

Louvain School of Management
and
Instituto Superior Técnico

**A Framework for evaluating, certifying and
promoting CSR in the modern business world**

Research Master's Thesis submitted by
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Abstract

In a world that seeks to move towards sustainability and that aspires to find solutions for achieving a sustainable development, corporate social responsibility presents itself as a possible answer for such quests. This thesis deals with the current lack of an effective and efficient consumer-oriented framework for evaluating, certifying and promoting corporate social responsibility in the modern business world. The inexistence of such framework prevents consumers from rewarding socially responsible companies and from influencing the market through their consumption behaviours. To further understand the issue and to pave the way for the proposed framework itself, a literature review (on the topics of sustainability, corporate social responsibility and previous attempts to evaluate corporate social responsibility performance in companies) is presented. Based on the state of the art, a methodology (using a multiple-criteria decision analysis approach) to address the problem is explored and a concrete framework is proposed/developed.

For that purpose, a Choquet integral preference model (with some specific methodological developments) is used to produce a ranking of alternatives. Such model allows to include and to study the effects of interactions between criteria, which is particularly useful in certain fields of study like the one of corporate social responsibility.

The proposed framework is then subjected to a first practical application, in the form of a case-study on the Portuguese energy sector. The results of such application are in line with what was expected, appear to be robust and seem to succeed in providing relevant information that can be used by common consumers.

Keywords: Corporate social responsibility, Sustainability, Multiple-criteria decision analysis, Consumer behaviour.

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List of abbreviations and acronyms

CSR – Corporate social responsibility

DJSI – Dow Jones Sustainability Indices

EC – European commission

EU – European Union

FCA – Full cost accounting

FPV – Fundamental point of view

GRACE – Grupo de Reflexão e Apoio à Cidadania Empresarial

GRI – Global Reporting Initiative

ISO – International Organization for Standardization

KPI – Key performance indicator

MCDA – Multiple-criteria decision analysis

NGOs – Non-governmental organizations

SARD – Sustainable assessment of retrofit design

SMEs – Small and medium-sized enterprises

TBL – Triple bottom line

UK – United Kingdom

UN – United Nations

USA – United States of America

1. Introduction

This chapter presents a first background analysis about the main topics addressed in this thesis (corporate social responsibility, sustainability and consumer behaviour), the motivations/objectives behind it (including some initial research questions) and a brief explanation concerning its structure (i.e., how the information will be organized throughout the thesis).

1.1 Background

The modern business world context is dominated by private companies which operate in a market economy ruled by the forces of supply and demand (Gilbert, 2002). Over the last decades and even centuries, the economic prosperity of peoples and nations neglected or did not prioritize environmental and social concerns. This unbalanced equation created fragile environmental situations and excessively unequal societies with stalled social elevators. Despite being already profoundly negative on their own, these growing realities, if not averted or mitigated, will inevitably jeopardize future economic growth, social cohesion and the vital habitability of our own and only planet (see Hopwood et al., 2005).

Recent technological revolutions and the inexorable process of globalization that is currently taking place not only create many new opportunities for companies to develop, optimize and expand their businesses and operations (for example, through the implementation of global supply chains), but also created a more powerful, mobilized and active consumer with a much greater influence capacity and willingness to use it (Rezabakhsh et al., 2006).

In this context, and as stakeholders in the social and environmental well-being that surrounds them, companies must adapt their corporate strategy in order to include consumer concerns and to ensure future development. Corporate social responsibility (CSR), which can be defined (using an instrumental perspective) as the voluntary integration of social and environmental concerns in the business operations and strategy of corporations (European Commission, 2002), appears to be the best available answer to face these challenges. CSR simultaneously helps companies achieve better social and environmental performances and improves the companies' reputation in terms of consumer perception and brand value, giving them a competitive edge over less responsible companies (which in turn makes this a win-win situation for them and for the environment/society in which they are inserted) (European Commission, 2002).

Previous initiatives of measuring/assessing CSR performance have been more concerned with creating reporting standards and with improving internal corporate information systems rather than with creating a consumer-oriented tool that might influence consumer behaviour. Thus, currently available systems for evaluating, certifying and promoting CSR do not satisfy the needs and expectations of consumers and are not producing the required and wanted results. The consequence of this is that the market is still unable to correctly reward positive and responsible business practices, making it difficult to influence or induce consumer patterns in the right direction (Oberseder et al., 2011).

1.2 Thesis' objectives

This thesis was done in order to conclude and obtain the Master of Science Degrees in Industrial Engineering and Management (from Instituto Superior Técnico – Universidade de Lisboa) and Business Engineering (from Louvain School of Management – UCLouvain), as part of a double degree program between both academic institutions. The thesis' two most important objectives are the following: (1) to clearly present and discuss the theoretical foundations of CSR evaluation, certification and promotion through a critical review of the already existing theoretical knowledge and methods; (2) to perform a systematic empirical work designed to produce original results (in this case, the application of an existing multiple-criteria decision analysis (MCDA) methodology to the field of CSR) while setting out the methodology in a clear way and critically drawing the due conclusions.

The work developed for this thesis will be carried out around the following (still generic) research questions:

- ❖ What is the nature of the relationship between sustainability and CSR?
- ❖ How is it possible to obtain a comprehensive CSR performance evaluation of companies?
- ❖ Which are the previous attempts that have tried to do it, and what was their approach?
- ❖ Can an MCDA methodology be applied to the context of CSR?
- ❖ If so, how can that be achieved, and does it produce robust results?
- ❖ How can such results influence and induce consumer behaviour?

The main objective of this thesis is thus to provide the proper answers for these questions and, at the same time, to produce a framework which fulfils the need caused by the current lack of an effective and efficient consumer-oriented framework for evaluating and certifying corporate social responsibility of companies. If successfully developed, a framework like this might represent a big push in promoting CSR in the modern business world and a breaking point on the ability of consumers to include CSR issues in their consumption decisions.

1.3 Thesis' structure

This thesis is divided into six main chapters: “problem definition”, “literature review”, “proposed framework”, “case study”, “discussion”, and “final conclusions”. The chapter “problem definition” presents a contextualization of the chosen theme as well as the main motivations, concepts and definitions on some important topics. Afterwards, the problem is clearly identified, and the corresponding proposed solution is presented. The chapter ends with some brief conclusions.

The chapter “literature review” explores the state of art on three major topics: sustainability, CSR itself and systems for assessing, reporting and comparing CSR in companies. Again, some conclusions are drawn in the end of the chapter.

The chapter “proposed framework” develops the proposed solution for the identified problem, considering all the most relevant aspects identified during the literature review. After stating the research

questions which the thesis will try to answer and some inevitable assumptions and initial remarks, the framework (composed of eight sequential steps) is presented in the context (and using the type of structure) of a generic MCDA, thus dividing the presentation into four main sections: representation of the problem situation, problem formulation, evaluation model and final recommendations. Once more, a conclusion is presented at the end of the chapter.

The chapter “case study” presents a real and concrete application of the proposed framework following the eight steps presented during the preceding chapter. This part of the thesis was done in partnership with an external non-profit corporate association and focused on the Portuguese energy sector.

The chapter “discussion” tests the case study results’ level of uncertainty through a sensitivity analysis and changes in ratio z . Some major implications are also enunciated.

Finally, the chapter “final conclusions” includes all the final considerations, remarks and consequences that this whole thesis produced (or tried to produce), a brief exploration of some of the framework’s limitations as well as important ideas that should be further expanded in future research.

2. Problem definition

This chapter presents a broader contextualization of the CSR reality, an identification of the problem that this thesis aims to overcome and a brief description of the type of solution that will be proposed.

2.1 Contextualization

Private business is (at least for western countries) the backbone of the employment and wealth creation, and consequently of the economic growth/development. Unfortunately, that same economic growth, and mainly the means to achieve it, also had their negative impact in both our own planet and the people who live on it. To address those problems and to better understand them, over the last decades mankind started taking notice of the pernicious effects caused by its own economic activities and social structures, introducing/developing the concepts of sustainability and of sustainable development to deal with such issues (Hopwood et al., 2005).

Since the dawn of the industrial revolution (1760–1840), human emissions of greenhouse gases (like CO₂) and other harmful substances have exponentially increased year after year (see Figure 1), resulting in some already observed and documented consequences like severe draughts with water shortages, global warming, the destruction of the ozone layer, the melting of the arctic ice caps and the sea level rise.

