]	75%	For more information, visit the Climate Change page on ESG Topics A–Z.
Scope 3: Reduce absolute GHG emissions by 40% by 2030[1,4]	–[5]	–[5]	3%	2%[6]	3%	40%	
Total Emissions: Reduction of absolute GHG emissions[1]	–[5]	–[5]	3%	2%[6]	5%		

[1] Measured versus a 2015 baseline
[2] Third-party limited assurance provided
[3] Results reflect the inclusion of the Pioneer Foods portfolio
[4] Results reflect the inclusion of Pioneer Foods, Rockstar and BFY; Pioneer Foods portfolio is included only in fuel/energy related activities within Scope 3; BFY and Rockstar are included only in purchased goods and services within Scope 3
[5] All data for this time period is not available
[6] Beginning in 2019, we enhanced our calculation methodology. Baseline year 2015, and 2019, have been recalculated utilizing this enhanced methodology.

Figure 2.4 - Example of SDG reference, in a company's disclosures

ble (IA) and Externally Actionable (EA). IA SDG can be meaningfully impacted by changes exerted in businesses' value chains directly. EA SDG, by contrast, cannot be achieved by private businesses' actions alone, and require substantial government intervention and/or partnerships. Moreover, the targets can also be distinguished between Doing Good (DG) and Do no Harm (DnH), according to the nature of the actions they entail. Some of the targets focus on reducing companies' negative externalities and are thus regarded as the DnH type. By contrast, other targets involve actions that go beyond damage control and have a direct positive impact and can, as such, be regarded as the DG type. For instance, SDG target 2.4, which is concerned with sustainable food production, can be classified as IA and of the DG type. By contrast, SDG target 2. c, which addresses the stability of food availability, can be classified as EA and of the type DNH (van Zanten & van Tulder, 2018).

The success of the adoption of the SGD can be observed in a study published in 2021. In this article, the authors sought to ascertain whether the integration of SDG with business goals results in a significant improvement in sustainability performance or can be regarded as simply Greenwashing. The argument of Greenwashing is grounded on the general acceptance by the research community, that one of the drivers for sustainability disclosure is to gain legitimacy and that the discourse presented may differ from the actual company's performance and objectives. Hence, Greenwashing can be summarised the practice of publishing false or biased information, in order to influence their sustainability performance or orientation. The study considered the information gathered on 153 Vietnamese companies, spanning a wide range of sectors. Despite focusing mainly on the environmental spectrum of sustainability, the study concluded that companies which incorporate SDG into their business targets are more likely to increase their environmental performance, even when com-

pared to other companies that employ similar Environmental and Management Control Systems (EMCS) (Nishitani et al., 2021).

With less than a decade left before the deadline of 2030, the full achievement of the SDG is uncertain. The current understanding amongst the relevant literature agrees that none of the 17 Goals are on track to being accomplished. As the implementation of the SGDs is not legally binding, their success depends on the ability of international organizations to incite pressure and concern for the accomplishment of the goals. Yet, such organizations remain lacking the proper resources and influence, to exert the required pressure and create meaningful changes (Haas & Ivanovskis, 2022). To fulfill the UN's 2030 Agenda, an increase in engagement with the SDG, both by governments and private companies is required. To correct the imminent failure, the UN appealed for the urgency of the matter, by naming the period between 2020 and 2030 the "decade of action" and committing to increase national engagement and enhance local action and financial application (United Nations, 2019).

2.3.2 Corporate SDG Reporting

Sustainability reporting is defined in the literature as the act of disclosing information to the public, about the companies' economic, social, and environmental performance (GRI, 2022). By linking such impacts with the SDG framework, companies can disclose their impacts on the SDG, hence engaging in SDG reporting (García-Sánchez et al., 2020; Rosati & Faria, 2019a).

Increasing social pressures have led to the majority of large companies publishing reports on their social and environmental impacts, along with the economic ones (Perello-Marin et al., 2022). Likewise, with the introduction of the SDG, many companies have started to refer to them in their sustainability reports, however, such references are heterogenous in complexity and relevance (Nishitani et al., 2021). This is evident by analyzing figure 2.5,

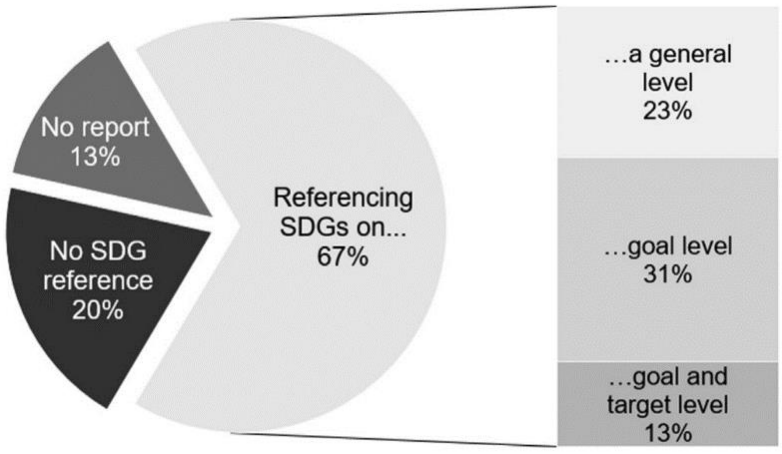


Figure 2.5 - Presence of SDGs in companies' sustainability reports

Adapted from: (Silva, 2021)

where one can see the statistics published in 2021, after systematically analyzing 100 businesses' corporate reports (Silva, 2021) .

Engagement with the private sector is fundamental for the accomplishment of the SDG. Despite such critical dependency, the research community has overlooked the matter until recently (Calabrese et al., 2021). A study published in 2020, conducted extensive literature research on the topic of SDG reporting. The study found that, while the attention given to SDG reporting has grown significantly in the period considered (which can be observed in figure 2.6), from 2012 to 2019, only 26% of the articles suggest a method or framework for corporate reporting on the SGD (Pizzi et al., 2020).

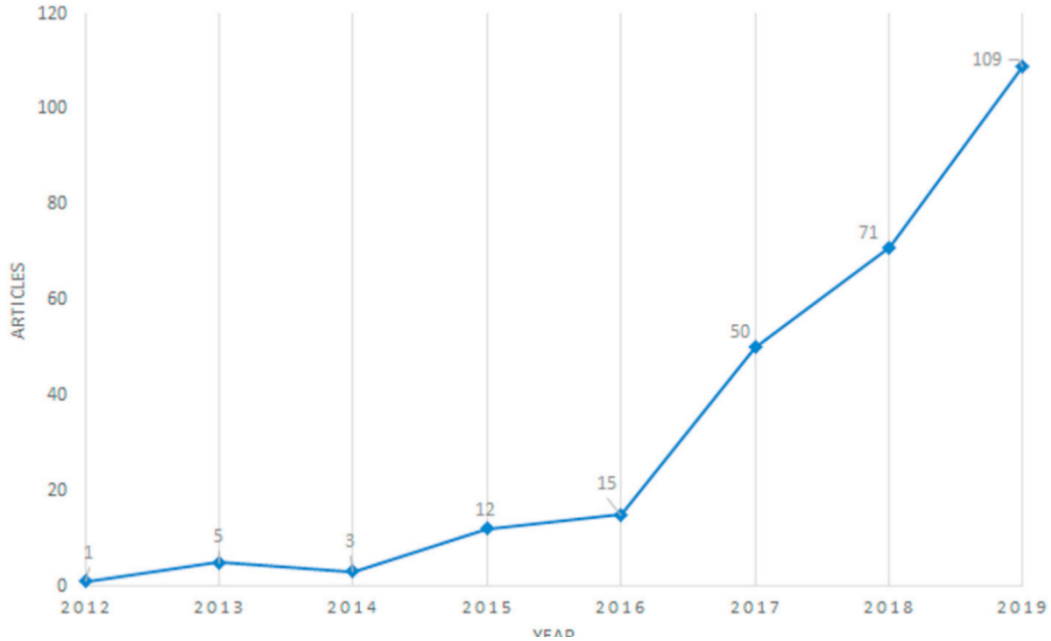


Figure 2.6 - Number of publications on SDG reporting per year

Adapted from: (Pizzi et al., 2020)

Note that, there are studies that were published before the official introduction of the SDG in 2015. This is due to the fact that the SDGs were already being materialised in the previous years, allowing researcher to publish content on the matter.

The major difficulty companies face regarding reporting on the SDG, is their extreme complexity. The wide scope of topics and areas the goals encompass is considered to be too complex for companies to deal with and implement proper solutions (Calabrese et al., 2021). Additionally, there are notable interactions between different goals and targets, furthering the difficulty of accurately measuring contributions (Horne et al., 2020). As such, a need for the development of proper tools, methodologies, and standards arises, which are capable of truthfully relating a company's sustainable performance to SDG contribution (Perello-Marin et al., 2022).

One of the major contributions to SDG reporting was the creation of a common framework of reporting KPIs by the GRI, Global Compact, and WBCSD. Through their combined effort, the SDG Compass was created and introduced a set of sustainability indicators, the GSSR, specific for companies and businesses, that can be directly related to the SDG. Additionally, the SDG Compass also provides important insights into how companies can facilitate the process of embracing the SDGs, advocating increased transparency and accountability (GRI, 2022; UNGC, 2022).

Given the complexity of the topic, many variables can affect companies' adherence to the SDGs. The current literature has yet to fully understand the dimension and relevance of such factors, but some insights have been put forth by recent studies (Rosati & Faria, 2019b).

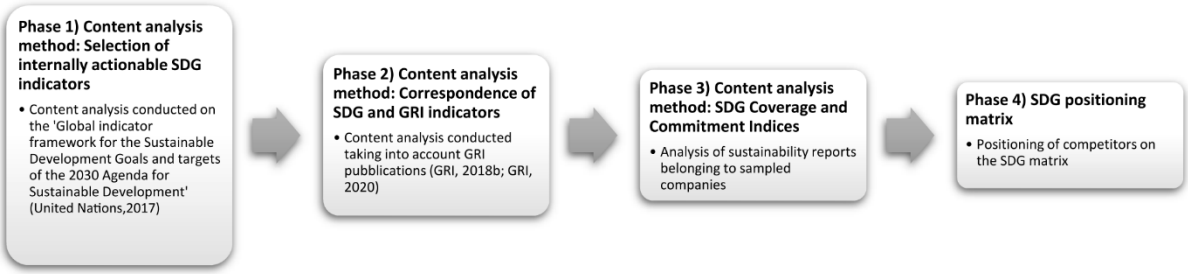
One such case is presented in an article, published in 2020, where the researchers aimed to quantify the impact and relevance of the factors considered, on companies' adherence to reporting on the SDGs. The factors considered were of three types (Pizzi et al., 2021):

- Firm-level determinants comprised of the company's characteristics such as size and sector.
- Governance-level Determinants comprised of the characteristics of the board of directors.
- Report-level determinants, where characteristics specific to the sustainability reports were accounted for.

To measure the relevance of the factors, the authors suggested a model based on the percentage of GRI indicators present in the sustainability reports of the sample companies, to act as a qualitative proxy for measuring company alignment with SDG reporting. By performing further statistical analysis, conclusions were able to be drawn. The main findings of the study suggest that the adoption of GRI indicators, early adoption of the SDG and report size are factors that positively impact SDG engagement. Most notable, however, is the methodology used in the article, which validates qualitative CA, performed on sustainability reports, with a coding based on GRI indicators as an effective method for estimating company performance regarding SDG reporting (Pizzi et al., 2021).

Such practice is further verified by (Calabrese et al., 2021) in a study published in 2021, where the authors suggest a model for evaluating a company's discourse on the SDG. The model proposed, is based on the evaluation of two characteristics: commitment and coverage. The coverage characteristic expresses the extent to which said company engages with the SDG, effectively quantifying the number of targets covered in each sustainability report. The commitment metric, on the other hand, quantified the quality of the report. The quality of the report was translated to a quantitative metric via a 4-point scale, as follows:

- Level 1: Qualitative Report
- Level 2: Quantitative Report



- Level 3: Quantitative Time Series
- Level 4: Quantitative Time Series and a future qualitative goal

Figure 2.8 - Four step research methodology

Adapted from: (Calabrese et al., 2021)

The methodology proposed is based on four phases, as portrayed in figure 2.7. The first phase consists of selecting which SDG indicators will be included in the study. This selection utilized CA to discern the SDG indicators between IA and EA. Since only IA indicators can be efficiently impacted by companies directly, the EA indicators were excluded. Phase two used, again, CA on the GRI indicators and the SDG, in order to form a correspondence between them. This correspondence will form the coding based on which further CA will be made. The resulting correspondence is illustrated in table 2.2. Visible, as well, is the intricate relation of each GRI indicator with multiple SDG targets. Phase three employed CA, based on the coding of GRI indicators previously established, to analyze the sustainability reports of the companies selected and thus calculate the commitment and coverage indexes. In phase four the SDG positioning matrix was created, and the results were interpreted and analyzed.

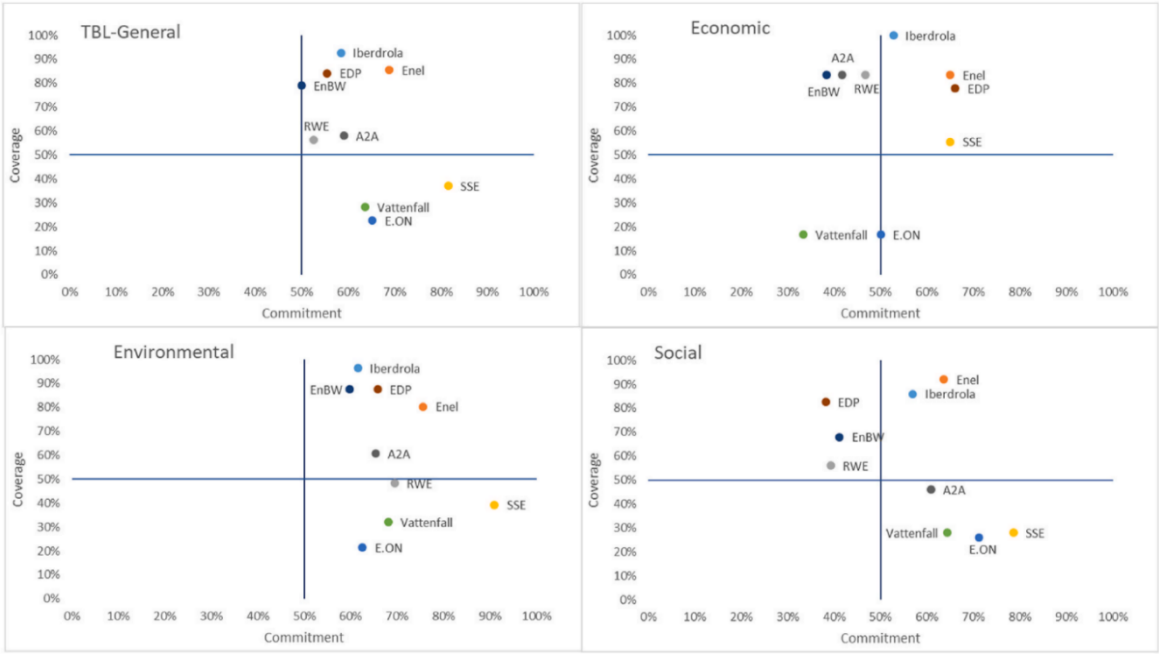


Figure 2.7 - Positioning matrices

Adapted from: (Calabrese et al., 2021)

Figure 2.8 shows the positioning matrices. Visible as well as the use of the TBL framework.

Table 2.2 - 1 Correspondence between GRI Indicators and IA SDG Indicators

ECONOMIC		ENVIRONMENTAL		SOCIAL	
SDG	GRI	SDG	GRI	SDG	GRI
6.2.1	203–1	3.9.1	305-1; 305–2; 305–3; 305–6; 305-7	2.3.1	413–2
8.3.1	203-2; 204-1			2.3.2	411–1
8.5.1	202-1; 202-2	3.9.2	305-1; 306-1	2.4.1	414–2
9.3.2	201–4	3.9.3	306-2; 306–3; 306-4	3.9.1	403-2; 403-3
9.4.1	201-1; 203-1	6.2.1	303–1	3.9.2	403-2; 403–3; 403-9
9.5.1	201–1	6.3.1	303-3; 303–4; 306–1; 306-2	3.9.3	403-2; 403–3; 403-10
9.5.2	201–1	6.3.2	303-3; 306-3	4.3.1	404–1
10.4.1	201-1; 207–1;	6.4.1	303-1; 303–5; 306-1	4.5.1	404–1
	207–2; 207-3; 207-4	6.4.2	303-1; 303-2	5.5.2	102-22; 102–24; 405-1
11.4.1	201–1	6.5.1	303-1; 303-2	8.5.1	102-8; 401–1;
12.3.1	102-10; 201-1	6.5.2	303–1		401–2; 401–3; 404–1; 404–2; 404–3; 405–1; 405-2
12.5.1	417–1	7.1.1	302–2	8.5.2	102-8; 401–1; 405-1
16.5.2	205-1; 205–2; 205-3	7.1.2	302–1	8.6.1	401–1
17.7.1	201–1	7.2.1	302-1; 302-2	8.7.1	408-1; 409-1
17.11.1	102–6	7.3.1	302-1; 302–2; 302–3; 302–4; 302-5	8.8.1	403-1; 403–2; 403–3; 403–4; 402–1; 403–5; 403-7
		8.4.1	301-1; 301–2; 301–3; 302–1; 302–2; 302–3; 302–4; 302–5; 303-3	8.8.2	102-41; 406–1; 407–1; 414–1; 414–2; 403–8; 403–9; 403-10
		9.4.1	305-1; 305–2; 305-3	10.3.1	102-8; 401–1; 404–1; 404–3; 405-2
		11.4.1	304–4	16.5.2	415–1
		11.6.1	306–2	16.7.2	102-21; 102–22; 102–24; 102–29; 102–37; 403-4
		11.6.2	305–7		
		12.2.1	301-1; 301–2; 302–1; 302–2; 302–3; 302–4; 302–5; 303-3	17.7.1	415–1
		12.2.2	301-1; 301–3; 303-3		
		12.4.1	303–1		
		12.4.2	305-1; 305–2; 305–3; 305–6; 305–7; 306–1; 306–2; 306–3; 306-4		
		12.5.1	301-2; 301–3; 306-2		

The results presented, show that the model proposed was capable of distinguishing the performance of the companies considered, across the two metrics, validating the methodology used (Calabrese et al., 2021).

Similar results were also attained in another study, published in 2022. Here the authors utilized a constructivist approach to build a framework for assessing company disclosure on the SDG, based on GRI reports of 7 companies in the automotive sector. A constructivist approach allows for an incremental enrichment of the work carried out, by following a stepwise process (Perello-Marin et al., 2022).

First, the requirements of the framework were identified, via the CA of the GRI reports considered in the study. The metrics present in the reports were identified and then classified according to the TBL framework, which resulted in three groups: economic metrics, social metrics, and environmental metrics. Table 2.3 displays the economic metrics identified and their occurrence through the reports considered. To see the Environmental and Economic metrics, refer to the Appendix A17.

Table 2.3 - Presence of economic metrics in the sustainability reports

Adapted from: (Perello-Marin et al., 2022

Economic metrics.

Code	Metrics	#Times	Manufacturer/s
E_1	Sales revenue	7	M1-M7
E_2	Profit	7	M1-M7
E_3	Sales and service satisfaction	3	M1, M4, M3
E_4	Dividends	2	M3, M7
E_5	Market share	2	M2, M3
E_6	Value added	1	M7
E_7	Wages, salaries, benefits to employees	1	M7
E_8	Direct economic value generated and distributed	1	M2
E_9	Financial assistance received from government	1	M2
E_{10}	Ratio of basic salary and remuneration of women to men	1	M2
E_{11}	Customer satisfaction (in the 3 first months)	1	M4
E_{12}	Security calls	1	M4
E_{13}	Car-dealers satisfaction level	1	M4
E_{14}	Sales volume automobiles (in thousand units)	1	M1
E_{15}	Sales of electric and electrified vehicles (number)	1	M1
E_{16}	Share of production-relevant purchasing volume in the CDP Supply Chain Programme (in%)	1	M1
E_{17}	Capital expenditure	1	M1
E_{18}	Income taxes	1	M1
E_{19}	Research and development expenditure	1	M1
E_{20}	Tangible assets	1	M5
E_{21}	Financial investments	1	M5
E_{22}	Total financial security	1	M5
E_{23}	ROE (return of equity)	1	M7

The second step consisted of correlating the identified GRI metrics to SDG targets. Three situations were considered:

- Full alignment – the GRI metrics coincided completely with the relevant SDG targets.
- Partial alignment – the GRI metrics were meaningfully related to the relevant SDG targets.
- No alignment – the GRI metrics have no meaningful relation to the relevant SDG target.

By considering the three situations described above, the authors were capable of mapping the GRI metrics to the DSG, resulting in the coverage table, illustrated in figure 2.9.

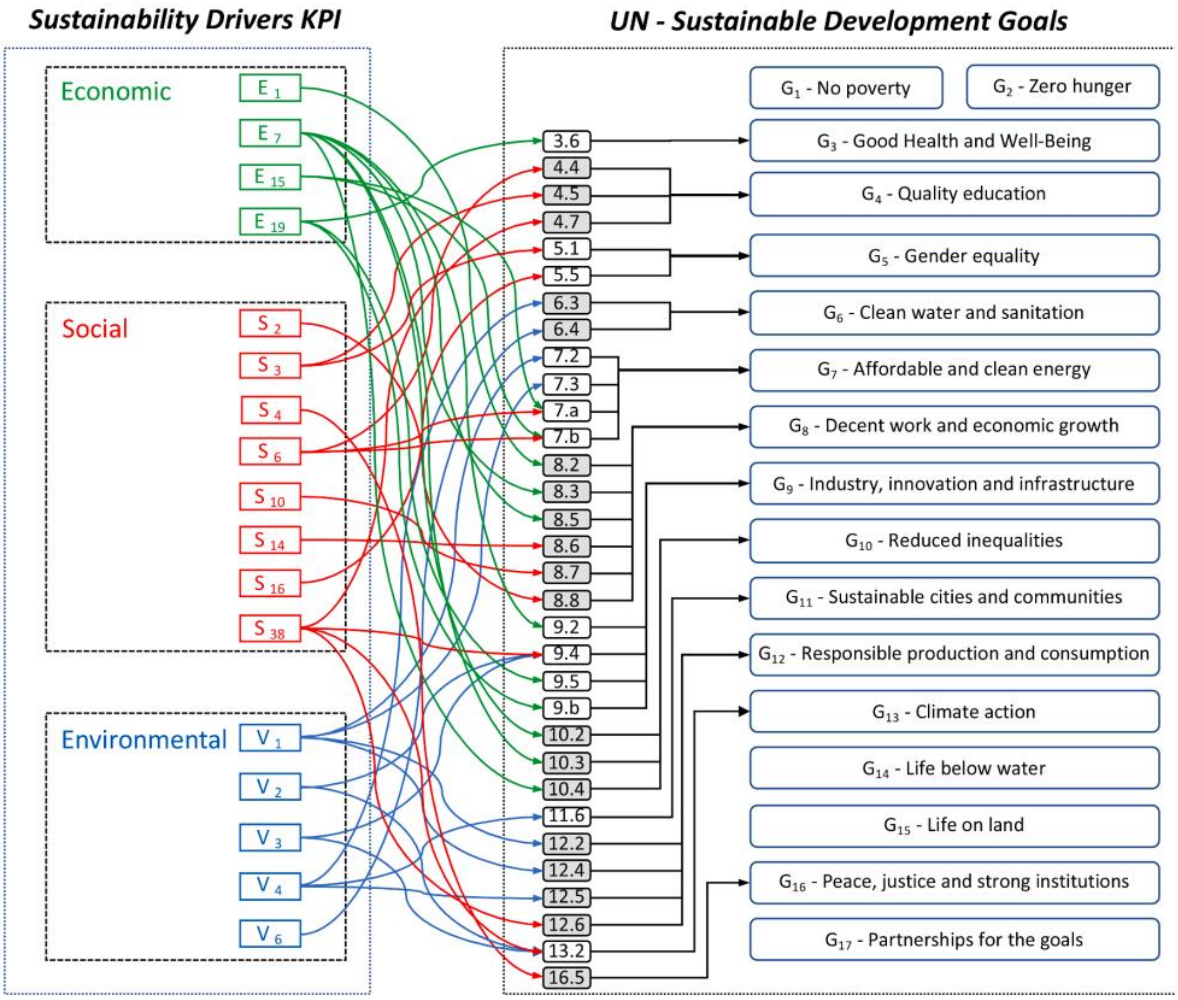


Figure 2.9 - Correlation between SDG targets and TBL metrics

Adapted from: (Perello-Marin et al., 2022)

The final and third step was to relate the occurrence of the GRI metrics to SDG disclosure, hence providing insight into the impact the companies considered in the study have

on the SDG. The results published suggest that reporting on the selected 17 metrics is sufficient to impact a total of 12 SDG and 32 targets. Additionally, the results show that companies have a greater impact on the SDG than their perception suggests, hence, further highlighting the importance of accurate measurement of the sustainability reports published by private companies (Perello-Marin et al., 2022).

The impacts of SDG performance assessment extend beyond the meaningful measurement of companies' contribution towards the goals and SD as a whole. SDG reporting assessment, is also an important driver for companies' sustainable positioning, by exerting pressure and forcing them to rethink certain positions and stances, that are less desirable, and promoting action, investment, and strategy development, hence furthering the accomplishment of the SDGs (Perello-Marin et al., 2022).

3 GREENCHECKER: SUSTAINABILITY AND GREENWASHING ASSESSMENT TOOL PROPOSAL

The present chapter aims to present GreenChecker, the proposed assessment tool. As such, the methodology utilized is described, followed by the objectives and requirements defined for the resulting tool. Next, its scope is explored, along with the description of the indicator framework utilized. Finally, the assessment method is presented and explained.

3.1 Methodology

SD is a multi-dimensional problem, with impacts and implications across our entire society, and environment. As an extension of SD, SA inherits the very same complexity and difficulties. The SDGs stand as the current UN's answer for the achievement of SD, and thus, have been widely accepted and are the major frameworks to guide SD worldwide. Despite several proposals of methodologies, approaches, and tools, no academic consensus has been reached on the proper means to measure companies' performance on the SDG and SD.

To tackle this challenge, the methodologies of previous studies were considered. The majority of the published methods for SDG performance assessment are based on the CA of sustainability reports and other corporate disclosures. CA as a methodology, while providing sufficient grounding to withdraw conclusions from the source material, offers a thorough, yet too strict approach for such endeavour, as SD and SA research, often requires increased flexibility (Calabrese et al., 2021; Chen et al., 2015; Perello-Marin et al., 2022; Rosati & Faria, 2019b). The CAPS, in contrast, provides a much more flexible approach to problem-solving but does not indicate any particular tools and methods to be used, and as such, may prove insufficient for the chosen methodology. Despite the relative scarcity of references, its use can be observed across the literature and, more importantly, it has been successfully used for SD-specific research and development of SA models (Perello-Marin et al., 2022).

Previous works have utilized an adaptation of the above-mentioned methods, combining them, to form an appropriate methodology for the work carried out (Perello-Marin et al., 2022). For this thesis, a similar technique was chosen, based on the combination of the

CAPS and CA methodology, intending to maintain the flexibility provided by CAPS and the usefulness and grounding of CA. Also considered, were the notions proposed by (Rotmans, 2006), of the learn-by-doing- and doing-by-learning process, which, proved particularly useful, in the development of the GreenChecker's assessment process. The methodology used can be summarized in the following steps:

1. Identify a relevant challenge, that presents an opportunity for development.
2. Gather in-depth knowledge of the topic, its constraints, and major difficulties.
3. Propose a solution.
4. Validate the solution via case studies.
5. Identify relevant contributions, applicability, and limitations.

The first step considered, was based on the CAPS, where it is required to identify a relevant challenge to be tackled, with relevant research potential. This step was realized by firstly, the thesis theme proposition, followed by limited research on the topic, enabling the identification of the research potential of the SDGs. This step, however, does not produce any deliverables itself, and as such, cannot be directly related to any chapter in this thesis.

The following step includes elements of the CAPS's second, and CA's first stages. In this stage, it is required to obtain a deep and broad understanding of the topic, its current accepted notions and concepts, and relevant developments, which are to be empirically studied later. To realize this stage, extensive literature research was performed, on various topics related to SD, SA, and the SDGs. The state of the art was acknowledged, along with the main shortcomings of current literature. This step resulted in the deliverables already shown, in the previous chapter (chapter number 2 – Literature Research).

The third step was based mainly on CAPS's third stage but also coincides with the second and third, steps of CA. This entails the proposal of a solution for the challenge identified in stage 1, based on the knowledge acquired in stage 2. To properly define the solution proposed, 4 topics were considered: Objectives and Requirements, Scope, Indicator framework to be used, and Assessment method. These will be explained in detail, in subchapters 3.2 through 3.5.

The fourth step is based on steps four and five of CAPS, while also combining elements of stages 4, 5, and 6 of CA. As such, in this step, GreenChecker is applied to case studies, so that its applicability may be verified, and validate that the tool produces useful results, considering the objectives and requirements proposed. This will be expanded upon, in chapter 4.

The final step, considered in this thesis, coincides with the fifth and final step of CAPS. Here, the implications of the results, relative to the theoretical knowledge acquired, will be described, along with the final considerations and contributions. These notions will be explained in detail along chapters 4 and 5.

3.2 GreenChecker's Objectives, Requirements and Benefits

3.2.1 Objectives and Requiments

The proper engagement of private businesses and companies is an absolute necessity for the achievement of the SDGs and SD, hence, the relevance of quantifying their contribution and adoption. However, the question arises: To whom is the measurement of such contributions relevant? Besides the immediate stakeholders, such as the UN, governments, and other international organizations, the growing concern with the environment and SD has led to ever more interest by management and financial experts. Between increased client/consumer awareness, tightening policies and legislation, and genuine concern, businesses have a lot to gain by adopting the correct stance and improving their sustainability performance across their value chain. As such, sustainable performance quickly becomes an important factor in decision-making, when considering business partners, suppliers, and other relevant investments.

Having conducted a comprehensive literature research, the main limitations and necessities in the literature were identified. By looking at the examples of SDG assessment/performance models, one can realize that the existence of a generalist tool, that can be applied to the large majority of businesses, is lacking. Furthermore, and perhaps more importantly, most articles suggest a framework that cannot be easily replicable, as doing so, would require extensive work. In this sense, a *plug-and-play* type solution is largely unexplored. Companies stand to be the most affected by this, as they possess limited resources, and are often reluctant to allocate significant amounts of time and personnel to a process that may not directly create value.

Additionally, most models presented in the literature, either do not fully encompass all the SDGs targets (e.g., by focussing on particular sectors, or by selecting which objectives to address) or only provide a measure of the extent to which companies disclose information, thus disregarding any actual performance metric.

Having established the notions above and realizing the research opportunities available, the requirements of GreenChecker's were defined as follows:

1. Provide a meaningful measure of SDG engagement and contribution.
2. Provide a measure of possible greenwashing in companies' disclosures.
3. Be applicable to virtually any business or private company.
4. Be ready to be used by stakeholders, with minimal adjustment and preparation.
5. Provide an output that can support subsequent decision-making processes.

These requirements will be used to guide the research and development of the model, as well as to justify some of the decisions made further in this study.

3.2.2 GreenChecker's benefits

With the Objectives and requirements fully defined, it is now possible to describe the envisaged benefits of using GreenChecker tool. In this section, these will be mentioned in an exploratory sense since the model is merely experimental. Hence, they will require further study to be properly employed, as well as to derive reliable conclusions. Additionally, these benefits are dependent in the ability of the model to satisfy the requirements defined in the previous sub-chapter.

As such, the main benefits of using Greencheck can be summarized as follows:

1. Directly applicable.
2. Full SDG assessment
3. Universally applicable
4. GreenWashing measurement

The direct applicability refers to the tool's ability to be applied without extensive preparation work. This is a benefit as the large majority of sustainability assessment methods require adaptation of the method before the evaluation itself. With GreenChecker, the only adaptation required is adjusting the applicability of the indicators, a topic which will be further explained in section 4.3.

Regarding the SDG coverage, GreenChecker includes consideration of the impacts across all the 17 SDGs. This was possible by utilizing the GSSRs as the base indicator framework, which consist of a selection of GRIs indicators, especially made for SDG related assessments. This to can be considered a benefit as existing assessment tools do not fully encompass the SDGs, as mentioned previously, in the sub-chapter 2.3.2.

The universal applicability is achieved, in consideration of the constraints of the reality of sustainability. While GreenChecker it not applicable to every single business or company, it is applicable to any sustainability report. As sustainability reporting is a standard practice amongst companies, with evermore presence and importance, this was deemed sufficient, for purposes of this study, to consider GreenChecker as universally applicable.

Checker should the capability to contrast between companies' disclosures and the related achievements mentioned in sustainability reports. Cases where the levels of the achievements do not match the levels of the disclosure, indicate the possibility of greenwashing in the report evaluated. This not only provides decision makers with useful extra information, but also allows companies to identify and correct these situations, in an attempt to make sustainability reports more reliable and consistent.

3.3 Scope of GreenChecker

Having established GreenChecker's requirements, it is now possible to frame the scope. The definition of the scope is fundamental, as it allows us to establish the interactions considered, which are beyond the focus of this study. To better understand the boundaries of the assessment model, a diagram was created, visible in figure 3.1, depicting the main interactions theorized.

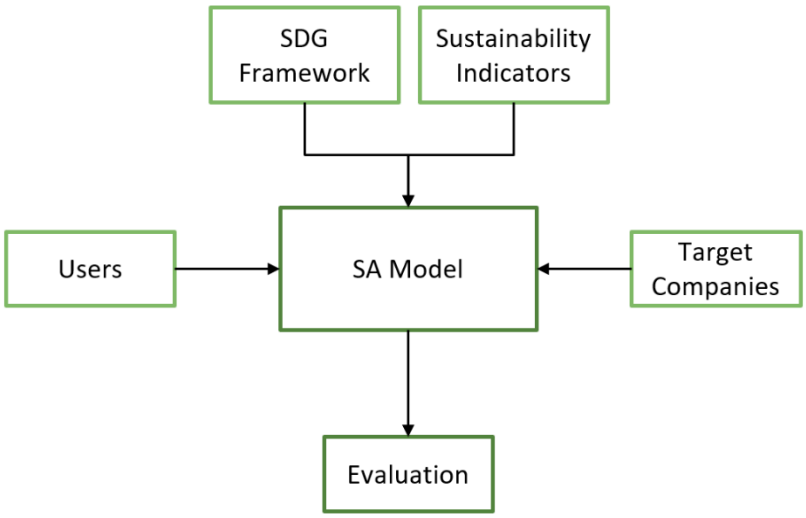


Figure 3.1 - Sustainability assessment model's interactions

3.3.1 Users

The GreenChecker's users are the entities/individuals who will use the model, to receive valuable insights regarding the target companies. As this assessment method is merely theoretical, its usage cannot be accurately defined, only envisaged. As previously mentioned in the GreenChecker's objectives, the major research gap is in models that can be directly and easily applied, and such lack primarily affects companies and investors, who have limited resources and therefore, may not be as willing to use the already available but complex and time-consuming tools, when compared to larger entities such as governments and organizations. Hence, the theoretical primary users of the model, are companies and investors, that want to gain insights into the SDG performance of other companies, with relative ease.

3.3.2 Target companies

The target companies are already identified by the definition of the GreenChecker's requirement number 2: Be applicable to any business or private company. However, ap-

plicability toward 100% of companies is almost impossible to achieve with certainty. A compromise is then required, one that affects the applicability of the model, concerning the target companies, the least possible. The solution proposed, is to utilize the sustainability reports as the main interaction between target companies and the mode. This solution, not only is valid for the large majority of companies, as publishing non-financial data is a requirement for most companies, either by laws and regulations, or by pressure from business partners, but also has a high amount of precedent in the literature (Calabrese et al., 2021; Chen et al., 2015; Perello-Marin et al., 2022; Rosati & Faria, 2019b). As such, the model will assess the data present in sustainability reports and similar non-financial disclosures.

3.3.3 SDG framework

The SDGs are not all equally applicable to the business context as they were created for SD as a global matter. Indeed, some of the problems addressed cannot be meaningfully impacted by companies alone, and rather require government initiatives and collaborations between multiple companies and entire sectors. As such the SDGs can be distinguished between IA and EA (van Zanten & van Tulder, 2018). One might feel inclined to disregard EA SDGs when measuring company contribution, however, even if companies cannot fully impact the situation addressed by the target, they can still adopt positively contributing positions and enable further efforts to be made. For instance, target 8.1: "Sustain per capita economic growth in accordance with national circumstances and, in particular, at least 7 percent gross domestic product growth per annum in the least developed countries" - presents a situation that cannot be meaningfully impacted by changes in the companies' value chain alone and will require initiatives from governments or other organizations. Yet, companies can enable such initiatives by increasing the economic value generated and distributed. Additionally, given the heterogeneity of possible deciding parties, it is not possible to accurately predict their priorities and so, it was deemed appropriate to include EA in the study.

3.3.4 Sustainability Indicators

As previously mentioned, the basis of a SA model is the SI framework used. In this case, the SI framework chosen will provide the correlation between companies' disclosure/impacts and SDG performance. The SDGs already have an indicator framework provided, though its intended use, is for measuring countrywide performances, instead of focusing on the private sector. This is evident by observing some of the metrics utilized. Using target 8.1 as an example once more, the proposed indicator to evaluate the performance relative to it is indicator 8.1.1: "Annual growth rate of real GDP per capita". As we can see, the indicator utilizes the metric Gross Domestic Product (GDP) per capita, and since the GDP

does not apply to companies, the indicator cannot be directly applied to them. It is then required to choose an indicator framework capable of doing such connections.

The GRI indicators, stand as the most widely accepted and utilized indicator framework in SA models. Across the literature, we can see examples of its use, validating its capabilities. Such validity is further verified, beyond academic and research studies, as the GRI is also extensively used in corporate disclosures. Additionally, the introduction of the GSSR by the GC and SDG Compass has provided a framework of 192 indicators, divided across all 17 Goals, capable of linking corporate disclosures to SDG impacts directly (SDG Compass, 2022; UNGC, 2022). Also, while not the focus of this thesis, it is important to note that the GSSR addresses all the requirements of ESG criteria, furthering their validity and justification. Having established both the appropriateness of the GSSR and the valid precedent in the literature, it was deemed suitable to use the GRI's GSSR indicators as the basis of the model here developed.

3.3.5 Evaluation Scores

The GreenChecker is meant to provide the users with an easily understandable output, that allows for subsequent decision-making processes. As such, the model will provide a set of scores, for each company assessed. The scores will be based on the evaluation of the company's sustainability reports, combining the considered metrics into a final score for each metric. Additional sub-scores will also be included, according to the relevant categories considered, such as each of the components of TBL (Economic score, Social score, and Environmental score). These metrics, and all the others considered in the GreenChecker, will be explained in the following sub-chapter.

By providing, not only a final score but also additional sub-scores and other metrics, the model caters to a variety of possible users and provides an extended insight into companies' commitment and performance relative to the SDGs and, by extension, to SD.

3.4 Sustainability Indicators Framework

The indicator framework selected for GreenChecker is the GRI's GSSRs indicators. Composed of 192 indicators, selected from already existing GRI frameworks, for the sole purpose of connecting companies' disclosures to SDG contributions and impacts.

The indicators come already classified into different categories, furthering the usability of the framework. One of such categories, and for the purposes of SA, the most im-

portant, is the impacted SDG target. Each indicator comes with established impacts across multiple SDG targets, enabling the definition of impacted SDGs. Furthermore, the indicators are also provided with a business theme, supporting the definition of the relative TBL component. Another useful category presented, is the source GRI indicator. Such information is useful, as it provides context and an additional explanation for the indicators.

The framework, however, was not specifically created for use in SA models, and naturally, is not directly suitable for the necessities of the model here proposed, warranting some adaptations to the original GSSR, which will be explained in detail, in the following subchapters.

3.4.1 Revision of the indicator framework

Aggregation of indicators

Despite presenting an extensive connection between disclosures and SDG targets, and the consideration of all 17 SDGs, the GSSRs are not suitable to be directly used in a model, such as the one proposed in this thesis. This argument is justified by three rationales:

Firstly, the 192 indicators, while providing extensive coverage of the SGDs, are not practical to be used as the basis for a tool. Since the proposed assessment method is based on the CA of sustainability reports, using the indicators as coding, using the GSSR indicators directly, would require the evaluation of all 192 indicators individually, repeating the process for each target company. In instances where the user requires the assessment of multiple companies, such proceedings would quickly become too extensive. This is especially valid when considering the objective mentioned in the previous subchapter, of providing an accessible and practical tool, for stakeholders to access companies' sustainability efforts.

Secondly, some of the indicators proposed in the GSSR, present redundancies and convergence in their scope. For instance, two indicators, as suggested in the GSSR, are as follows:

- Total volume of water recycled and reused by the organization.
- Total volume of water recycled and reused as a percentage of the total water withdrawal as specified in Disclosure 303-1.

These two indicators are not the same, as they refer to different metrics of water recycling. However, considering the context of sustainability reports, where different companies may utilize different structures, and display different types and amounts of information, an instance might occur, where for a particular report, the indicators may not provide a sufficient distinction between them and be related to the same text unit. As mentioned in previous chapters, the coding of CA must respect the principles of mutual exclusion, meaning that each unit of code must be unique, and each text unit must only be relatable to one, and only

one, code unit (Baxter, 2020). As such, the convergence of the indicators presented may result in situations where mutual exclusiveness is not respected. Hence, it was concluded that the GSSRs indicators do not suffice, for direct usage in the model proposed in this thesis.

Other instances exist, where two indicators relate to the same problem, yet address different elements of it. Such is the case of the following indicators:

- Measures were taken by the organization in the reporting period intended to contribute to the effective abolition of child labor.
- Operations and suppliers considered having significant risk for incidents of i. Child labor ii. Young workers are exposed to hazardous work.

As evidence, these two indicators refer to the same problem and do not overlap in scope, as the previous example does. However, they can be considered an extension of the disclosure of one another, as one refers to the state of the problem and the other refers to the efforts made to mitigate/prevent it. While this does not present a problem for the methodologies proposed in this model, as they are compatible with CA, such situations would not be compatible with the intended evaluation method. One of the evaluation dimensions proposed in this thesis, is the extension of the disclosure, in the sense of evaluating the importance and attention the company has given to the problem.

To overcome the shortcomings mentioned above, a solution is required, one that is capable of diminishing the number of indicators, eliminating the possibility of overlapping the indicator's scope, and providing better compatibility with the envisaged evaluation. For such purposes, previous studies have utilized one of two approaches, either making a selection of indicators to be considered, and disregarding the remaining ones, or aggregating multiple indicators into a smaller number, reworking the indicator framework in the process.

The selection of indicators provides a simple solution for the problem. Through the content analysis method, researchers can make a selection of which indicators to disregard (Baxter, 2020). However, this would imply a reduction in the scope encompassed by the indicators utilized. For instance, this approach was utilized in the development of another model, to reduce the indicators initially considered, including only IA SDG indicators. In doing so, the EA indicators were not considered, reducing the number of SDGs impacted, from 17 to 13 (Calabrese et al., 2021).

Another solution utilized is the aggregation of indicators. Aggregation also relies on content analysis to rework the initial indicator framework. Similar indicators or metrics can be identified and aggregated, combining the original scope. However, doing so may impact the precision of the assessment, as reducing the number of indicators equates to a slight simplification, effectively reducing the number of variables. Researchers have utilized this method to group similar disclosures, simplify the framework, and adapt the indicators to the

requirements of the study in question. Such practices were utilized to group similar disclosures into indicators, enabling the assessment of which SDGs were being disclosed, without reducing the scope of the study, validating this approach all the same (Perello-Marin et al., 2022).

For the purposes of this study, the aggregation of indicators was considered the appropriate approach. This was grounded on the fact that GreenChecker intends to provide a practical assessment of the companies in question, and as such, a slight loss of precision in the evaluation was not deemed sufficiently relevant to reduce the scope of ODSs analyzed. Furthermore, the evaluation will be carried out through CA of sustainability reports, which implies a level of subjectivity and, therefore, is not meaningfully impacted by a slight reduction in the precision of the indicators, relative to the original indicator framework.

The aggregation of the indicators was based on the scope of topics encompassed by the indicators. Indicators where an overlap of topics was observed, were aggregated into one, if compatible. In such cases, the original impacts of each indicator were considered in the aggregate indicator, maintaining the initial scope and relations provided by the GRI. The Indicator ID category also proved useful for providing additional context for indicators where the validity of the aggregation was not obvious. For instance, table 3.1 shows the aggregation of three indicators, where the scope was considered too similar and therefore, aggregated into one. The aggregate indicator encompasses the cumulative scope and impacts of the three indicators.

Table 3.1 - Example of the aggregation of 3 GSSR indicators

<table>
<tr><th colspan="5">GSSR Indicators</th><th>Aggregate Indicator</th></tr>
<tr><th>SGD</th><th>SDG Target</th><th>Business Theme</th><th>Indicator Description</th><th>Indicator GRI ID</th><th>Description</th></tr>
<tr><td>8</td><td>8.7</td><td>Abolition of child labor</td><td rowspan="2">Measures taken by the organization in the reporting period intended to contribute to the effective abolition of child labor.</td><td rowspan="6">GRI Standard 408-1</td><td rowspan="6">Operations and suppliers considered to have significant risk for incidents of: i. Child labor; ii. Young workers exposed to hazardous work.</td></tr>
<tr><td>16</td><td>16.2</td><td>Abolition of child labor</td></tr>
<tr><td>8</td><td>8.7</td><td>Children and young worker protection</td><td rowspan="2">Operations and suppliers considered to have significant risk for incidents of child labor either in terms of: i. Type of operation (such as manufacturing plant) and supplier; ii. Countries or geographic areas with operations and suppliers considered at risk.</td></tr>
<tr><td>16</td><td>16.2</td><td>Abolition of child labor</td></tr>
<tr><td>8</td><td>8.7</td><td>Children and young worker protection</td><td rowspan="2">Operations and suppliers considered to have significant risk for incidents of: i. Child labor; ii. Young workers exposed to hazardous work.</td></tr>
<tr><td>16</td><td>16.2</td><td>Abolition of child labor</td></tr>
</table>

Indicator Type

As previously mentioned, SI can be differentiated across a multitude of categories (Waas et al., 2014). Since the mode requires company disclosures based on the indicator framework, the type of indicator may affect the applicability of the assessment method employed, particularly, the distinction between qualitative and quantitative indicators. Quantitative indicators require the disclosure of quantitative data, while qualitative indicators require the discretion of efforts, initiatives, and situations, relating to a particular problem (Waas et al., 2014). For these reasons, the aggregate indicators were classified, resulting in 20 qualitative and 34 quantitative indicators.

Indicator Actionability and Action Type

The SDGs can be distinguished, based on their interaction with companies. Some SDGs can be meaningfully impacted by the private sector alone, while others require significant government intervention and partnerships. As such, they can be differentiated between IA and EA, respectively. Furthermore, the SDGs can also be classified depending on the actions they entail. Some actions focus on mitigating negative outcomes of companies' operations, while others focus on producing positive outcomes. Hence, they can be classified into two types: DG and DnH (van Zanten & van Tulder, 2018).

The GSSR does not include notions of actionability or action type, in the indicators presented. However these metrics may provide important insights into the company's approach to sustainability, so, it was decided to include them in the model here proposed. The aggregate was classified in actionability and action type, based on the work of (van Zanten & van Tulder, 2018), and the indicator scope and impacted SDGs. Each indicator can have only one classification for both of the categories mentioned in this subchapter.

The classification process resulted in a total of 50 IA and 5 EA, regarding their actionability, 35 of the "doing no harm" type and 20 of the "doing good" type.

TBL framework

The TBL framework remains relevant in sustainability studies, as it is still one of the most widely used sustainability concepts in management practices. The GSSR do not include the TBL in their indicators, and instead, classifies them into a "Business theme" category, with 76 different classifications. This is a rather large number and would not provide a usable category for analyzing the indicators, according to their impacted areas. TBL, on the contrary, has only three components, providing a very accessible, yet reductionist, view of the differences between indicators when it comes to their area of effect. This, together with the

extensive precedent in the literature, especially in similar SA models, justified using the TBL framework instead of the provided "business theme".

Each aggregate indicator was reclassified, according to the TBL framework, based on the "business theme" and the scope of the indicators. Since the indicators can have a very different range of impacts, it was necessary to consider them fully by allowing a cumulative classification, meaning that each indicator can be assigned one, two, or all three areas of TBL.

3.4.2 The adapted framework

The adapted framework stands as the adaptation made to the GSSR's indicators so that they would better fit the purposes of the assessment method suggested in this thesis.

The rework of the GRI's GSSR resulted in a significant reduction in the number of indicators considered. From the original 192, an amount that would have heavily detracted from the GreenChecker's practicality, 54 aggregate indicators were created. This reduction in the number ensures the practicality of the model and provides a simpler take on the SDG SA, which is one of the key defining features of the intended approach. Despite such a dramatic reduction, since the original impacts are transferred in a cumulative manner to the aggregate indicators, the original scope is not lost (see appendices B1 and B3 to B8).

The categories of each indicator were also changed to better suit GreenChecker. The original "business theme" was adapted to the TBL framework as this would provide a more accessible understanding of the areas impacted by each indicator. Two more categories were also added, the actionability and the indicator type, as they may provide useful insights into companies' stance towards SD and the SDGs.

Table 3.2 displays all the categories considered for each indicator and their possible classifications. Table 3.3 displays indicators 1 through 5, as an example of the adapted framework. For more information on the classification of the indicators, see appendix B2.

Table 3.2 - Indicator categories

Type	TBL	SDG	Actionability	Action Type
Quantitative or Qualitative	Economic Social Environmental	Any, from 1 to 17	Externally Actionable or Internally Actionable	Doing Good or Not doing Harm

Having established the model's interactions, it is now possible to fully define the way the model will evaluate the sustainability reports. The main challenge presented, is being able to properly manage all the different types of indicators and information presented in the reports. The solution proposed in this thesis, is based on the CA of the sustainability reports,

where the coding utilized, is the sustainability indicator framework. This method was chosen, due to the fact that CA is specifically tailored towards compiling large amounts of information, into manageable and accurate, quantitative or qualitative, insights regarding the source. Additionally, this method has been heavily utilized in SA and applied to sustainability reports, throughout the literature, providing sufficient precedent and validating the CA method.

Table 3.3 - Indicators 1 through 5, of the adapted framework

Index	Indicator
1	Significant indirect economic impacts in the context of external benchmarks and stakeholder priorities, such as national and international standards, protocols, and policy agendas.
2	Describe policies and practices used to promote economic inclusion when selecting suppliers. Describe policies and practices used to promote economic inclusion when selecting suppliers. Forms of economic inclusion can include: small and medium-sized suppliers; suppliers owned by women; suppliers which are owned by or recruit workers from members of vulnerable, marginalized, or under-represented social groups.
3	Direct economic value generated and distributed (EVG&D) on an accruals basis, including the basic components for the organization's global operations as listed below. If data are presented on a cash basis, report the justification for this decision in addition to reporting the following basic components:i. Direct economic value generated: revenues;ii. Economic value distributed: operating costs, employee wages and benefits, payments to providers of capital, payments to government by country, and community investments;iii. Economic value retained: 'direct economic value generated' less 'economic value distributed'.b. Where significant, report EVG&D separately at country, regional, or market levels, and the criteria used for defining significance.
4	Operations and suppliers considered to have significant risk for incidents of:i. Child labor;ii. Young workers exposed to hazardous work.
5	Total number of employees by employment contract, including outsourcing (permanent, temporary, full -time, part-time) by gender and region.

Unlike previous studies, this analysis will not be limited to verifying the existence of the code elements in the text, as it will also include a qualitative measure of the report presented, across two dimensions. As such, both a qualitative and quantitative assessment will be performed, in stages. This qualitative measure will be translated into a quantitative one, by the use of purpose-built scales, which will allow the model to output a score for the particular indicator. The score is based on the weighted averages of each indicator evaluation, where the importance will be calculated by considering the appropriate categories.

The evaluation is performed in four major steps:

1. Weighting of the indicators and categories.
2. Disclosure evaluation, through CA of the sustainability reports.
3. Calculation of the companies' final scores.
4. Analysis of the results.

In the following subchapters, these stages will be explained in full detail.

3.5 Weighting of the indicators and categories

The first task for applying GreenChecker is the weighting of all the criteria and categories. The importance of properly weighting criteria, in SA, has been readily acknowledged by researchers. Disregarding weighting principles implies that the criteria considered, have equal contribution/impact on the objectives (Rotmans, 2006). In the case of SD, this is hardly ever true, as each criterion may have different levels of impact in their respective area. One criterion may be essential for a particular target, while another may have only a superficial or complementary role, in the achievement of said target. Also, individual criteria can have different ranges of impacts, when compared to each other, which should also be accounted for.

Furthermore, the large amount of stakeholders involved translates to a wide range of possible priorities and opinions. The ability to accommodate such priorities through the weighting system, provides the model with extended flexibility and increases the value for the users.

For the reasons above, the weighting of the GreenChecker's components was considered fundamental, and as such, was applied in three different aspects:

- Indicator weighting
- TBL component weighting
- Evaluation weighting

3.5.1 Weighting of Indicators

The indicator weighting provides the ability to give increased importance to particular indicators. This is relevant to accommodate indicators that have a greater impact on their respective target or that have an extended range of implications and areas affected. In a more practical sense, it may also be important to differentiate the indicators that affect particular problems, that are either falling behind other objectives, or that have increased relevance at the moment as such represent a greater concern for the GreenChecker's user.

As such, a five-point scale was considered. The scale is progressive, assigning lower values for reduced relevance, and higher values for critical indicators. Table 3.4, shows the scale considered:

Table 3.4 - Possible indicator weights

level	Relevance
1	Less Important
2	Slightly Important
3	Moderately Important
4	Important
5	Very Important

3.5.2 Weighting of TBL framework

The TBL framework is divided into three equally important branches: Economy, Society, and Environment. This notion of equal importance is highly accepted in research studies and management practices. However, such equal importance is highly subjective, as one may consider any one of them more relevant, depending on their interests or situation.

It is beyond the scope of this study, to try and predict the preferences, or positioning, of potential users of GreenChecker, and so, it was deemed fitting to try and accommodate them as much as possible. Hence, the model accommodates different positions regarding the three TBL components, by allowing the user to establish their importance. The importance is set by means of a percentage value, where the sum of the three values must be equal to 1.

3.5.3 Weighting of the evaluation components

As mentioned in the previous subchapter, the evaluation of sustainability reports is carried out in two dimensions, divided into three metrics. The commitment dimension is evaluated through the report type and the report scope metrics, while the performance is based solely on the performance metric. Both similar studies and other relevant literature, do not provide a notion of the relation between these concepts. Hence, there is no agreed-upon, theoretical background for establishing the importance of the tree metrics considered. As such, it was not possible to define a set relative importance for each of them.

Like the TBL, users of the model may have different opinions on the relationship between these metrics. This, together with the lack o theoretical insights, resulted in the decision to also allow the user to define the importance themselves, making sure that the GreenChecker stays true to their priorities.

This importance, like the TBL one, is set by assigning a percentage value to each metric, report type, report scope, and performance. Again, these values must add up to 100%.

3.6 Disclosure evaluation

Following the weighting of the categories and criteria, the next step in applying the GreenChecker is to evaluate the company's sustainability report. As previously mentioned, the evaluation of such report is done through the use of the CA method. Since the methodology chosen is an adaptation of CA and CAPS, which incorporates elements of both, the application of CA does not follow the CA's methodology in its most rigorous form. However, the core elements remain present.

According to the CA methodology, the coding must be defined previous to its application (Perello-Marin et al., 2022). The coding, in CA, is a form of a dictionary, that contains the categories or attributes that will be used to group or classify the different text units, forming the basis of the analytical process (Baxter, 2020). Since the coding considered for this CA is the indicator framework, this step has already been performed in previous sub-chapters.

Having established the coding for the analytical process, it is required to establish how the coding will be applied to the source text. This interaction is what defines the type of CA, which can be quantitative or qualitative. For the purposes of this model, it was decided to apply both types simultaneously, as this would allow for a more in-depth evaluation of the company's disclosures on their sustainability reports.

As such, each indicator is evaluated based on two dimensions, commitment, and performance, where the first has two metrics, report type, and report scope, and the latter has one, named progress. The commitment intends to measure the quality and extent to which companies disclose information on each indicator, while the performance aims to evaluate the progress the company has achieved, regarding their expectations. Figure 3.2 presents a diagram where one can see the indicator evaluation components, and table displays the evaluation scales. These will be explained in further detail, in the following subchapters.

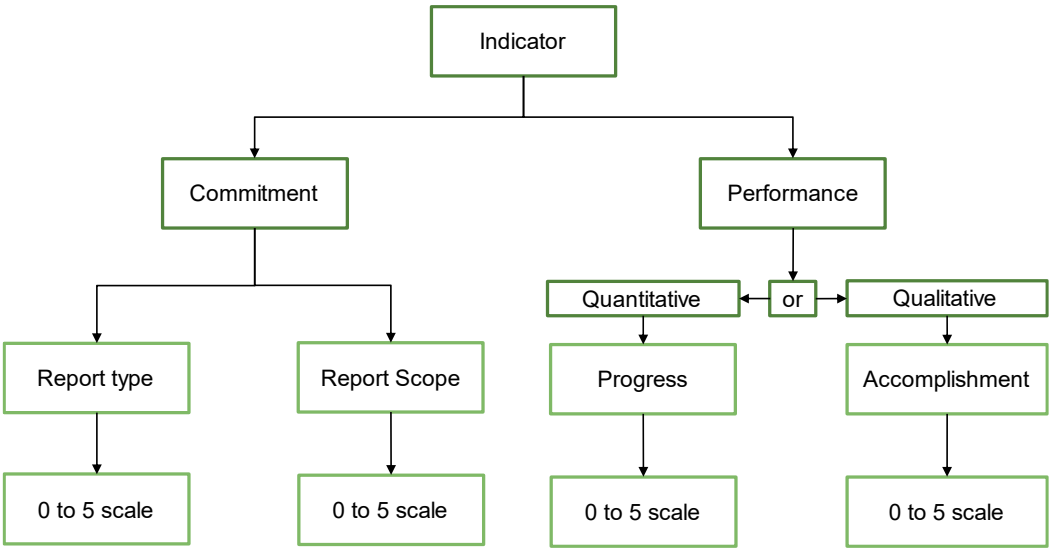


Figure 3.2 - Indicator evaluation diagram

Table 3.5 - Summary of the evaluation scales utilized

	Commitment		Quantitative performance	Qualitative performance
Level	Reporting Type	Report Scope	Progress	Accomplishment
0	No disclosure	No disclosure (0%)	No disclosure	No disclosure
1	Qualitative report only	Limited (<20%)	Negative	Initiatives yet to be implemented
2	Quantitative data	Average (20% - 50%)	Positive	Risk assessment
3	Quantitative time series	Good disclosure (>50%)	Positive and compatible	Initiatives implemented
4	Goals and targets	Extensive disclosure (>80%)	Positive and advanced	Impact assessment
5	External benchmarks	Full disclosure (100%)	Objective achieved	Initiatives fully implemented, with periodic risk and impact analysis

3.6.1 Report type metric

The report type metric aims to measure the quality of the report, by considering the several components a sustainability disclosure can have. Other studies have already developed similar scales and validated their use through case studies (Calabrese et al., 2021). However, for the purposes of this study, it was deemed lacking in complexity. As such, a 6-point scale (0 to 5) was created, expanding on the concepts already established by research-

ers. The scale is organized in a progressive manner, where the lower levels represent a basic report, with only the essential information, and the higher levels account for the addition of complementary information. This way, GreenChecker respects the notions of accountability and transparency, which are essential for SD, SDGs, and ESG. To achieve a given level, the disclosure must meet all the conditions required in the previous levels.

The 6 points of the report type scale, are as follows:

(0): No report – this value is given when the report does not disclose any information related to the indicator in question.

(1): Qualitative report - this value is attributed when the report only presents qualitative information regarding the indicator. This is applicable when the report only mentions initiatives, efforts, and/or accomplishments made by the e company, without any factual and quantitative support.

(2): Quantitative data - this value is attributed when the report presents factual and quantitative data to support the initiatives, efforts, or accomplishments mentioned.

(3): Quantitative time series – this value is attributed when the report also presents the quantitative data along multiple periods, such as previous years, semesters, or quarters.

(4): Future quantitative goals – this value is attributed when the report additionally mentions any goals or targets relevant to the topic, set by the company.

(5): Sector benchmarks – this value is attributed when the report also includes a comparison between the company's own metrics, initiatives, and accomplishments, and other companies and/or the related sector.

3.6.2 Report scope metric

The original GSSR indicators present very different dimensions of themes and metrics they encompass, from one another. This factor is further exacerbated, by the aggregation of the indicators, made for the purposes of this model, which results in the existence of complex indicators, meaning that, for one indicator, there can be multiple values and metrics to be disclosed.

For instance, consider the indicator:" Types of injury, injury rate (IR), occupational disease rate (ODR), lost day rate (LDR), absentee rate (AR), and work-related fatalities, for all employees with a breakdown by: i. Region; ii. Gender. Also, work-related fatalities, for all workers (excluding employees) whose work, or workplace, is controlled by the organization, with a breakdown by i. Region; ii. Gender". It is evident, that report that only discloses the injury rate of the company, for example, is of significantly less value, for SA purposes, than a report that discloses all the topics and metrics defined in the indicator.

To account for the possibility of these differences, the report scope metric will measure the extent to which the company's disclosure covers the topics specified by the indicator, percentage-wise. Similar scales have been employed and validated by previous studies, which provides sufficient grounding for the application of the metric defined here (Calabrese et al., 2021; Perello-Marin et al., 2022). This measurement is also progressive, where lower values indicate a reduced disclosure, and higher values are attributed to disclosures that extensively cover the topics specified by the indicators.

The 6-point scale for assessing the scope scale is as follows:

(0): No report – this value is given when there is no disclosure on the topic.

(1): Limited disclosure – this value is given when the disclosure only mentions less than 20% of the topics specified by the indicator.

(2): Average disclosure – this value is attributed when the disclosure mentions between 20% and 50% of the topics specified by the indicator:

(3): Good disclosure – this value is assigned to disclosures that mention equal or more than 50% of the topics specified in the indicator.

(4): Extensive disclosure – this value is given when the report discloses more than 70% of the topics specified by the indicator.

(5): Full disclosure – this value is reserved for instances where the disclosure includes all the topics specified in the indicator in question.

It was noted that the scale presented above, displays an amount of detail that is not required. The use of 6 points, and the way they are structured, means that for most indicators, some points become irrelevant. For example, indicators with two metrics defined, has only three possible states, for the amount disclosed in a report. Either there is no disclosure for this indicator (0%), only one of the metrics is disclosed (50%), or the two metrics are reported (100%). This would translate to scores of 0, 3, and 5, reactively, without the possibility of the remaining scores for this particular indicator. This notion, however, was displaced by the fact that some indicators would benefit and possibly use all the scale developed, and, by sticking to a 6-point scale, equal to the other metrics of the model, consistency is ensured, not needing any adjustment of the scores when performing later calculations.

3.6.3 Progress and Accomplishment metrics

The progress metrics intend to estimate the level of completion of the initiatives and measures mentioned in the report. These scales provide an innovative take on companies' portrayed intentions and stance towards SD, one that hasn't yet been fully explored in the relevant literature. Researchers have emphasized the importance of incremental works such

as this one and incorporated already-known and studied notions into innovative methods and approaches (Rotmans, 2006). As such the progress metrics here defined, are largely experimental, and thus will require extensive validation by future studies.

These metrics allow the model to contrast the apparent concern and initiatives displayed in the sustainability reports, to actual reported progress, in fulfilling the objectives established by the companies themselves. By providing such contrast within companies' reports, the model contributes to a critical engagement with companies' notions of sustainable practices, reducing the hegemonic position of such organizations, which positively affects SD in the long term (Tregidga et al., 2014).

The previous metrics explained, refer to the measurement of the commitment dimension, and will be used simultaneously for each indicator, as they can be universally applied. Regarding the measurement of the performance dimension, the heterogeneity of the selected indicators conditions the applicability of the scales. While this could be circumvented, by defining particular rules for such cases where the applicability was lacking, another approach was taken, one that ensures the future-proofing of the model, meaning that indicators may be altered and updated, and the model's assessment method remains valid.

The main characteristic that influences the applicability of the performance assessment, is whether the indicator is quantitative or qualitative. Quantitative indicators require the disclosure of quantitative data, while qualitative indicators require the discretion of efforts, initiatives, and situations, relating to a particular problem. For instance, the indicator "Total number of employees by employment contract, including outsourcing (permanent, temporary, full -time, part-time) by gender and region." Requires the disclosure of quantitative data while the indicator "Significant indirect economic impacts in the context of external benchmarks and stakeholder priorities, such as national and international standards, protocols, and policy agendas." requires only the description of related impacts. Therefore, such indicators can be considered quantitative and qualitative, respectively.

To address these differences in disclosure, two metrics are employed, which will be used alternatively, for quantitative and qualitative indicators. Again, both scales utilized, are also progressive, assigning lower values to disclosures with poor performance, and higher values to disclosures that report significant accomplishments related to the goal proposed.

Progress scale

For quantitative indicators, the performance will be measured by the progress metric, which focuses on the evolution of displayed quantitative values, defined as follows:

0): No report – this value is given when there is no disclosure on the topic, or the disclosure does not allow the performance to be estimated.

(1): Negative – this value is given when the reported values show negative progress towards the target or goal, set by the company. This also includes instances where there is no progress, meaning the situation remains the same.

(2): Positive – this value is attributed when the disclosure shows progress towards the target set by the company, yet the current pace does not allow for the achievement of the target in the timeframe established by the company. If no deadline is referred for the company's target, the 2030 date is considered.

(3): Positive and Compatible – this value is assigned to disclosures where the value reported displays a positive progression relative to the target set, and if the current pace is maintained, the target will be achieved in the proposed timeframe. If no deadline is referred for the company's target, the 2030 date is considered.

(4): Positive and advanced – this value is given to disclosures where the value reported shows displays a positive progression relative to the target set, and if the current pace is maintained, the target will be achieved before the proposed deadline. If no deadline is referred for the company's target, the 2030 date is considered.

(5): Target achieved – this value is reserved for instances where the disclosure indicates that the target established has already been achieved.

Accomplishment scale

For qualitative indicators, the accomplishment scale is utilized, which is centered on the level of implementation of the proposed measures and initiatives, and the monitoring of the situation, which is defined as follows:

0): No report – this value is given when there is no disclosure on the topic, or the disclosure does not allow the performance to be estimated.

(1): Initiatives yet to be implemented – This value is given when the report indicates that no initiatives or measures have been put in place, to dimmish, prevent, or better the situation specified by the indicator.

(2): Risk and Impact Assessment – This value is assigned when the company states that a risk and impact assessment has been carried out, relative to the situation defined by the indicator. Ideally, the results of this assessment should be presented.

(3): Initiatives have been implemented – This value is assigned when the initiatives and/or measures have been implemented or are currently under the deployment phase.

(4): Initiative Impact assessment– This value is given, when the company performs impact assessments of previously implemented initiatives and measures, gaining insights into their effects. Ideally, the results of this assessment should be presented.

(5): Initiatives fully implemented, with periodic risk and impact assessment – This value is given when companies refer that the initiatives proposed are fully implemented and

that the situation is being monitored on a periodic basis, including re-evaluating the risk and impact of such situations. The results of these assessments should also be presented.

3.6.4 Validation of the disclosure evaluation

Given that the CA relies on the observation and interpretation of text sources, it naturally presents varying levels of subjectivity, which depends both on the researchers themselves and the source text. As such, such a model must be applied by multiple users, if possible, and their results compared via the Intercoder reliability coefficient, defined by the equation 1. This coefficient should be above 80% in order to validate the CA process (Miles & Huberman, 1994, pp. 9–11).

$$Intercoder\ reliability\ coeficient = \frac{2 * M}{N} \quad (1)$$

Where:

M: number of matches, where the decisions are consistent between them.

N: total number of decisions made.

Given the notions above, whenever possible, GreenChecker's users should apply the formula to validate that their analysis is reliable and provides repeatable results. In cases where this is not possible, for instance, if there is only one singular user, the possible levels of subjectivity should be considered in the studies' conclusions.

3.7 Calculation of Scores and metrics

Having established how the sustainability reports are to be assessed, the following stage is to define how each indicator's evaluations will be combined to provide meaningful insights. Without this step, the model would produce three numbers for each indicator, relative to the evaluation of the report type, report score, and progress metrics. This would amount to 165 individual numbers, which is a number of variables too great to withdraw any usable information, in a practical manner. To achieve the proposed goal of offering a tool that is practical and provides valuable insights into the assessed companies, the individual scores of the indicators must be combined into meaningful groupings. To obtain said groupings, one can refer to the multitude of examples of such practices in the literature.