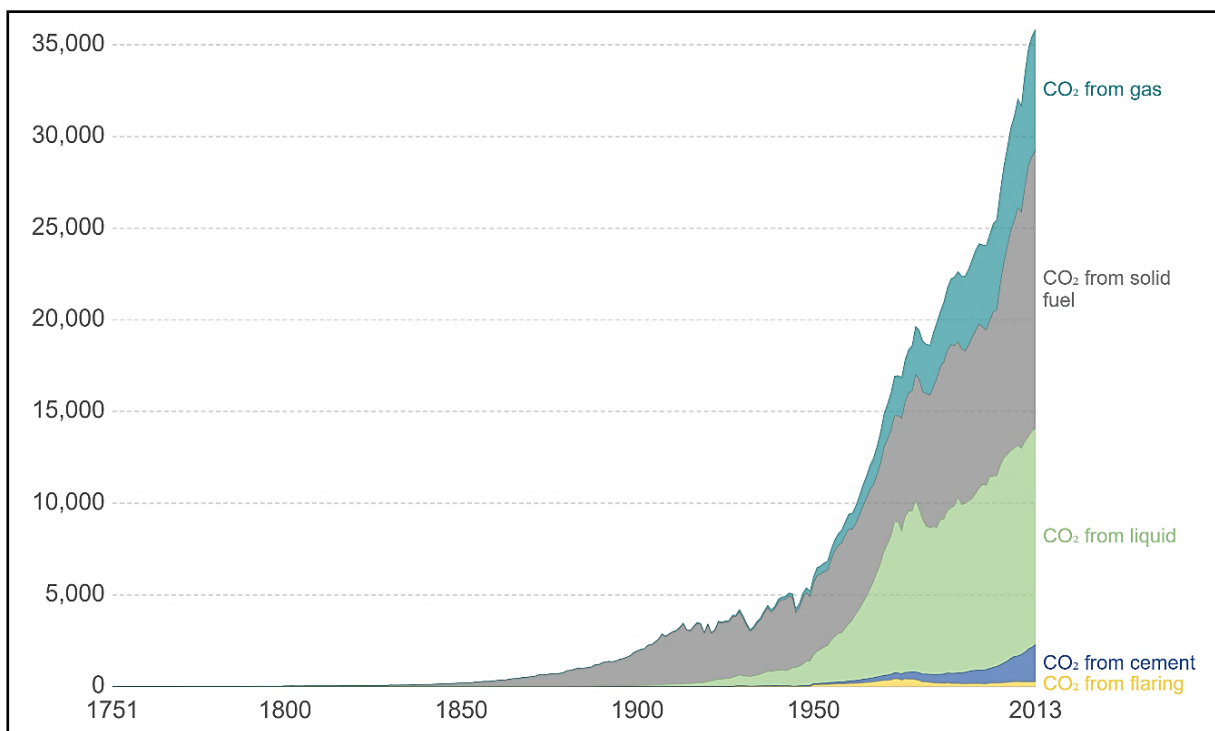


FIGURE 1 – ANNUAL CARBON DIOXIDE EMISSIONS IN MILLION TONNES FROM SOLID FUEL, LIQUID, GAS, CEMENT PRODUCTION AND GAS FLARING. DATA SOURCE: CARBON DIOXIDE INFORMATION ANALYSIS CENTRE

Many international and multilateral initiatives, conferences, summits and treaties have been put forward to address this urgent issue like the Kyoto Protocol (1997) and, more recently, COP 21 (2015) that produced the Paris Agreement. This last agreement set out a series of concrete commitments and

common strategies (including ambitious emissions reduction targets), being subscribed and signed by nearly all UN member states.

If it is true that the humanity has never had before the levels of prosperity we have today, it is also evident that the distribution of that wealth should be a point of concern. Since the 1980's of the last century, inequality levels have stopped decreasing (after a very pronounced drop since the beginning of that century) in continental Europe and Japan (graph on the right side of Figure 2). For English speaking countries, the available data is even more daunting, with inequality numbers once again reaching levels never seen since the first quarter of the XX century (graph on the left side of Figure 2).

Even if we exclude the clear ethical concerns that theses evidences should generate, recent studies have pointed to the existence of a positive correlation between equality and prosperity. Dabla-Norris et al. (2015) concluded that fairer and more equal societies tend to produce more wealth and to redistribute it more efficiently than societies with high inequality levels.

Another important phenomenon that characterise our current world and business reality is globalization. Successive technological breakthroughs in transportation and communications (for example, intercontinental daily flights, very significant cuts in shipping costs and the invention, together with the subsequent massification, of the internet) have created global markets and interconnected societies. Corporations that embraced this new reality and that integrated themselves into global supply chains benefited from considerable economies of scale in production, distribution, marketing and management (Levitt, 1983).

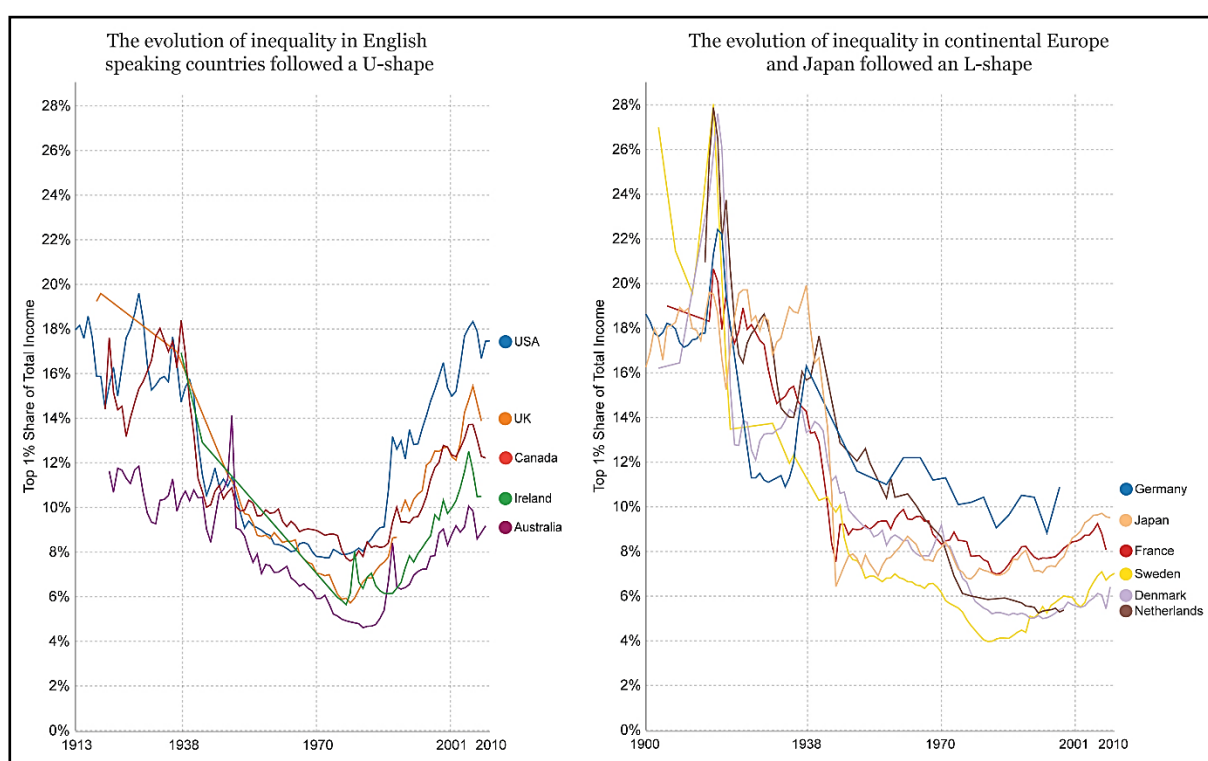


FIGURE 2 – SHARE OF TOTAL INCOME GOING TO THE TOP 1%, 1900 – 2010. DATA SOURCE: THE WORLD TOP INCOMES DATABASE

But the globalization and the digitalization of our societies, have also produced a new challenge for companies: more informed, more mindful and more demanding customers. Basically, companies must now deal with more powerful customers. This change in the company-customer relationship, highly related with the emergence of social media, made stakeholders and shareholders realize about the fundamental importance of company reputation for preserving business success.

Rezabakhsh et al. (2006) concluded, using an adaption of the global power concept proposed by French & Raven (1959), that customer power increased with the diffusion of the Internet due to some changes on the three sources of consumer power: sanction power, legitimate power and expert power.

Sanction power relates to the “*means of disciplining the firms’ behaviour and thus avoiding the disregard of consumer interests*” (Rezabakhsh et al, 2006, p. 6), meaning that the customer has the ability to reward the company’s behaviour (loyalty), to demonstrate/complain about something (voice) or even to terminate the business relationship (exit). The consumers’ sanction power has increased significantly through the massification of the Internet (and more specifically, social media), as the voice and exit options are now much more amplified, reaching vast (and sometimes even uninvolved and passive) audiences. The fact that customers can now complain and protest against many companies directly on Facebook, for anyone to see, is a powerful example of this and, if not dealt correctly, may harm the image and reputation of the company. On the other hand, positive feedback by customers can also spread in a viral way and enhance the company’s sales, making their presence on the Internet (almost fundamental nowadays) a double-edged sword for corporations and brands.

Legitimate power refers to the “*consumers’ abilities to directly influence marketing, especially product and price policy*” (Rezabakhsh et al, 2006, p. 6) which indicates the ability that consumers may have (or may not have) to influence corporate decisions. The structure of the Internet allowed the customers’ legitimate power to increase due to the integration of customers into the value chain through the implementation of interactive business models (even though it is still very rare in the current business context).

Finally, expert power is used to designate the “*possession of information on quality and prices in markets*” (Rezabakhsh et al, 2006, p. 6), many times associated with the different levels of information (market knowledge) that companies and customers have, resulting in unbalanced business relationships in favour of companies. Internet has allowed customers to have a much better understanding of the market for an insignificant cost (for example, through the use of search engines), which in turn increases the consumers’ expert power, as long as there is enough motivation to search for that information and the necessary sensibility to only use useful and correct information. This also gave rise to the emergence of powerful opinion makers and specialized websites that compare and evaluate different products or services in a systematic and organized way, with the objective to allow consumers to still be well informed but without making them feel distrustful or overwhelmed by the amount of information available (see also Labrecque et al., 2013).

A more powerful customer and a globalized world mean that companies are now more scrutinized than ever and that their decisions/actions might have major repercussions, even if carried out on the other side of the world. A recent example of this was Delta Airlines' decision to sever all ties with the National Rifle Association (NRA) in the aftermath of the Stoneman Douglas High School shooting and following a significant media and public opinion backlash (at a national and international levels) against companies which had a business relationship with that gun rights lobby group.

Taking all the previous factors and aspects into account, it is possible to attest the significant relevance of CSR for the business world, not only as a compensation mechanism for the impacts they have on society and ecosystems, but also as a business opportunity and a way to gain and sustain a competitive advantage. On the broader perspective, these findings should also make governments realize that policies intended to promote fairer and more equal societies (for example, incentives for companies to adopt socially oriented CSR practices) should not only be regarded as a way to promote social justice but also as a way to achieve higher and more efficient levels of economic growth (European Commission, 2002).

The environmental conditions and the social fabric that dictate the success or failure of all economic agents need to be enriched and nurtured by all parts. It is not a matter of claiming for charity from companies or making them substitute the state itself, but rather a way to make companies an interested and active player in the preservation of the ecosystems surrounding them and in the well-being of the society that they wish to sell their products (or services) to. Deep down, it is a question of allowing the business reality to learn from the past, to plan the present and to guarantee their future (see also Smit & Pilifosova, 2001).

If companies are today more permeable to the sensitivities and opinions of customers, then CSR has a rather important role to play in the company-customer relationship. Bhattacharya & Sen (2004) saw evidence that there are interdependencies (a positive correlation) between product quality (the consumers' desirability of the product) and CSR initiatives, and that such interdependencies affect the willingness that consumers have, to acquire the company's products. In fact, CSR efforts can play a role for the consumer's choice among undifferentiated products, privileging the products from companies with a responsible record/reputation. Nevertheless, the same authors argue that the consumers' awareness about CSR initiatives is still limited and that companies must work more intensively and thoroughly on that, having in mind that "*attempts to "sell" CSR may actually backfire*" (Bhattacharya & Sen, 2004, p. 23).

Focusing on the customer, in particular, a qualitative study by Oberseder et al. (2011) on the attitude-behaviour gap – consumers state to have a positive attitude about the companies' CSR engagement but do not tend to convert those attitudes into actual purchase behaviour – has delivered some insights for companies who want to improve their CSR positioning and marketing communication. First and more importantly, companies need to make their CSR information more easily available and point out exactly how their products/services (or even the entire company) are connected to CSR initiatives. Second,

despite being very difficult to know the consumers' personal concerns and to take them into account when developing the communication strategy, companies should try to segment consumers according to some more frequently expressed concerns and customize their CSR communication for each target group. Third and last, income is one of the factors that more affect the consumers' CSR sensibility, which means that if the CSR initiatives implicate a higher product price, it is probable that the consumer will only be willing to pay that price difference in high price or high quality niches (this logic works both ways, as companies which simply choose to ignore CSR issues will probably only be able to compete in low-price segments).

2.2 Identified problem

The relevance and level of engagement in CSR is growing in the business world, motivated not only by the consumers' expectations but also to create and maintain a competitive advantage for themselves. In the same way, CSR is also an increasingly important topic for consumers which tend to be more and more informed about this issue, whether it is about the current reputation of a particular company or about its corporate track record. In fact, the concerns stated and addressed by companies in their CSR initiatives (for example, improving recycling practices or campaigning for healthier food choices) are normally also shared entirely by consumers, awakening a feeling of empathy and self-identification in the consumer towards that company, which in turn has a positive impact in the whole corporate image and related products/services. So, to make perfect sense, if there is a match between expectation and reality, then consumers should feel the willingness to reward the responsible companies for their positive attitude and efforts (by starting to value more the products/services which those companies sell). This would later translate into an effective economic gain for the socially responsible companies (predictably, through higher sales volumes) and create a concrete and measurable incentive (higher profits) for companies to adopt or develop their CSR strategies even more. Such scenario induces a virtuous and mutual-beneficial cycle in which companies keep improving their CSR engagements and for which the market finds a way to reward them.

The problem is that this is normally not the case. This cyclical chain of events seems to be broken because of the previously referred attitude-behaviour gap that consumers appear to have. The main reasons behind the existence of such gap (and for which both the literature and business world have yet to produce an adequate response) are the following:

- ❖ Inconsistent information management and reporting: consumers are not getting the type of CSR information they want (or expect) whether it is due to its quantity, relevance or even clarity. These problems are highly related with the lack of homogeneity in the reporting process (for example, companies normally only choose to share with the consumers indicators, metrics or general news for which they can present good results or positive improvements). Companies may even have the intention of disclosing all the information possible (strong and weak points) but

end up lacking the knowledge about which are the relevant criteria or having a poor understanding on how to collect, work and present such data;

- ❖ Information dispersion, availability and understanding: companies have different ways of making CSR information publicly available. Sustainability reports are a very common way of doing so, but such reports do not have to follow a certain set of guidelines, not all companies produce them, total disclosure is not guaranteed and the information there is not easily understood or interpreted by a person who is not familiarized with the context and technicalities of sustainability reporting. Other companies tend to display CSR issues using almost exclusively less formal communication channels, like social media pages, and end up giving an image of timely and sporadic CSR concern instead of a clear strategic involvement in the implementation of more responsible practices. A possible solution for this could be to create a specific section in the companies' websites for grouping and disclosing this sort of information. Nevertheless, to ask the consumer (during the customer journey) to visit all the companies' websites, to find the relevant CSR information in each one and to produce a verdict about CSR performance based on that, is just too much;
- ❖ Absence of an efficient, transparent and global way for evaluating CSR in companies: it is yet to be presented and implemented a practical (yet both truthful and relevant) method to assess global CSR performance in any type of company (for example regardless of the sector in which it operates or the dimension of the company itself), with full disclosure of its methodology and available to any company that wishes to be evaluated. There are some current attempts which try to deal with this issue and partly cover some of referred concerns (efficiency, transparency and the extent of the evaluation) but there does not seem to be one that meets all the necessary requirements (as it can be seen in the last section of the literature review chapter);
- ❖ Inability to efficiently compare companies in terms of CSR: this specific reason can be seen as a natural corollary of the combination of all the previous reasons but also adds an independent component of the problem on its own. The moment when CSR information is more important and can play a more decisive role in the customer journey is during the research part. Unfortunately, there is not a quick and easy way of evaluating or attesting the certification of companies in terms of their CSR compliance. Specialized websites (for example TechRadar) and magazines often compare products from different brands/companies and evaluate them in terms of their quality but any mention to the CSR engagement of the analysed companies is quite rare or virtually non-existent. In the same way, many internet platforms provide user-based reviews (in which any consumer can participate) that aggregate individual reviews and provide an overall score (TripAdvisor and Zomato are two examples of this type of community assessment). CSR policy and initiatives can impact such reviews, since consumers can decide to reward or punish companies for their CSR initiatives (or their lack), artificially affecting the review of the quality of the product. While this may effectively pressure companies to adopt more responsible

practices, it is not the correct approach of evaluating either quality nor CSR performance and end up providing inconclusive/irrelevant information.

2.3 Proposed solution

To tackle the different mentioned problems, the proposed solution is to create a framework that allows to properly (in an efficient, transparent and global way) evaluate or certify the CSR performance of companies. This will be done by applying a sectorial and geographical approach, thus recognizing that companies from different sectors and geographies (namely in terms of economic/human stage of development) present different CSR challenges, priorities or levels of impact. This multiple-criteria evaluation or certification would then be made available directly to consumers through a multi-stakeholder platform and, more importantly, through traditional/online retailers, specialized publications and user-based review systems, who will all have to be persuaded to become strategic partners of this initiative for it to succeed. The mentioned multi-stakeholder platform would be a way of bringing all the stakeholders to the same table and of helping to create more CSR awareness in consumers. The main objectives of such platform will be the following: to make companies share their initiatives and CSR experiences with other companies; to help companies to unveil new campaigns and initiatives to consumers; to create a user-friendly and appealing space for consumers to gather more extensive and systematic information about CSR developments; to involve NGOs and other stakeholders of the same type in this process, assisting in the celebration of partnerships between them and companies.

If the two main general objectives (to create the proposed framework and to find a way to make the information available to the largest possible number of customers) are achieved as expected, then this would allow to solve the problem about the inexistence of a satisfactory method for evaluating CSR in companies as well as the problem related with the inability to efficiently compare companies in terms of their CSR performance. Additionally, there would no longer exist the issue concerning inconsistent information management and reporting because the CSR performance of all companies from the same sector and geography would be calculated using the same logic (for example, implying the use of the same criteria) and producing reliable and comparable final scores. Finally, the combination between single final scores for each company and their expected notoriety (previously explained) would also solve the problem of information dispersion, availability and understanding.

2.4 Chapter conclusions

CSR is a concern more and more relevant not only for companies but also for consumers. For companies it represents, at the same time, both an opportunity and a risk: on the one hand, if companies really bet on CSR commitments and integrate such initiatives on their strategy, they can enhance their reputation and collect such gains through increases in sales or through enhances in the product/service value (that can be translated into higher selling prices); on the other hand, the lack of CSR initiatives, a bad

corporate record on the issue or a misguided approach on the subject may unleash a consumer backlash against the company which will be reflected in less sales or loss of product/service value. In fact, CSR can also be seen by companies as way to “play safe” and mitigate that particular risk.

For consumers, CSR is how they attest if companies share or not the same values and concerns as them and is also a way of making companies integrate in their operations, procedures and general corporate policy the ethical paradigms and behaviours that the society, in which they are inserted, has and lives by. This way, CSR and its respective record is also a criterion that consumers can use to influence their purchase decisions by comparing the different companies from which they can acquire a certain type of product or service.

Nevertheless, the integration of such criterion in the purchase decision is currently not possible because such information is currently not available at all, is available but has doubtful content (for example, a CSR evaluation that does not reveal the methodology and analytical model behind it) or is available but not on desirable terms (for example, a CSR evaluation method that is only applied to big corporations or only evaluates a small fraction of the entire CSR scope of issues).

To face this situation, consumers must get access to a powerful, useful and easy-to-use tool (evaluating mechanism) which will allow them to integrate CSR into their decision-making process (during the consumer journey). The chosen way on how to address and solve this identified problem and how to make this objective (proposed solution) possible is fully developed and presented on this thesis during the “proposed framework” chapter.

3. Literature review

This chapter presents the literature review performed in the context of this thesis, focusing on three different topics: sustainability, CSR (in general), and CSR assessment, reporting and comparison.