One of the major difficulties of SD and SA lies in dealing with the large difference in the inputs, rather than formulating the conclusions derived from them. This is evident in the literature when most of the calculations made on SA models rely mainly on simple statistical

analysis (Rotmans, 2006). In the case of the assessment method here proposed, weighted averages were deemed to be the best choice to process the information generated from the CA of the sustainability reports.

Weighted averages, are a common method for such purposes, providing a solid basis for statistical analysis, and present sufficient precedent in the literature to justify its use (Calabrese et al., 2021; Chen et al., 2021; Rotmans, 2006). Other, more elaborate methods, such as normalized values and standard deviations, require sufficiently large data sets, which were not compatible with the scope of this thesis. Moreover, such statistical calculations, provide normative results, meaning that each evaluation is calculated considering the whole sample (Chen et al., 2021). This would mean that the evaluation of the companies would not be independent, and the addition of more samples could invalidate previous conclusions. By utilizing weighted averages, each evaluation remains independent from one another, with the added benefit of having provided more flexibility during the development of the model.

With the calculation basis now established, the model's outputs can now be explained. The result of the company assessment is a set of scores, that aim to provide insights into the company's positioning and performance towards the SDG and, by extension, SD. The main output is the Overall Score, which considers the entire set of indicators and all the categories, resulting in a single metric, allowing for a direct comparison between multiple companies.

To support the main output, other scores are also calculated, according to the main categories considered. For instance, the indicators, as mentioned before, have an impact on one, or multiple, TBL components. Hence, a score will be calculated, for the components, considering only the evaluation of the indicators that impact said component, resulting in three additional scores: Economic Score, Social Score, and Environmental Score. Similar proceedings are done for the remaining categories: SDG impact, Action type, and Actionability.

The addition of these scores provides GreenChecker with extended capabilities and allows for a more in-depth evaluation of the companies' priorities and stances. The following sub-chapters will present the justification and explanation of all the calculations that provide the scores.

3.7.1 Weighted score of indicators

The calculation of the Weighted Score is the first calculation made. As previously mentioned, each indicator (i) is evaluated through quantitative scales, across three metrics: Report Type (t_i), Report Scope (s_i), and Progress (p_i). Each of these metrics, is given a value of 1-5, according to the defined qualitative scale. To provide each indicator with a one-dimensional score, the metrics' values are tallied, respecting the importance defined, previ-

ous to the evaluation of the report. As such, the values t_i, s_i, and p_i, are summed according to the equation 2. The resulting value is the Weighted Score of the Indicator (X_i). The Weighted Score, does not provide any meaningful insights, serving only the purpose of facilitating further calculations, where it will be heavily utilized.

$$X_i = t_i \cdot t_w + s_i \cdot s_w + p_i \cdot p_w \quad (2)$$

Where:
t_w: the weight of the report type metric
s_w: the weight of the report scope metric
p_w: the weight of the report progress metric
$t_w + s_w + p_w = 1$

3.7.2 Overall Score

The overall score is the main and final result of GreenChecker. It intends to provide the user, with a single metric, which allows for the direct comparison between each company assessed. This score considers all the indicators and all the weights, of all the categories present in the model. As such, it reflects the company's adherence to the priorities and principles defined by the user.

To calculate the Overall Score (Z) of the company, it is necessary to first calculate the relative importance of each indicator (wr_i), that considers all the categories and their respective weights. There are three weightings present in this model, the individual weight of each indicator, the weighting of the assessment metrics, and the weighting of the TBL components. The weight of each indicator is expressed by the variable, Indicator Importance (w_i). The weighting of the assessment metrics is accounted for, by the calculation of the Weighted Score of the Indicator (x_i). As such, only the TBL weighting remains. The importance and reason for including weighting of TBL components is better explained in chapter 3.5.6, however, in summary, it is beyond the scope of this thesis to predict eventual preferences or use cases. Hence de decision was made to include it, to accommodate the biggest number of stakeholders possible.

The TBL weighting functions in a different manner than the previously explained weightings. Each indicator is classified according to its impact on the TBL components. This means that indicators can have impacts on one, two, or even all three of the components. As each of the components has a weighting assigned, the TBL weighting for each indicator may

have to consider one, two, or three weights. This combination of the weights is expressed by the variable TBL Factor (Tf_i).

Given the reasons explained above, the TBL Factor can be calculated in three different ways, to account for the possible indicator classifications regarding the TBL framework:

1. If the indicator only impacts one of the TBL dimensions, Tf_i is calculated through the equation 3, considering only one TBL weighting.
2. If the indicator impacts two of the TBL dimensions, Tf_i is calculated through the equation 4, considering the average of the two TBL weights.
3. If the indicator impacts all the three TBL dimensions, Tf_i is calculated through the equation 5, considering the average of the three TBL weights.

$$Tf_i = w_i \cdot A \tag{3}$$

$$Tf_i = w_i \cdot \frac{A + B}{2} \tag{4}$$

$$Tf_i = w_i \cdot \frac{A + B + C}{3} \tag{5}$$

Where:

A: The relative importance of the first TBL dimension

B: The relative importance of the second TBL dimension

C: The relative importance of the third TBL dimension

$A + B + C = 1$

Having established the impact of the TBL weighting on each indicator, it is now possible to calculate the final rating that considers all the weights and defines the relative importance of each indicator. The overall weight of each indicator is expressed by the variable Relative Weight (zr_i) and is calculated by means of the equation 6.

Finally, the overall score (Z) can be obtained by tallying all the products between the indicators' Weighted Score (x_i) and the respective Relative Weight (wr_i). This translates to the equation 7

$$wr_i = \frac{Tf_i}{\sum Tf} \tag{6}$$

$$Z = \sum_{i=1}^{I} X_i \cdot wr_i \tag{7}$$

Where:

I: The totality of indicators considered in the model.

In summary, the condensed equation for the overall score (Z), is as follows (see equation 8):

$$Z = \sum_{i=1}^{I} (t_i \cdot t_w + s_i \cdot s_w + p_i \cdot p_w) \cdot \frac{Tf_i}{\sum Tf} \tag{8}$$

3.7.3 TBL based score

The TBL Based Score (Z_y) intends to assess how well the analysed company performs, relative to each of the TBL components and as such, the model will calculate one score for the economic scope, one for the social and another for the environmental scope. These are, respectively, the Economic Score ($Z_{economic}$), Social Score (Z_{social}) and the Environmental Score ($Z_{environmental}$).

As this metric calculates the TBL components independently, the TBL weighting is not factored in these scores. For each of the TBL Components (y), the model calculates the score based only on the indicators that have impacts on that particular component. The remaining indicators are, therefore, not considered. For instance, for the calculation of the Economic Score, only the indicators that have impacts on the economic component are considered, including the ones that have impacts on multiple TBL components.

The calculate the TBL Based Scores, the Weighted Scores of the indicators are multiplied by their weight and dived by the sum of the weights of all the indicators that impact the relevant TBL component. All these scores are then tallied, providing the TBL Based Score, as defined by the equation 9:

$$Z_y = \sum_{i}^{I_y} X_i \cdot \frac{w_i}{w_y} \tag{9}$$

Where:

y: One of the TBL components (Economic, Social or Environmental).

I_y: The set of indicators that impact the y TBL component.

w_y: The sum of the importance (w_i) of all the indicators that impact the (y) component.

By providing a different score for each of the TBL components, it is possible to gain insights into how balanced the company's efforts are, regarding the three categories. A large difference between these values indicates a high disparity in the company's awareness and efforts toward each of them. Balanced values indicate that the company has an equal stance regarding the effort and awareness, applied to each category.

Also, when assessing multiple companies, these scores allow the user to directly compare their commitment and performance separately for each of the components, which may be a useful metric for later decision-making.

3.7.4 SDG based score

The SDG based score intends to measure the company's commitment and performance relative to each SGD (g). The calculation of the SDG Based Score (Z_g), is performed in a similar manner as the TBL Score. For these metrics, only the indicators that relate to the SDG being evaluated are considered. Once again, each indicator can impact a multitude of SDGs, however, since the scores of each SDG are independent, it is of no consequence.

The calculate the SDG Based Scores, the Weighted Scores of the indicators are multiplied by their Relative Weight and dived by the sum of the Relative Weights of all the indicators that impact the relevant SDG. All these scores are then tallied, providing the SGD Based Score, as defined by the equation 10:

$$Z_g = \sum_{i}^{I_g} X_i * \frac{zr_i}{zr_g} \tag{10}$$

Where:

g: The specific SDG (1-17)

I_g: The set of indicators that impact the g component.

zr_g: The sum of the importance of the indicators that impact the (g) SDG.

By presenting a score for each SDG, the model intends to provide a proxy for the impacts of the company's sustainability efforts, on the individual SDGs. Regarding individual companies, this metric allows us to assess the balance of the contributions, as well as their magnitude. In instances where multiple companies are being assessed, these results may prove useful to establish trends between different types of companies and sectors.

3.7.5 Actionability based Score

The actionability based score intends to provide a score based on the two types of actionability. As previously explained, each indicator can be considered an IA or EA, depending on the effect companies can have on the particular problem, addressed by the indicator in question.

To calculate the Internally Actionable Score (Z_{ia}) and the Externally Actionable Score (Z_{ea}), the proceedings are, once again, similar to the SDG Based Scores. The scores are achieved by multiplying the Weighted Scores (X_i) by their Relative Weight (zr_i) and dived by the sum of the Relative Weights (zr_{ia} *or* zr_{ea}), considering only the indicators that have the proper actionability classification. The values are then tallied, providing the score rating desired, as defined in equations 11 and 12.

$$Z_{ia} = \sum_{i}^{I_{ia}} X_i * \frac{zr_i}{zr_{ia}} \tag{11}$$

$$Z_{ea} = \sum_{i}^{I_{ea}} X_i * \frac{zr_i}{zr_{ea}} \tag{12}$$

Where:
I_{ia}: The set of IA indicators.
I_{ea}: The set of EA indicators.
zr_{ia}: The sum of the importance of the IA indicators.
zr_{ea}: The sum of the importance of the EA indicators.

Having the capability to differentiate the score according to actionability, the model is able to provide insights on the balance of effort and attention towards the two types. As explained in previous chapters, IA targets and indicators, tackle problems that can be directly impacted by changes or initiatives, made within the companies' value chain. EA indicators or targets relate to problems or that require substantial amounts of collective effort, from multiple companies and governments, and as such, cannot be directly impacted by single companies (van Zanten & van Tulder, 2018). By contrasting the two values, the model can assess the commitment and performance of the two realities and provide a proxy for the levels of awareness and effort inside and beyond the value chain.

3.7.6 Indicator type based score

The indicator type based score discerns between the type of action the indicator implies. These can be DG and DnH. The indicator type scores offer a score rating based on the type of indicator. The calculation of these scores, is symmetrical to the actionability score, considering the type instead.

To calculate the Doing Good Score (Z_{dg}) and the Not Doing Harm Score (Z_{nh}), the Weighted Scores (X_i) are multiplied by their Relative Weight (zr_i), and dived by the sum of the Relative Weights (zr_{dg} *or* zr_{nh}), considering only the indicators that have the proper type classification. The values are then tallied, providing the score rating desired, as defined in the equations 13 and 14.

$$Z_{dg} = \sum_{i}^{I_{dg}} X_i * \frac{zr_i}{zr_{dg}} \tag{13}$$

$$Z_{nh} = \sum_{i}^{I_{nh}} X_i * \frac{zr_i}{zr_{nh}} \tag{14}$$

Where:

I_{dg}: The set of DG type indicators.

I_{nh}: The set of DNH type indicators.

zr_{dg}: The sum of the importance of the DG type indicators.

zr_{nh}: The sum of the importance of the DNH type indicators.

By providing the two scores for each indicator type, the model provides the capability to assess the efforts made to them. In previous chapters, the difference between these two types was explained: DnH type indicators relate to reducing companies' negative externalities, while DG indicators relate to actions that seek to actively better the situation regarding a particular problem, going beyond damage control (van Zanten & van Tulder, 2018). By contrasting the two, the model can measure the balance between the two, and provide insights into the company's levels of proactiveness regarding SD.

3.7.7 Greenwashing factor

The Greenwashing Factor (Z_{gw}) intends to measure the difference between the commitment and performance dimensions. The commitment represents the apparent awareness

and effort the company applies to the indicator in question, while the performance evaluates the actual progress that the company has achieved in the current period. By contrasting the two values, GreenChecker provides an insight into the difference between the companies' portrayed concern, and initiatives, towards their impacts on sustainability, and the actual adherence to their very own claims. Such contrast may provide a relevant insight to estimate possible levels of greenwashing, which has been widely identified as one of the problems with companies engaging with the SDGs (Nishitani et al., 2021).

The Greenwashing Factor is calculated based on the average of the difference between the progress metric (p_i), and the average of the commitment metrics, the report type (t_i), and report scope (s_i). This translates to the equation 15.

$$Z_{gw} = \frac{\sum_{i=1}^{I}(p_i - \frac{t_i + s_i}{2})}{I} \tag{15}$$

Where:
I: The totality of indicators considered in the model

3.7.8 Awareness Level

The Awareness level is meant to reflect the number of indicators the company discloses information on. This metric has been utilized in previous studies and proved effective in measuring the extent to which companies are aware of all the impacts they have on sustainability (Calabrese et al., 2021). As such, like previous studies, the Awareness Level is calculated based on the percentage of indicators on which the company discloses information. To consider information disclosed on a particular indicator (i), the evaluated company must have a report type (t_i) value greater than 0. The calculation of the Awareness level will follow the equation 16.

$$Awereness\ Level = \frac{number\ of\ disclosed\ indicators}{I} \tag{16}$$

Where:
I: The totality of indicators considered in the model.

Higher levels of awareness indicate that the company discloses information in a higher number of indicators, which can be perceived as a greater level of consciousness and information regarding the impacts the company may have on sustainability. This notion can

be extended to the calculation of scores, which allows for the creation of the Awareness Opportunity Cost, which intends to quantify the score value lost by not including all the indicators in the company's sustainability report. The calculation of this value will consider the Awareness Adjusted Score, which is similar to the Overall Score, instead considering only the indicators that were reported on, and disregarding the remaining on the calculation of the averages. As such, the Awareness Opportunity Cost calculation translates to the equation 17.

$$Awereness\ Opportunity\ Cost\ = Awereness\ Adjusted\ Score\ -\ \ Overall\ Score \qquad (17)$$

4 GREENCHECKER'S VALIDATION

In this chapter the proposed model is validated. As dictated by the methodology, GreenChecker is applied to case studies so that it's capabilities and applicability may be tested. The chapter will start by provide a description of the validation process, followed by the selection of the sample of case studies. Next, the model is applied to the case studies, which allows for the subsequent analysis of the results obtained. followed by the final considerations and understandings on the applicability of the proposed assessment method.

4.1 Validation process

Having completed the GreenChecker's development in the previous chapter, it now needs to be validated. The validation process, as dictated by the methodology chosen for this thesis, is based on the application of GreenChecker to case studies. Such application is meant to simulate the model's use in the conditions envisaged for it and verify both that it can be applied in the expected scenarios and also, that it can satisfy the conditions required by the goals, which were defined in the previous chapter (Rotmans, 2006).

To realize the proposed assessment method, GreenChecker was modelled on an Excell workbook.

As previously mentioned, GreenChecker proposed is meant to analyze companies' sustainability reports and provide multiple ratings that reflect the company's commitment and performance towards the SDGs. As such, in the validation process, GreenChecker is applied to a chosen sample, which consists of a set of sustainability reports, from different companies.

The application of the model to the sample companies should provide insights and conclusions on the GreenChecker's quality and applicability. These are subjective notions, which will be derived from this thesis author's experience while using the model and analysis of the main outputs.

As such, GreenChecker's validation can be summarized in three main steps, which will be explained in detail, along the following subchapters:

1. Definition of the sample

2. Application of the Assessment Process to the sample
3. Evaluation of the results and applicability

4.2 Selection and characterization of the sample

The sample selection is an important step, as it will define the companies assessed in this thesis. In the envisaged setting for the application of GreenChecker, the assessed companies would be defined by criteria such as direct competition, actual and/or possible suppliers, or potential investment opportunities. However, in this particular application, the model is meant to provide insights into its validity and applicability, instead of the commitment and performance of the assessed companies. Hence the companies were chosen and respective evaluations are to serve as mere examples, and not to actually be considered in further decisions.

Given the previous notions, the company selection does not require meaningful deliberation, however, since GreenChecker is intended to be applicable to virtually any private company, and considering the substantial differences and realities, across the multitude of sectors and businesses, the sample should reflect a meaningful portion of these differences.

To guarantee richer results, the companies assessed should cover multiple sectors. This will allow us to perceive possible tendencies and, perhaps more importantly, to validate that the model functions as intended, with reports that originate from different sectors, which have different realities and challenges. Ideally, these sectors should be sufficiently different from one another, and encompass the various types of possible activities such as industrial operations, distribution, and services.

Considering the notions mentioned above, three different sectors were chosen, to provide sufficient diversity between the evaluated companies. The first sector considered, was the energy sector, which is characterized by the prevalence of heavy industry, as the main activities are energy production, oil refining, and the distribution of related products. The second sector considered, was the banking sector, which contrasts whit the former, as relies mainly on providing banking and financial services, which does not require significant infrastructure. The third option chosen, was the telecommunications sector, as it sits between the two former options. Despite relying on providing services, similarly to the banking sector, the telecommunications sector also requires significant infrastructure, such as the installation of antenna structures and cabling.

Having established the sectors, the decision of which companies to select remains. The main requirement for the company selection is to provide a sufficient number of companies, one which would allow comparisons both between and within sectors. Considering this, the decision was made to select 3 companies for each sector, totalling 9 companies overall, which

was deemed sufficient. The 9 companies were selected amongst the highest grossing, within each sector. The companies selected, along with their respective sectors have summarized the 4.1. The reports can be accessed via the links present appendix A19.

Table 4.1 - Sample composition

Sectors	Companies	Key	Report year
Energy	Galp	A	2021
	EDP	B	2021
	Repsol	C	2021
Telecommunications	Altice	D	2021
	Vodafone	E	2022
	NOS	F	2021
Banking	BPI	G	2021
	Millennium	H	2021
	Santander	I	2021

4.3 Assessment process

With the sample selected in the previous subchapter, GreenChecker can now be applied to the target companies, according to the Assessment Process defined in chapters 3.5, 3.6 and 3.7.

The first step in the assessment process is to attribute the weighting to the TBL categories, Indicators, and metrics (report type, report scope, and progress). The weighting is a critical step in the assessment process, as it allows the model to reflect the user's priorities. However, in this case, the priorities of this thesis' author, are of no consequence, and beyond the focus of the study. Hence, the decision was made, to assign balanced weighting, which intends to provide an unbiased analysis, and perhaps closer to real scenarios.

Considering the previous notions, the indicators were all assigned the same value of importance, 5 which effectively disables the weighing of the indicators. The TBL categories and the metrics were assigned weights according to table 4.2.

Table 4.2 - TBL and Evaluation weighting utilized

Components		weighting
TBL	Economic	30%
	Social	35%
	Environmental	35%
Evaluation	Report Type	35%
	Report Scope	35%
	Performance	30%

Following the weighting of the required categories and metrics, the sustainability reports were analyzed and the evaluation of each metric was registered in the Excel workbook's" Inputs" sheet, visible in the appendix B11. The tables with the evaluations of each company are available in appendices B9 and B10. In some cases, some indicators were considered as not applicable, effectively disabling their evaluation and consideration in the calculations made. These decisions were justified, by situations when the specific indicator did not refer to a problem or situation which is common or significant in the reality of the companies.

For instance, consider indicator 31: "Percentage of reclaimed products and their packaging materials for each product category". In the case of the energy sector, which deals mainly with energy production and distribution, the packaging is not a significant component of their value chain, if at all present, and the likelihood of energy companies reporting on the packaging was considered very low. Given this situation, it was considered beneficial to disable this indicator for the energy sector, by considering it not applicable, rather than include it and alter the results negatively, providing a more accurate measurement of companies' disclosures.

A similar consideration was made for each sector, which resulted in a total of 3, 4, and 12, not applicable indicators, respectively for the energy, telecommunications, and baking sectors. The baking sector presents a higher number of non-applicability, as its operations do not require significant industrial infrastructure and so, most indicators related to industrial operations were not considered. For further clarification on which indicators were considered for each company, refer to appendices B9 and B10.

By adjusting the indicators used, as mentioned above, it is ensured that GreenChecker is shaped to be compatible with the different companies' realities and operations while maintaining the same indicators within the sectors still allows for comparability.

With the content analysis performed, the procedure calls for the validation of the former, by calculating the reliability coefficient. This step is of extreme importance, as it validates that the analysis made by the GreenChecker's users is repeatable and presents low enough levels of subjectivity. However, this analysis relies on the comparison of two evaluations, for the same case study, and as such, requires at least two users, ideally more, which was not possible in this thesis. Therefore the reliability coefficient was not calculated, which implies that the results of these case studies can only be used as an illustrative example of the model's capabilities, and should not be directly used for any further decisions or analysis.

Having inserted all the required information in the "Inputs" sheet, the excel workbook will calculate all the required metrics, in the "back office" sheet (showcased in the ap-

pendix B12), by using a calculation table for each company. The results provided by these tables are then summarized in the "results" sheet (Showcased in the appendixes B13 to B15), which presents them in the results table, along with the relevant charts. Over the following sub-chapters, the results will be presented and discussed, making full use of the GreenChecker's capabilities.

4.4 Analysis of the results

Having completed the proposed assessment process, the Excel workbook utilized to support the model automatically calculates the metrics and scores required. The analysis of the GreenChecker's results will be carried out firstly, by looking at and comparing individual companies, within each sector, and secondly by comparing the average results achieved for each sector. By analyzing the results in such a fashion, it will be possible to validate the model's ability to directly compare individual company results, but also the ability to identify trends and tendencies of sectors and other groups.

The resulting scores and metrics are summarized by the Results Table, featured below, in tables 4.3 and 4.4:

Table 4.3 - Results table

Company	Overall Score	TBL based Scores			Actionability Based Score		Indicator Type Based Score		GW factor	Awareness	Awareness Opportunity Cost
		Economic Score	Social Score	Env. Score	IA	EA	DG	DNH			
A	2,78	2,18	2,48	3,22	2,78	2,70	2,74	2,84	-0,69	0,76	0,84
B	2,30	2,06	2,24	2,37	2,30	2,30	2,49	2,01	-0,38	0,73	0,87
C	3,44	3,78	3,47	3,35	3,45	3,40	3,30	3,67	-0,69	0,94	0,22
D	2,13	3,81	2,21	1,81	2,23	1,59	1,98	2,46	-0,57	0,70	0,99
E	2,71	3,15	3,21	1,96	2,94	1,14	2,98	2,43	-0,47	0,80	0,84
F	2,32	2,48	2,27	2,39	2,38	1,83	2,14	2,62	-0,31	0,74	0,88
G	2,20	2,59	2,21	2,06	2,69	2,54	2,90	2,39	-0,41	0,79	1,20
H	1,82	1,81	1,73	2,10	2,28	1,63	2,55	1,80	-0,28	0,67	1,51
I	2,13	3,11	2,29	1,83	2,72	1,47	2,91	2,21	-0,28	0,86	0,91
(Averages)	2,42	2,77	2,46	2,34	2,64	2,07	2,66	2,49	-0,45	0,78	0,92
Energy Sector	2,84	2,68	2,73	2,98	2,85	2,80	2,84	2,84	-0,59	0,81	0,64
Telecom Sector	2,38	3,15	2,56	2,05	2,51	1,52	2,36	2,50	-0,45	0,75	0,90
Banking Sector	2,05	2,50	2,08	2,00	2,56	1,88	2,78	2,13	-0,32	0,77	1,21

Table 4.4 - SDG based results table

Company	SGD Based Score																
	SGD 1	SGD 2	SGD 3	SGD 4	SGD 5	SGD 6	SGD 7	SGD 8	SGD 9	SGD 10	SGD 11	SGD 12	SGD 13	SGD 14	SGD 15	SGD 16	SGD 17
A	2,54	2,94	2,68	4,70	3,16	2,87	4,19	2,88	4,02	4,28	4,00	3,20	4,15	3,46	3,51	2,11	4,05
B	2,84	3,04	2,34	2,75	2,19	1,49	3,89	2,17	3,86	2,33	4,05	2,56	3,75	1,75	1,97	2,26	3,70
C	3,68	3,96	2,81	4,00	3,25	2,64	4,30	3,50	4,22	4,19	4,70	3,37	4,02	2,97	3,34	3,17	4,05
D	2,68	2,28	2,23	2,70	3,00	0,78	3,54	2,32	3,84	3,60	3,70	1,96	3,19	1,52	1,71	2,03	4,35
E	2,47	3,54	2,21	3,70	3,59	1,42	4,10	3,10	4,05	3,79	4,05	2,30	3,42	1,61	1,81	3,56	3,70
F	2,11	2,87	2,25	3,70	2,84	1,27	3,80	2,62	4,38	3,61	5,00	2,54	3,51	1,41	1,58	1,62	3,70
G	2,21	2,53	2,58	2,75	2,71	0,99	4,22	2,28	4,49	3,77	4,35	2,14	3,76	1,64	1,84	2,27	4,35
H	0,95	0,98	1,61	2,70	2,08	1,56	3,49	2,24	2,05	2,85	2,70	2,14	3,74	1,42	1,59	0,98	1,05
I	1,88	1,92	1,68	2,75	2,75	1,08	3,42	2,43	3,53	2,69	3,70	1,90	3,40	1,22	1,37	2,18	3,05
(Averages)	2,37	2,68	2,27	3,31	2,84	1,57	3,88	2,62	3,83	3,46	4,03	2,46	3,66	1,89	2,08	2,24	3,56
Energy Sector	3,02	3,32	2,61	3,82	2,87	2,33	4,13	2,85	4,03	3,60	4,25	3,04	3,97	2,73	2,94	2,51	3,93
Telecom Sector	2,42	2,90	2,23	3,37	3,14	1,16	3,81	2,68	4,09	3,67	4,25	2,27	3,37	1,51	1,70	2,40	3,92
Banking Sector	1,68	1,81	1,96	2,73	2,51	1,21	3,71	2,31	3,36	3,10	3,58	2,06	3,63	1,42	1,60	1,81	2,82

4.4.1 Overall scores

The comparison of the companies' overall scores provides a unidimensional measure, to directly compare the companies' overall engagement with the SDGs. Figure 4.1 displays a chart, that summarizes all the companies' overall scores, along with their mean, which has a value of 2.42. From the analysis of the graph, one can note that company C presents the highest value amongst the sample, and company H can be distinguished as the least-rated company. Companies A, C, and E are the only ones that present a rating higher than the average and can be distinguished from the remaining group. The rest of the sample have similar results (apart from company H) yet can still be distinguished: Companies B and F, stand very close to the average value of 2.42 while, companies D, G, H, and I, are below the average of the sample.

Additionally, since the companies are arranged by their sector, meaning A, B and C belong to the energy sector, D, E, and F to Telecommunications, and G, H, and I to banking, a trend is observable, that indicates that the energy sector, on average, has slightly higher scores than the other two, which in turn also present differences. This is verifiable by considering the averages of the overall scores for each sector, which were displayed in table 4.3, in the previous subchapter.

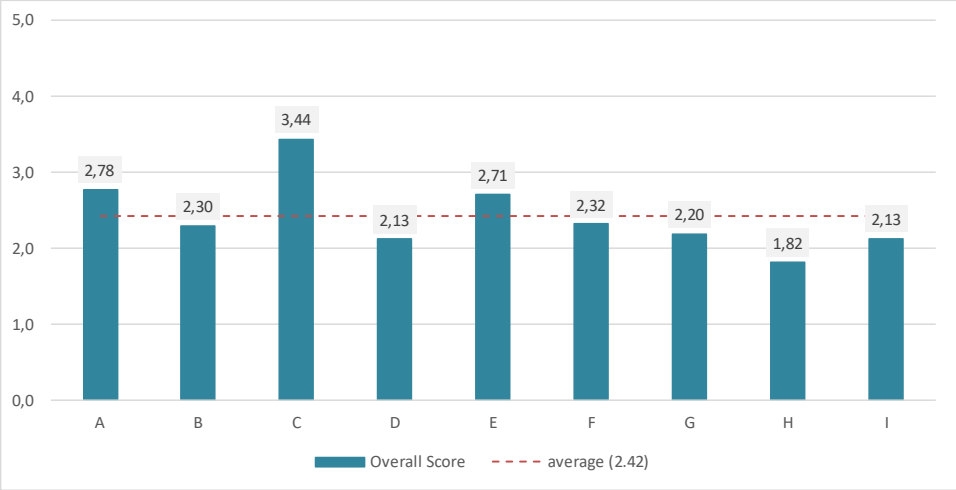


Figure 4.1 - Overall scores

4.4.2 TBL based scores

The TBL score offers the user an evaluation that considers each TBL component individually, for each company, that allows the user to verify whether the companies' disclosures are balanced, or if they reveal significant differences amongst the three components. Ideally, companies should address topics related to each of the TBL components in an equivalent manner, regarding them as equally important. These scores are represented on a radar chart, with three variables, which means that a balanced company's result should resemble an equilateral triangle. Deviations from this ideal shape, indicate an unbalance in companies' disclosures. The analysis of these results will be performed first, within each sector, followed by a comparison of each sector's mean scores.

As such, the first sector to be analyzed is the energy sector, whose results are presented via the radar chart, portrayed in figure 4.2. The results presented, show that companies A and C, display balanced results and are, therefore, within the desired stance. On the contrary, company B presents an evidenced deviation in the environmental score. This deviation, however, is positive, since the former score is higher than the rest, meaning that, Company

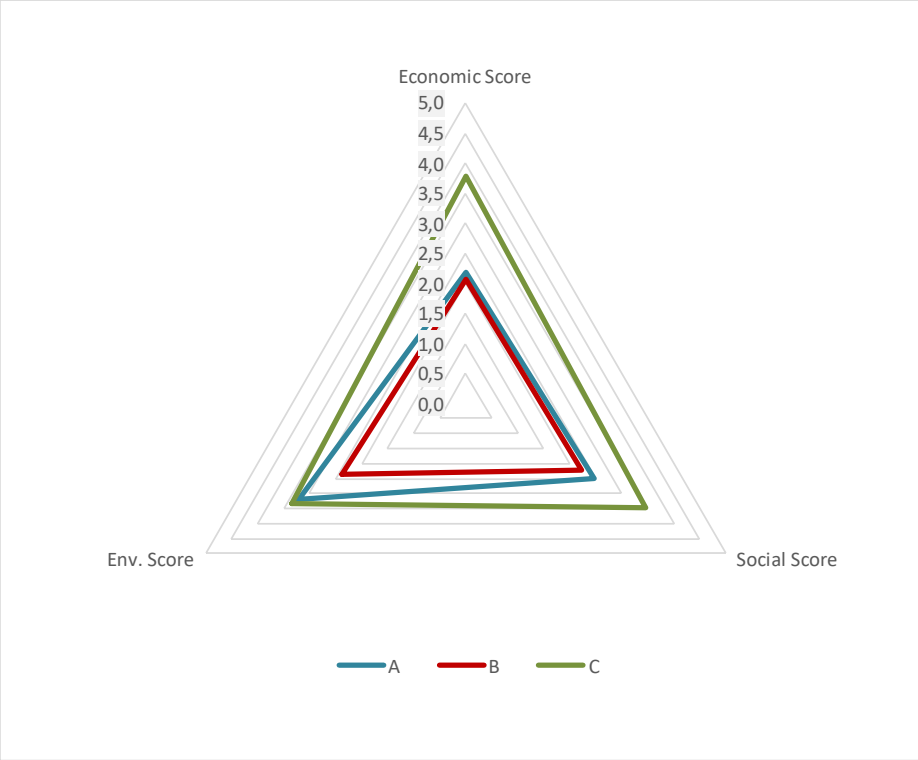


Figure 4.2 - Energy group's TBL scores

C's disclosures on social and economic matters are sub-par when compared to their environmental ones. Hence, further efforts by company C, to better their disclosures, should be focussed on social and economic topics.

Regarding the telecommunications sector, by observing the results presented in figure 4.3 one can gather that these companies offer an inferior level of balance, compared to the previous sector. While company F achieved scores compatible with what is considered a balanced stance, companies D and E, do not. Company D presents an extensive disparity between its economic score and the social and environmental ones. Indeed, this difference between company D's economic score and the environmental score is o.0 points, which is the greatest disparity in the sample, while the social score sits between the two. Concerning company E, the results achieved point towards a balanced stance between the economic and social scores, yet the environmental score is comparatively lacking, as it differs by 1.2 points from the other two scores. As such, additional efforts from companies D and E to improve their disclosures on sustainability should be focussed on the environmental and social components, for Company D, and the environmental, for company E.

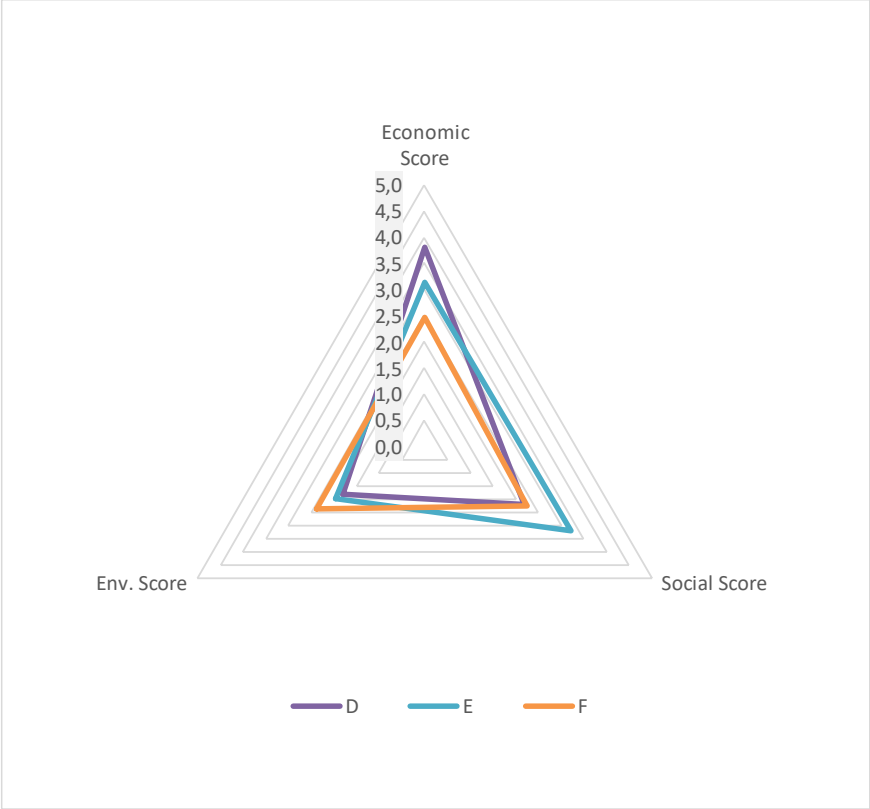


Figure 4.3 - Telecom. group's TBL scores

Concerning the banking sector, the results presented in figure 4.4, also point towards a mixture of balance and unbalance, much like the other sectors. Companies G and H achieved what can be interpreted as balanced scores, as the biggest difference between the three components does not exceed 0.5 and 0.3 points, respectively. Company I's results,

however, do not indicate the same level of balance. With a score of 3.1, 2.3, and 1.8, respectively for the economic, social, and environmental components, the company presents a significant disparity between the economic and environmental scores. Hence, the company's further efforts on improving its disclosures should focus on reducing this imbalance.