3.1 Sustainability

In the year of 1983, the then UN secretary-general Javier Pérez de Cuéllar created the World Commission on Environment and Development with the mission to unite the different nations in the fight against the heavy deterioration of human environment and natural resources that was already being felt. At the helm of that mission was the former prime minister of Norway Gro Harlem Brundtland. Four years later, in 1987, the same commission released the report entitled “*Our Common Future*” (but widely known as the Brundtland Report) which had a very significant impact in many world strategies related with fundamental notions such as sustainability, economic development, environmental protection, wealth redistribution, fair trade and social justice. In fact, this report is single-handedly responsible for producing the first global and still-in-use definition of sustainable development, which is the type of development that “*meets the needs of the present without compromising the ability of future generations to meet their own needs*” (World Commission on Environment and Development, 1987, p. 36).

According to the Brundtland Report, there were seven strategic imperatives (critical objectives for environment and development policies) that needed to be achieved to reach a sustainable development:

- 1) Reviving growth;
- 2) Changing the quality of growth;
- 3) Meeting essential needs for jobs, food, energy, water, and sanitation;
- 4) Ensuring a sustainable level of population;
- 5) Conserving and enhancing the resource base;
- 6) Reorienting technology and managing risk;
- 7) Merging environment and economics in decision making.

By analysing each of the imperatives, it is possible to conclude that companies have a major role to play in all of them and can even be the biggest stakeholder in some of them (for example, points 1, 5, 6 and 7).

The literature has proposed different (but many times complementary) definitions for sustainable development (see Hopwood et al., 2005 and Mawhinney, 2002), which reflect the multidisciplinary character, different values and diverse contexts of the field. Robinson (2004) even argued that “*no single approach will, or indeed should be, seen as the correct one*” (Robinson, 2004, p. 382) and that that is not necessarily a bad thing, rather the recognition of the many conflicting views among practitioners and researchers. Nevertheless, it is fair to say that the conceptualization and definition proposed by the Brundtland Report are the most accepted and used ones.

The notion of triple bottom line (TBL) was first used by John Elkington in 1994 using the 3P formulation “Profit, People and Planet” as a way to represent and to incorporate the three dimensions of sustainability (respectively, economic, social and environmental dimensions) into both corporate values and reporting/accounting systems. This framework positions itself as an alternative to the conventional accounting systems which only consider the economic dimension, a single bottom-line of profits or losses, and might neglect or simply ignore the remaining two (Elkington, 1998).

Elkington also defended the vital role of partnerships during the sustainability transition period which we are now experiencing. These supposedly long-term partnerships between private and/or public companies (also interacting and collaborating with TBL activists) will create synergies and exchange knowledge (good practices), thus establishing a platform to share experience, know-how and common goals. Strategies like this one allow economic players to obtain results that would never be achieved if they were on their own (Elkington, 1998).

The vision of TBL also recommend companies to be prepared for being constantly challenged in depth by their partners, which is a key part of the whole partnership. This is only possible if there is a partnership based on earned loyalty, for which the choice of partners plays a decisive role. Moreover, the stakeholder relationship must also suffer significant changes: stakeholders must be given an active part (like partners) in the entire push for sustainability and ownership in the approaches adopted. This brings different visions, concerns and rationalities to the discussion, enriching it and involving all the relevant parts in the process. Such approach is vital for creating the so needed (and wanted) trust in this type of relationship, which cuts costs, reduces delays involved in project development and other processes, helps to perfect competitive edges and, last but not least, “*provides a source of new business ideas*” (Elkington, 1998, p. 46).

Based on the TBL logic, the Global Reporting Initiative (GRI) proposed some concrete definitions for the three dimensions of sustainability (see Global Reporting Initiative, 2004) which can be seen, with examples of respective sub-categories, in Table 1.

TABLE 1 – GRI DEFINITIONS AND SOME SUB-CATEGORIES OF THE THREE SUSTAINABILITY DIMENSIONS. ADAPTED FROM: GLOBAL REPORTING INITIATIVE (2004)

Dimension	Definition	Examples of sub-categories
Economic	Organization’s impacts on the economic conditions of its stakeholders, and on economic systems at local, national, and global levels.	. Economic performance . Market presence . Indirect economic impacts . Procurement practices
Social	Impacts the organization has on the social systems within which it operates.	. Employment . Labour relations . Health and safety . Training and education
Environmental	Organization’s impact on living and non-living natural systems, including land, air, water and ecosystems.	. Materials . Energy . Effluents and waste . Emissions

Apart from its inherent conceptual importance, TBL have also effectively originated new ways of corporate control and governance, mainly influenced by the growing awareness and importance of sustainability in management decisions. Full cost accounting (FCA) is a proposed accounting system which allows companies to incorporate all the costs and benefits of its activities, including environmental and social externalities (Bebbington et al., 2001).

Externalities, in economics, “*arise where private decisions (taken for largely personal reasons) do not reflect either the public costs of those decisions (cost borne in society as a whole) or private costs which are born elsewhere in the system (by someone other than the individual causing the costs)*” (Bebbington et al., 2001, pp. 13-15). In other words, externalities represent the unrecognized and/or not incorporated impacts that private business has on the community and ecosystem in which is inserted. And since there are still many externalities that are not incorporated (sometimes, they are not even identified) by companies, the implementation of the FCA methodology may be a powerful way to deal with this (Bebbington et al., 2001).

While adopting a democratic/accountability style (meaning that companies should improve their environmental performance, social performance and reporting mechanisms as a way to allow society to act in a more informed and ethical manner), the FCA proposes to internalise the externalities by using a combination of impact identification techniques (for example, eco-balance, life-cycle analysis and the notion of ecological footprint) with monetisation methodologies (for example, economic rent of depleted resources, cost of abating, avoiding or remediating the impact, and cost of the damage arising from the impact) which in turn tend to use a shadow price framework and to apply approaches such as net price, present value or user cost. Nevertheless, the authors clearly state that this monetisation effort is a complex and complicated task and that “*there are a huge variety of defendable (but not unique) ways of generating costing figures*” (Bebbington et al., 2001, p. 73), which is problematic because they will result in different figures and conclusions (Bebbington et al., 2001).

A clear advantage of adopting FCA is to allow companies to anticipate future legal changes, making them better prepared to face the current trend of legislative initiatives which is taking place to tackle pressing sustainability issues (for example, in the EU) like carbon taxes or penalization mechanisms to discourage the use of precarious labour (Bebbington et al., 2001).

Finally, another positive outcome of FCA is the “*enhanced understanding of the organization’s operations and its impacts*” (Bebbington et al., 2001, p. 133) which tends to translate into a better environmental and social performance and might even originate strategic changes/redesigns in the organizational processes that might result in higher levels of productivity, effectively giving companies a competitive edge (Bebbington et al., 2001).

Despite the broad use and acceptance of TBL terminology and paradigm (see Dyllick & Hockerts, 2002) there are some authors who have a very critical position towards it. Norman & MacDonald (2004) argue that TBL is a sort of “*jargon that is inherently misleading*” (Norman & MacDonald, 2004, p. 256) and put in question the validity of that approach to both the social and the environmental bottom lines.

The authors focus their attention on trying to deconstruct and invalidate the concept behind the social bottom line, advocating that a similar analysis could be done in posterior researches for the environmental bottom line. Nevertheless, TBL's opponents are clearly a minority of the scientific community that deals with sustainability issues.

Different initiatives have taken place through the years to try to identify and map an extensive list of the aspects that influence and compose the economic, social and environmental dimensions, as well as to provide indicators, standards and metrics to measure, evaluate and report them. The Global Reporting Initiative (GRI) released in 2016 the most recent version of a set of standards specifically developed to be used by companies to report about their impacts on the economy (GRI 200), the environment (GRI 300) and society (GRI 400) (see Global Reporting Initiative, 2016a, 2016b, 2016c, 2016d, 2016e and 2016f). Additionally, the International Organization for Standardization (ISO) has also issued requirements and guidance lines for certifying organizations on sustainable environmental performance (ISO 14001) in 1996.

There is also research on how to systematize the profusion of sustainable indicators and on how to effectively apply CSR commitments to already established businesses and industries, for example by applying retrofit design (the redesign of an operating process, using new production parameters and configurations, to maximize performance). Carvalho (2016) proposed the SARD (sustainable assessment of retrofit design) framework as a way to help and guide practitioners in the field of process engineering when planning/implementing a more sustainable operation, process or even supply chain (SARD considers these three levels of layer boundary). The framework uses the TBL logic combined with a bottleneck analysis and proposes concrete indicators to assess economic, social and environmental performances, allowing retrofit designers to evaluate and compare different scenarios (for example, the base case against a new design). Because it already considers the three different pillars of sustainability, SARD allows decision makers to have information not only on the foreseen improvements in the sustainability indicators of social and environmental issues but also on vital economic data such as the predicted impacts in net return and the payback time forecast.

Methodologies like SARD allow business to move from words to deeds and to make CSR a viable, and not only rhetorical, corporate strategy. It allows a more informed and objective decision analysis by shareholders and enables the sustainability field to “talk” in the same language as companies, with the economic viability of the business as the starting basis for any further sustainability improvements (see also Doane et al., 2001).

The concepts of sustainable development, and consequently of sustainability, are of crucial importance for CSR since it represents simultaneously its main motivation and aim. Motivation because the need for CSR arises from the assumption that the current economic system and social/environmental policies are not enough to ensure a desirable future and aim because CSR presents itself as a proposed way to make that same desirable future easier to reach.

3.2 Corporate social responsibility

According to the European Commission (EC), CSR can be defined as “*a concept whereby companies integrate social and environmental concerns in their business operations and in their interaction with their stakeholders on a voluntary basis*” (European Commission, 2002, p. 8). It involves actions that go beyond the logics of legal expectations and compliance, possibly leading to competitiveness and/or productivity gains. CSR should not be seen as an equally viable substitute of regulation and legislation. Instead, those state impositions and constraints should be viewed as a basis for which CSR practices can start being implemented (European Commission, 2002). More recently, the same EC made the definition of CSR more flexible and embracing by defining it as “*the responsibility of enterprises for their impacts on society*” (European Commission, 2011, p. 6).

Despite being highly associated with very well known and powerful brands, CSR is a way forward for all types of companies (regardless of their size), including small and medium-sized enterprises (SMEs), and not only big size multinational companies (even though these last ones have led the process of CSR implementation). In fact, due to their position as the greatest contributors to the creation of wealth and employment in western economies, SMEs play a vital role in promoting social and environmental responsible behaviours (European Commission, 2002).

There is evidence of companies that directly benefit (economically) from their larger CSR commitments. These translate into higher profits and stronger growth, because of internal factors (for example, a better working environment which increases the levels of productivity or the more efficient use of natural resources which decreases waste) and external factors (for example, an enhanced CSR reputation with consumers might create more market opportunities and increase product/service value) (European Commission, 2002).

CSR will play an increasing role in the financial sector with the recent introduction of social and environmental checklists as risk evaluation factors for granting loans and approving investments. Moreover, financial services such as stock market indexes have shown a new interest on CSR and initiatives like the Dow Jones Sustainable Indices (which is going to be further discussed in the following section) entails factual financial benefits for responsible corporations (European Commission, 2002).

Matten & Moon (2008) diverge from the definition proposed by the EC and classify the elements of CSR into two different categories: explicit and implicit. Explicit CSR comprises “*corporate policies that assume and articulate responsibility for some societal interests*” (Matten & Moon, 2008, p. 409) and implicit CSR is the “*corporations’ role within the wider formal and informal institutions for society’s interests and concerns*” (Matten & Moon, 2008, p. 409). On the one hand, explicit CSR is associated with strategies, actions and programs that companies undertake on a voluntary basis to reflect social responsibility and sustainability values and to effectively apply them (due to different stakeholders’ expectations) in favour of the community. On the other hand, implicit CSR deals with all the regulatory and legal framework that companies are obliged and accustomed to complying with. This

second category is induced by societal consensus and perceived as a natural contribution of corporations for the society (Matten & Moon, 2008).

Europe is historically more associated with implicit CSR practices (contrary to what happens in the USA, for example) but there are signs of a recent shift in European companies that are starting to adopt more and more explicit CSR initiatives. This fact is justified by the enactment of supranational legislation (EU common policy) that incentivises the adoption of corporate-level managerial solutions concerning CSR and sustainable development in general (Matten & Moon, 2008).

There are even some interesting relations between the two categories if we analyse CSR as a global phenomenon (in global supply chains or multinational corporations). Many companies are now applying the implicit policies practiced at home countries (associated with the developed world) across their entire international operation and this originates cases in which the same practises are no longer implicit, but explicit, because there is no local legislation concerning such issues (for example, in many African countries). On the other hand, the emergence of new regulations in countries like Russia, China or Bolivia will transform current explicit CSR initiatives into implicit CSR practices (Matten & Moon, 2008).

Also taking a different approach than the EC, Carroll (1991) elaborated on the nature of CSR, proposing the model known as the pyramid of CSR (Figure 3), identifying a four-part definitional framework for CSR with four types of responsibilities (sometimes also referred to as expectations): economic, legal, ethical and philanthropic.

The pyramid is intended to be seen as an integrated and unified whole, not a hierarchical relation or a step-by-step process. It is also to be interpreted from a stakeholder perspective (Carroll, 2016).

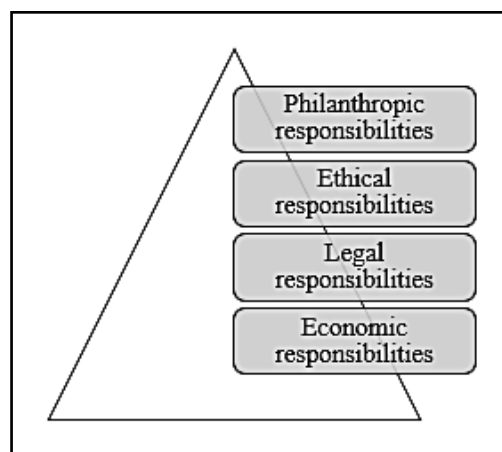


FIGURE 3 – CARROLL'S PYRAMID OF CORPORATE SOCIAL RESPONSIBILITY. ADAPTED FROM: CARROLL (2016)

The economic responsibilities are placed at the bottom of the pyramid to represent the foundational importance of the economic success of any private company (profitability and return on investment) to achieve anything else and to survive in a competitive business world. Basically, without economic success and financial equilibrium, companies will fail (go out of business) and “any other

responsibilities that may be incumbent upon them become moot considerations” (Carroll, 2016, p. 3). Thus, fulfilling the economic responsibilities (to be profitable) is required by society.

The legal responsibilities deal with the whole spectrum of laws and regulations, established/imposed by authorities and law makers. Companies are obliged to respect such minimal requirements, otherwise they may incur severe penalties. So, once again, fulfilling the legal responsibilities (to obey to laws and to comply with regulations) is required by society.

The ethical responsibilities encompass all the issues that, even though they are not covered by law, society considers important to be respected. Sometimes they are difficult to distinguish from legal responsibilities because both share a strong moral dimension. The main difference is that one group underwent legal codification (legal responsibilities) and the other did not (ethical responsibilities). This way, fulfilling the ethical responsibilities (to do what is just and fair, and to avoid harm) is expected by society.

Finally, the philanthropic responsibilities are all the remaining activities (voluntary and discretionary) by altruistic motivation or as way to show good corporate citizenship. Money donations to charities, community development initiatives and volunteering programs are some examples of this. Implying that fulfilling the philanthropic responsibilities (to be a good corporate citizen) is desired by society.

Kotler & Lee (2005) pointed out the following six determining reasons (and examples) for companies to engage in CSR:

- 1) Increased sales and market share: American Express launched a campaign for restoring the Statue of Liberty in which the company would contribute with a certain amount of money for every time their cards were used and for every new card application, resulting in a 27% increase in card usage and in a 10% increase in new card applications;
- 2) Strengthened brand positioning: systematic and coherent CSR practices in Ben & Jerry have created a unique and positive image of that brand that many consumers recognize, even if they are not fully aware of the complete range of commitments the company has;
- 3) Improved corporate image and clout: during the 1992 South Central Los Angeles riots, McDonald's franchises were spared harm. This was only possible due to the solid reputational image of the brand, which in turn was only achieved through its Ronald McDonald Houses program (community relations development program) and its positive labour policies;
- 4) Increased ability to attract, motivate and retain employees: Timberland gives its full-time American workers 40 hours (per year) to be involved in community services, having already been considered one of the best companies to work in (and being that volunteering program a factor for that distinction);
- 5) Decrease operating costs: the energy conservation initiative “Cleaner Air and Millions in Savings” at Cisco Systems, allowed the company to save \$4.5 million per year in operating costs;

- 6) Increased appeal to investors and financial analysts: a report from the Social Investment Forum indicates a considerable increase in value from \$639 billion in 1995 to \$1.185 trillion in 1997, to \$2.16 trillion in 1999 for assets in portfolios linked to sustainability concerns and CSR issues.

Kotler & Lee (2005) also divided CSR initiatives into six types:

- 1) Corporate cause promotions: resources spent to promote specific causes (for example, a fundraising effort to help victims of a certain natural disaster);
- 2) Cause-related marketing: marketing campaigns that result into donations to charity based on product sales;
- 3) Corporate social marketing: marketing campaigns that promote general causes (for example, a campaign to encourage people to donate blood);
- 4) Corporate philanthropy: donations of large sums of money or large amounts of products/services to support specific causes;
- 5) Community volunteering: allowing workers to spend part of their working hours in favour of the community, by taking part in voluntary programs;
- 6) Socially responsible business practices: fair trade practices towards suppliers and adoption of ethical business norms.

Proposing a different conceptual model, Vilanova et al. (2009) grouped CSR issues and initiatives into five different categories (Vilanova et al., 2009, p. 58–59):

- 1) Vision: *“CSR conceptual development within the organization, governance, ethical codes, values and reputation”*;
- 2) Community relations: *“collaborations and partnerships with different stakeholders, corporate philanthropy and community action”*;
- 3) Workplace: *“labour practices and human rights issues”*;
- 4) Accountability: *“corporate transparency, reporting and communication”*;
- 5) Marketplace: *“CSR practices directly related to core business activities such as research and development, pricing, fair competition, marketing or investment”*.

The same authors carried out a study, using a focus group composed of practitioners from the European financial sector, and concluded that there is a clear connection between CSR and competitiveness which is normally caused by issues of image and reputation. Additionally, companies which already internally accept CSR, tend to (in a very organic and natural way) also incorporate new values and modify some processes to reflect the new responsible attitude towards society. Another finding was that, even though many companies consider CSR a very important issue and part of their identity, its measure or evaluation is scarce, mainly due to the lack of a common way to link CSR and competitiveness (which also makes companies to have a much more reactive stance towards CSR initiatives, for example to counter a recent reputational scandal, rather than being proactive about it). Moreover, there is an apparent lack of CSR’s organizational leadership because NGOs do not have the necessary resources, business does not have legitimacy to head the process and public institutions do

not want to assume that responsibility. Finally, the focus group also allowed to conclude that the biggest barrier for CSR development and implementation in the future was “*the difficulty in aligning current business processes with CSR and sustainability objectives, such as establishing CSR performance indicators*” (Vilanova et al., 2009, p. 63).