Having analyzed each company's balance, within the sectors, it is important to verify if these differences are also visible when aggregating their results sector-wise. Such analysis can be performed by observing figure 4.5, which portrays the chart with the sector's mean scores, across the TBL components. The results presented indicate that the energy and banking sectors achieved an acceptable level of balance, given that there are no differences over 0.5 points within each component score. On the other hand, the telecommunications sector does present significant disparities, as the difference between the economic and environmental scores is 1.0 points.

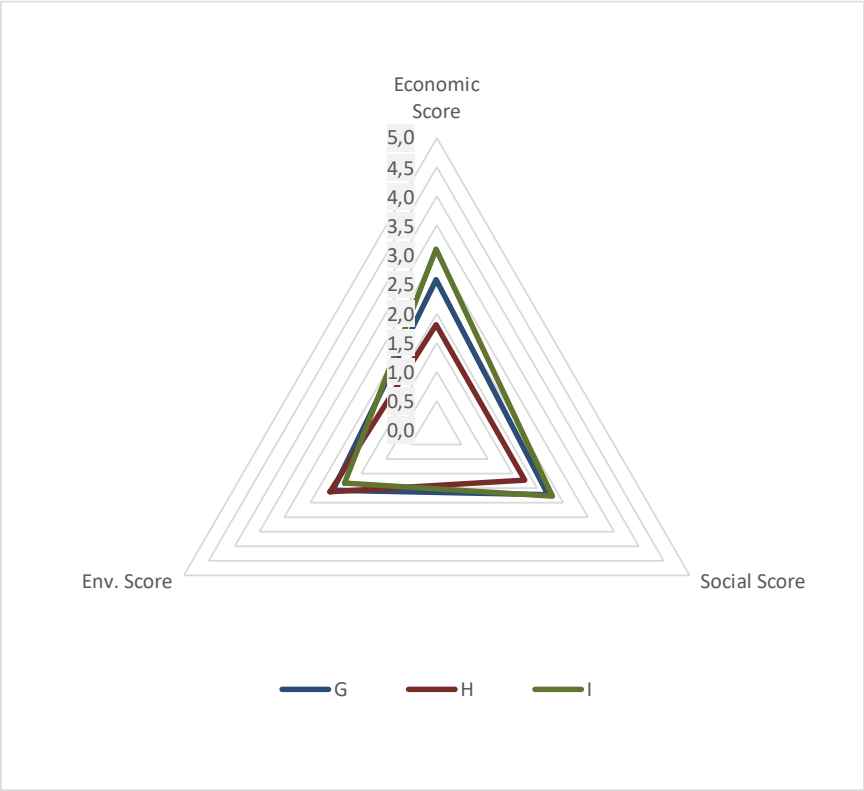


Figure 4.4 - Baking group's TBL scores

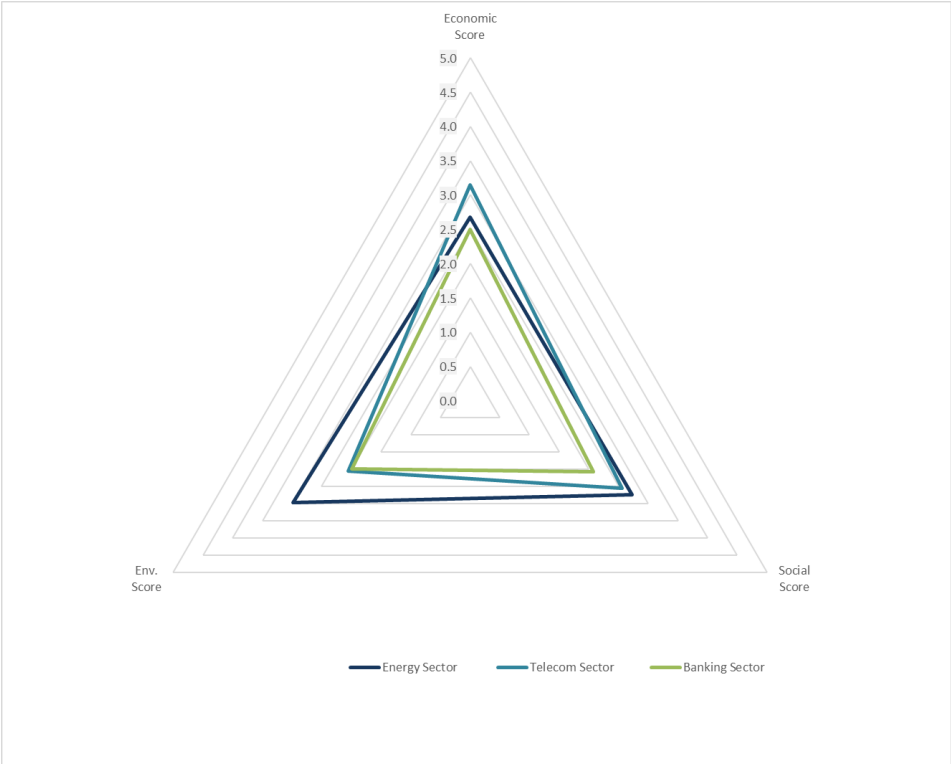


Figure 4.5 -Group-wise TBL scores

4.4.3 SDG based scores

The SDG based score provides the user with a score, for each company, relative to the individual goals. The analysis of these scores, allows the user to identify where companies are overperforming and underperforming, which could help define future strategies. Much like the TBL scores previously, this analysis will be done firstly sector-wise, and then the averages of each group will be compared, in order to identify possible tendencies.

Figure 4.6 presents the energy sector SDG score chart. By analyzing the same, it is evident that the energy sector presents a relatively stable average across all the goals, which indicates that there are no significant disparities between them. The highest-rated SDG is SDG 11, while the lowest-rated is SDG 6, with ratings of 4.3 and 2.3 respectively. Also, it is visible that company B stays consistently below the sector average, contrary to Company C, which is consistently above.

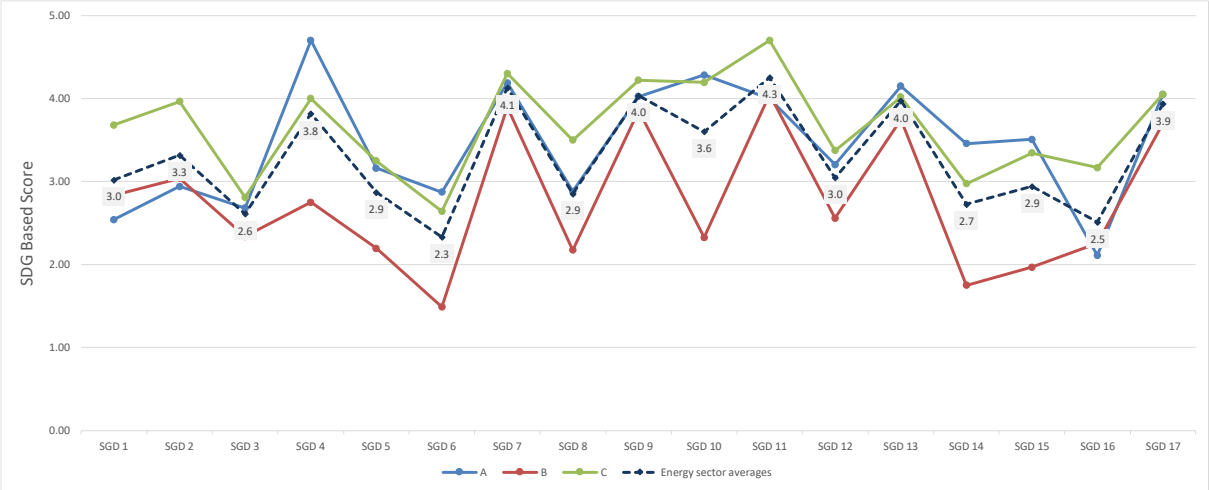


Figure 4.6 - Energy group SDG scores

In contrast, by observing figure 4.7, which presents the results of the Telecommunications sector, with a particular focus on the sector's average, one can notice a significant disparity of scores achieved for each SDG. Indeed, the highest-rated SDG and lowest, are again SDGs 11 and 6, this time with ratings of 4.3 and 1.2 respectively, which is a difference of 3.1 points. Unlike the previous sector, the companies' results do not present such a hard distinction between them, and also in relation to the sector average. However, Company D, presents results below the sector average in most goals, except for SDGs 1, 2, 14, and 15, while the other two companies, present similar results.

Likewise, the banking sector also presents a significant disparity between each SDG score achieved. By analyzing the charts presented in figure 4.8, one can see that the highest and lowest rated SDGs are, SDGs 7 and 6, with ratings of 3.7 and 1.2 respectively, which translates to a difference of 2.5 points. Again, the baking companies present mixed results, as

Figure 4.7 - Telecommunications group SDG scores

they achieved results above and below the sector average, not displaying any particular pattern.

Finally, figure 4.9 presents the average of each sector, with the overall average of the sample. By analyzing the same, one can verify that the sample exhibits a tendency to have the lowest rating on SDG 6, and SDG 11 as the highest rated. As expected, it is evident that the energy sector leads the sample by presenting scores consistently above the sample average, which is contrasted by the average of the baking sector, which is consistently below the sample average. The telecommunications sector displays mixed results, being evenly positioned below and above the sample average.

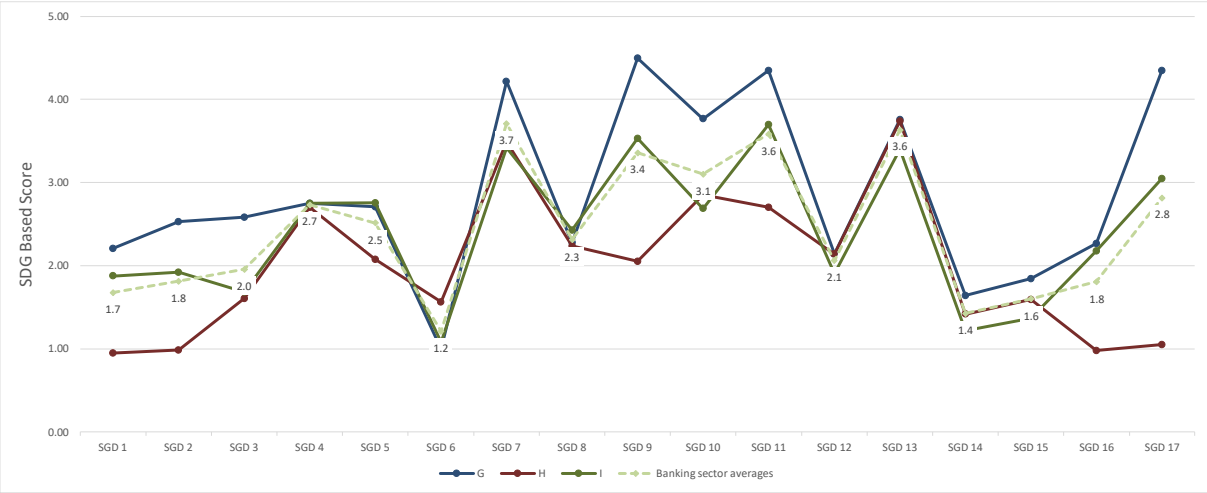


Figure 4.8 - Banking group SDG scores

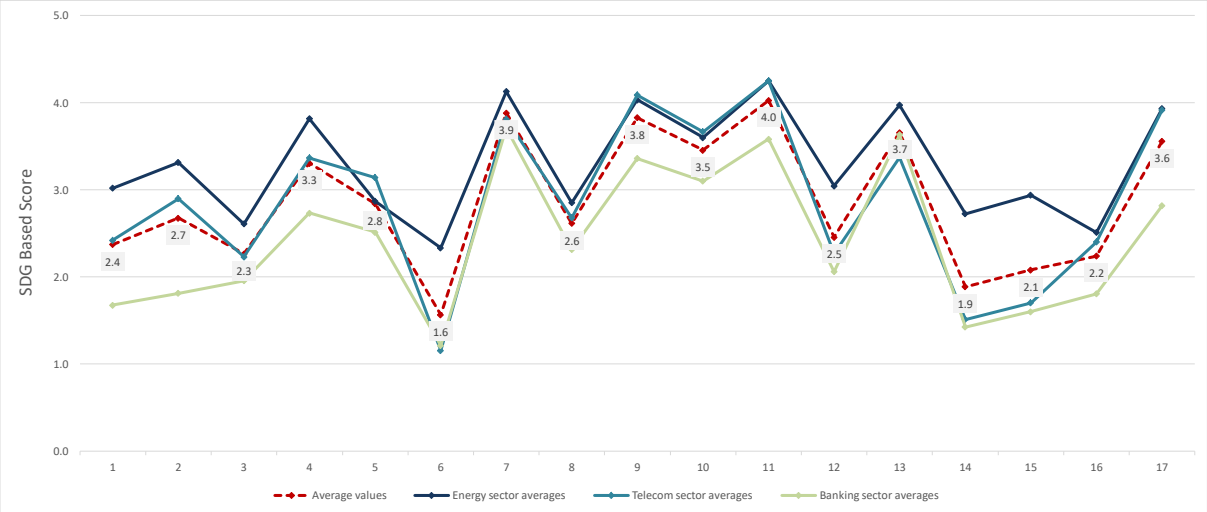


Figure 4.9 - - Sector-wise SDG scores

4.4.4 Actionability based scores

The Actionability evaluation is based on two metrics, IA and EA scores, which provide a rating considering the type of problem the indicator addresses. As previously mentioned, IA indicators refer to problems that can be directly impacted by changes made to companies' value chains, and EA indicators refer to problems that require substantial amounts of collective effort, from companies, governments, and organizations. By providing these two scores, GreenChecker can provide insights into the balance of the information disclosed on the two categories, and by extension, the importance the company is giving to factors that are within and outside the value chain. The results of the sample, regarding actionability, are presented in the chart portrayed in figure 4.10. This chart is divided into four quadrants, which allows us to determine the positioning of companies. Note that the full scale (0 - 5) is not presented to better the visibility and clarity of the results.

On the lower left, is the low IA and low EA quadrant, which is characterized, evi-

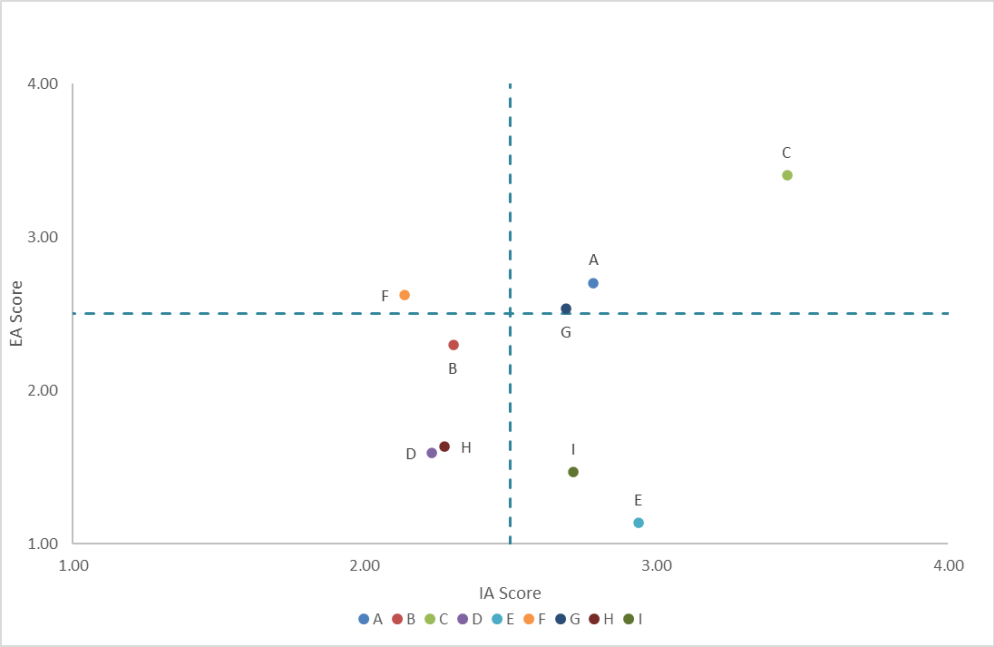


Figure 4.10 - Actionability positioning matrix

dently, by low values on both scores. In this quadrant, are the companies B, D, and H, which indicates that these companies have sub-par commitment and performance towards both types of problematics, despite having a balanced stance.

On the upper left, is the low IA and high EA quadrant, in which company F is classified. This entails that this company shows sufficient concern and effort toward EA indicators, yet lower levels of concern and effort regarding IA indicators.

On the bottom right corner, is the high IA and low EA quadrant. This quadrant is characterized by companies that display good levels of commitment and performance to-

wards IA indicators, and yet, don't display similar effort towards EA indicators. In this quadrant sit the companies E and I, which means that these companies should improve their commitment and performance regarding EA indicators.

Finally, in the top right corner, is the high IA and high EA quadrant. In it, are companies A, C, and G, which means that these companies display a balanced stance and have good levels of commitment and performance, regarding both IA and EA indicators. However, it is important to note that company G (with an EA score of 2.54) sits very close to the border (EA=2.50) to the lower quadrant and as such does not have a positioning as solid as A and C.

4.4.5 Indicator type based score

The Indicator Type evaluation is based on two metrics, DG and DnH scores, that provide a rating considering the type of action the indicator entails. As previously mentioned, DnH indicators relate to actions that aim to reduce companies' externalities, while DG indicators relate to actions that seek to have a positive impact and go beyond damage control. By providing these two scores, GreenChecker is able to provide insights into the balance of the information disclosed in the two categories. The results of the sample, regarding indicator type, are presented in the chart portrayed in figure 4.11. This chart is divided into four quadrants, similar to the previously analyzed actionability, which allows us to determine the positioning of companies. Note that the full scale (0 - 5) is not presented to better the visibility and clarity of the results.

On the lower left, is the low DG and low DnH quadrant, which is characterized, by low values on both scores. In this quadrant, are companies B and D, which indicates that these companies have sub-par commitment and performance towards both types of actions, however, it is notable that they sit close to the borders of the quadrants to the right and the top, respectively, and so their results can be considered closer to average, instead of insufficient.

On the upper left, is the low DG and high DnH quadrant which is classified the company F. This entails that company F presents good levels of concern towards reducing their own negative externalities, yet lacks proactiveness, displaying insufficient levels of commitment and performance towards DG indicators.

On the bottom right corner, is the high DG and low DnH quadrant. This quadrant is characterized by companies that display good levels of commitment and performance towards DG indicators, and yet, don't display similar effort towards DnH indicators. In this quadrant sit the companies E, G, H, and I, which means that these companies display good levels of proactiveness as they display good efforts on DG indicators, yet fail to display simi-

lar efforts, towards reducing their externalities. However, it is important to note that, Company H sits very close to the border to the left quadrant, and as such, does not have a positioning as strong as the other ones in this quadrant. Also, company E sits very close to the upper border, and the others (G and I) are not too distant from a similar situation. Additionally, it is interesting to note that in this quadrant sits the entire banking sector, despite presenting some dispersion within the quadrant itself.

Finally, in the top right corner, is the high DG and high DnH quadrant. Where sit companies A and C, which means that these companies display a balanced stance and have good levels of commitment and performance, regarding both DG and DnH indicators.

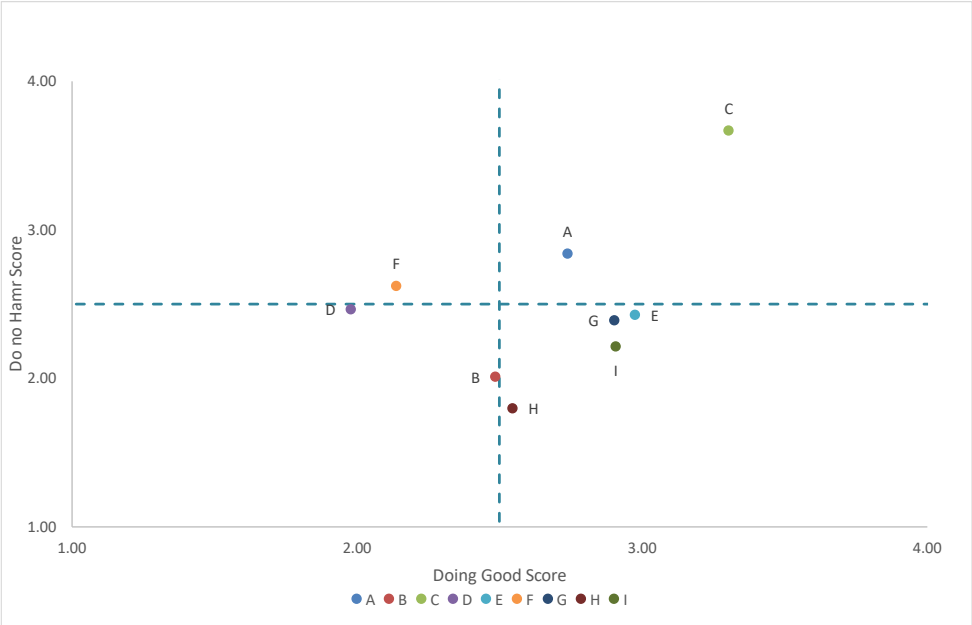


Figure 4.11 - Indicator type positioning matrix

4.4.6 Greenwashing Factor

The greenwashing factor is meant to provide a sense of the disparity between the companies' commitment discourse, and their performance results. The factor is calculated by the average difference, between the evaluation achieved on the commitment and performance metrics (performance minus commitment). A high disparity of these values will produce a Lower Greenwashing factor, which means that companies are putting more effort into displaying concern and disclosing information than actually reporting on progress and achieving the initiatives and goals set by themselves. If the company's discourse is balanced, this value should be closer to 0.

The results of the sample, regarding the Greenwashing factor, are visible in the graph presented in figure 4.12. The analysis of the latter reveals that there is an overall tendency for negative results, as every company in the sample presents values below 0 points. Companies A, C, D, and E sit below the average of the sample (-0.47 points), which indicates they present higher levels of disparity between the evaluation of commitment and performance metrics. The remaining companies sit above the average of the sample, which indicates better results than the former.

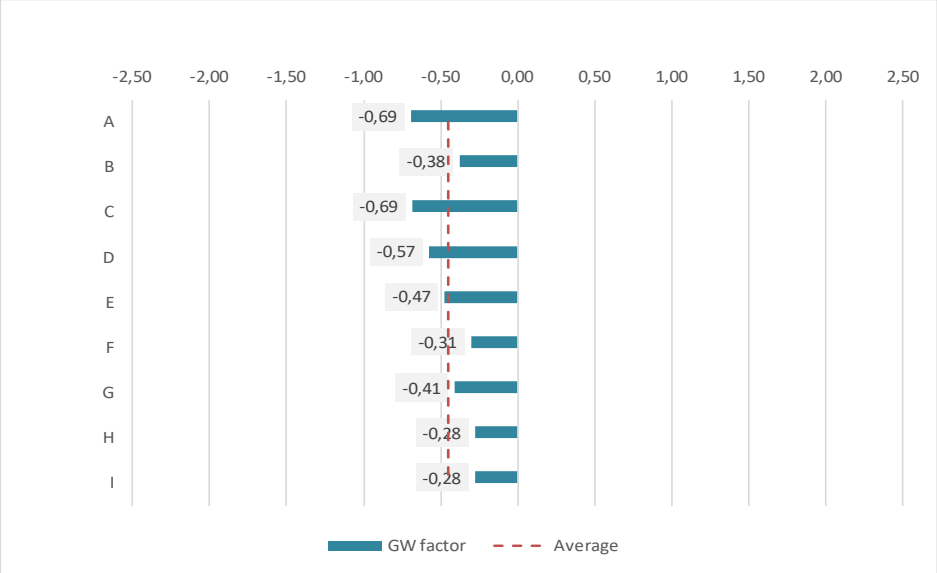


Figure 4.12 - Greenwashing factors

Notability, the companies with higher overall scores present higher Greenwashing (lower Greenwashing factor). This is expected, since the way the factor is calculated means that companies that have higher values in the commitment metrics, also have a higher probability to have a lower level of performance. For instance, for an average commitment level of 4, the performance can be from 1-5, which translates to 3 possible values below 4, and 1 value superior to 4. As such, the conclusions withdrawn from these results should take into consideration the Overall Score as well. To correct this, an additional metric was calculated, based on the normalization of the Greenwashing factor, based on the Overall score obtained by each company (Greenwashing factor, divided by the Overall Score). The results of this normalization can be observer in the figure 4.13.

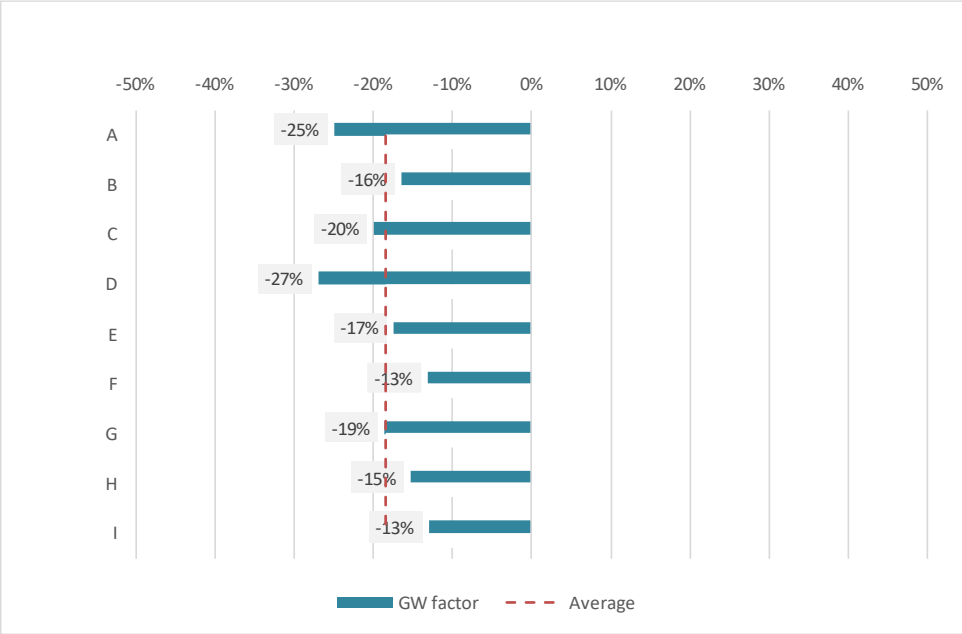


Figure 4.13 - Normalized greenwashing factors

By observing the latter, we can see that companies A and C now present a more noticeable difference between them. The biggest difference, however, is in the company D which now presents the lowest performance in the chart. Also, company G is now situated above the average of the sample, which is equal to -18%. As such, this normalization allows for a better comparison of the results.

4.4.7 Awareness Opportunity Cost

The awareness level represents the extent to which companies are reporting on the indicators considered by GreenChecker. This notion is expressed by the percentage of indicators that are included in the companies' sustainability reports. Additionally, since the indicators that were not reported upon, still are considered in the score calculations, yet valued at 0 points, the model also calculates an additional overall score, the Awareness-corrected score. This score only considers the indicators that are included in the companies' disclosures, and as such, disregards the ones that were not addressed when calculating the scores and metrics.

Figure 4.13 displays the chart where the awareness levels of the sample companies are plotted, along with the average awareness level of the sample, which is equal to 80%. By analyzing the former, it can be observed that the companies do not diverge too much from the average. The lowest-rated company is company D and the highest-rated is company C. Companies C, E, G, and I, present an awareness above the average of the sample, indicating

that they disclose information on a larger number of indicators than the remaining companies.

Figure 4.14 presents the Awareness Opportunity Cost chart. Its analysis reveals that, as expected, companies with lower levels of awareness have a tendency to have a higher difference between the actual score and the score that only considers the indicators that were reported upon. Also, it is evident that company H stands out as the company that has more to gain by increasing their awareness, followed by companies G and D. Such insights may be useful for companies to make more informed decisions regarding improving their communication in the sustainability reports.

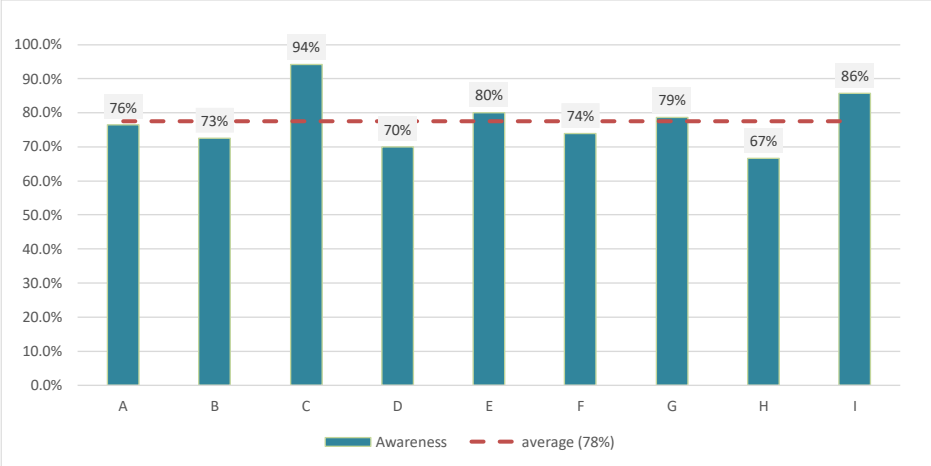


Figure 4.14 - Sample awareness levels

Figure 4.15 -Sample awereness opportunity cost

4.5 Applicability and Final Considerations

Having applied GreenChecker to the chosen sample and analyzed the results, the validation process now calls for conclusions regarding the model's applicability. Such conclusions will be based on the experimental use of the GreenChecker, by this thesis' author, to a limited sample, notions that should be taken into consideration when expanding the conclusions to other studies and situations.

The sample selected, is composed of nine companies, belonging to three different sectors, which is intended to provide sufficient diversity to test the GreenChecker's adaptability to different realities and challenges. One result of such diversity is the unequal applicability of the sustainability indicators considered in the model. For instance, some indicators relate to externalities that result from industrial activities, yet the third sector considered (the banking sector), does not engage in such operations. However, GreenChecker was designed with these differences in mind and was successfully able to circumvent such shortcomings, while still providing a meaningful assessment of these companies. As such, concerning the ability to adjust to different scenarios, and considering the results of presented in the previous subchapters, it seems fair to say that GreenChecker was able to adapt to the companies' realities and provide meaningful assessments of the companies' commitment and performance, relative to the SDGs.

It is important to note that, since GreenChecker is based on the analysis of sustainability reports, it is limited to companies that publish such disclosures, and ideally on a periodic basis, so that the years of publication between the companies remain relevant. However, this problem was not encountered in the sample selected. Furthermore, the disclosure of sustainability reports is evermore present in corporate practices, and as such, this problem is expected to become less relevant (KPMG, 2022).

One of the most important components that required validation, was the assessment process. While the commitment dimension is based on previous works and is consequently, well supported by the literature, the performance dimension is innovative and requires increased attention. The evaluation of the sample revealed that all the metrics worked as intended, and all the situations present in the sustainability reports were able to be accommodated within the evaluation scales, without any detected incompatibilities.

Concerning the validity of the scores and metrics presented some notions remain to be explored. Since GreenChecker was developed as exploratory work, building on previous studies, and pushing the current state-of-the-art boundaries, the metrics and scores calculated need further validation, before the results can be generalized. However, since this model's evaluation is comparative in nature, and all the companies evaluated were assessed with the

same levels of subjectiveness, the results remain applicable within the sample studied. Additionally, the results provided were capable of identifying improvement opportunities within companies' disclosures, which constitutes useful information for sustainability stakeholders.

For instance, from the results obtained, one can gather that companies A and B, while having above average results, stand out with poorer results on the Economic scores, considering the remainder of the sample. Therefore, it would be advisable for these companies to improve their discourses related to economic issues, so that they can approach the scores obtained by other companies. Company C, stands out as the best performing company in most scores, also having a balanced stance in most measures. However, it´s environmental score is the lowest rated, which should be one of the main concerns in future efforts of improving sustainability disclosure. Companies D and E, while having distinct results, both achieved the lowest score in environmental indicators, and as such, an opportunity for improvement exists, in topics related to this TBL component. Companies F and G presented results consistently below average, yet balanced. Their future efforts and initiatives should be evenly applied across the three TBL dimensions. Furthermore, company H stands out as the lowest performing of all, the sample, most notability having the lowest awareness level of the sample, and consequently, having the highest awareness opportunity cost. Hence, future initiatives should address the indicators that were previously ignored. Finally, company I, presents sub-par economic and environmental results, which present an opportunity diminish the differences to the rest of the sample in future sustainability reporting efforts.

Additional to the methodology, a relation to the ESGs was also considered. Since the ESGs are experiencing significant amounts of development and attention from the private sector, the capacity to relate to ESG principles and frameworks would extend the interest in using such an assessment process. Also, since the ESG criteria are related, yet not synonymous to SD, such information would not be redundant and instead complementary. As previously explained, the ESG criteria are mainly focused on how decisions are made within organizations, while the main concern of sustainability, is the impacts of said decisions.

To attempt a relation between the assessment method proposed, and the ESG criteria, a relation matrix was constructed, based on the ESG materiality matrix presented by Caldeira dos Santos & Pereira (2022). The result is visible by observing table 4.5, where the ESG relation matrix is presented. In it, one can gather the possible connections to the ESGs, and from it, possible impacts could be discerned. However, the matrix shows that the indicator framework utilized does not fully encompass the entire ESG scope, as some metrics lack relations to indicators. Therefore, to provide a full connection to the ESGs, further work is required, yet some relations are already observable. By extending the model to the relations observed, it was possible to extract overall scores and group-wise scores, in a similar way as

previously done for the TBL components. The results achieved, are summarised in the table 4.6. Additionally, the overall ESG scores achieved portrayed in figure 4.16. As expected, the results achieved are similar to SDG ones, since the evaluation basis is the same.

Table 4.5 - Relation between indicator framework and ESG materiality matrix

ESG materiality matrix			**GreenChecker's indicators**
Group	**Section**	**Metrics**	**Indicators**
Environmental	Emission	Air pollutant emissions	40. 41, 42, 43
		Environmental management systems	13, 17, 50
	Resources	Energy consumption	21, 22, 23
		Effluent management	20, 25, 27
		Natural resources protection	18, 19, 24, 26, 28, 48, 49
		Environmental reports	16, 54
Social	Regional dialogue	Regional development planning	37
		Social development	2, 6, 10, 38
		Social actions	8, 29, 30, 33, 34
		Useless areas management	none
	Collaboration	Diversity and inclusion	5, 7, 9, 11, 12
		Career development	14, 35
	Health and safety	Work conditions	4, 15, 39
		Health and safety	46, 47
Governance	Management	Financial performance	1, 2
		Operational performance	none
		Data management	51, 52
		Ethics and corruption	44, 45, 51
	Board	Share distribution	none
		Regionality	none
		Intramodality and connectivity	none
	Presence	P&D	none
		Internationalization	none

Table 4.6 - Sample ESG ratings (overall and component wise)

Company	ESG rating			
	Overall	Environmental	Social	Governance
A	2,76	3,40	2,41	2,47
B	2,44	2,50	1,85	2,99
C	3,40	3,35	3,62	3,23
E	2,25	2,02	2,33	2,42
F	2,94	2,33	2,80	3,69
G	2,39	2,52	2,23	2,42
H	2,76	2,85	2,22	1,28
I	2,59	2,49	2,73	2,55

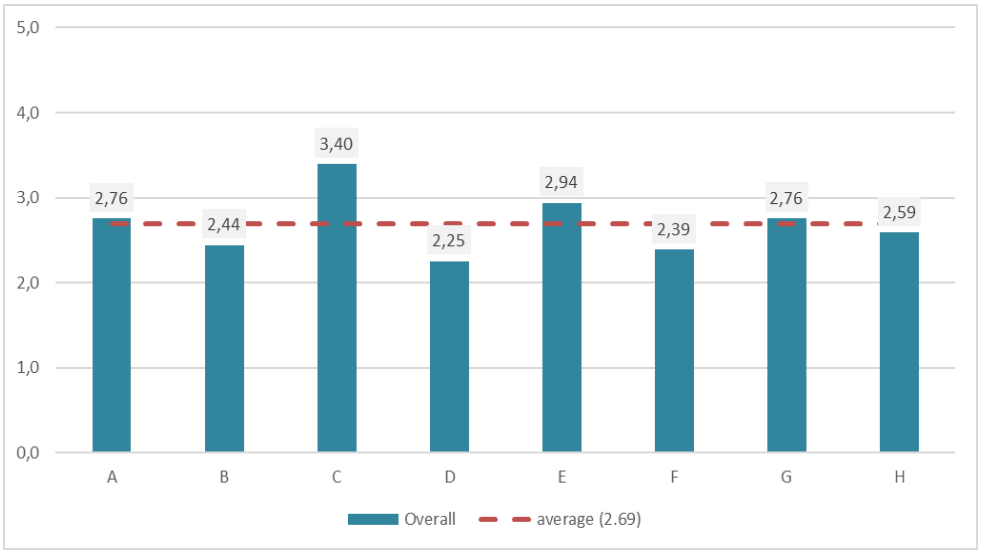


Figure 4.16 - Sample overall ESG ratings

Considering the notions above, it seems reasonable to say that the GreenChecker's applicability is assured, hence concluding the validation process of the model, as dictated by the methodology selected to guide this thesis.

5 CONCLUSIONS

This final chapter will describe the conclusions derived from the work described in the previous chapters, along with considerations on the shortcoming of the suggested assessment tool, followed by suggestions on future work, so that the present thesis may contribute in a meaningfully manner to the sustainability assessment research.

5.1 Conclusions of the study

Sustainability is an ever more present topic amongst both management studies and policymakers. Despite such importance, and a substantial number of publications on the topic, the literature is still lacking in providing practical assessment methods and tools, especially directed for company use. The work presented in this thesis aims to contribute to this matter, by providing a pragmatic approach to sustainability and SA. By building upon the latest studies, the assessment method presented here, incorporates some of the insights suggested by them, and perhaps more importantly, constitutes an exploratory study, by introducing innovative notions. As such, this work aims to suggest a valid yet practical method, for measuring company performance relative to the SDG, which materialized via the development of GreenChecker, a theoretical assessment model.

Choosing the appropriate methodology was the first challenge encountered. The existing gap in the literature is not limited to a lack of methods and tools for SA, but also a general lack of understanding and theoretical consensus, on the best-suited methodologies for sustainability research. The methodology utilized in this study was derived from previous studies, where CA was successfully utilized, together with the CAPS. The adaptation of these two methods provided a methodology with the required flexibility to develop a SA method, yet still proving sufficient theoretical background to withdraw valid conclusions.

Another challenge was the adaptation of the GRI's GSSR. The indicator framework is the backbone of any SA tool or method, as it provides the basis of the assessment by defining which topics will be subjected to evaluation. Despite being purpose-made, to link sustainability disclosures to SGD impacts, the GSSR were presented from the source in a manner that was not compatible with this study, and so, the original framework was reworked to provide

a better fit to the assessment method proposed. However original connections between indicators and targets were preserved, which assured the validity of the reworked indicators.

The assessment method utilized in the present study was conceived by building on previous works, while also introducing innovative concepts. The notions of commitment have already been explored and validated in the literature, yet the performance dimension, as defined in this thesis, has yet to be sufficiently studied. Hence the assessment method here suggested, presents a step forward in sustainability and SA research, which contributes to the literature in an incremental manner.

As dictated by the methodology, the validation of GreenChecker was performed by applying it to case studies, that consisted of a sample of 9 companies, chosen to provide sufficient diversity and mimic the intended use and functionality of GreenChecker's theorized use. The validation process allowed also the verification that the model's ability to fulfill the requirements, set in its development process. However, it is important to note that the results achieved by the validation process, should not be used to withdraw any conclusions beyond the GreenChecker's capabilities, or generalized in any manner. Figure 5.1 aims to summarize the problems identified by the literature study, which translated to the model's objectives, components and finally, the relevant results achieved by the validation process.

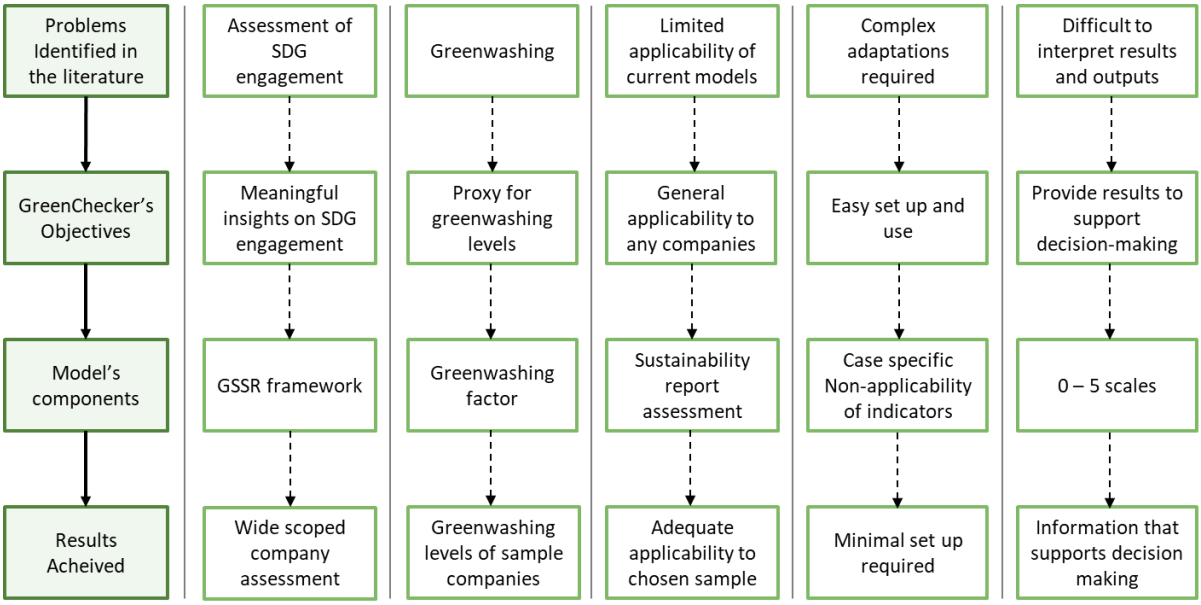


Figure 5.1 - Model's drivers, components and results

Five main objectives were considered to facilitate the development of the assessment method. The first two required the ability to provide meaningful measures of company SDG

engagement and contribution, and insights on possible greenwashing. By providing an analysis, based on 7 distinct scores and metrics, for each company, that consider multiple categories, GreenChecker was able to offer insights into each company's strong points and weaknesses, relative to the relevant competitors, allowing the identification of possible improvement points. Additionally, by also considering a sector-wise assessment, the model can also help identify trends and common occurrences. Regarding greenwashing, which is amongst the most widespread problems in sustainability disclosures, GreenChecker allows for the comparison of the company's portrayed efforts and concerns, to their actual ability to perform on the achievement of their goals. Hence, the conclusion that GreenChecker achieved these requirements seems rather realistic.

The third objective stipulated that the model should be applicable to virtually any private business. This was a tall order yet was achieved by basing the assessment of companies on the evaluation of sustainability reports. While not every single company publishes sustainability reports, the practice is ever more common, and the large majority of medium and large companies do present sustainability reports periodically. Therefore, the applicability of GreenChecker is largely ensured, as the non-applicably can be considered the exception, rather than the rule.

The fourth objective requires that the model can be applied without significant alterations or adaptations. The application of GreenChecker to the sample, required only the definition of the importance of indicators and categories, which, as previously mentioned, is a fundamental and unavoidable step for SA, and the definition of non-applicable indicators, based on the sector. As such, it is safe to conclude, that this objective was achieved.

Regarding the fifth and last requirement, which specified that the results provided should be able to support later decision-making processes, similar conclusions can be withdrawn. By providing the scores and metrics on a 0-5 scale, across multiple categories, it is fair to say that the model delivers usable information, is easily understandable, and can be factored into subsequent decision-making processes.

Having concluded that the assessment method presented was able to fulfill the objectives proposed, and also successfully validated the former, as required by the methodology, one can consider that the main goal of the thesis was achieved, which was to propose a experimental model, that provides a practical solution for assessing company performance towards the SDG and Greenwashing.

By proving an accessible SA tool, capable of measuring and comparing companies' commitment and performance, relative to the SDG, while also assessing possible levels of greenwashing, this thesis constitutes a meaningful contribution to the existent gap in the

literature and is consistent with the notions of incremental and experimental research, that are the backbone of sustainability development.

5.2 Limitations of the study

Despite having accomplished the proposed goals, the present thesis includes a number of limitations, which should be considered.

The major weakness of the proposed assessment method is the significant subjectivity of the results, which is caused by multiple factors. Firstly, the importance of each indicator and category, including the non-applicability of certain indicators, is defined by the GreenChecker's users, which may differ significantly between the possible users. Secondly, the assessment relies on CA, which is a method naturally prone to subjectiveness, as it relies on the analysis and interpretation of the written text. The impact of the former is diminished by the fact that GreenChecker is meant to be comparative, meaning that the results should not be generalized, and serve only to distinguish company positioning and discourse, within the sample. Also, the users evaluating the companies should be the same for each evaluation, so that the same subjectiveness is applied to all companies, allowing for meaningful comparisons. The latter is monitored by the verification that the assessment process produces an acceptable reliability coefficient, which indicates that the analysis performed is repeatable and has sufficient validity. Despite these constraints and measures, the conclusions that the model may suggest, are still influenced by subjectivity, and while being widely recognized as an almost unavoidable vulnerability, it remains a limitation, nonetheless.

Regarding the validation of the analysis of the sample, it is important to note that the assessment was not tested by the reliability coefficient, which is a crucial step in CA. The coefficient's calculation is based on the difference between the multiple evaluations of the same companies, which evidently requires multiple users. Since this thesis has a singular author, only one set of evaluations, for each company was produced, which is not sufficient for the reliability coefficient. The implication of this is that the evaluation of the sample companies may not be valid, meaning that the achieved results may not be repeatable and may not hold significance. This, however, has no impact on the main objective of GreenChecker's application, which was the validation of the model itself, its capabilities, and applicability, which were successfully verified, yet still constitutes a limitation of the study presented.

5.3 Recommendations for Future Work

The present work was developed as the academic thesis for a master's degree, and as such, was subject to the confines of its scope. Therefore, the current model, should not be considered as final since additional research is recommended.

Firstly, the validation process was based on the application of the assessment method, to a limited sample of companies. While the sample was deemed sufficient for this study, it would be advisable that GreenChecker should be used on a larger sample, to verify that the conclusions withdrawn from the validation remain applicable on a larger scale. Also, this larger sample should be evaluated by multiple users, so that the reliability coefficient may be included in the study. Another benefit of using a larger sample is the ability to analyze possible statistical relations between the scores provided, especially between the Greenwashing Factor and the Overall Scores.

Additionally, since this assessment method relies on innovative notions, these must be also validated, and subjected to analysis and criticism. Even though the methodology utilized was derived from previous studies, and is therefore validated by the literature, the level of pragmatism here displayed is unprecedented. Specifically, the performance scales utilized in this assessment method, constitute the most innovative element in this thesis and hence, have no significant background in the literature. It is important and advisable that comparisons with other SA methods are made, to ensure that the results achieved remain consistent with other methodologies.

Finally, in sustainability research, it is imperative that the results and conclusions are published and made widely available, so they can be validated and verified by the research community. Therefore, it is recommended that the assessment method here proposed, should be revised and validated by sustainability and SA researchers. One of the suggested focuses of further research is concerning the level of pragmatism utilized in this study. Once again, sustainability presents an enormously complex and extensive challenge, whit a large number of stakeholders, and each has different priorities and interests. The assessment method here proposed, stands as a practical assessment tool, which is directly related to a large gap in the sustainability literature and is, therefore, less supported by the same. Most sustainability and SA studies address the problem in a complex and exhaustive manner, which contrasts with the approach here utilized.

Also interesting, would be to explore the relation between this SA model, which is centered around the SDGs, and the ESGs. Given the extensive amounts of recent development on the ESGs, the ability to provide also an ESG rating would improve the GreenChecker's capabilities in a meaningful manner. This matter was explored, yet the current state of

the ESGs, which lack a general framework for reporting, does not allow for direct connections. A relation to an ESG materiality matrix, suggested by a recent study, also proved lacking. As such, another recommendation, once both the assessment process here suggested and the ESG improve in maturity, would be to establish a solid connection between the two, allowing for a direct comparison between the SDGs and ESG criteria.

It's also worth mentioning that further developments on Greenchecker should also explore data reduction techniques such as factorial analysis, to help better there results and consistency of the model.

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A
APPENDIX

A.1 Sustainable Development Goal 1

Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development*	
Goals and targets (from the 2030 Agenda for Sustainable Development)	**Indicators**
Goal 1. End poverty in all its forms everywhere	
1.1 By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than $1.25 a day	1.1.1 Proportion of the population living below the international poverty line by sex, age, employment status and geographic location (urban/rural)
1.2 By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions	1.2.1 Proportion of population living below the national poverty line, by sex and age
	1.2.2 Proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions
1.3 Implement nationally appropriate social protection systems and measures for all, including floors, and by 2030 achieve substantial coverage of the poor and the vulnerable	1.3.1 Proportion of population covered by social protection floors/systems, by sex, distinguishing children, unemployed persons, older persons, persons with disabilities, pregnant women, newborns, work-injury victims and the poor and the vulnerable
1.4 By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance	1.4.1 Proportion of population living in households with access to basic services
	1.4.2 Proportion of total adult population with secure tenure rights to land, (*a*) with legally recognized documentation, and (*b*) who perceive their rights to land as secure, by sex and type of tenure
1.5 By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters	1.5.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population
	1.5.2 Direct economic loss attributed to disasters in relation to global gross domestic product (GDP)
	1.5.3 Number of countries that adopt and implement national disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015–2030
	1.5.4 Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with national disaster risk reduction strategies
1.a Ensure significant mobilization of resources from a variety of sources, including through enhanced development cooperation, in order to provide adequate and predictable means for developing countries, in particular least developed countries, to implement programmes and policies to end poverty in all its dimensions	1.a.1 Total official development assistance grants from all donors that focus on poverty reduction as a share of the recipient country's gross national income
	1.a.2 Proportion of total government spending on essential services (education, health and social protection)
1.b Create sound policy frameworks at the national, regional and international levels, based on pro-poor and gender-sensitive development strategies, to support accelerated investment in poverty eradication actions	1.b.1 Pro-poor public social spending

A.2 Sustainable Development Goal 2

Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development*	
Goals and targets (from the 2030 Agenda for Sustainable Development)	**Indicators**
Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture	
2.1 By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round	2.1.1 Prevalence of undernourishment
	2.1.2 Prevalence of moderate or severe food insecurity in the population, based on the Food Insecurity Experience Scale (FIES)
2.2 By 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons	2.2.1 Prevalence of stunting (height for age <-2 standard deviation from the median of the World Health Organization (WHO) Child Growth Standards) among children under 5 years of age
	2.2.2 Prevalence of malnutrition (weight for height >+2 or <-2 standard deviation from the median of the WHO Child Growth Standards) among children under 5 years of age, by type (wasting and overweight)
	2.2.3 Prevalence of anaemia in women aged 15 to 49 years, by pregnancy status (percentage)
2.3 By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment	2.3.1 Volume of production per labour unit by classes of farming/pastoral/forestry enterprise size
	2.3.2 Average income of small-scale food producers, by sex and indigenous status
2.4 By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality	2.4.1 Proportion of agricultural area under productive and sustainable agriculture
2.5 By 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as	2.5.1 Number of (*a*) plant and (*b*) animal genetic resources for food and agriculture secured in either medium- or long-term conservation facilities
	2.5.2 Proportion of local breeds classified as being at risk of extinction
2.a Increase investment, including through enhanced international cooperation, in rural infrastructure, agricultural research and extension services, technology development and plant and livestock gene banks in order to enhance agricultural productive capacity in developing countries, in particular least developed countries	2.a.1 The agriculture orientation index for government expenditures
	2.a.2 Total official flows (official development assistance plus other official flows) to the agriculture sector
2.b Correct and prevent trade restrictions and distortions in world agricultural markets, including through the parallel elimination of all forms of agricultural export subsidies and all export measures with equivalent effect, in accordance with the mandate of the Doha Development Round	2.b.1 Agricultural export subsidies
2.c Adopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility	2.c.1 Indicator of food price anomalies

A.3 Sustainable Development Goal 3

Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development*	
Goals and targets (from the 2030 Agenda for Sustainable Development)	**Indicators**
Goal 3. Ensure healthy lives and promote well-being for all at all ages	
3.1 By 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births	3.1.1 Maternal mortality ratio
	3.1.2 Proportion of births attended by skilled health personnel
3.2 By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births	3.2.1 Under-5 mortality rate
	3.2.2 Neonatal mortality rate
3.3 By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases	3.3.1 Number of new HIV infections per 1,000 uninfected population, by sex, age and key populations
	3.3.2 Tuberculosis incidence per 100,000 population
	3.3.3 Malaria incidence per 1,000 population
	3.3.4 Hepatitis B incidence per 100,000 population
	3.3.5 Number of people requiring interventions against neglected tropical diseases
3.4 By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being	3.4.1 Mortality rate attributed to cardiovascular disease, cancer, diabetes or chronic respiratory disease
	3.4.2 Suicide mortality rate
3.5 Strengthen the prevention and treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol	3.5.1 Coverage of treatment interventions (pharmacological, psychosocial and rehabilitation and aftercare services) for substance use disorders
	3.5.2 Alcohol per capita consumption (aged 15 years and older) within a calendar year in litres of pure alcohol
3.6 By 2020, halve the number of global deaths and injuries from road traffic accidents	3.6.1 Death rate due to road traffic injuries
3.7 By 2030, ensure universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programmes	3.7.1 Proportion of women of reproductive age (aged 15–49 years) who have their need for family planning satisfied with modern methods
	3.7.2 Adolescent birth rate (aged 10–14 years; aged 15–19 years) per 1,000 women in that age group
3.8 Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all	3.8.1 Coverage of essential health services
	3.8.2 Proportion of population with large household expenditures on health as a share of total household expenditure or income
3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination	3.9.1 Mortality rate attributed to household and ambient air pollution
	3.9.2 Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene (exposure to unsafe Water, Sanitation and Hygiene for All (WASH) services)
	3.9.3 Mortality rate attributed to unintentional poisoning
3.a Strengthen the implementation of the World Health Organization Framework Convention on Tobacco Control in all countries, as appropriate	3.a.1 Age-standardized prevalence of current tobacco use among persons aged 15 years and older
3.b Support the research and development of vaccines and medicines for the communicable and non-communicable diseases that primarily affect developing countries, provide access to affordable essential medicines and vaccines, in accordance with the Doha Declaration on the TRIPS Agreement and Public Health, which affirms the right of developing countries to use to the full the provisions in the Agreement on Trade-Related Aspects of Intellectual Property Rights regarding flexibilities to protect public health, and, in particular, provide access to medicines for all	3.b.1 Proportion of the target population covered by all vaccines included in their national programme
	3.b.2 Total net official development assistance to medical research and basic health sectors
	3.b.3 Proportion of health facilities that have a core set of relevant essential medicines available and affordable on a sustainable basis
3.c Substantially increase health financing and the recruitment, development, training and retention of the health workforce in developing countries, especially in least developed countries and small island developing States	3.c.1 Health worker density and distribution
3.d Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks	3.d.1 International Health Regulations (IHR) capacity and health emergency preparedness
	3.d.2 Percentage of bloodstream infections due to selected antimicrobial-resistant organisms

A.4 Sustainable Development Goal 4

Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development*	
Goals and targets (from the 2030 Agenda for Sustainable Development)	**Indicators**
Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	
4.1 By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes	4.1.1 Proportion of children and young people (*a*) in grades 2/3; (*b*) at the end of primary; and (*c*) at the end of lower secondary achieving at least a minimum proficiency level in (i) reading and (ii) mathematics, by sex
	4.1.2 Completion rate (primary education, lower secondary education, upper secondary education)
4.2 By 2030, ensure that all girls and boys have access to quality early childhood development, care and pre-primary education so that they are ready for primary education	4.2.1 Proportion of children aged 24–59 months who are developmentally on track in health, learning and psychosocial well-being, by sex
	4.2.2 Participation rate in organized learning (one year before the official primary entry age), by sex
4.3 By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university	4.3.1 Participation rate of youth and adults in formal and non-formal education and training in the previous 12 months, by sex
4.4 By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship	4.4.1 Proportion of youth and adults with information and communications technology (ICT) skills, by type of skill
4.5 By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations	4.5.1 Parity indices (female/male, rural/urban, bottom/top wealth quintile and others such as disability status, indigenous peoples and conflict-affected, as data become available) for all education indicators on this list that can be disaggregated
4.6 By 2030, ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy	4.6.1 Proportion of population in a given age group achieving at least a fixed level of proficiency in functional (*a*) literacy and (*b*) numeracy skills, by sex
4.7 By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development	4.7.1 Extent to which (i) global citizenship education and (ii) education for sustainable development are mainstreamed in (*a*) national education policies; (*b*) curricula; (*c*) teacher education; and (*d*) student assessment
4.a Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all	4.a.1 Proportion of schools offering basic services, by type of service
4.b By 2020, substantially expand globally the number of scholarships available to developing countries, in particular least developed countries, small island developing States and African countries, for enrolment in higher education, including vocational training and information and communications technology, technical, engineering and scientific programmes, in developed countries and other developing countries	4.b.1 Volume of official development assistance flows for scholarships by sector and type of study
4.c By 2030, substantially increase the supply of qualified teachers, including through international cooperation for teacher training in developing countries, especially least developed countries and small island developing States	4.c.1 Proportion of teachers with the minimum required qualifications, by education level

A.5 Sustainable Development Goal 5

Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development*	
Goals and targets (from the 2030 Agenda for Sustainable Development)	**Indicators**
Goal 5. Achieve gender equality and empower all women and girls	
5.1 End all forms of discrimination against all women and girls everywhere	5.1.1 Whether or not legal frameworks are in place to promote, enforce and monitor equality and non-discrimination on the basis of sex
5.2 Eliminate all forms of violence against all women and girls in the public and private spheres, including trafficking and sexual and other types of exploitation	5.2.1 Proportion of ever-partnered women and girls aged 15 years and older subjected to physical, sexual or psychological violence by a current or former intimate partner in the previous 12 months, by form of violence and by age
	5.2.2 Proportion of women and girls aged 15 years and older subjected to sexual violence by persons other than an intimate partner in the previous 12 months, by age and place of occurrence
5.3 Eliminate all harmful practices, such as child, early and forced marriage and female genital mutilation	5.3.1 Proportion of women aged 20–24 years who were married or in a union before age 15 and before age 18
	5.3.2 Proportion of girls and women aged 15–49 years who have undergone female genital mutilation/cutting, by age
5.4 Recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate	5.4.1 Proportion of time spent on unpaid domestic and care work, by sex, age and location
5.5 Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life	5.5.1 Proportion of seats held by women in (*a*) national parliaments and (*b*) local governments
	5.5.2 Proportion of women in managerial positions
5.6 Ensure universal access to sexual and reproductive health and reproductive rights as agreed in accordance with the Programme of Action of the International Conference on Population and Development and the Beijing Platform for Action and the outcome documents of their review conferences	5.6.1 Proportion of women aged 15–49 years who make their own informed decisions regarding sexual relations, contraceptive use and reproductive health care
	5.6.2 Number of countries with laws and regulations that guarantee full and equal access to women and men aged 15 years and older to sexual and reproductive health care, information and education
5.a Undertake reforms to give women equal rights to economic resources, as well as access to ownership and control over land and other forms of property, financial services, inheritance and natural resources, in accordance with national laws	5.a.1 (*a*) Proportion of total agricultural population with ownership or secure rights over agricultural land, by sex; and (*b*) share of women among owners or rights-bearers of agricultural land, by type of tenure
	5.a.2 Proportion of countries where the legal framework (including customary law) guarantees women's equal rights to land ownership and/or control
5.b Enhance the use of enabling technology, in particular information and communications technology, to promote the empowerment of women	5.b.1 Proportion of individuals who own a mobile telephone, by sex
5.c Adopt and strengthen sound policies and enforceable legislation for the promotion of gender equality and the empowerment of all women and girls at all levels	5.c.1 Proportion of countries with systems to track and make public allocations for gender equality and women's empowerment

A.6 Sustainable Development Goals 6 and 7

Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development*	
Goals and targets (from the 2030 Agenda for Sustainable Development)	**Indicators**
Goal 6. Ensure availability and sustainable management of water and sanitation for all	
6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all	6.1.1 Proportion of population using safely managed drinking water services
6.2 By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations	6.2.1 Proportion of population using (*a*) safely managed sanitation services and (*b*) a hand-washing facility with soap and water
6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally	6.3.1 Proportion of domestic and industrial wastewater flows safely treated
	6.3.2 Proportion of bodies of water with good ambient water quality
6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity	6.4.1 Change in water-use efficiency over time
	6.4.2 Level of water stress: freshwater withdrawal as a proportion of available freshwater resources
6.5 By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate	6.5.1 Degree of integrated water resources management
	6.5.2 Proportion of transboundary basin area with an operational arrangement for water cooperation
6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes	6.6.1 Change in the extent of water-related ecosystems over time
6.a By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies	6.a.1 Amount of water- and sanitation-related official development assistance that is part of a government-coordinated spending plan
6.b Support and strengthen the participation of local communities in improving water and sanitation management	6.b.1 Proportion of local administrative units with established and operational policies and procedures for participation of local communities in water and sanitation management

Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development*	
Goals and targets (from the 2030 Agenda for Sustainable Development)	**Indicators**
Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all	
7.1 By 2030, ensure universal access to affordable, reliable and modern energy services	7.1.1 Proportion of population with access to electricity
	7.1.2 Proportion of population with primary reliance on clean fuels and technology
7.2 By 2030, increase substantially the share of renewable energy in the global energy mix	7.2.1 Renewable energy share in the total final energy consumption
7.3 By 2030, double the global rate of improvement in energy efficiency	7.3.1 Energy intensity measured in terms of primary energy and GDP
7.a By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology	7.a.1 International financial flows to developing countries in support of clean energy research and development and renewable energy production, including in hybrid systems
7.b By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States and landlocked developing countries, in accordance with their respective programmes of support	7.b.1 Installed renewable energy-generating capacity in developing countries (in watts per capita)

A.7 Sustainable Development Goal 8

Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development*	
Goals and targets (from the 2030 Agenda for Sustainable Development)	**Indicators**
Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	
8.1 Sustain per capita economic growth in accordance with national circumstances and, in particular, at least 7 per cent gross domestic product growth per annum in the least developed countries	8.1.1 Annual growth rate of real GDP per capita
8.2 Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labour-intensive sectors	8.2.1 Annual growth rate of real GDP per employed person
8.3 Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services	8.3.1 Proportion of informal employment in total employment, by sector and sex
8.4 Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-Year Framework of Programmes on Sustainable Consumption and Production, with developed countries taking the lead	8.4.1 Material footprint, material footprint per capita, and material footprint per GDP
	8.4.2 Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP
8.5 By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value	8.5.1 Average hourly earnings of employees, by sex, age, occupation and persons with disabilities
	8.5.2 Unemployment rate, by sex, age and persons with disabilities
8.6 By 2020, substantially reduce the proportion of youth not in employment, education or training	8.6.1 Proportion of youth (aged 15–24 years) not in education, employment or training
8.7 Take immediate and effective measures to eradicate forced labour, end modern slavery and human trafficking and secure the prohibition and elimination of the worst forms of child labour, including recruitment and use of child soldiers, and by 2025 end child labour in all its forms	8.7.1 Proportion and number of children aged 5–17 years engaged in child labour, by sex and age
8.8 Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment	8.8.1 Fatal and non-fatal occupational injuries per 100,000 workers, by sex and migrant status
	8.8.2 Level of national compliance with labour rights (freedom of association and collective bargaining) based on International Labour Organization (ILO) textual sources and national legislation, by sex and migrant status
8.9 By 2030, devise and implement policies to promote sustainable tourism that creates jobs and promotes local culture and products	8.9.1 Tourism direct GDP as a proportion of total GDP and in growth rate
8.10 Strengthen the capacity of domestic financial institutions to encourage and expand access to banking, insurance and financial services for all	8.10.1 (*a*) Number of commercial bank branches per 100,000 adults and (*b*) number of automated teller machines (ATMs) per 100,000 adults
	8.10.2 Proportion of adults (15 years and older) with an account at a bank or other financial institution or with a mobile-money-service provider
8.a Increase Aid for Trade support for developing countries, in particular least developed countries, including through the Enhanced Integrated Framework for Trade-related Technical Assistance to Least Developed Countries	8.a.1 Aid for Trade commitments and disbursements
8.b By 2020, develop and operationalize a global strategy for youth employment and implement the Global Jobs Pact of the International Labour Organization	8.b.1 Existence of a developed and operationalized national strategy for youth employment, as a distinct strategy or as part of a national employment strategy

A.8 Sustainable Development Goal 9

Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development*	
Goals and targets (from the 2030 Agenda for Sustainable Development)	**Indicators**
Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	
9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all	9.1.1 Proportion of the rural population who live within 2 km of an all-season road
	9.1.2 Passenger and freight volumes, by mode of transport
9.2 Promote inclusive and sustainable industrialization and, by 2030, significantly raise industry's share of employment and gross domestic product, in line with national circumstances, and double its share in least developed countries	9.2.1 Manufacturing value added as a proportion of GDP and per capita
	9.2.2 Manufacturing employment as a proportion of total employment
9.3 Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets	9.3.1 Proportion of small-scale industries in total industry value added
	9.3.2 Proportion of small-scale industries with a loan or line of credit
9.4 By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities	9.4.1 CO_2 emission per unit of value added
9.5 Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending	9.5.1 Research and development expenditure as a proportion of GDP
	9.5.2 Researchers (in full-time equivalent) per million inhabitants
9.a Facilitate sustainable and resilient infrastructure development in developing countries through enhanced financial, technological and technical support to African countries, least developed countries, landlocked developing countries and small island developing States	9.a.1 Total official international support (official development assistance plus other official flows) to infrastructure
9.b Support domestic technology development, research and innovation in developing countries, including by ensuring a conducive policy environment for, inter alia, industrial diversification and value addition to commodities	9.b.1 Proportion of medium and high-tech industry value added in total value added
9.c Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020	9.c.1 Proportion of population covered by a mobile network, by technology

A.9 Sustainable Development Goal 10

Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development*	
Goals and targets (from the 2030 Agenda for Sustainable Development)	**Indicators**
Goal 10. Reduce inequality within and among countries	
10.1 By 2030, progressively achieve and sustain income growth of the bottom 40 per cent of the population at a rate higher than the national average	10.1.1 Growth rates of household expenditure or income per capita among the bottom 40 per cent of the population and the total population
10.2 By 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status	10.2.1 Proportion of people living below 50 per cent of median income, by sex, age and persons with disabilities
10.3 Ensure equal opportunity and reduce inequalities of outcome, including by eliminating discriminatory laws, policies and practices and promoting appropriate legislation, policies and action in this regard	10.3.1 Proportion of population reporting having personally felt discriminated against or harassed in the previous 12 months on the basis of a ground of discrimination prohibited under international human rights law
10.4 Adopt policies, especially fiscal, wage and social protection policies, and progressively achieve greater equality	10.4.1 Labour share of GDP
	10.4.2 Redistributive impact of fiscal policy[4]
10.5 Improve the regulation and monitoring of global financial markets and institutions and strengthen the implementation of such regulations	10.5.1 Financial Soundness Indicators
10.6 Ensure enhanced representation and voice for developing countries in decision-making in global international economic and financial institutions in order to deliver more effective, credible, accountable and legitimate institutions	10.6.1 Proportion of members and voting rights of developing countries in international organizations
10.7 Facilitate orderly, safe, regular and responsible migration and mobility of people, including through the implementation of planned and well-managed migration policies	10.7.1 Recruitment cost borne by employee as a proportion of monthly income earned in country of destination
	10.7.2 Number of countries with migration policies that facilitate orderly, safe, regular and responsible migration and mobility of people
	10.7.3 Number of people who died or disappeared in the process of migration towards an international destination
	10.7.4 Proportion of the population who are refugees, by country of origin
10.a Implement the principle of special and differential treatment for developing countries, in particular least developed countries, in accordance with World Trade Organization agreements	10.a.1 Proportion of tariff lines applied to imports from least developed countries and developing countries with zero-tariff
10.b Encourage official development assistance and financial flows, including foreign direct investment, to States where the need is greatest, in particular least developed countries, African countries, small island developing States and landlocked developing countries, in accordance with their national plans and programmes	10.b.1 Total resource flows for development, by recipient and donor countries and type of flow (e.g. official development assistance, foreign direct investment and other flows)
10.c By 2030, reduce to less than 3 per cent the transaction costs of migrant remittances and eliminate remittance corridors with costs higher than 5 per cent	10.c.1 Remittance costs as a proportion of the amount remitted