The idea that CSR is a diffuse or only symbolic aspect of the business world and management academia can also be proven wrong. Matten & Moon (2004) concluded that the generally accepted thought that colleges are not yet capable of teaching and instilling in future managers the necessary CSR values is false, at least across Europe. In fact, CSR is already a frequent curricular concern for many business education institutions which are perfectly aware of the need to reflect such knowledge on their classes and seminars. Nevertheless, CSR research focus remains rare and tends to be oriented towards business topics. The most optimistic part of the findings was actually the trend that was drawn, evidencing an increasingly popular and stunningly dynamic field of studies, with increasing clarification of concepts, growth and maturation of terminology and stronger interest among practitioners and industry (Matten & Moon, 2004).

There is also evidence (Lockett et al., 2006) of a fluctuating importance of CSR in the literature over the years which indicates the intrinsic relation that exists between this field of knowledge and the varied and volatile agendas of the business environment. Even more interesting is the number of references about CSR in the management literature (the greatest single source of references) that clearly surpasses the number of references in the CSR literature itself. Additionally, the amount of empirical research seems to be persistent over time and is dominated by studies of quantitative nature (for example, testing the relationship between CSR and financial performance). These conclusions demonstrate the natural relationship between the two fields and the increasing interest and relevance of CSR in today’s academic world.

Moving from the academia to the consumer/business reality, the CSR awareness and/or impact trends are not always that clear or optimistic. A quantitative study (Pomering & Dolnicar, 2009) on the Australian banking sector evidenced low levels of consumer awareness about CSR and unmet information needs. The authors suggested to companies “*to direct the emphasis of their CSR communication efforts away from advertising to public relations*” (Pomering & Dolnicar, 2009, p. 298) mainly since CSR advertisement seems to induce higher sentiments of scepticism and cynicism on consumers, weakening the message’s level of persuasion and making it a counterproductive measure. This study also pointed as a solution for this, a specific and targeted communication (based on market segmentation), dealing with different personal concerns in a more customized way.

As it was already mentioned, big corporations have been leading the CSR implementation effort for the past decades. Taking that into account, it becomes relevant to also understand if their interactions with the remaining economic players (like SMEs) is able to induce some sort of “positive influence”. For that effect, Baden et al. (2009) conducted a series of interviews and surveys to owners, directors and managers of SMEs. The authors concluded that the buyer power acts as an additional incentive for SMEs

to implement CSR practices, in the majority of cases. This was the case, as an example, for the citrus industry in South Africa which supplied European retailer companies. The pressure from those retailers (the buyers) to promote CSR in their supply chains and make responsible practices part of their decision-making process for procurement activities, resulted in lower levels of pesticide use, higher environmental quality and an improved worker health, distinguishing this South African product from competitors and giving it a clear competitive advantage (Baden et al., 2009).

However, there are also dangers and possible drawbacks for SMEs in this process. The feedback from people working in those companies showed some fear that this would lead to pointless bureaucracy (misleading box-ticking), counterproductive measures (ceiling effect) and less motivation to adopt CSR initiatives. Results also indicate that the two key drivers towards responsible business in SMEs are the desire for a better company reputation and the owner's/manager's personal values on environmental responsibility, showing that the main motivations for CSR implementation are intrinsic ones (Baden et al., 2009).

The ceiling effect happens when imposed CSR standards are lower (less demanding) than the already practised. This makes the case for the need to allow companies to report their CSR achievements using their own terms and not only by filling a standardized form. If that overperformance is taken into account by the buyers, then *“the belief that the SMEs' CSR efforts will increase their chances of gaining custom from large organisations would operate synergistically with intrinsic motivations, rather than undermine them”* (Baden et al., 2009, p. 439).

A quite relevant finding of this study was the sentiment of resentment and cynicism by tick-box approaches and global certification norms such as ISO14001 because of their failure to fully capture the entire range of the diverse and informal CSR engagement types, which is unlikely to illustrate genuine efforts intended to make business more sustainable. That is why it is so important to introduce CSR criteria into procurement decision-making in a comprehensible way. On the one hand, it will involve bigger efforts for buyers to compare the different SMEs, making that task more detailed, time consuming and subjective. But, on the other hand, it is a necessary move to create trust between large organisations and SMEs and to more correctly report and reward responsible business practices (Baden et al., 2009).

3.3 CSR assessment, reporting and comparison

Similar to what has already been presented concerning the sustainability dimensions, different initiatives have already taken place to try to identify and map an extensive list of the aspects that influence and compose CSR issues, and to develop the necessary indicators, standards and metrics to measure, evaluate and report them.

ISO has issued the ISO 26000 requirements and guidelines for certifying organizations on social responsibility in 2010 (see International Organization for Standardization, 2010 and 2015) and the Social Accountability International (SAI) developed the SA8000 auditable certification standard to

encourage organizations to adopt socially acceptable practices in the workplace in 1989 (see Social Accountability International, 2014).

With the objective of measuring and evaluating the impact of CSR on a company-specific level, Weber (2008) has proposed a CSR impact assessment cycle with the following four steps:

- 1) Assessment of qualitative CSR impacts;
- 2) Development and measurement of key performance indicators (KPIs) for the assessment of CSR;
- 3) Assessment of monetary CSR value added;
- 4) Evaluation of strategic relevance of assessment components.

The objective of the first step is to give shareholders and decision makers a view of the CSR measures that would be forgotten in a solely quantitative analysis and that, sometimes, are themselves “*leading indicators for changes in quantitative KPIs*” (Weber, 2008, p. 252).

The second step consists on the complete definition of the CSR KPIs that will be used in the monetary assessment, which translate into benefits for the company (for example, customer attraction and retention). After that, quantitative indicators must be determined to measure such KPIs (giving sequence to the previous example, repurchase rates and market share).

During the third step, a discounted cash flow logic is used to calculate the monetary impact of CSR, taking into account all the benefits, costs and risks (the author defines risk as “*CSR-related stakeholder behaviours that can lead to negative economic consequences for a company*” (Weber, 2008, p. 254–255)) that the individual CSR initiatives induce. These values are often hard to obtain due to the many times dubious cause-and-effect relation between CSR measures and the evolution of the indicators, and also because of the difficulty on distinguishing between CSR and non-CSR costs when using conventional cost accounting systems. Additionally, the author is vague when defining how to calculate the discount rate to be used, only mentioning that it represents “*the opportunity cost of capital and accounts for the risk involved*” (Weber, 2008, p. 251), which implies that the discount rate should be directly proportional to the level and comparative dimension of the risks identified and incorporated by the company.

The fourth and final step aims at providing additional information, not conveyed in the monetary assessment (like the measures pointed during the first step), and prioritizing the different CSR benefits according to their contribution to the broader CSR strategy. This means that CSR value added is not supposed to serve as a determining factor to validate or disqualify any CSR activity, since the activities’ inherent and overall values are not fully captured by that specific calculation.

Models like this one seek to fill the lack of a methodical and practical method to evaluate individual CSR initiatives that companies have adopted or may adopt in the future.

Mota et al. (2015) developed a generic multiple objective mathematical programming model to support supply chain management design and decisions, integrating TBL logic, and performed a case study to apply it. The economic performance was evaluated using the value of total costs (including, for

example, raw materials costs, transportation and product recovery), which the objective function tries to minimize; the social performance was measured using a social indicator created for this specific case, directly connected with the population density (favouring operational solutions implemented in regions with lower population density); lastly, the environmental performance was evaluated using the ReCiPe life-cycle analysis methodology to find out the overall values of the environmental impacts (for production, transport and installation of entities), which sum is minimized by the objective function.

The authors concluded that such model allows decision makers to consider solutions that improve all the three dimensions of sustainability. At the same time, the model also showed that small compromises on the economic performance (but still improving it) may translate into significant social performance gains, indicating that some governmental economic incentives might be pertinent for these sorts of cases.

Applied research like this one is important to deconstruct the idea that CSR measures are a constant trade-off between non-economic sustainability performances and costs, and to effectively demonstrate to managers, shareholders and other decision-makers that investments in CSR initiatives, if competently studied and implemented, may result in higher profits (see also Ramos et al., 2014).

Paredes-Gazquez et al. (2016) analysed the measurement of the social outcomes in the electricity utility industry, by using a composite index. Two main types of problems were found: the lack of available information and technical issues related with the properties of CSR data. On the one hand, the lack of available information was caused by the reduced quantity of information concerning social aspects for that specific industry and the absence of specified social goals for the electricity utility industry at the firm level. On the other hand, the technical issues were caused by the mix of continuous and categorical indicators, non-normal distribution of indicators, lots of missing data, the presence of outliers, small sample sizes at the industry level and low correlations between indicators. To counter these problems, the authors advised the industry to adopt more homogeneous CSR measurement procedures, with the introduction of reporting standards or, more optimistically, the enforcement of a single standard for measuring CSR to guarantee the needed level of detail and transparency. Additionally, the creation of future composite indexes should always include uncertainty and sensitivity analysis to check their robustness because this research concluded that this proposed CSR composite index was not robust enough for measuring social outcomes.

Also taking an industry-level approach, Vintró & Comajuncosa (2010) proposed a set of CSR criteria (addressing sustainability, ethics and human capital issues), performance metrics, predetermine weights and a total score formula (used to obtain a global index) to evaluate CSR performance in the mining industry.

Gjølberg (2009) presented two indexes with the objective of measuring and comparing CSR practices (first index) and CSR performance (second index) in 20 Organisation for Economic Co-operation and Development (OECD) countries. The indexes were developed based on the countries over-representation or under-representation in 9 global CSR indicators (Dow Jones Sustainability Indices,

FTSE4Good, Global 100, UN Global Compact, World Business Council for Sustainable Development, GRI, KMPG International Survey of CSR Reporting, SustainAbility's list of the 100 best sustainability reports and ISO 14001), weighted using the countries' gross domestic product (GDP) share, and allowed to conclude that CSR success is not driven by ethical factors (like countries with higher moral standards than others), but by *“non-ethical factors, such as susceptibility to naming and shaming, and the degree to which business is socially embedded in society”* (Gjølberg, 2009, p. 21).

Gallego (2006) studied the CSR reporting and disclosure procedures of some Ibex-35 (the benchmark of the Spanish stock market index) companies, following the GRI framework, and verified that those relevant and well-known companies already have good systems in place to gather and provide such information. The study also confirmed the existence of sectorial specific-indicators but recommended that the information provided by companies should be as homogeneous as possible, regardless of its size, sector or country of origin.

O'Connor & Spangenberg (2008) developed a methodology for CSR reporting using a multi-stakeholder dialogue approach. The authors defended that companies from the same sector should work synergistically to create standardized CSR managing and reporting activities and to allow all relevant stakeholders to be represented in both processes, by using specific indicators concerning each individual stakeholder. This approach allows companies to build effective communication systems, using a small number of indicators and carrying low implementation costs.

Bonsón & Bednárová (2015) performed a study (using a sample of 306 companies listed in the STOXX Europe 600 index) on the CSR reporting practices of Eurozone companies and reached the following conclusions:

- ❖ Eurozone companies evidence an intensive use of corporate governance indicators;
- ❖ Eurozone companies evidence a moderate use of environmental indicators;
- ❖ Eurozone companies evidence a low use of social indicators;
- ❖ There is no correlation between the size of the company and the extent of CSR disclosure;
- ❖ The sector in which the company operates influences its disclosure practices.

Apart from the economic sector, the size of the company itself and of its business activities, and the geographic location of both its operations and sales, the CSR performance/commitment of companies is also related with market structure and economic environment. Catalão-Lopes (2018) concluded that companies that do business in more competitive market structures (markets where companies – and not necessarily small companies – have smaller market shares) are expected to invest more in CSR, given the same market size, price elasticity and CSR elasticity. Indirectly, and considering that a higher investment eventually leads to better performances, this finding seems to also indicate a positive correlation between market structure competitiveness and CSR performance.

Taking a similar approach, Catalão-Lopes et al. (2016) found out that there exists a dynamic relationship between the economic environment (or economic cycle) and CSR investment. The study concluded that companies, in the short term, tend to reduce their CSR costs when facing economic

downturns (slack resources theory). However, some years after the economic crisis (this empirical study points to three years), companies start to invest more in CSR issues and initiatives (good management theory). This implicates that companies behave in a pro cyclical manner when deciding their CSR investments, meaning that they refrain from doing such investments during periods of GDP (gross domestic product) decline (as a way to control costs) and invest more in CSR during periods of GDP growth. The pro cyclical behaviour during the economic rebound means that companies positively contribute to the overall economic recovery and to its own financial recovery.

Aravossis et al. (2006) proposed a very simplified and general methodological framework for the evaluation of CSR by companies, consisting of the following three stages:

- 1) CSR analysis: companies perform external and internal environment analysis using PEST (political, economic, social and technological) and SWOT (strengths, weaknesses, opportunities and threats) analysis. This will allow the company to better understand the strategic orientation of the organization concerning CSR and therefore to establish a set of measurable targets (quantitative and/or qualitative) that fit its corporate vision and organization culture;
- 2) CSR execution: companies identify and classify the different CSR activity areas (the authors suggest five categories – environment, society, human capital, shareholders and, customers and suppliers). For each one, they develop (with detailed instructions) specific CSR plans and practices which are implemented and executed afterwards;
- 3) CSR evaluation: lastly, companies evaluate the deployed CSR policies to attest if the results matched the objectives. The authors suggest the use of a linear additive evaluation model (a very simple MCDA analysis approach) to provide a final score for each category, calculating the weight of each criterion by analysing existing companies on a sector level and scoring each criterion using a five qualitative degree scale that state different levels of CSR conformance.

More directly connected with what this thesis proposes to achieve, and after some research, three different already implemented (and some of them, very well known) initiatives seemed worth mentioning and analysing: Dow Jones Sustainability Indices (DJSI), Global CSR RepTrak and CSRHub.

The DJSI are a series of indices (which are subsets and customized versions of a common, general and global index – DJSI World) that evaluate the sustainability performance of companies (by using the TBL logic) which necessarily touch many of the same issues as a more specific CSR assessment process. This is done using a two-phase methodology, starting with a corporate sustainability assessment that is later complemented by a media and stakeholder analysis. During the corporate sustainability assessment, the selected companies (meaning that not all companies qualify to be part of the DJSI) answer a questionnaire featuring 80 to 120 questions. These questionnaires cover both industry-specific issues (representing 50% to 60% of the questions) and general criteria which are transversal to any industry (representing 40% to 50% of the questions). The answers provided by the companies allow to score all the criteria through which companies will be evaluated and that already have pre-defined associated

weights (which, for its part, are revised and updated every year). Then, after adding all the scores in a duly weighted manner, a final and global score is assigned to each company. Finally, the media and stakeholder analysis represent a more subjective part of the whole evaluation process, by incorporating (in the final evaluation that provides the total sustainability score) information gathered by “*monitoring media coverage and other publicly available information from consumer organizations, governments or NGOs*” (CSA Guide – RobecoSAM’s Corporate Sustainability Assessment Methodology). The media and stakeholder analysis can reduce the company’s total sustainability score or even recommend to the DJSI Index Committee to exclude certain companies from the indices in extreme situations. After compiling all the total sustainability scores from all the analysed companies, the DJSI selects the companies with the 10% highest scores (for the particular case of the DJSI World Index) and creates a stock index based on the aggregation of the different free-float market capitalization values of all the selected companies. So, basically, the final result of this specific initiative is not a ranking of some companies or even the simple display of all the analysed total sustainability scores but rather a list of the very best companies in terms of sustainability assessment and an associated stock index.

The Global CSR RepTrak is a reputational ranking that aggregates many ratings by individual respondents (for example, according to the ranking webpage, 140,000 ratings were collected during the first quarter of 2017). The respondents are screened in order to verify that they are (at least) “somewhat” familiar or “very” familiar with the issues of CSR and with the analysed companies. There is also a geographic and cultural representation concern included in this study, in which people from 15 countries participate (Canada, USA, Mexico, Brazil, Spain, France, Italy, UK, Germany, Russia, India, China, South Korea, Japan and Australia). This ranking evaluates three CSR dimensions in companies – workplace, governance and citizenship – and for each one of these, three always subjective and sometimes quite generic questions (for example, one of the questions in the citizenship dimension is whether or not the company has a positive influence on society) are made to the respondents. The final result of the Global CSR RepTrak is an ordered CSR reputation ranking of companies’ scores from 0 (worst possible score) to 100 (best possible score) which allows a clear comparison between companies in terms of their CSR score. Nevertheless, it is important to stress that this is a reputational ranking and not a performance one. It is based only on the respondents’ perception of the CSR performance of companies and not on the factual and measurable performance itself (the two – reputation and performance – would only be the same for a the scenario of access to perfect information by consumers, which is clearly not the case in the modern business world).

Finally, CSRHub is a CSR performance rating provider, considering the following four CSR categories with the corresponding sub-categories (three for each one) below them:

- ❖ Environment;
 - ❖ Environmental policy and reporting;
 - ❖ Energy and climate change;
 - ❖ Resource management.

- ❖ Employees;
 - ❖ Diversity and labour rights;
 - ❖ Compensation and benefits;
 - ❖ Training, health and safety.
- ❖ Community;
 - ❖ Community development and philanthropy;
 - ❖ Human rights and supply chain;
 - ❖ Product.
- ❖ Governance.
 - ❖ Leadership ethics;
 - ❖ Board;
 - ❖ Transparency and reporting.

The rating is calculated based on the information provided by more than 550 data sources, including socially responsible investing analysis firms (for example, ASSET4 from Thomson Reuters, Carbon Disclosure Project and RepRisk), NGOs, government databases, publications, research reports and input from individual CSRHub users. After aggregating such a wide variety of data and making sure that there is a minimum number of sources, a minimum amount of data and a good level of agreement between the data sources, the data is normalized using a scale of 0 to 100, being 0 the worst possible performance and 100 the best possible performance. Then, each sub-category and category are weighted according to each user's profile settings (defined for the first time during the profile creation but being editable at any given time), meaning that the generated rating is dependent on the level of importance that each user attributes to each one of the different sub-categories and categories at any given moment. Which in turn means that no single score exists and that the final rating will be specially customized for each user and just reflect his/her own concerns about CSR at that time. Additionally, it is not always possible to get information about all the sub-categories of a company. In that case, and to mitigate that issue, CSRHub also offers partial evaluations for the three categories but fails, this way, to present a global evaluation.

A complementary comparison (in terms of efficiency, transparency and globality) of the three previously analysed evaluating initiatives is presented in Table 2. The first column of Table 2 contains the three terms of comparison and some questions (for each one) that seek to clarify what efficiency, transparency and globality mean in this context and to state the basis for the analysis.