A.10 Sustainable Development Goal 11

Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development*	
Goals and targets (from the 2030 Agenda for Sustainable Development)	**Indicators**
Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable	
11.1 By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums	11.1.1 Proportion of urban population living in slums, informal settlements or inadequate housing
11.2 By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons	11.2.1 Proportion of population that has convenient access to public transport, by sex, age and persons with disabilities
11.3 By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries	11.3.1 Ratio of land consumption rate to population growth rate
	11.3.2 Proportion of cities with a direct participation structure of civil society in urban planning and management that operate regularly and democratically
11.4 Strengthen efforts to protect and safeguard the world's cultural and natural heritage	11.4.1 Total per capita expenditure on the preservation, protection and conservation of all cultural and natural heritage, by source of funding (public, private), type of heritage (cultural, natural) and level of government (national, regional, and local/municipal)
11.5 By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations	11.5.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population
	11.5.2 Direct economic loss in relation to global GDP, damage to critical infrastructure and number of disruptions to basic services, attributed to disasters
11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management	11.6.1 Proportion of municipal solid waste collected and managed in controlled facilities out of total municipal waste generated, by cities
	11.6.2 Annual mean levels of fine particulate matter (e.g. PM2.5 and PM10) in cities (population weighted)
11.7 By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities	11.7.1 Average share of the built-up area of cities that is open space for public use for all, by sex, age and persons with disabilities
	11.7.2 Proportion of persons victim of physical or sexual harassment, by sex, age, disability status and place of occurrence, in the previous 12 months
11.a Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning	11.a.1 Number of countries that have national urban policies or regional development plans that (*a*) respond to population dynamics; (*b*) ensure balanced territorial development; and (*c*) increase local fiscal space
11.b By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015–2030, holistic disaster risk management at all levels	11.b.1 Number of countries that adopt and implement national disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015–2030
	11.b.2 Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with national disaster risk reduction strategies
11.c Support least developed countries, including through financial and technical assistance, in building sustainable and resilient buildings utilizing local materials	*No suitable replacement indicator was proposed. The global statistical community is encouraged to work to develop an indicator that could be proposed for the 2025 comprehensive review. See E/CN.3/2020/2, paragraph 23.*

A.11 Sustainable Development Goal 12

Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development*	
Goals and targets (from the 2030 Agenda for Sustainable Development)	**Indicators**
Goal 12. Ensure sustainable consumption and production patterns	
12.1 Implement the 10-Year Framework of Programmes on Sustainable Consumption and Production Patterns, all countries taking action, with	12.1.1 Number of countries developing, adopting or implementing policy instruments aimed at supporting the shift to sustainable
12.2 By 2030, achieve the sustainable management and efficient use of natural resources	12.2.1 Material footprint, material footprint per capita, and material footprint per GDP
	12.2.2 Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP
12.3 By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses	12.3.1 (*a*) Food loss index and (*b*) food waste index
12.4 By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment	12.4.1 Number of parties to international multilateral environmental agreements on hazardous waste, and other chemicals that meet their commitments and obligations in transmitting information as required by each relevant agreement
	12.4.2 (*a*) Hazardous waste generated per capita; and (*b*) proportion of hazardous waste treated, by type of treatment
12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse	12.5.1 National recycling rate, tons of material recycled
12.6 Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle	12.6.1 Number of companies publishing sustainability reports
12.7 Promote public procurement practices that are sustainable, in accordance with national policies and priorities	12.7.1 Degree of sustainable public procurement policies and action plan implementation
12.8 By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature	12.8.1 Extent to which (i) global citizenship education and (ii) education for sustainable development are mainstreamed in (*a*) national education policies; (*b*) curricula; (*c*) teacher education; and (*d*) student assessment
12.a Support developing countries to strengthen their scientific and technological capacity to move towards more sustainable patterns of consumption and production	12.a.1 Installed renewable energy-generating capacity in developing countries (in watts per capita)
12.b Develop and implement tools to monitor sustainable development impacts for sustainable tourism that creates jobs and promotes local culture and products	12.b.1 Implementation of standard accounting tools to monitor the economic and environmental aspects of tourism sustainability
12.c Rationalize inefficient fossil-fuel subsidies that encourage wasteful consumption by removing market distortions, in accordance with national circumstances, including by restructuring taxation and phasing out those harmful subsidies, where they exist, to reflect their environmental impacts, taking fully into account the specific needs and conditions of developing countries and minimizing the possible adverse impacts on their development in a manner that protects the poor and the affected communities	12.c.1 Amount of fossil-fuel subsidies (production and consumption) per unit of GDP

A.12 Sustainable Development Goal 13

Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development*	
Goals and targets (from the 2030 Agenda for Sustainable Development)	**Indicators**
Goal 13. Take urgent action to combat climate change and its impacts[3]	
13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries	13.1.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population
	13.1.2 Number of countries that adopt and implement national disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015–2030
	13.1.3 Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with national disaster risk reduction strategies
13.2 Integrate climate change measures into national policies, strategies and planning	13.2.1 Number of countries with nationally determined contributions, long-term strategies, national adaptation plans and adaptation communications, as reported to the secretariat of the United Nations Framework Convention on Climate Change
	13.2.2 Total greenhouse gas emissions per year
13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning	13.3.1 Extent to which (i) global citizenship education and (ii) education for sustainable development are mainstreamed in (*a*) national education policies; (*b*) curricula; (*c*) teacher education; and (*d*) student assessment
13.a Implement the commitment undertaken by developed-country parties to the United Nations Framework Convention on Climate Change	13.a.1 Amounts provided and mobilized in United States dollars per year in relation to the continued existing collective mobilization goal
13.b Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities	13.b.1 Number of least developed countries and small island developing States with nationally determined contributions, long-term strategies, national adaptation plans and adaptation communications, as reported to the secretariat of the United Nations Framework Convention on Climate Change

A.13 Sustainable Development Goal 14

Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development*	
Goals and targets (from the 2030 Agenda for Sustainable Development)	**Indicators**
Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development	
14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution	14.1.1 (*a*) Index of coastal eutrophication; and (*b*) plastic debris density
14.2 By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans	14.2.1 Number of countries using ecosystem-based approaches to managing marine areas
14.3 Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels	14.3.1 Average marine acidity (pH) measured at agreed suite of representative sampling stations
14.4 By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics	14.4.1 Proportion of fish stocks within biologically sustainable levels
14.5 By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information	14.5.1 Coverage of protected areas in relation to marine areas
14.6 By 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, eliminate subsidies that contribute to illegal, unreported and unregulated fishing and refrain from introducing new such subsidies, recognizing that appropriate and effective special and differential treatment for developing and least developed countries should be an integral part of the World Trade Organization fisheries subsidies negotiation[4]	14.6.1 Degree of implementation of international instruments aiming to combat illegal, unreported and unregulated fishing
14.7 By 2030, increase the economic benefits to small island developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism	14.7.1 Sustainable fisheries as a proportion of GDP in small island developing States, least developed countries and all countries
14.a Increase scientific knowledge, develop research capacity and transfer marine technology, taking into account the Intergovernmental	14.a.1 Proportion of total research budget allocated to research in the field of marine technology
14.b Provide access for small-scale artisanal fishers to marine resources and markets	14.b.1 Degree of application of a legal/regulatory/ policy/institutional framework which recognizes and protects access rights for small-scale fisheries
14.c Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in the United Nations Convention on the Law of the Sea, which provides the legal framework for the conservation and sustainable use of oceans and their resources, as recalled in paragraph 158 of "The future we want"	14.c.1 Number of countries making progress in ratifying, accepting and implementing through legal, policy and institutional frameworks, ocean-related instruments that implement international law, as reflected in the United Nations Convention on the Law of the Sea, for the conservation and sustainable use of the oceans and their resources

A.14 Sustainable Development Goal 15

Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development*	
Goals and targets (from the 2030 Agenda for Sustainable Development)	**Indicators**
Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	
15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements	15.1.1 Forest area as a proportion of total land area
	15.1.2 Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type
15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally	15.2.1 Progress towards sustainable forest management
15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world	15.3.1 Proportion of land that is degraded over total land area
15.4 By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development	15.4.1 Coverage by protected areas of important sites for mountain biodiversity
	15.4.2 Mountain Green Cover Index
15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species	15.5.1 Red List Index
15.6 Promote fair and equitable sharing of the benefits arising from the utilization of genetic resources and promote appropriate access to such resources, as internationally agreed	15.6.1 Number of countries that have adopted legislative, administrative and policy frameworks to ensure fair and equitable sharing of benefits
15.7 Take urgent action to end poaching and trafficking of protected species of flora and fauna and address both demand and supply of illegal wildlife products	15.7.1 Proportion of traded wildlife that was poached or illicitly trafficked
15.8 By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species	15.8.1 Proportion of countries adopting relevant national legislation and adequately resourcing the prevention or control of invasive alien species
15.9 By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts	15.9.1 (*a*) Number of countries that have established national targets in accordance with or similar to Aichi Biodiversity Target 2 of the Strategic Plan for Biodiversity 2011–2020 in their national biodiversity strategy and action plans and the progress reported towards these targets; and (*b*) integration of biodiversity into national accounting and reporting systems, defined as implementation of the System of Environmental-Economic Accounting
15.a Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems	15.a.1 (*a*) Official development assistance on conservation and sustainable use of biodiversity; and (*b*) revenue generated and finance mobilized from biodiversity-relevant economic instruments
15.b Mobilize significant resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation	15.b.1 (*a*) Official development assistance on conservation and sustainable use of biodiversity; and (*b*) revenue generated and finance mobilized from biodiversity-relevant economic instruments
15.c Enhance global support for efforts to combat poaching and trafficking of protected species, including by increasing the capacity of local communities to pursue sustainable livelihood opportunities	15.c.1 Proportion of traded wildlife that was poached or illicitly trafficked

A.15 Sustainable Development Goal 16

Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development*	
Goals and targets (from the 2030 Agenda for Sustainable Development)	**Indicators**
Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels	
16.1 Significantly reduce all forms of violence and related death rates everywhere	16.1.1 Number of victims of intentional homicide per 100,000 population, by sex and age
	16.1.2 Conflict-related deaths per 100,000 population, by sex, age and cause
	16.1.3 Proportion of population subjected to (*a*) physical violence, (*b*) psychological violence and (*c*) sexual violence in the previous 12 months
	16.1.4 Proportion of population that feel safe walking alone around the area they live
16.2 End abuse, exploitation, trafficking and all forms of violence against and torture of children	16.2.1 Proportion of children aged 1–17 years who experienced any physical punishment and/or psychological aggression by caregivers in the past month
	16.2.2 Number of victims of human trafficking per 100,000 population, by sex, age and form of exploitation
	16.2.3 Proportion of young women and men aged 18–29 years who experienced sexual violence by age 18
16.3 Promote the rule of law at the national and international levels and ensure equal access to justice for all	16.3.1 Proportion of victims of violence in the previous 12 months who reported their victimization to competent authorities or other officially recognized conflict resolution mechanisms
	16.3.2 Unsentenced detainees as a proportion of overall prison population
	16.3.3 Proportion of the population who have experienced a dispute in the past two years and who accessed a formal or informal dispute resolution mechanism, by type of mechanism
16.4 By 2030, significantly reduce illicit financial and arms flows, strengthen the recovery and return of stolen assets and combat all forms of organized crime	16.4.1 Total value of inward and outward illicit financial flows (in current United States dollars)
	16.4.2 Proportion of seized, found or surrendered arms whose illicit origin or context has been traced or established by a competent
16.5 Substantially reduce corruption and bribery in all their forms	16.5.1 Proportion of persons who had at least one contact with a public official and who paid a bribe to a public official, or were asked for a bribe by those public officials, during the previous 12 months
	16.5.2 Proportion of businesses that had at least one contact with a public official and that paid a bribe to a public official, or were asked for a bribe by those public officials during the previous 12 months
16.6 Develop effective, accountable and transparent institutions at all levels	16.6.1 Primary government expenditures as a proportion of original approved budget, by sector (or by budget codes or similar)
	16.6.2 Proportion of population satisfied with their last experience of public services
16.7 Ensure responsive, inclusive, participatory and representative decision-making at all levels	16.7.1 Proportions of positions in national and local institutions, including (*a*) the legislatures; (*b*) the public service; and (*c*) the judiciary, compared to national distributions, by sex, age, persons with disabilities and population groups
	16.7.2 Proportion of population who believe decision-making is inclusive and responsive, by sex, age, disability and population group
16.8 Broaden and strengthen the participation of developing countries in the institutions of global governance	16.8.1 Proportion of members and voting rights of developing countries in international organizations
16.9 By 2030, provide legal identity for all, including birth registration	16.9.1 Proportion of children under 5 years of age whose births have been registered with a civil authority, by age
16.10 Ensure public access to information and protect fundamental freedoms, in accordance with national legislation and international agreements	16.10.1 Number of verified cases of killing, kidnapping, enforced disappearance, arbitrary detention and torture of journalists, associated media personnel, trade unionists and human rights advocates in the previous 12 months
	16.10.2 Number of countries that adopt and implement constitutional, statutory and/or policy guarantees for public access to information
16.a Strengthen relevant national institutions, including through international cooperation, for building capacity at all levels, in particular in developing countries, to prevent violence and combat terrorism and crime	16.a.1 Existence of independent national human rights institutions in compliance with the Paris Principles
16.b Promote and enforce non-discriminatory laws and policies for sustainable development	16.b.1 Proportion of population reporting having personally felt discriminated against or harassed in the previous 12 months on the basis of a ground of discrimination prohibited under international human rights law

A.16 Sustainable Development Goal 17

Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development*	
Goals and targets (from the 2030 Agenda for Sustainable Development)	**Indicators**
Goal 17. Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development	
Finance	
17.1 Strengthen domestic resource mobilization, including through international support to developing countries, to improve domestic capacity for tax and other revenue collection	17.1.1 Total government revenue as a proportion of GDP, by source
	17.1.2 Proportion of domestic budget funded by domestic taxes
17.2 Developed countries to implement fully their official development assistance commitments, including the commitment by many developed countries to achieve the target of 0.7 per cent of gross national income for official development assistance (ODA/GNI) to developing countries and 0.15 to 0.20 per cent of ODA/GNI to least developed countries; ODA providers are encouraged to consider setting a target to provide at least 0.20 per cent of ODA/GNI to least developed countries	17.2.1 Net official development assistance, total and to least developed countries, as a proportion of the Organization for Economic Cooperation and Development (OECD) Development Assistance Committee donors' gross national income (GNI)
17.3 Mobilize additional financial resources for developing countries from multiple sources	17.3.1 Foreign direct investment, official development assistance and South-South cooperation as a proportion of gross national income
	17.3.2 Volume of remittances (in United States dollars) as a proportion of total GDP
17.4 Assist developing countries in attaining long-term debt sustainability through coordinated policies aimed at fostering debt financing, debt relief and debt restructuring, as appropriate, and address the external debt of highly indebted poor countries to reduce debt distress	17.4.1 Debt service as a proportion of exports of goods and services
17.5 Adopt and implement investment promotion regimes for least developed countries	17.5.1 Number of countries that adopt and implement investment promotion regimes for developing countries, including the least developed countries
Technology	
17.6 Enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation and enhance knowledge-sharing on mutually agreed terms,	17.6.1 Fixed Internet broadband subscriptions per 100 inhabitants, by speed[5]
17.7 Promote the development, transfer, dissemination and diffusion of environmentally sound technologies to developing countries on favourable terms, including on concessional and preferential terms, as mutually agreed	17.7.1 Total amount of funding for developing countries to promote the development, transfer, dissemination and diffusion of environmentally sound technologies
17.8 Fully operationalize the technology bank and science, technology and innovation capacity-building mechanism for least developed countries by 2017 and enhance the use of enabling technology, in particular information and communications technology	17.8.1 Proportion of individuals using the Internet
Capacity-building	
17.9 Enhance international support for implementing effective and targeted capacity-building in developing countries to support national plans to implement all the Sustainable Development Goals, including through North-South, South-South and triangular cooperation	17.9.1 Dollar value of financial and technical assistance (including through North-South, South-South and triangular cooperation) committed to developing countries

A.17 Sustainable Development Goal 17 (continuation)

Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development*	
Goals and targets (from the 2030 Agenda for Sustainable Development)	**Indicators**
Goal 17. Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development	
Trade	
17.10 Promote a universal, rules-based, open, non-discriminatory and equitable multilateral trading system under the World Trade Organization, including through the conclusion of negotiations under its Doha Development Agenda	17.10.1 Worldwide weighted tariff-average
17.11 Significantly increase the exports of developing countries, in particular with a view to doubling the least developed countries' share of global exports by 2020	17.11.1 Developing countries' and least developed countries' share of global exports
17.12 Realize timely implementation of duty-free and quota-free market access on a lasting basis for all least developed countries, consistent with World Trade Organization decisions, including by ensuring that preferential rules of origin applicable to imports from least developed countries are transparent and simple, and contribute to facilitating market access	17.12.1 Weighted average tariffs faced by developing countries, least developed countries and small island developing States
Systemic issues	
Policy and institutional coherence	
17.13 Enhance global macroeconomic stability, including through policy coordination and policy coherence	17.13.1 Macroeconomic Dashboard
17.14 Enhance policy coherence for sustainable development	17.14.1 Number of countries with mechanisms in place to enhance policy coherence of sustainable development
17.15 Respect each country's policy space and leadership to establish and implement policies for poverty eradication and sustainable development	17.15.1 Extent of use of country-owned results frameworks and planning tools by providers of development cooperation
Multi-stakeholder partnerships	
17.16 Enhance the Global Partnership for Sustainable Development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the Sustainable Development Goals in all countries, in particular developing countries	17.16.1 Number of countries reporting progress in multi-stakeholder development effectiveness monitoring frameworks that support the achievement of the sustainable development goals
17.17 Encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships	17.17.1 Amount in United States dollars committed to public-private partnerships for infrastructure
Data, monitoring and accountability	
17.18 By 2020, enhance capacity-building support to developing countries, including for least developed countries and small island developing States, to increase significantly the availability of high-quality, timely and reliable data disaggregated by income, gender, age, race, ethnicity, migratory status, disability, geographic location and other characteristics relevant in national contexts	17.18.1 Statistical capacity indicator for Sustainable Development Goal monitoring
	17.18.2 Number of countries that have national statistical legislation that complies with the Fundamental Principles of Official Statistics
	17.18.3 Number of countries with a national statistical plan that is fully funded and under implementation, by source of funding
17.19 By 2030, build on existing initiatives to develop measurements of progress on sustainable development that complement gross domestic product, and support statistical capacity-building in developing countries	17.19.1 Dollar value of all resources made available to strengthen statistical capacity in developing countries
	17.19.2 Proportion of countries that (*a*) have conducted at least one population and housing census in the last 10 years; and (*b*) have achieved 100 per cent birth registration and 80 per cent death registration

A.18 Social and Environmental Metrics

Adapted from: Adapted from: (Perello-Marin et al., 2022)

Table 2
Social metrics.

Code	Metrics	#Times	Manufacturer/s
S_1	Number of employees	7	M1-M7
S_2	Accident Indexes	7	M1-M7
S_3	Proportion of women	5	M1, M2, M3, M4, M7
S_4	Comply with anti-corruption/bribery regulations	4	M1, M2, M3, M7
S_5	Sickness rate	4	M1, M3, M4, M7
S_6	Investments in employee qualification (in E millions)	4	M1, M2, M3, M7
S_7	Employee turnover	3	M1, M4, M7
S_8	People satisfaction	3	M1, M2, M4
S_9	Company contribution (pensions)	3	M1, M3, M7
S_{10}	Trafficking	3	M1, M4, M5
S_{11}	Level of qualification	2	M1, M7
S_{12}	Community engagement	2	M1, M2
S_{13}	Charity contributions	2	M4
S_{14}	Apprentices	1	M7
S_{15}	Employee average age	1	M7
S_{16}	Share of women in management positions (in%)	1	M1
S_{17}	Average period of employment	1	M7
S_{18}	Absenteeism	1	M7
S_{19}	Parental Leave	1	M1
S_{20}	Accident Severity	1	M7
S_{21}	Costs for training and advanced professional development (in E millions)	1	M3
S_{22}	Qualification days per employee/year	1	M3
S_{23}	Qualification days per employee/year	1	M3
S_{24}	Qualification hours per employee/year	1	M3
S_{25}	Employee contribution to the Group's sustainability profile	1	M2
S_{26}	Work-life balance	1	M2
S_{27}	Occupational health and safety	1	M2
S_{28}	Engagement in prevention	1	M2
S_{29}	Working alongside the community	1	M2
S_{30}	Membership in associations or organisations	1	M2
S_{31}	Voluntary work	1	M4
S_{32}	Expenditure on corporate citizenship (in € thousand)	1	M1
S_{33}	Hiring for permanent contract	1	M5
S_{34}	Change in number of employees under permanent or fixed-term contracts over 3 years	1	M5
S_{35}	Change in permanent contract turnover rate	1	M5
S_{36}	Number of temporary employees	1	M5
S_{37}	Paid absences for sickness	1	M5
S_{38}	Corporate Social Responsibility	1	M6

Table 3
Environmental metrics.

Code	KPI	#Times	Manufacturer/s
V_1	Energy consumption	7	M1-M7
V_2	Direct CO_2 emissions	7	M1-M7
V_3	CO_2 equivalents	7	M1-M7
V_4	Waste for recycling	6	M1, M2, M4, M5, M6, M7
V_5	GHG emissions	4	M1, M5, M6, M7
V_6	Waste for disposal	4	M1, M2, M6, M7
V_7	Volatile organic compounds (VOC) per vehicle produced (in kg/vehicle)	3	M1, M5, M6
V_8	Energy averages per vehicle	2	M1, M5
V_9	Direct Nox and SO_2 emissions	2	M5, M7
V_{10}	Fleet fuel consumption	2	M1, M4
V_{11}	Freshwater and wastewater	1	M7
V_{12}	Wastewater discharges	1	M7
V_{13}	Environmental protection costs	1	M7
V_{14}	Water Recycling Index	1	M2
V_{15}	Number of Environmental Violations	1	M2
V_{16}	Emissions and fuel economy	1	M2
V_{17}	Waste to landfill	1	M2
V_{18}	Overall consumption of recycled plastic	1	M6
V_{19}	Alternative fuels	1	M2
V_{20}	Fuel economy for major renewals of FCA US vehicles	1	M2
V_{21}	Materials used in vehicles	1	M2
V_{22}	Efficient powertrains and technologies	1	M2
V_{23}	Share of renewable energy purchased from third parties (in%)	1	M1
V_{24}	Hours dedicated to environmental training	1	M5
V_{25}	ISO 14001 Certified plants	1	M5
V_{26}	Investments in energy savings	1	M5

A.19 References for the Sustainability reports

Sectors	Companies	Link
Energy	Galp	https://www.galp.com/corp/en/sustainability/reporting/documents
	EDP	https://www.edp.com/en/sustainability-report-2021
	Repsol	https://www.repsol.com/en/sustainability/sustainability-strategy/reports-and-kpis/sustainability-and-management-reports/index.cshtml
Telecommunica-tions	Altice	https://alticefrance.com/sites/default/files/pdf/Altice%20France%20Non-Financial%20Performance%20Statement%202021.pdf
	Vodafone	https://www.vodafone.com/about-vodafone/reporting-centre/sustainability-reports
	NOS	https://www.nos.pt/en/institutional/investors/results-and-presentations/results
Banking	BPI	https://bpi.bancobpi.pt/storage/download/ficheiro.54C95FF4-1295-42C6-A4F3-BBC3C15A35F2.1.pt.asp?id=050A16EC-D845-4486-9CB3-FE956584E2F5)
	Millennium	https://ind.millenniumbcp.pt/relcontas/2020/files/SustentabilidadeBCP2020_4.en.pdf
	Santander	https://www.santander.com/content/dam/santander-com/en/contenido-paginas/nuestro-compromiso/reports/doc-informe-BR-polonia-2021.pdf

For the purposes of this thesis, all the reports were consulted and downloaded in 20/09/2022.

B
APPENDIX

B.1 Reworked Indicator Framework

ID	Indicator
1	Significant indirect economic impacts in the context of external benchmarks and stakeholder priorities, such as national and international standards, protocols, and policy agendas.
2	Describe policies and practices used to promote economic inclusion when selecting suppliers. Describe policies and practices used to promote economic inclusion when selecting suppliers. Forms of economic inclusion can include: small and medium-sized suppliers; suppliers owned by women; suppliers which are owned by or recruit workers from members of vulnerable, marginalized, or under-represented social groups.
3	Direct economic value generated and distributed (EVG&D) on an accruals basis, including the basic components for the organization's global operations as listed below. If data are presented on a cash basis, report the justification for this decision in addition to reporting the following basic components:i. Direct economic value generated: revenues;ii. Economic value distributed: operating costs, employee wages and benefits, payments to providers of capital, payments to government by country, and community investments;iii. Economic value retained: 'direct economic value generated' less 'economic value distributed'.b. Where significant, report EVG&D separately at country, regional, or market levels, and the criteria used for defining significance.
4	Operations and suppliers considered to have significant risk for incidents of:i. Child labor;ii. Young workers exposed to hazardous work.
5	Total number of employees by employment contract, including outsourcing (permanent, temporary, full -time, part-time) by gender and region.
6	Percentage of senior management at significant locations of operation that are hired from the local community.
7	Total number and rate of new employee hires and employee turnover during the reporting period, by age group, gender and region.
8	Operations with significant actual and potential negative impacts on local communities, including:i. The location of the operations;ii. The significant actual and potential negative impacts of operations
9	Percentage of employees per employee category in each of the following diversity categories: i. Gender;ii. Age group: under 30 years old, 30-50 years old, over 50 years old;iii. Other indicators of diversity where relevant (such as minority or vulnerable groups).
10	When a significant proportion of employees and other workers are compensated based on wages subject to minimum wage rules, report the relevant ratio of the entry level wage by gender at significant locations of operation to the minimum wage. Report the minimum wage value used.
11	Ratio of the basic salary and remuneration of women to men for each employee category, by significant locations of operation.
12	Percentage of individuals within the organization's governance bodies in each of the following diversity categories:i. Gender;ii. Age group: under 30 years old, 30-50 years old, over 50 years old;iii. Other indicators of diversity where relevant (such as minority or vulnerable groups).
13	Total number of IUCN Red List species and national conservation list species with habitats in areas affected by the operations of the organization, by level of extinction risk:i. Critically endangeredii. Endangerediii. Vulnerableiv. Near threatenedv. Least concern
14	Average hours of training that the organization's employees have undertaken during the reporting period, by:i. Gender;ii. Employee category. Report the type and scope of programs implemented and assistance provided to upgrade employee skills.
15	Operations and suppliers considered to have significant risk for incidents of forced or compulsory labor either in terms of:i. Type of operation (such as manufacturing plant) and supplier;ii. Countries or geographic areas with operations and suppliers considered at risk.
16	Percentage of reclaimed products and their packaging materials for each product category.

ID	Indicator
17	Partnerships and initiatives for restoration or protecive measures for habitat and natural areas. Describe the acomplishments os such initiatives and partnerships.
18	Significant direct and indirect positive and negative impacts with reference to the following:i. Species affected;ii. Extent of areas impacted;iii. Duration of impacts;iv. Reversibility or irreversibility of the impacts.
19	Total number of water sources/bodies significantly affected by withdrawal and discharge by type:i. Size of the water source;ii. Whether the source is designated as a nationally or internationally protected area; iii. Biodiversity value (such as species diversity and endemism, and total number of protected species);iv. Value or importance of the water source to local communities and indigenous peoples.
20	Total weight of hazardous and non-hazardous waste, with a breakdown by the following disposal methods where applicable:i. Reuseii. Recyclingiii. Compostingiv. Recovery, including energy recoveryv. Incineration (mass burn)vi. Deep well injectionvii. Landfillviii. On-site storageOther (to be specified by the organization)
21	Energy intensity ratio for the organization. Reductions in energy requirements of sold products and services achieved during the reporting period, in joules or multiples.
22	In joules, watt-hours or multiples, the total:i. Electricity consumption/Sales ii. Heating consumption/Sales iii. Cooling consumption/Sales iv. Steam consumption/Sales
23	Total energy consumption within the organization from non-renewable and Renewable sources, in joules or multiples, and including fuel types used.
24	Environmental protection expenditure including costs of waste disposal, emissions treatment, and remediation and costs of prevention and environmental management
25	Total number and total volume of recorded significant spills. Include Location of spill;ii. Volume of spill;Material of spill, categorized by: oil spills (soil or water surfaces), fuel spills (soil or water surfaces), spills of wastes (soil or water surfaces), spills of chemicals (mostly soil or water surfaces), and other (to be specified by the organization).
26	Total volume of water recycled and reused by the organization. Total volume of water recycled and reused as a percentage of the total water withdrawal.
27	Total volume of planned and unplanned water discharges by:i. Destination;ii. Quality of the water, including treatment method;iii. Whether the water was reused by another organization.
28	Total volume of water withdrawn, with a breakdown by the following sources: i. Surface water, including water from wetlands, rivers, lakes, and oceans;ii. Ground water;iii. Rainwater collected directly and stored by the organization;iv. Waste water from another organization;v. Municipal water supplies or other public or private water utilities.
29	Benefits which are standard for full-time employees of the organization but are not provided to temporary or part-time employees, by significant locations of operation. These include, as a minimum:i. Life insurance;ii. Health care;iii. Disability and invalidity coverage;iv. Parental leave;v. Retirement provision;vi. Stock ownership;vii. Others.
30	Total number of identified incidents of violations involving the rights of indigenous peoples during the reporting period and Status of the incidents and actions taken with reference to the following:i. Incident reviewed by the organization;ii. Remediation plans being implemented;iii. Remediation plans that have been implemented, with results reviewed through routine internal management review processes;iv. Incident no longer subject to action
31	A description of the organization's values, principles, standards, and norms of behavior. Along with a description of internal and external mechanisms for:i. Seeking advice about ethical and lawful behavior, and organizational integrity;ii. Reporting concerns about unethical or unlawful behavior, and organizational integrity
32	Processes for the highest governance body to ensure conflicts of interest are avoided and managed.b. Whether conflicts of interest are disclosed to stakeholders, including, as a minimum:i. Cross-board membership;ii. Cross-shareholding with suppliers and other stakeholders;iii. Existence of controlling shareholder;iv. Related party disclosures.
33	Operations and suppliers in which workers' rights to exercise freedom of association or collective bargaining may be violated or at significant risk either in terms of:i. Type of operation (such as manufacturing plant) and supplier;ii. Countries or geographic areas with operations and suppliers considered at risk.
34	Percentage of new suppliers that were screened using social criteria. Also, number of suppliers identified as having significant actual and potential negative social impacts.
35	When a significant proportion of other workers (excluding employees) performing the organization's activities are compensated based on wages subject to minimum wage rules, describe the actions taken to determine whether these workers are paid above the minimum wage
36	Total percentage of operations assessed for risks related to corruption and significant risks identified. Total number of incidents of non-compliance with regulations and/or voluntary codes concerning the health and safety impacts of products and services within the reporting period or pending resolution.
37	Percentage of the procurement budget used for significant locations of operation that is spent on suppliers local to that operation (such as percentage of products and services purchased locally).
38	Infrastructure investments and services supported. Extent of such development.b. Current or expected impacts on communities and local economies, including positive and negative impacts where relevant.c. Whether these investments and services are commercial, in-kind, or pro bono engagements.
39	Total number of employees that were entitled to parental leave, by gender. Number of employees that took parental leave, by gender. Return to work and retention rates of employees that took parental leave, by gender
40	Gross direct and indirect GHG emissions in metric tons of CO2 equivalent.b. Gases included in the calculation; whether CO2, CH4, N2O, HFCs, PFCs, SF6, NF3, or all.c. Biogenic CO2 emissions in metric tons of CO2 equivalent
41	Significant air emissions, in kilograms or multiples, for each of the following:i. NOXii. SOXiii. Persistent organic pollutants (POP)iv. Volatile organic compounds (VOC)v. Hazardous air pollutants (HAP)vi. Particulate matter (PM)vii. Other standard categories of air emissions identified in relevant regulations

ID	Indicator
42	GHG emissions intensity ratio for the organization. Emissions reduced as a direct result of reduction initiatives, in metric tons of CO2 equivalent.
43	Production, imports, and exports of ODS in metric tons of CFC-11 (trichlorofluoromethane) equivalent
44	Composition of the highest governance body and its committees by:i. Executive or non-executive;ii. Independence;iii. Tenure on the governance body;iv. Number of each individual's other significant positions and commitments, and the nature of the commitments;v. Gender;vi. Membership of under-represented social groups;vii. Competencies relating to economic, environmental, and social topics;viii. Stakeholder representation.
45	Nomination and selection processes for the highest governance body and its committees. Criteria used for nominating and selecting highest governance body members, including whether and how:i. Stakeholders (including shareholders) are involved;ii. Diversity is considered;iii. Independence is considered;iv. Expertise and experience relating to economic, environmental, and social topics are considered.
46	Whether there are workers whose work, or workplace, is controlled by the organization, involved in occupational activities who have a high incidence or high risk of specific diseases. Also disclose if those workers are represented by formal joint management-worker health and safety committees.
47	Types of injury, injury rate (IR), occupational disease rate (ODR), lost day rate (LDR), absentee rate (AR), and work-related fatalities, for all employees with a breakdown by:i. Region;ii. Gender. Also, work-related fatalities, for all workers (excluding employees) whose work, or workplace, is controlled by the organization, with a breakdown by:i. Region;ii. Gender
48	Total weight or volume of materials that are used to produce and package the organization's primary products and services during the reporting period, by:i. Non-renewable materials used;ii. Renewable materials used.
49	Percentage of recycled input materials used to manufacture the organization's primary products and services.
50	Risks and opportunities posed by climate change that have the potential to generate substantive changes in operations, revenue, or expenditure, including:i. A description of the risk or opportunity and its classification as either physical, regulatory, or other;ii. A description of the impact associated with the risk or opportunity;iii. The financial implications of the risk or opportunity before action is taken;iv. The methods used to manage the risk or opportunity;v. The costs of actions taken to manage the risk or opportunity.
51	Total number of incidents of discrimination during the reporting period.
52	Total number of substantiated complaints received concerning breaches of customer privacy, categorized by: i. Complaints received from outside parties and substantiated by the organization;ii. Complaints from regulatory bodies.
53	Total number of identified leaks, thefts, or losses of customer data.
54	Whether each of the following types of information is required by the organization's procedures for product and service information and labeling:i. The sourcing of components of the product or service;ii. Content, particularly with regard to substances that might produce an environmental or social impact;iii. Safe use of the product or service;iv. Disposal of the product and environmental or social impacts;v. Other (explain).

B.2 Indicator Classification

Indicator Classification																								
Indicator	Economic	Social	Environmental	Sustainable Development Goals																Actionability		Indicator Type		Quantitative/ Qualitative
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	IA	EA	DnH	DG	
1	1			1	1	1					1		1							1		1		1	Qualitative
2	1	1		1				1													1			1	Qualitative
3	1				1			1		1	1	1									1			1	Qualitative
4		1									1								1		1		1		Qualitative
5		1									1		1								1			1	Quantitative
6		1									1										1			1	Quantitative
7		1						1			1		1								1		1		Quantitative
8		1		1	1																1		1		Qualitative
9		1						1			1										1			1	Quantitative
10	1			1																	1			1	Qualitative
11	1	1									1										1			1	Quantitative
12		1									1										1			1	Quantitative
13			1						1								1	1				1	1		Quantitative
14		1					1	1			1		1								1			1	Quantitative
15		1									1										1		1		Qualitative
16		1									1				1						1		1		Quantitative
17			1						1								1	1				1		1	Qualitative
18			1						1						1		1	1				1		1	Qualitative
19			1						1								1	1			1		1		Quantitative
20			1			1			1						1						1		1		Quantitative
21			1							1	1				1	1					1		1		Quantitative
22			1							1	1				1	1					1		1		Quantitative
23			1							1	1				1	1					1		1		Quantitative
24			1												1						1			1	Quantitative
25			1			1			1						1		1	1			1		1		Quantitative
26			1						1		1				1						1		1		Quantitative
27			1			1			1						1		1				1		1		Quantitative
28			1						1												1		1		Quantitative
29	1	1				1		1			1										1			1	Qualitative
30		1			1																1		1		Quantitative
31		1																	1		1		1		Qualitative
32		1																	1		1		1		Qualitative
33		1									1										1		1		Qualitative
34		1						1			1								1		1		1		Quantitative
35	1	1						1			1								1		1			1	Qualitative
36		1									1										1		1		Quantitative
37		1									1										1			1	Quantitative
38	1	1			1			1		1		1		1							1			1	Qualitative
39		1						1			1										1		1		Quantitative
40			1			1									1	1	1	1			1		1		Quantitative
41			1												1		1	1			1		1		Quantitative
42			1													1	1	1			1		1		Quantitative
43			1			1									1						1		1		Quantitative
44		1						1											1		1		1		Qualitative
45		1						1											1		1		1		Qualitative
46		1				1					1										1			1	Qualitative
47		1				1					1										1		1		Quantitative
48			1								1				1						1		1		Quantitative
49			1								1				1						1			1	Quantitative
50			1													1						1		1	Qualitative
51		1						1			1								1		1		1		Quantitative
52		1																	1		1		1		Quantitative
53		1																	1		1		1		Quantitative
54		1													1						1		1		Qualitative

B.3 Indicator Aggregation 1-12

GSSR (source)		Agregating Indicator
Indicator Description	**GRI ID**	**ID**
Examples of significant identified indirect economic impacts of the organization, including positive and negative impacts.	GRI Standard 203-2	1
Significance of the indirect economic impacts in the context of external benchmarks and stakeholder priorities, such as national and international standards, protocols, and policy agendas.		
Significant indirect economic impacts		
Describe policies and practices used to promote economic inclusion when selecting suppliers. Forms of economic inclusion can include: small and medium-sized suppliers; suppliers owned by women; suppliers which are owned by or recruit workers from members of vulnerable, marginalized, or under-represented social groups.	GRI standard 204	2
Direct economic value generated and distributed	GRI Standard 201-1	3
a. Direct economic value generated and distributed (EVG&D) on an accruals basis, including the basic components for the organization's global operations as listed below. If data are presented on a cash basis, report the justification for this decision in addition to reporting the following basic components:i. Direct economic value generated: revenues;ii. Economic value distributed: operating costs, employee wages and benefits, payments to providers of capital, payments to government by country, and community investments;iii. Economic value retained: 'direct economic value generated' less 'economic value distributed'.b. Where significant, report EVG&D separately at country, regional, or market levels, and the criteria used for defining significance.		
Operations and suppliers considered to have significant risk for incidents of:i. Child labor;ii. Young workers exposed to hazardous work.	GRI Standard 408-1	4
Measures taken by the organization in the reporting period intended to contribute to the effective abolition of child labor.		
Total number of employees by employment contract (permanent and temporary), by region.	GRI Standard 102-8	5
Total number of employees by employment type (full-time and part-time), by gender.		
Whether a significant portion of the organization's activities are performed by workers who are not employees. If applicable, a description of the nature and scale of work performed by workers who are not employees.		
Total number of employees by employment contract (permanent and temporary), by gender.		
Total number of employees by employment type (full-time and part-time), by gender.		
Percentage of senior management at significant locations of operation that are hired from the local community.	GRI Standard 202-2	6
Total number and rate of new employee hires during the reporting period, by age group, gender and region	GRI Standard 401-1	7
Total number and rate of employee turnover during the reporting period, by age group, gender and region		
Operations with significant actual and potential negative impacts on local communities, including:i. The location of the operations;ii. The significant actual and potential negative impacts of operations.	GRI Standard 413-2	8
Percentage of individuals within the organization's governance bodies in each of the following diversity categories:i. Gender;ii. Age group: under 30 years old, 30-50 years old, over 50 years old;iii. Other indicators of diversity where relevant (such as minority or vulnerable groups).	GRI Standard 405-1	9
Percentage of employees per employee category in each of the following diversity categories: i. Gender;ii. Age group: under 30 years old, 30-50 years old, over 50 years old;iii. Other indicators of diversity where relevant (such as minority or vulnerable groups).		
When a significant proportion of employees are compensated based on wages subject to minimum wage rules, report the relevant ratio of the entry level wage by gender at significant locations of operation to the minimum wage.	GRI Standard 202-1	10
When a significant proportion of other workers (excluding employees) performing the organization's activities are compensated based on wages subject to minimum wage rules, describe the actions taken to determine whether these workers are paid above the minimum wage.		
Whether a local minimum wage is absent or variable at significant locations of operation, by gender. In circumstances in which different minimums can be used as a reference, report which minimum wage is being used.		
Ratio of basic salary and remuneration of women to men	GRI Standard 405-2	11
Ratio of the basic salary and remuneration of women to men for each employee category, by significant locations of operation.		
a. Percentage of individuals within the organization's governance bodies in each of the following diversity categories:i. Gender;ii. Age group: under 30 years old, 30-50 years old, over 50 years old;iii. Other indicators of diversity where relevant (such as minority or vulnerable groups).	GRI Standard 405-1	12

B.4 Indicator Aggregation 13-22

GSSR (source)		Agregating Indicator
Indicator Description	**GRI ID**	**ID**
Total number of IUCN Red List species and national conservation list species with habitats in areas affected by the operations of the organization, by level of extinction risk:i. Critically endangeredii. Endangerediii. Vulnerableiv. Near threatenedv. Least concern	GRI Standard 304-4	13
Average hours of training that the organization's employees have undertaken during the reporting period, by:i. Gender;ii. Employee category	GRI Standard 404-1	14
Percentage of total employees by gender and by employee category who received a regular performance and career development review during the reporting period	GRI Standard 404-3	
Type and scope of programs implemented and assistance provided to upgrade employee skills.	GRI Standard 404-2	
Transition assistance programs provided to facilitate continued employability and the management of career endings resulting from retirement or termination of employment.		
Operations and suppliers considered to have significant risk for incidents of forced or compulsory labor either in terms of:i. Type of operation (such as manufacturing plant) and supplier;ii. Countries or geographic areas with operations and suppliers considered at risk.	GRI Standard 409-1	15
Measures taken by the organization in the reporting period intended to contribute to the elimination of all forms of forced or compulsory labor.		
Percentage of reclaimed products and their packaging materials for each product category.	GRI Standard 301-3	16
Size and location of all habitat areas protected or restored, and whether the success of the restoration measure was or is approved by independent external professionals.	GRI Standard 304-3	17
Whether partnerships exist with third parties to protect or restore habitat areas distinct from where the organization has overseen and implemented restoration or protection measures.		
For each operational site owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas, the following information:i. Geographic location;ii. Subsurface and underground land that may be owned, leased, or managed by the organization;iii. Position in relation to the protected area (in the area, adjacent to, or containing portions of the protected area) or the high biodiversity value area outside protected areas;iv. Type of operation (office, manufacturing or production, or extractive);v. Size of operational site in km2 (or another unit, if appropriate);vi. Biodiversity value characterized by the attribute of the protected area or area of high biodiversity value outside the protected area (terrestrial, freshwater, or maritime ecosystem);vii. Biodiversity value characterized by listing of protected status (such as IUCN Protected Area Management Categories, Ramsar Convention, national legislation).	GRI Standard 304-1	18
Nature of significant direct and indirect impacts on biodiversity with reference to one or more of the following:i. Construction or use of manufacturing plants, mines, and transport infrastructure; ii. Pollution (introduction of substances that do not naturally occur in the habitat from point and non-point sources);iii. Introduction of invasive species, pests, and pathogens; iv. Reduction of species;v. Habitat conversion;vi. Changes in ecological processes outside the natural range of variation (such as salinity or changes in groundwater level).	GRI Standard 304-2	
Significant direct and indirect positive and negative impacts with reference to the following:i. Species affected;ii. Extent of areas impacted;iii. Duration of impacts;iv. Reversibility or irreversibility of the impacts.	GRI Standard 304-2	
Impacts of significant spills.	GRI Standard 306-3	
Total number of water sources significantly affected by withdrawal by type:i. Size of the water source;ii. Whether the source is designated as a nationally or internationally protected area; iii. Biodiversity value (such as species diversity and endemism, and total number of protected species);iv. Value or importance of the water source to local communities and indigenous peoples.	GRI Standard 303-2	19
Water bodies and related habitats that are significantly affected by water discharges and/or runoff, including information on:i. The size of the water body and related habitat;ii. Whether the water body and related habitat is designated as a nationally or internationally protected area;iii. The biodiversity value, such as total number of protected species.	GRI Standard 306-5	
Water bodies affected by water discharges and/or runoff		
Nature of significant direct and indirect impacts on biodiversity with reference to one or more of the following:i. Construction or use of manufacturing plants, mines, and transport infrastructure; ii. Pollution (introduction of substances that do not naturally occur in the habitat from point and non-point sources);iii. Introduction of invasive species, pests, and pathogens; iv. Reduction of species;v. Habitat conversion;vi. Changes in ecological processes outside the natural range of variation (such as salinity or changes in groundwater level).	GRI Standard 304-2	
Total weight of non-hazardous waste, with a breakdown by the following disposal methods where applicable:i. Reuseii. Recyclingiii. Compostingiv. Recovery, including energy recoveryv. Incineration (mass burn)vi. Deep well injectionvii. Landfillviii. On-site storageOther (to be specified by the organization)		20
Total weight for each of the following:i. Hazardous waste transportedii. Hazardous waste importediii. Hazardous waste exportedHazardous waste treated	GRI Standard 306-4	
Percentage of hazardous waste shipped internationally		
Energy intensity ratio for the organization.	GRI Standard 302-3	21
Amount of reductions in energy consumption achieved as a direct result of conservation and efficiency initiatives, in joules or multiples.	GRI Standard 302-4	
Reductions in energy requirements of sold products and services achieved during the reporting period, in joules or multiples.	GRI Standard 302-5	
In joules, watt-hours or multiples, the total:i. Electricity consumptionii. Heating consumptioniii. Cooling consumptioniv. Steam consumption	GRI Standard 302-1	22
In joules, watt-hours or multiples, the total:i. Electricity soldii. Heating soldiii. Cooling soldiv. Steam sold		
Energy consumption outside of the organization, in joules or multiples.	GRI Standard 302-2	

B.5 Indicator Aggregation 23-34

GSSR (source)		Agregating Indicator
Indicator Description	**GRI ID**	**ID**
Total fuel consumption within the organization from renewable sources, in joules or multiples, and including fuel types used.	GRI Standard 302-1	23
Total fuel consumption within the organization from non-renewable sources, in joules or multiples, and including fuel types used.		
Total energy consumption within the organization, in joules or multiples.		
Energy consumption outside of the organization, in joules or multiples.	GRI Standard 302-2	
In joules, watt-hours or multiples, the total:i. Electricity consumptionii. Heating consumptioniii. Cooling consumptioniv. Steam consumption	GRI Standard 302-1	
In joules, watt-hours or multiples, the total:i. Electricity soldii. Heating soldiii. Cooling soldiv. Steam sold		
Environmental protection expenditure including costs of waste disposal, emissions treatment, and remediation and costs of prevention and environmental management	GRI G4-EN31	24
The following additional information for each spill that was reported in the organization's financial statements:i. Location of spill;ii. Volume of spill;Material of spill, categorized by: oil spills (soil or water surfaces), fuel spills (soil or water surfaces), spills of wastes (soil or water surfaces), spills of chemicals (mostly soil or water surfaces), and other (to be specified by the organization)	GRI Standard 306-3	25
Total number and total volume of recorded significant spills.		
Impacts of significant spills. Number of spills/tons		
Total volume of water recycled and reused by the organization.	GRI Standard 303-3	26
Total volume of water recycled and reused as a percentage of the total water withdrawal as specified in Disclosure 303-1.		
Total volume of planned and unplanned water discharges by:i. Destination;ii. Quality of the water, including treatment method;iii. Whether the water was reused by another organization	GRI Standard 306-1	27
Total volume of water withdrawn, with a breakdown by the following sources: i. Surface water, including water from wetlands, rivers, lakes, and oceans;ii. Ground water;iii. Rainwater collected directly and stored by the organization;iv. Waste water from another organization;v. Municipal water supplies or other public or private water utilities.	GRI Standard 303-1	28
Benefits which are standard for full-time employees of the organization but are not provided to temporary or part-time employees, by significant locations of operation. These include, as a minimum:i. Life insurance;ii. Health care;iii. Disability and invalidity coverage;iv. Parental leave;v. Retirement provision;vi. Stock ownership;vii. Others.	GRI Standard 401-2	29
a. Whether formal agreements (either local or global) with trade unions cover health and safety.b. If so, the extent, as a percentage, to which various health and safety topics are covered by these agreements.	GRI Standard 403-4	
Total number of identified incidents of violations involving the rights of indigenous peoples during the reporting period	GRI Standard 411-1	30
Status of the incidents and actions taken with reference to the following:i. Incident reviewed by the organization;ii. Remediation plans being implemented;iii. Remediation plans that have been implemented, with results reviewed through routine internal management review processes;iv. Incident no longer subject to action		
A description of the organization's values, principles, standards, and norms of behavior.	GRI Standard 102-16	31
Grievance mechanisms	GRI 103-2-c-vi	
A description of internal and external mechanisms for:i. Seeking advice about ethical and lawful behavior, and organizational integrity;ii. Reporting concerns about unethical or unlawful behavior, and organizational integrity	GRI Standard 102-17	
a. Whether the chair of the highest governance body is also an executive officer in the organization.b. If the chair is also an executive officer, describe his or her function within the organization's management and the reasons for this arrangement.	GRI Standard 102-23	32
a. Processes for the highest governance body to ensure conflicts of interest are avoided and managed.b. Whether conflicts of interest are disclosed to stakeholders, including, as a minimum:i. Cross-board membership;ii. Cross-shareholding with suppliers and other stakeholders;iii. Existence of controlling shareholder;iv. Related party disclosures.	GRI Standard 102-25	
Percentage of total employees covered by collective bargaining agreements.	GRI Standard 102-41	33
Operations and suppliers in which workers' rights to exercise freedom of association or collective bargaining may be violated or at significant risk either in terms of:i. Type of operation (such as manufacturing plant) and supplier;ii. Countries or geographic areas with operations and suppliers considered at risk.	GRI Standard 407-1	
Measures taken by the organization in the reporting period intended to support rights to exercise freedom of association and collective bargaining.	GRI Standard 407-1	
Percentage of new suppliers that were screened using social criteria	GRI Standard 414-1	34
Number of suppliers assessed for social impacts	GRI Standard 414-2	
Number of suppliers identified as having significant actual and potential negative social impacts		
Significant actual and potential negative social impacts identified in the supply chain.		
Percentage of suppliers identified as having significant actual and potential negative social impacts with which improvements were agreed upon as a result of assessment.		
Number of suppliers assessed for social impacts.		
Significant actual and potential negative social impacts identified in the supply chain.		

B.6 Indicator Aggregation 35-38

GSSR (source)		Agregating Indicator
Indicator Description	**GRI ID**	**ID**
When a significant proportion of employees are compensated based on wages subject to minimum wage rules, report the relevant ratio of the entry level wage by gender at significant locations of operation to the minimum wage	GRI Standard 202-1	35
When a significant proportion of other workers (excluding employees) performing the organization's activities are compensated based on wages subject to minimum wage rules, describe the actions taken to determine whether these workers are paid above the minimum wage		
Whether a local minimum wage is absent or variable at significant locations of operation, by gender. In circumstances in which different minimums can be used as a reference, report which minimum wage is being used		
Total number and percentage of operations assessed for risks related to corruption.	GRI Standard 205-1	36
Significant risks related to corruption identified through the risk assessment.		
Total number and percentage of governance body members that the organization's anti-corruption policies and procedures have been communicated to, broken down by region.	GRI Standard 205-2	
Total number and percentage of employees that the organization's anti-corruption policies and procedures have been communicated to, broken down by employee category and region.		
Total number and percentage of business partners that the organization's anti-corruption policies and procedures have been communicated to, broken down by type of business partner and region. Describe if the organization's anti-corruption policies and procedures have been communicated to any other persons or organizations.		
Total number and percentage of governance body members that have received training on anti-corruption, broken down by region.		
Total number and percentage of employees that have received training on anti-corruption, broken down by employee category and region.		
Total number and nature of confirmed incidents of corruption.	GRI Standard 205-3	
Total number of confirmed incidents in which employees were dismissed or disciplined for corruption.	GRI Standard 205-3	
Total number of confirmed incidents when contracts with business partners were terminated or not renewed due to violations related to corruption.	GRI Standard 205-3	
Public legal cases regarding corruption brought against the organization or its employees during the reporting period and the outcomes of such cases	GRI Standard 205-3	
Total monetary value of financial and in-kind political contributions made directly and indirectly by the organization by country and recipient/beneficiary.	GRI Standard 415-1	
Number of legal actions pending or completed during the reporting period regarding anti-competitive behavior and violations of anti-trust and monopoly legislation in which the organization has been identified as a participant.	GRI Standard 206-1	
Main outcomes of completed legal actions, including any decisions or judgments.	GRI Standard 206-1	
Significant fines and non-monetary sanctions for non-compliance with environmental laws and/or regulations in terms of:i. Total monetary value of significant fines;ii. Total number of non-monetary sanctions;iii. Cases brought through dispute resolution mechanisms.	GRI Standard 307-1	
Total number of incidents of non-compliance with regulations and/or voluntary codes concerning the health and safety impacts of products and services within the reporting period, by:i. Incidents of non-compliance with regulations resulting in a fine or penalty;ii. Incidents of non-compliance with regulations resulting in a warning;iii. Incidents of non-compliance with voluntary codes.	GRI Standard 416-2	
Total number of incidents of non-compliance with regulations and/or voluntary codes concerning product and service information and labeling, by:i. Incidents of non-compliance with regulations resulting in a fine or penalty;ii. Incidents of non-compliance with regulations resulting in a warning;iii. Incidents of non-compliance with voluntary codes.	GRI Standard 417-2	
Total number of incidents of non-compliance with regulations and/or voluntary codes concerning marketing communications, including advertising, promotion, and sponsorship, by:i. Incidents of non-compliance with regulations resulting in a fine or penalty;ii. Incidents of non-compliance with regulations resulting in a warning;iii. Incidents of non-compliance with voluntary codes.	GRI Standard 417-3	
Total number of substantiated complaints received concerning breaches of customer privacy, categorized by: i. Complaints received from outside parties and substantiated by the organization;ii. Complaints from regulatory bodies.	GRI Standard 418-1	
Total number of identified leaks, thefts, or losses of customer data.	GRI Standard 418-1	
Significant fines and non-monetary sanctions for non-compliance with laws and/or regulations in the social and economic area in terms of:i. Total monetary value of significant fines;ii. Total number of non-monetary sanctions;iii. Cases brought through dispute resolution mechanism	GRI Standard 419-1	
Percentage of the procurement budget used for significant locations of operation that is spent on suppliers local to that operation (such as percentage of products and services purchased locally).	GRI Standard 204-1	37
Infrastructure investments and services supported	GRI Standard 203-1	38
a. Extent of development of significant infrastructure investments and services supported.b. Current or expected impacts on communities and local economies, including positive and negative impacts where relevant.c. Whether these investments and services are commercial, in-kind, or pro bono engagements.		

B.7 Indicator Aggregation 38 to 47

GSSR (source)		Agregating Indicator
Indicator Description	**GRI ID**	**ID**
Total number of employees that were entitled to parental leave, by gender	GRI Standard 401-3	39
Total number of employees that took parental leave, by gender		
Total number of employees that returned to work in the reporting period after parental leave ended, by gender		
Total number of employees that returned to work after parental leave ended that were still employed 12 months after their return to work, by gender		
Return to work and retention rates of employees that took parental leave, by gender		
a. Gross direct GHG emissions in metric tons of CO2 equivalent.b. Gases included in the calculation; whether CO2, CH4, N2O, HFCs, PFCs, SF6, NF3, or all.c. Biogenic CO2 emissions in metric tons of CO2 equivalent	GRI Standard 305-1	40
a. Gross location-based energy indirect (Scope 2) GHG emissions in metric tons of CO2 equivalentb. If applicable, gross market-based energy indirect (Scope 2) GHG emissions in metric tons of CO2 equivalent.c. If available, the gases included in the calculation; whether CO2, CH4, N2O, HFCs, PFCs, SF6, NF3, or al	GRI Standard 305-2	
a. Gross other indirect (Scope 3) GHG emissions in metric tons of CO2 equivalent.b. If available, the gases included in the calculation; whether CO2, CH4, N2O, HFCs, PFCs, SF6, NF3, or all.c. Biogenic CO2 emissions in metric tons of CO2 equivalent.d. Other indirect (Scope 3) GHG emissions categories and activities included in the calculation	GRI Standard 305-3	
a. Gross direct (Scope 1) GHG emissions in metric tons of CO2 equivalent.b. Gases included in the calculation; whether CO2, CH4, N2O, HFCs, PFCs, SF6, NF3, or all.c. Biogenic CO2 emissions in metric tons of CO2 equivalent.	GRI Standard 305-1	
The reporting organization shall report the following information:Significant air emissions, in kilograms or multiples, for each of the following:i. NOXii. SOXiii. Persistent organic pollutants (POP)iv. Volatile organic compounds (VOC)v. Hazardous air pollutants (HAP)vi. Particulate matter (PM)vii. Other standard categories of air emissions identified in relevant regulationsSource of the emission factors used.Standards, methodologies, assumptions, and/or calculation tools used.	GRI Standard 305-7	41
a. Significant air emissions, in kilograms or multiples, for each of the following:i. NOXii. SOXiii. Persistent organic pollutants (POP)iv. Volatile organic compounds (VOC)v. Hazardous air pollutants (HAP)vi. Particulate matter (PM)vii. Other standard categories of air emissions identified in relevant regulationsb. Source of the emission factors used.c. Standards, methodologies, assumptions, and/or calculation tools used.		
Significant air emissions, in kilograms or multiples, for each of the following:i. NOXii. SOXiii. Persistent organic pollutants (POP)iv. Volatile organic compounds (VOC)v. Hazardous air pollutants (HAP)vi. Particulate matter (PM)vii. Other standard categories of air emissions identified in relevant regulations		
GHG emissions intensity ratio for the organization.	GRI Standard 305-4	42
GHG emissions reduced as a direct result of reduction initiatives, in metric tons of CO2 equivalent.	GRI Standard 305-5	
GHG emissions reduced as a direct result of reduction initiatives, in metric tons of CO2 equivalent.		
GHG emissions reduced as a direct result of reduction initiatives, in metric tons of CO2 equivalent.		
Production, imports, and exports of ODS in metric tons of CFC-11 (trichlorofluoromethane) equivalent	GRI Standard 305-6	43
Composition of the highest governance body and its committees by:i. Executive or non-executive;ii. Independence;iii. Tenure on the governance body;iv. Number of each individual's other significant positions and commitments, and the nature of the commitments;v. Gender;vi. Membership of under-represented social groups;vii. Competencies relating to economic, environmental, and social topics;viii. Stakeholder representation.	GRI Standard 102-22	44
Composition of the highest governance body and its committees by:i. Executive or non-executive;ii. Independence;iii. Tenure on the governance body;iv. Number of each individual's other significant positions and commitments, and the nature of the commitments;v. Gender;vi. Membership of under-represented social groups;vii. Competencies relating to economic, environmental, and social topics;viii. Stakeholder representation.		
Percentage of individuals within the organization's governance bodies in each of the following diversity categories:i. Gender;ii. Age group: under 30 years old, 30-50 years old, over 50 years old;iii. Other indicators of diversity where relevant (such as minority or vulnerable groups).	GRI Standard 405-1	
a. Processes for consultation between stakeholders and the highest governance body on economic, environmental, and social topics.b. If consultation is delegated, describe to whom it is delegated and how the resulting feedback is provided to the highest governance body.	GRI Standard 102-21	
Highest governance body's role in identifying and managing economic, environmental, and social topics and their impacts, risks, and opportunities - including its role in the implementation of due diligence processes.	GRI Standard 102-29	
Whether stakeholder consultation is used to support the highest governance body's identification and management of economic, environmental, and social topics and their impacts, risks, and opportunities.		
a. How stakeholders' views are sought and taken into account regarding remuneration.b. If applicable, the results of votes on remuneration policies and proposals.	GRI Standard 102-37	
Nomination and selection processes for the highest governance body and its committees.	GRI Standard 102-24	45
Criteria used for nominating and selecting highest governance body members, including whether and how:i. Stakeholders (including shareholders) are involved;ii. Diversity is considered;iii. Independence is considered;iv. Expertise and experience relating to economic, environmental, and social topics are considered.		
Workers with high incidence or high risk of diseases related to their occupation	GRI Standard 403-3	46
Whether there are workers whose work, or workplace, is controlled by the organization, involved in occupational activities who have a high incidence or high risk of specific diseases		
The level at which each formal joint management-worker health and safety committee typically operates within the organization.	GRI Standard 403-1	
Percentage of workers whose work, or workplace, is controlled by the organization, that are represented by formal joint management-worker health and safety committees.		
Types of injury, injury rate (IR), occupational disease rate (ODR), lost day rate (LDR), absentee rate (AR), and work-related fatalities, for all employees, with a breakdown by: i. Region;ii. Gender	GRI Standard 403-2	47
Types of injury, injury rate (IR), and work-related fatalities, for all workers (excluding employees) whose work, or workplace, is controlled by the organization, with a breakdown by:i. Region;ii. Gender		
Whether there are workers whose work, or workplace, is controlled by the organization, involved in occupational activities who have a high incidence or high risk of specific diseases	GRI Standard 403-3	

B.8 Indicator Aggregation 48 to 54

GSSR (source)		Agregating Indicator
Indicator Description	**GRI ID**	**ID**
Total weight or volume of materials that are used to produce and package the organization's primary products and services during the reporting period, by:i. Non-renewable materials used;ii. Renewable materials used.	GRI Standard 301-1	48
Percentage of recycled input materials used to manufacture the organization's primary products and services.	GRI Standard 301-2	49
Risks and opportunities posed by climate change that have the potential to generate substantive changes in operations, revenue, or expenditure, including:i. A description of the risk or opportunity and its classification as either physical, regulatory, or other;ii. A description of the impact associated with the risk or opportunity;iii. The financial implications of the risk or opportunity before action is taken;iv. The methods used to manage the risk or opportunity;v. The costs of actions taken to manage the risk or opportunity.	GRI Standard 201-2	50
Total number of incidents of discrimination during the reporting period.	GRI Standard 406-1	51
Status of the incidents and actions taken with reference to the following:i. Incident reviewed by the organization;ii. Remediation plans being implemented;iii. Remediation plans that have been implemented, with results reviewed through routine internal management review processes;Incident no longer subject to action.		
Incidents of discrimination and corrective actions taken		
Total number of substantiated complaints received concerning breaches of customer privacy, categorized by: i. Complaints received from outside parties and substantiated by the organization;ii. Complaints from regulatory bodies.	GRI Standard 418-1	52
Total number of identified leaks, thefts, or losses of customer data.		53
Percentage of significant product or service categories covered by and assessed for compliance with such procedures.	GRI Standard 417-1	54
Whether each of the following types of information is required by the organization's procedures for product and service information and labeling:i. The sourcing of components of the product or service;ii. Content, particularly with regard to substances that might produce an environmental or social impact;iii. Safe use of the product or service;iv. Disposal of the product and environmental or social impacts;v. Other (explain).		

B.9 Company Evaluation A to E

	Company A Evaluation (1-5)				Company B Evaluation (0-5)				y C Evaluation (0-5)			n.a.	hy D Evaluation (0-5)			n.a.	hy E Evaluation (0-5)			n.a.
ID	Commitment		Performance	n.a.	Commitment		Performance	n.a.	Commitment		Performance	n.a.	Commitment		Performance	n.a.	Commitment		Performance	n.a.
1	4	5	3		4	4	3		4	5	3		4	5	4		4	4	3	
2	3	3	3		3	4	3		3	4	3		4	4	3		3	4	3	
3	4	5	3		3	4	4		4	4	3		3	5	3		4	5	3	
4	3	5	2		0	0	0		5	5	4		0	0	0		3	3	2	
5	4	5	3		4	3	2		5	5	4		4	5	3		4	5	4	
6	5	5	5		0	0	0		5	5	4		0	0	0		0	0	0	
7	3	5	5		0	0	0		3	5	4		3	5	2		4	4	2	
8	2	4	3		4	5	3		3	4	3		0	0	0		3	3	2	
9	5	5	2		0	0	0		4	4	3		3	3	2		4	4	4	
10	0	0	0		0	0	0		4	5	3		2	5	2		0	0	0	
11	0	0	0		0	0	0		5	5	4		4	5	3		4	5	5	
12	3	5	3		4	1	3		4	4	3		2	3	2		3	3	4	
13	0	0	0		0	0	0		3	4	3		0	0	0		0	0	0	
14	5	5	4		3	4	1		4	4	4		3	3	2		4	4	3	
15	0	0	0		3	3	4		2	3	2		0	0	0	1	2	3	3	1
16				1				1				1	0	0	0		2	3	2	
17	3	4	4		2	3	1		3	4	3		0	0	0		2	3	2	
18	2	3	4		2	2	4		4	4	4		2	2	3		0	0	0	
19	5	5	3		0	0	0		3	3	3					1				1
20	1	1	2		3	4	3		3	4	3		2	1	1		4	3	3	
21	4	5	3		3	5	3		4	5	4		3	3	3		4	5	3	
22	5	5	3		4	4	3		4	5	4		4	4	3		3	5	3	
23	5	5	3		4	5	4		4	5	4		4	4	2		4	5	5	
24	3	4	2		2	3	1		4	4	3		0	0	0		0	0	0	
25	3	4	2		0	0	0		0	0	0					1				1
26	4	4	3		3	4	1		3	4	3		0	0	0		3	5	3	
27	3	4	2		0	0	0		0	0	0					1				1
28	4	5	2		3	2	3		3	4	3		3	5	2		3	4	3	
29	2	3	2		3	2	0		4	5	3		3	4	3		3	4	2	
30	0	0	0		0	0	0		4	5	3		0	0	0		3	4	3	
31	4	5	5		4	5	5		3	5	3		3	5	4		4	5	4	
32	3	4	1		4	5	1		3	4	3		2	3	2		4	5	3	
33	0	0	0		2	2	2		2	3	2		0	0	0		0	0	0	
34	3	4	3		3	3	5		4	4	3		3	2	2		3	5	3	
35	0	0	0		0	0	0		1	2	2		3	5	5		2	3	2	
36	2	3	2		4	4	3		3	4	2		1	3	2		2	3	2	
37	0	0	0		3	2	3		3	4	3		4	5	3		4	4	3	
38	4	4	4		4	5	3		5	5	4		3	5	3		4	5	3	
39	4	5	4		2	5	5		4	5	1		4	5	2		3	4	3	
40	4	5	4		3	5	3		4	5	4		4	3	4		4	5	3	
41	5	5	5		3	5	3		4	5	4		4	5	3		4	5	3	
42	4	5	5		3	5	3		4	5	4		3	5	3		4	5	3	
43	0	0	0		3	4	3		4	5	4		4	5	3		0	0	0	
44	3	5	2		2	1	3		3	4	3		3	4	1		4	5	5	
45	3	5	2		4	4	3		2	4	2		2	3	3		3	4	2	
46	3	2	2		3	2	3		2	3	2		0	0	0		2	3	2	
47	5	5	1		3	3	2		3	4	2		3	5	3		3	4	4	
48				1				1				1	0	0	0		0	0	0	
49	2	3	2		0	0	0		3	4	3		0	0	0		0	0	0	
50	3	4	2		3	4	3		2	3	2		2	2	1		0	0	0	
51	0	0	0		0	0	0		0	0	0		0	0	0		3	4	5	
52	0	0	0		3	3	3		4	5	3		1	2	0		3	4	3	
53	0	0	0		3	2	1		4	5	4		1	2	0		3	4	3	
54				1				1				1	0	0	0		0	0	0	

B.10 Company Evaluation F to I

	Company F Evaluation (0-5)				Company G Evaluation (0-5)				Company H Evaluation (0-5)				Company I Evaluation (0-5)			
ID	Commitment		Performance	n.a.	Commitment		Performance	n.a.	Commitment		Performance	n.a.	Commitment		Performance	n.a.
1	4	4	3		4	5	4		1	2	0		3	4	2	
2	2	3	2		4	5	5		3	4	1		3	3	2	
3	3	5	3		4	5	5		1	2	1		3	4	3	
4	0	0	0					1				1				1
5	3	5	3		4	5	4		3	5	3		1	2	2	
6	2	3	1		0	0	0		0	0	0		0	0	0	
7	3	4	3		3	5	3		3	5	3		4	3	3	
8	2	3	2					1				1				1
9	4	3	3		4	5	3		4	5	4		3	4	3	
10	0	0	0		0	0	0		0	0	0		2	2	2	
11	2	3	2		0	0	0		2	5	5		4	5	5	
12	3	3	2		3	3	2		0	0	0		1	2	2	
13	0	0	0					1				1				1
14	4	4	3		4	3	1		3	3	2		3	4	1	
15	0	0	0	1				1				1				1
16	0	0	0					1				1				1
17	2	2	2		3	4	3		3	3	2		0	0	0	
18	0	0	0		0	0	0		0	0	0		0	0	0	
19				1				1				1				1
20	4	5	2		1	2	2		4	5	3		4	3	3	
21	3	4	3		4	5	3		4	5	4		4	3	3	
22	3	4	4		4	5	3		4	5	4		4	3	3	
23	3	4	3		4	5	3		4	5	4		4	3	3	
24	2	4	3		0	0	0		0	0	0		1	2	0	
25				1				1				1				1
26	3	2	2		2	3	3		4	4	4		2	4	3	
27				1				1				1				1
28	4	3	3		1	1	2		3	3	4		3	4	3	
29	3	3	2		3	3	2		2	3	3		2	5	2	
30	0	0	0					1				1				1
31	4	5	5		4	5	3		2	4	3		3	5	3	
32	3	3	2		3	4	3		3	4	3		3	4	3	
33	0	0	0		0	0	0		0	0	0		4	4	4	
34	2	2	2		3	3	3		3	4	3		3	5	3	
35	0	0	0		0	0	0		0	0	0		2	3	2	
36	3	3	2		3	4	3		4	4	4		3	4	3	
37	2	3	3		2	2	2		4	3	3		3	5	5	
38	5	5	5		4	5	4		3	3	2		3	5	3	
39	4	5	3		0	0	0		3	4	3		3	4	4	
40	3	4	4		3	5	3		3	4	3		3	4	4	
41	3	4	4		3	5	3		3	4	3		3	4	4	
42	3	4	3		3	5	4		3	4	3		3	4	4	
43	0	0	0		3	5	4		0	0	0		0	0	0	
44	3	5	3		3	4	3		0	0	0		1	3	1	
45	2	4	3		2	3	2		0	0	0		1	3	3	
46	2	3	2		3	4	2		0	0	0		0	0	0	
47	4	5	4		4	5	3		4	3	3		2	3	2	
48	2	3	4					1				1				1
49	3	3	4					1				1				1
50	4	4	3		3	3	2		3	3	2		3	4	2	
51	0	0	0		0	0	0		0	0	0		0	0	0	
52	0	0	0		3	4	3		0	0	0		1	4	2	
53	0	0	0		3	4	2		0	0	0		1	4	2	
54	0	0	0					1				1				1

B.11 Inputs sheet example - companies A to C

Importances

TBL			Commitment		erformance
Economic	Social	Environmental	Report type	Report Scope	Progress
30%	35%	35%	35%	35%	30%

Companies' evaluation

Inde	Indicator	Quanti	importar (1-5)	Company A Evaluation (1-5)			Non applicability	Company B Evaluation (0-5)			Non applicab	Company C Evaluation (0-5)			Non applicab
				Commitment		Performanc		Commitment		erformanc		Commitment		erformanc	
1	Significant indirect economic impacts in the context of extern	Qualitative	5	4	5	3		4	4	3		4	5	3	
2	Describe policies and practices used to promote economic in	Qualitative	5	3	3	3		3	4	3		3	4	3	
3	Direct economic value generated and distributed (EVG&	Qualitative	5	4	5	3		3	4	4		4	4	3	
4	Operations and suppliers considered to have significant risk	Qualitative	5	3	5	2		0	0	0		5	5	4	
5	Total number of employees by employment contract, includir	Quantitative	5	4	5	3		4	3	2		5	5	4	
6	Percentage of senior management at significant locations of	Quantitative	5	5	5	5		0	0	0		5	5	4	
7	Total number and rate of new employee hires and employee t	Quantitative	5	3	5	5		0	0	0		3	5	4	
8	Operations with significant actual and potential negative impa	Qualitative	5	2	4	3		4	5	3		3	4	3	
9	Percentage of employees per employee category in each of th	Quantitative	5	5	5	2		0	0	0		4	4	3	
10	When a significant proportion of employees and other worker	Qualitative	5	0	0	0		0	0	0		4	5	3	
11	Ratio of the basic salary and remuneration of women to men f	Quantitative	5	0	0	0		0	0	0		5	5	4	
12	Percentage of individuals within the organization's governan	Quantitative	5	3	5	3		4	1	3		4	4	3	
13	Total number of IUCN Red List species and national conserva	Quantitative	5	0	0	0		0	0	0		3	4	3	
14	Average hours of training that the organization's employees h	Quantitative	5	5	5	4		3	4	1		4	4	4	
15	Operations and suppliers considered to have significant risk	Qualitative	5	0	0	0		3	3	4		2	3	2	
16	Percentage of reclaimed products and their packaging mater	Quantitative	5				1				1				1
17	Partnerships and initiatives for restoration or protecive measu	Qualitative	5	3	4	4		2	3	1		3	4	3	
18	Significant direct and indirect positive and negative impacts	Qualitative	5	2	3	4		2	2	4		4	4	4	
19	Total number of water sources/bodies significantly affected b	Quantitative	5	5	5	3		0	0	0		3	3	3	
20	Total weight of hazardous and non-hazardous waste, with a b	Quantitative	5	1	1	2		3	4	3		3	4	3	
21	Energy intensity ratio for the organization. Reductions in ener	Quantitative	5	4	5	3		3	5	3		4	5	4	
22	In joules, watt-hours or multiples, the total:i. Electricity consur	Quantitative	5	5	5	3		4	4	3		4	5	4	
23	Total energy consumption within the organization from non-r	Quantitative	5	5	5	3		4	5	4		4	5	4	
24	Environmental protection expenditure including costs of wast	Quantitative	5	3	4	2		2	3	1		4	4	3	
25	Total number and total volume of recorded significant spills.	Quantitative	5	3	4	2		0	0	0		0	0	0	
26	Total volume of water recycled and reused by the organizatio	Quantitative	5	4	4	3		3	4	1		3	4	3	
27	Total volume of planned and unplanned water discharges by	Quantitative	5	3	4	2		0	0	0		0	0	0	
28	Total volume of water withdrawn, with a breakdown by the foll	Quantitative	5	4	5	2		3	2	3		3	4	3	
29	Benefits which are standard for full-time employees of the org	Qualitative	5	2	3	2		3	2	0		4	5	3	
30	Total number of identified incidents of violations involving th	Quantitative	5	0	0	0		0	0	0		4	5	3	
31	A description of the organization's values, principles, standar	Qualitative	5	4	5	5		4	5	5		3	5	3	
32	Processes for the highest governance body to ensure conflic	Qualitative	5	3	4	1		4	5	1		3	4	3	
33	Operations and suppliers in which workers' rights to exercise	Qualitative	5	0	0	0		2	2	2		2	3	2	
34	Percentage of new suppliers that were screened using social	Quantitative	5	3	4	3		3	3	5		4	4	3	
35	When a significant proportion of other workers (excluding em	Qualitative	5	0	0	0		0	0	0		1	2	2	
36	Total percentage of operations assessed for risks related to c	Quantitative	5	2	3	2		4	4	3		3	4	2	
37	Percentage of the procurement budget used for significant lo	Quantitative	5	0	0	0		3	2	3		3	4	3	
38	Infrastructure investments and services supported. Extent of	Qualitative	5	4	4	4		4	5	3		5	5	4	
39	Total number of employees that were entitled to parental leav	Quantitative	5	4	5	4		2	5	5		4	5	1	
40	Gross direct and indirect GHG emissions in metric tons of CO	Quantitative	5	4	5	4		3	5	3		4	5	4	
41	Significant air emissions, in kilograms or multiples, for each	Quantitative	5	5	5	5		3	5	3		4	5	4	
42	GHG emissions intensity ratio for the organization. Emission	Quantitative	5	4	5	5		3	5	3		4	5	4	
43	Production, imports, and exports of ODS in metric tons of CF	Quantitative	5	0	0	0		3	4	3		4	5	4	
44	Composition of the highest governance body and its committe	Qualitative	5	3	5	2		2	1	3		3	4	3	
45	Nomination and selection processes for the highest governan	Qualitative	5	3	5	2		4	4	3		2	4	2	
46	Whether there are workers whose work, or workplace, is contr	Qualitative	5	3	2	2		3	2	3		2	3	2	
47	Types of injury, injury rate (IR), occupational disease rate (OD	Quantitative	5	5	5	1		3	3	2		3	4	2	
48	Total weight or volume of materials that are used to produce a	Quantitative	5				1				1				1
49	Percentage of recycled input materials used to manufacture t	Quantitative	5	2	3	2		0	0	0		3	4	3	
50	Risks and opportunities posed by climate change that have th	Qualitative	5	3	4	2		3	4	3		2	3	2	
51	Total number of incidents of discrimination during the report	Quantitative	5	0	0	0		0	0	0		0	0	0	
52	Total number of substantiated complaints received concernin	Quantitative	5	0	0	0		3	3	3		4	5	3	
53	Total number of identified leaks, thefts, or losses of customer	Quantitative	5	0	0	0		3	2	1		4	5	4	
54	Whether each of the following types of information is required	Qualitative	5				1				1				1

B.12 "Backoffice" example - Company A

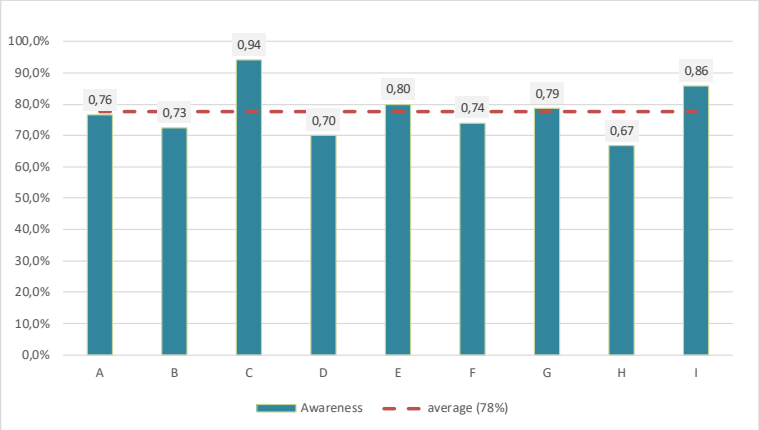
Company A Galp

				t	s	p			Wy																													
				0,35	0,35	0,3			0,3	0,35	0,35				Zec	Zso	Zenv	Z	Tf	WR																			
i		w		Evaluation			x	Zgw	TBL									Overall score			Sustainable Development Goals																		
Index	Indicator	Importance	Non-Applicability	Report type	Report scope	Progress	Weighted AVG	Alpha	Economic	Social	Env.	Economic	Social	Env.	Economic Score	Social Score	Env. Score	Overall Score	TBL factor	Relative	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Sigificant Direct	5		4	5	3	4,05	-1,5	5	0	0	12,50%	0,00%	0,00%	**0,506**	**0,000**	**0,000**	**0,069**	1,500	1,71%	0,017	0,017	0,017	0,000	0,000	0,000	0,000	0,017	0,000	0,017	0,000	0,000	0,000	0,000	0,000	0,017
2	Describe policies	5		3	3	3	3	0	5	5	0	12,50%	3,45%	0,00%	**0,375**	**0,103**	**0,000**	**0,055**	1,625	1,85%	0,018	0,000	0,000	0,000	0,018	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
3	Direct economic	5		4	5	3	4,05	-1,5	5	0	0	12,50%	0,00%	0,00%	**0,506**	**0,000**	**0,000**	**0,069**	1,500	1,71%	0,000	0,017	0,000	0,000	0,017	0,000	0,017	0,017	0,017	0,000	0,000	0,000	0,000	0,000	0,000	0,000
4	Operations and	5		3	5	2	3,4	-2	0	5	0	0,00%	3,45%	0,00%	**0,000**	**0,117**	**0,000**	**0,068**	1,750	1,99%	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,020	0,000	0,000	0,000	0,000	0,000	0,000	0,020	0,000
5	Total number of	5		4	5	3	4,05	-1,5	0	5	0	0,00%	3,45%	0,00%	**0,000**	**0,140**	**0,000**	**0,081**	1,750	1,99%	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,020	0,000	0,020	0,000	0,000	0,000	0,000	0,000	0,000
6	Percentage of se	5		5	5	5	5	0	0	5	0	0,00%	3,45%	0,00%	**0,000**	**0,172**	**0,000**	**0,100**	1,750	1,99%	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,020	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
7	Total number an	5		3	5	5	4,3	1	0	5	0	0,00%	3,45%	0,00%	**0,000**	**0,148**	**0,000**	**0,086**	1,750	1,99%	0,000	0,000	0,000	0,000	0,020	0,000	0,000	0,020	0,000	0,020	0,000	0,000	0,000	0,000	0,000	0,000
8	Operations with	5		2	4	3	3	0	0	5	0	0,00%	3,45%	0,00%	**0,000**	**0,103**	**0,000**	**0,060**	1,750	1,99%	0,020	0,020	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
9	Percentage of en	5		5	5	2	4,1	-3	0	5	0	0,00%	3,45%	0,00%	**0,000**	**0,141**	**0,000**	**0,082**	1,750	1,99%	0,000	0,000	0,000	0,000	0,020	0,000	0,000	0,020	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
10	When a significa	5		0	0	0	0	0	5	0	0	12,50%	0,00%	0,00%	**0,000**	**0,000**	**0,000**	**0,000**	1,500	1,71%	0,017	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
11	Ratio of basic sa	5		0	0	0	0	0	5	5	0	12,50%	3,45%	0,00%	**0,000**	**0,000**	**0,000**	**0,000**	1,625	1,85%	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,018	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
12	Percentage of in	5		3	5	3	3,7	-1	0	5	0	0,00%	3,45%	0,00%	**0,000**	**0,128**	**0,000**	**0,074**	1,750	1,99%	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,020	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
13	Total number of	5		0	0	0	0	0	0	0	5	0,00%	0,00%	5,26%	**0,000**	**0,000**	**0,000**	**0,000**	1,750	1,99%	0,000	0,000	0,000	0,000	0,000	0,020	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,020	0,020	0,000
14	Average hours o	5		5	5	4	4,7	-1	0	5	0	0,00%	3,45%	0,00%	**0,000**	**0,162**	**0,000**	**0,094**	1,750	1,99%	0,000	0,000	0,000	0,020	0,020	0,000	0,000	0,020	0,000	0,020	0,000	0,000	0,000	0,000	0,000	0,000
15	Operations and	5		0	0	0	0	0	0	5	0	0,00%	3,45%	0,00%	**0,000**	**0,000**	**0,000**	**0,000**	1,750	1,99%	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,020	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
16	Percentage of re	0	n.a.	0	0	0	0	0	0	0	0	0,00%	0,00%	0,00%	**0,000**	**0,000**	**0,000**	**0,000**	0,000	0,00%	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
17	Partnerships and	5		3	4	4	3,65	0,5	0	0	5	0,00%	0,00%	5,26%	**0,000**	**0,000**	**0,192**	**0,073**	1,750	1,99%	0,000	0,000	0,000	0,000	0,000	0,020	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,020	0,020	0,000
18	Significant direct	5		2	3	4	2,95	1,5	0	0	5	0,00%	0,00%	5,26%	**0,000**	**0,000**	**0,155**	**0,059**	1,750	1,99%	0,000	0,000	0,000	0,000	0,000	0,020	0,000	0,000	0,000	0,000	0,000	0,000	0,020	0,000	0,020	0,000
19	Total number of	5		5	5	3	4,4	-2	0	0	5	0,00%	0,00%	5,26%	**0,000**	**0,000**	**0,232**	**0,088**	1,750	1,99%	0,000	0,000	0,000	0,000	0,000	0,020	0,000	0,000	0,000	0,000	0,000	0,000	0,020	0,020	0,000	0,000
20	Total weight of l	5		1	1	2	1,3	1	0	0	5	0,00%	0,00%	5,26%	**0,000**	**0,000**	**0,068**	**0,026**	1,750	1,99%	0,000	0,000	0,020	0,000	0,000	0,020	0,000	0,000	0,000	0,000	0,000	0,000	0,020	0,000	0,000	0,000
21	Energy intensity	5		4	5	3	4,05	-1,5	0	0	5	0,00%	0,00%	5,26%	**0,000**	**0,000**	**0,213**	**0,081**	1,750	1,99%	0,000	0,000	0,000	0,000	0,000	0,000	0,020	0,020	0,000	0,000	0,000	0,020	0,020	0,000	0,000	0,000
22	In joules, watt-h	5		5	5	3	4,4	-2	0	0	5	0,00%	0,00%	5,26%	**0,000**	**0,000**	**0,232**	**0,088**	1,750	1,99%	0,000	0,000	0,000	0,000	0,000	0,000	0,020	0,020	0,000	0,000	0,000	0,020	0,020	0,000	0,000	0,000
23	Total energy con	5		5	5	3	4,4	-2	0	0	5	0,00%	0,00%	5,26%	**0,000**	**0,000**	**0,232**	**0,088**	1,750	1,99%	0,000	0,000	0,000	0,000	0,000	0,000	0,020	0,020	0,000	0,000	0,000	0,020	0,020	0,000	0,000	0,000
24	Environmental p	5		3	4	2	3,05	-1,5	0	0	5	0,00%	0,00%	5,26%	**0,000**	**0,000**	**0,161**	**0,061**	1,750	1,99%	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,020	0,000	0,000	0,000	0,000
25	Total number an	5		3	4	2	3,05	-1,5	0	0	5	0,00%	0,00%	5,26%	**0,000**	**0,000**	**0,161**	**0,061**	1,750	1,99%	0,000	0,000	0,020	0,000	0,000	0,000	0,020	0,000	0,000	0,000	0,000	0,020	0,000	0,020	0,020	0,000
26	Total volume of	5		4	4	3	3,7	-1	0	0	5	0,00%	0,00%	5,26%	**0,000**	**0,000**	**0,195**	**0,074**	1,750	1,99%	0,000	0,000	0,000	0,000	0,000	0,020	0,000	0,020	0,000	0,000	0,000	0,020	0,000	0,000	0,000	0,000
27	Total volume of	5		3	4	2	3,05	-1,5	0	0	5	0,00%	0,00%	5,26%	**0,000**	**0,000**	**0,161**	**0,061**	1,750	1,99%	0,000	0,000	0,020	0,000	0,000	0,020	0,000	0,000	0,000	0,000	0,000	0,020	0,000	0,020	0,000	0,000
28	Total volume of	5		4	5	2	3,75	-2,5	0	0	5	0,00%	0,00%	5,26%	**0,000**	**0,000**	**0,197**	**0,075**	1,750	1,99%	0,000	0,000	0,000	0,000	0,000	0,020	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
29	Benefits which a	5		2	3	2	2,35	-0,5	5	5	0	12,50%	3,45%	0,00%	**0,294**	**0,081**	**0,000**	**0,043**	1,625	1,85%	0,000	0,000	0,018	0,000	0,018	0,000	0,000	0,018	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
30	Total number of	5		0	0	0	0	0	0	5	0	0,00%	3,45%	0,00%	**0,000**	**0,000**	**0,000**	**0,000**	1,750	1,99%	0,000	0,020	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
31	A description of	5		4	5	5	4,65	0,5	0	5	0	0,00%	3,45%	0,00%	**0,000**	**0,160**	**0,000**	**0,093**	1,750	1,99%	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,020	0,000
32	Processes for th	5		3	4	1	2,75	-2,5	0	5	0	0,00%	3,45%	0,00%	**0,000**	**0,095**	**0,000**	**0,055**	1,750	1,99%	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,020	0,000
33	Operations and	5		0	0	0	0	0	0	5	0	0,00%	3,45%	0,00%	**0,000**	**0,000**	**0,000**	**0,000**	1,750	1,99%	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,020	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
34	Percentage of ne	5		3	4	3	3,35	-0,5	0	5	0	0,00%	3,45%	0,00%	**0,000**	**0,116**	**0,000**	**0,067**	1,750	1,99%	0,000	0,000	0,000	0,000	0,020	0,000	0,000	0,020	0,000	0,000	0,000	0,000	0,000	0,000	0,020	0,000
35	When a significa	5		0	0	0	0	0	5	5	0	12,50%	3,45%	0,00%	**0,000**	**0,000**	**0,000**	**0,000**	1,625	1,85%	0,000	0,000	0,000	0,000	0,018	0,000	0,000	0,018	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,018	0,000
36	Total percentage	5		2	3	2	2,35	-0,5	0	5	0	0,00%	3,45%	0,00%	**0,000**	**0,081**	**0,000**	**0,047**	1,750	1,99%	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,020	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
37	Percentage of th	5		0	0	0	0	0	0	5	0	0,00%	3,45%	0,00%	**0,000**	**0,000**	**0,000**	**0,000**	1,750	1,99%	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,020	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
38	Infrastructure in	5		4	4	4	4	0	5	5	0	12,50%	3,45%	0,00%	**0,500**	**0,138**	**0,000**	**0,074**	1,625	1,85%	0,000	0,018	0,000	0,000	0,018	0,000	0,018	0,000	0,018	0,000	0,018	0,000	0,000	0,000	0,000	0,000
39	Total number of	5		4	5	4	4,35	-0,5	0	5	0	0,00%	3,45%	0,00%	**0,000**	**0,150**	**0,000**	**0,087**	1,750	1,99%	0,000	0,000	0,000	0,000	0,020	0,000	0,000	0,020	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
40	Gross direct and	5		4	5	4	4,35	-0,5	0	0	5	0,00%	0,00%	5,26%	**0,000**	**0,000**	**0,229**	**0,087**	1,750	1,99%	0,000	0,000	0,020	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,020	0,020	0,020	0,020	0,000
41	Significant air en	5		5	5	5	5	0	0	0	5	0,00%	0,00%	5,26%	**0,000**	**0,000**	**0,263**	**0,100**	1,750	1,99%	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,020	0,000	0,020	0,020	0,000
42	GHG emissions i	5		4	5	5	4,65	0,5	0	0	5	0,00%	0,00%	5,26%	**0,000**	**0,000**	**0,245**	**0,093**	1,750	1,99%	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,020	0,020	0,020	0,020	0,000
43	Production, impo	5		0	0	0	0	0	0	0	5	0,00%	0,00%	5,26%	**0,000**	**0,000**	**0,000**	**0,000**	1,750	1,99%	0,000	0,000	0,020	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,020	0,000	0,000	0,000	0,000
44	Composition of	5		3	5	2	3,4	-2	0	5	0	0,00%	3,45%	0,00%	**0,000**	**0,117**	**0,000**	**0,068**	1,750	1,99%	0,000	0,000	0,000	0,000	0,020	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,020	0,000
45	Nomination and	5		3	5	2	3,4	-2	0	5	0	0,00%	3,45%	0,00%	**0,000**	**0,117**	**0,000**	**0,068**	1,750	1,99%	0,000	0,000	0,000	0,000	0,020	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,020	0,000
46	Whether there a	5		3	2	2	2,35	-0,5	0	5	0	0,00%	3,45%	0,00%	**0,000**	**0,081**	**0,000**	**0,047**	1,750	1,99%	0,000	0,000	0,020	0,000	0,000	0,000	0,000	0,020	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
47	Types of injury,	5		5	5	1	3,8	-4	0	5	0	0,00%	3,45%	0,00%	**0,000**	**0,131**	**0,000**	**0,076**	1,750	1,99%	0,000	0,000	0,020	0,000	0,000	0,000	0,000	0,020	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
48	Total weight or v	0	n.a.	0	0	0	0	0	0	0	0	0,00%	0,00%	0,00%	**0,000**	**0,000**	**0,000**	**0,000**	0,000	0,00%	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
49	Percentage of re	5		2	3	2	2,35	-0,5	0	0	5	0,00%	0,00%	5,26%	**0,000**	**0,000**	**0,124**	**0,047**	1,750	1,99%	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,020	0,000	0,000	0,000	0,020	0,000	0,000	0,000	0,000
50	Risks and opport	5		3	4	2	3,05	-1,5	0	0	5	0,00%	0,00%	5,26%	**0,000**	**0,000**	**0,161**	**0,061**	1,750	1,99%	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,020	0,000	0,000	0,000	0,000
51	Total number of	5		0	0	0	0	0	0	5	0	0,00%	3,45%	0,00%	**0,000**	**0,000**	**0,000**	**0,000**	1,750	1,99%	0,000	0,000	0,000	0,000	0,020	0,000	0,000	0,020	0,000	0,000	0,000	0,000	0,000	0,000	0,020	0,000
52	Total number of	5		0	0	0	0	0	0	5	0	0,00%	3,45%	0,00%	**0,000**	**0,000**	**0,000**	**0,000**	1,750	1,99%	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,020	0,000
53	Total number of	5		0	0	0	0	0	0	5	0	0,00%	3,45%	0,00%	**0,000**	**0,000**	**0,000**	**0,000**	1,750	1,99%	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,020	0,000
54	Whether each o	0	n.a.	0	0	0	0	0	0	0	0	0,00%	0,00%	0,00%	**0,000**	**0,000**	**0,000**	**0,000**	0,000	0,00%	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
		255						-0,69	40	145	95	100%	100%	100%	**2,18**	**2,48**	**3,22**	**2,78**	87,88	1,00	0,07	0,09	0,17	0,02	0,25	0,18	0,10	0,51	0,04	0,08	0,02	0,26	0,12	0,18	0,16	0,20	0,02

3	12	12	12
Awareness	76%		

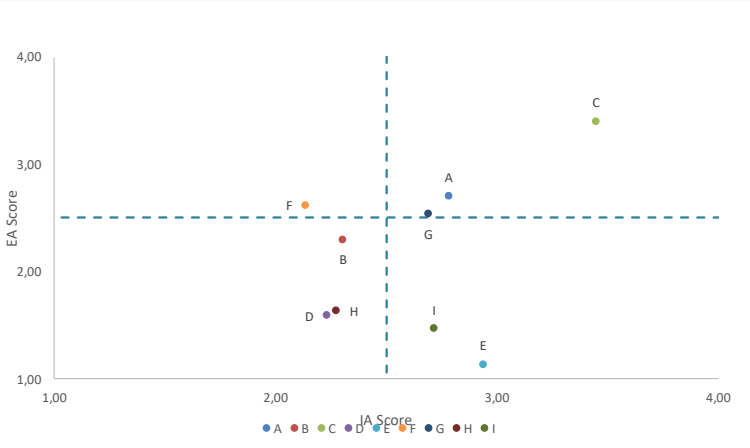
B.13 "Results" example - Awareness, Actionability and type

Awereness level

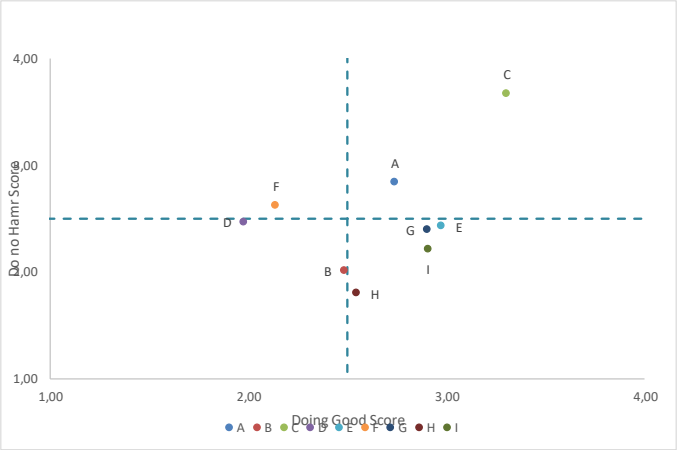


Awereness opportunity cost

Actionability

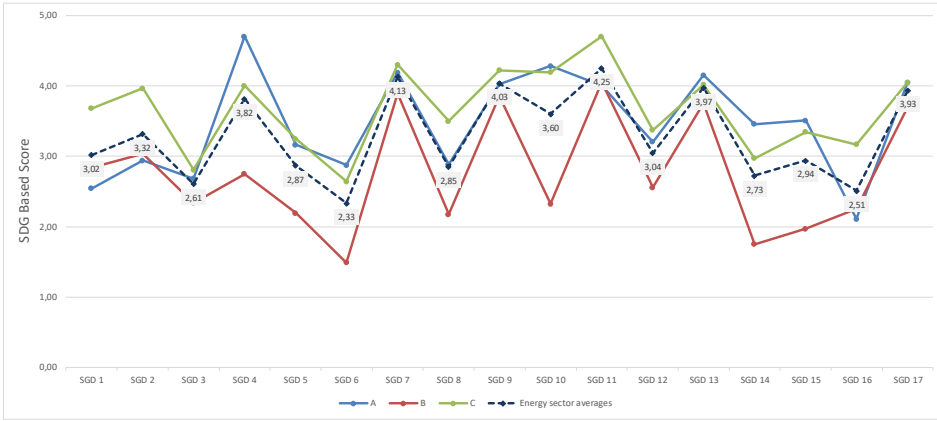


Indicator type

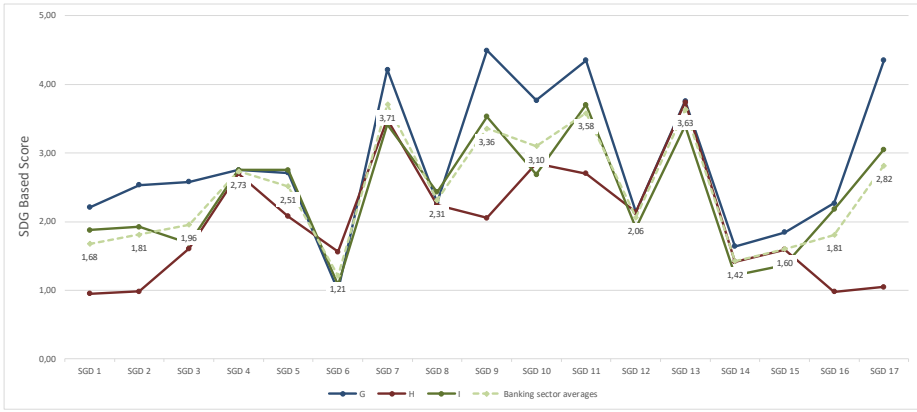


B.14 "Results" example - SDG Based Score

Energy sector

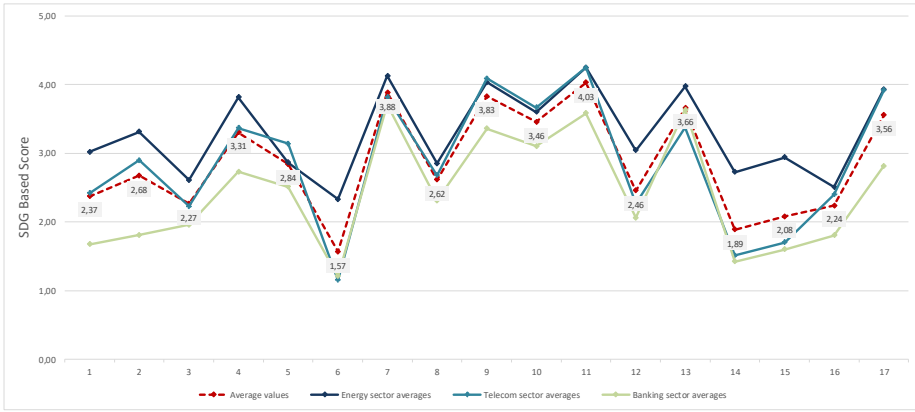


Banking sector



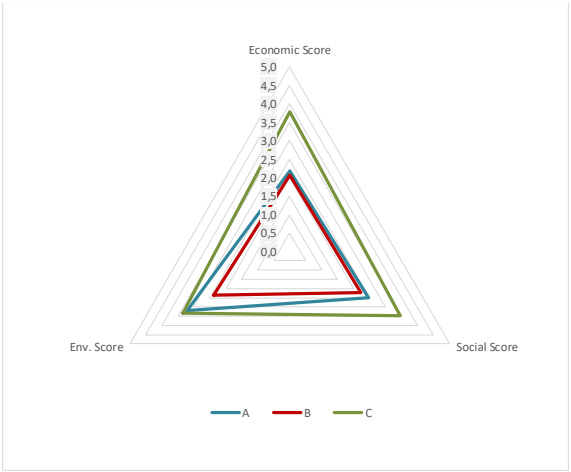
Telecom. sector

Cross sector

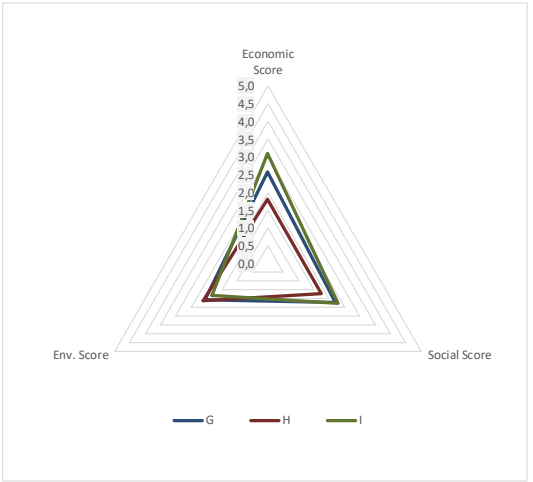


B.15 "Results" example - TBL Based Score

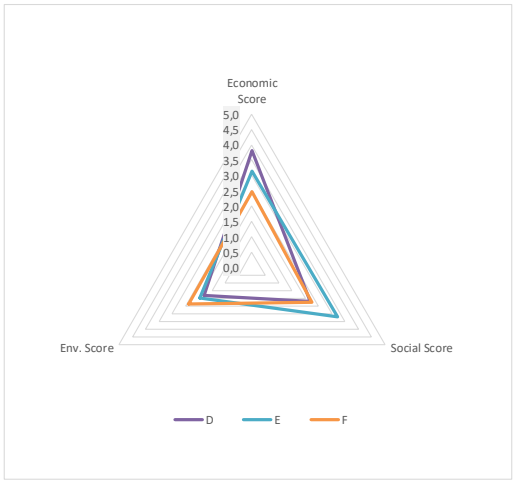
Energy sector



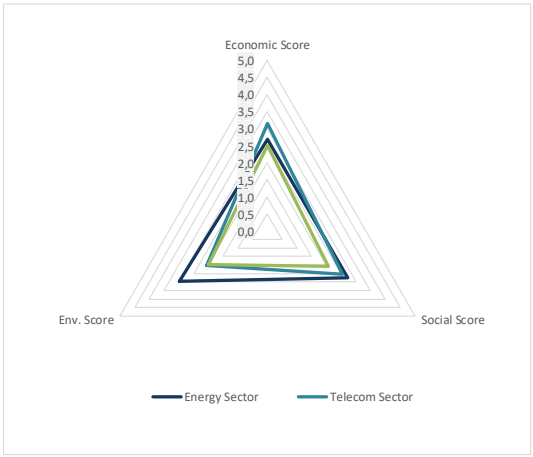
Banking sector



Telecom. sector



Cross sector



GreenChecker: Proposal of an assessment tool for sustainability and greenwashing awareness.

Tomás Monteiro da Fonseca Teles Soares

⟨2022⟩