TABLE 2 – COMPARISON BETWEEN DJSI, GLOBAL CSR REPTRAK AND CSRHUB

	DJSI	Global CSR RepTrak	CSRHub
<u>Efficiency</u> Is it easy to gather and process all the necessary information? Would it be feasible to evaluate all companies using this methodology (are there problems related with the dimension of the analysed group)? Does it allow to compare different companies?	×	×	×
	The questionnaires are quite extensive, include subjective questions and most SMEs do not have information or implemented reporting systems regarding many of the analysed criteria. To be evaluated, a company must be chosen by the DJSI committee and the complexity of the methodology does not allow a big number of companies to be involved. The only way to compare companies is whether they are present in the indices, which does not provide consumers with much information.	The information is not difficult to gather or to process but it would never be possible to evaluate all companies with this methodology because the evaluation is the responsibility of the respondents and asking them to classify hundreds of thousands (or even millions) of companies would be unthinkable and impractical. Additionally, the level of comparison obtained in the end is not the wanted one (reputation instead of actual performance).	Once the sources are selected and its inputs are normalized, the information is easy to gather and process. Additionally, the fact that each company gets its own score, allows them to be compared (even considering that such scores will differ from user to user). But, since many of the sources only gather information concerning big or well-known companies (with high notoriety), this method will never allow to evaluate all companies.
<u>Transparency</u> Are there striking conflicts of interests? Is the methodology clear and fully disclosed?	✓	✓	×
	There are no striking conflicts of interests. All the details concerning the methodology are available (list of criteria and respective weights). The only piece of information that seems to be missing is on how the different weights were obtained.	There are some conflicts of interest since several analysed companies are also clients of the organization responsible for this study. Yet, these companies are properly identified, and there does not seem to be any attempt to benefit them. The methodology is clear and fully disclosed.	There are no striking conflicts of interests. The methodology is not clear (for example, some sources provide conflicting information concerning the same company) and the website should provide more information on how the data is managed and treated.
<u>Globality</u> Does it cover all the relevant CSR issues? Is it possible to apply the methodology to all types of companies (are there problems related with the diversity of the analysed group)?	✓	×	✓
	Even though it is a sustainability analysis, all the most relevant CSR issues are present, and all types of company can be analysed (the method even takes into account the type of industry to which each company belongs).	The used criteria do not cover all the relevant CSR issues and appear to be too vague in many cases. Nevertheless, the methodology seems to be applicable to any type of company.	The used criteria cover all the relevant CSR issues and can be applied to evaluate all types of companies.

3.4 Chapter conclusions

This literature review allowed to have a clearer and more detailed picture of the state of the art in the fields of sustainability and CSR. Despite being quite recent fields, their relevance is already an indisputable fact and their connection to the business world is increasingly more applicable and frequent.

Nevertheless, a research gap that can be pointed out is the nature of the relation between CSR performance and financial performance in companies. Different studies present contradictory results (positive and negative correlations) and some studies even argue that the current research does not allow to draw any conclusion about the subject. The reputational risk management seems to represent a good argument (on its own) for companies to bet on CSR involvement and development. However, if the objective is to involve all companies and truly change the business paradigm, it would be useful to present such a powerful motivator as the proof of the positive relation between CSR performance and financial performance in companies. For this to be possible, more research (namely quantitative and applied research) is needed.

Additionally, some proposed methods and actual attempts to assess, report and compare the CSR performance of companies were presented and explained. This analysis revealed the inexistence of an ideal (considering the standards already defined and justified during this thesis) and already implemented method to properly evaluate the current CSR performance of companies. This research gap is the one that gave motivation to choose the theme of this thesis and gave origin to the proposed solution.

4. Proposed framework

This chapter presents the proposed framework (the embodiment of the proposed solution) and represents the central part of this thesis. Here, the research questions are stated, some assumptions and initial remarks are established, and an MCDA methodology is thoroughly described.

4.1 Research questions

Based on the exposed contextualization, on the identified problem, on the proposed solution and on the previous literature review, the following (now concrete) research questions arise:

- ❖ Which are the sets of CSR categories and sub-categories that allow a comprehensive CSR performance evaluation of companies?
- ❖ Is it possible to translate such sub-categories into a manageable number of measurable criteria?
- ❖ How can the model produce a single evaluation score for each company when considering several different criteria?
- ❖ How can a model deal with the inherent relations between criteria?
- ❖ What are the stakeholders that must be involved in such an initiative for it to succeed and what is their respective role?
- ❖ What is the best way of disseminating the evaluation results to consumers?

This framework, presented in this chapter, will try to answer such questions, thus providing a new alternative for evaluating, certifying and promoting CSR in the modern business world.

4.2 Assumptions and initial remarks

As it was previously mentioned in the literature review chapter, the CSR performance of companies seems to be related to all of the following factors:

- ❖ Economic sector;
- ❖ The geographic location of both operations and sales;
- ❖ Size of the company itself and of its business activities;
- ❖ Market structure;
- ❖ Economic environment.

In fact, in addition to these factors, some others (more subjective and harder to implement) might be mentioned such as the amount of available resources (financial, human, or of any other kind) and the CSR's implementation stage.

However, if one decides to only consider such generic factors to evaluate companies and to draw conclusions regarding their respective CSR performances, no valid conclusion will be reached, at least in terms of establishing a ranking or a score of distinct individual companies. This is because these factors, even if combined, only indicate generic trends and aggregated information, which is not useful

when we want to clearly distinguish the differences between two or more companies that might operate in the same sector, be present in the same geographic location, have the same size, face the same type of market competition and deal with the same moment of the business cycle. In other words, any evaluation of the business world in terms of CSR performance needs to assume that each unit that forms each company is unique.

Even though the previous factors are not suitable to be selected as criteria for the CSR evaluation of companies, they do provide a good basis for understanding the knowledge input that this evaluation effort will require, as well as a way of adapting the extensive list of criteria to each specific situation (this last topic will be fully addressed later in this chapter).

In order to simplify the problem and to make this evaluation and decision aiding process practicable, only two factors of the previous ones just mentioned will be selected: the sector and the geographical location. This choice immediately implies that this framework will have a sectorial and geographical approach to CSR, meaning that each time it is applied/used, it will only regard a chosen sector that operates inside a defined geographic location. Nevertheless, the remaining factors that were not selected must not be fully discarded and neglected. In fact, many of them should be taken into account during the whole process of developing and operating the criteria. For example, the size of the company or its amount of available resources should never act as an advantage or disadvantage in any criterion. These types of problems can and must be averted using different well know strategies (such as the careful weighting of indicators) to accommodate a priori comparisons which might unbalance the evaluation.

Having defined the bidirectional approach of this framework, it is necessary to further clarify the notions of “sector” and of “geographical location”.

According to the Eurostat (EU’s statistical office and authority), “*sectors are obtained by disaggregating the total economy to obtain more homogeneous groups of resident institutional units, which are similar in respect to their economic behaviour, their objectives and functions*” (Eurostat's Concepts and Definitions Database). There are many different types of sectorial statistical classification methods and, as long as they are technically well conceived and statistically relevant, any of them can be used to implement this framework. For example, the same Eurostat put forward the Statistical Classification of Economic Activities in the European Community Rev. 2 (2008), also known as NACE Rev. 2, which divides the economic fabric into the following twenty-one sectors: (1) agriculture, forestry and fishing; (2) mining and quarrying; (3) manufacturing; (4) electricity, gas, steam and air conditioning supply; (5) water supply; sewerage, waste management and remediation activities; (6) construction; (7) wholesale and retail trade; repair of motor vehicles and motorcycles; (8) transportation and storage; (9) accommodation and food service activities; (10) information and communication; (11) financial and insurance activities; (12) real estate activities; (13) professional, scientific and technical activities; (14) administrative and support service activities; (15) public administration and defence; compulsory social security; (16) education; (17) human health and social work activities; (18) arts, entertainment and recreation; (19) other service activities; (20) activities of households as employers; undifferentiated

goods- and services-producing activities of households for own use; (21) activities of extraterritorial organisations and bodies.

Regarding the geographic location factor, it refers to where (physical location) the company operates and does its business. It can be defined at a national level (for example, Portugal or Belgium) or at a supranational level (for example, the Benelux or the EU). The important aspect is the coherence and validity of the choice, which must only group countries with similar CSR and legal paradigms, and comparable wealth and development realities. If choosing the EU is an acceptable choice, the same could not be said if the choice was China and Japan, for the above reasons.

Taking all this into account, the first step of this proposed framework becomes evident: to choose the sector and the geographical location which are going to be studied. Only then, can the MCDA methodology be applied.

4.3 A multiple-criteria decision analysis methodology

The literature review (concretely the already implemented initiatives that try to evaluate CSR performance) and the research questions previously presented point out that this problem is an MCDA problem. So, to solve it, the appropriate methods and strategies must be followed. According to Bouyssou et al. (2006) a decision aiding process has the following four parts: a representation of the problem situation, a problem formulation, an evaluation model and final recommendations.

The representation of the problem deals with the definition of the different parts involved in the process, the concerns of each one of those parts and the level of commitment that each part has on each concern. During this stage, it is normal that different representations of the problem arise and are discussed between the analyst and the decision-maker, which should not be regarded as something negative, but rather a natural phase and part of a process of harmonization of perceptions (and which in turn is essential to ensure a good exchange of information and to obtain congruent future results or recommendations) (Bouyssou et al., 2006).

The problem formulation corresponds to the phase responsible for defining the appropriate strategy to approach and to deal with the problem (affecting the type of the final results or recommendations). It is often interpreted as a translation of the concerns and expectations of the decision maker to a formal and operable language through the use of the decision support language (formal type of communication which reduces ambiguity, is independent of any field of knowledge and introduces a model of rationality in the decision aiding activity). Normally this phase leads to a process of increasing clarification of concepts and objectives between the analyst and the decision maker. The problem formulation also tries to predict some conclusions of the decision aiding process to check if there is a match between their type and the type expected by the decision maker (Bouyssou et al., 2006).

The evaluation model is the construction of the analyst that, by organizing the available information, will allow to reach a formal answer. It is intended to be validated by both the analyst and the decision

maker, and “*to establish the necessary consensus between the decision maker and the analyst, consensus which (at least partially) legitimates the model to be used within the decision process for which it was conceived*” (Bouyssou et al., 2006, p. 43). During the construction of the evaluation model, the alternatives that are going to be evaluated are identified, the evaluation dimensions are chosen, the levels or degrees used to order or to “measure” the evaluation dimensions are defined, the criteria under which each alternative is going to be evaluated are selected, uncertainty structures to apply to the dimensions or to the criteria are defined and, finally, “*a set of aggregation procedures including the necessary parameters*” (Bouyssou et al., 2006, p. 44) (to allow a more concise evaluation through a comprehensive relation and/or function between the alternatives) is established. The preferences of the decision maker must be taken into account in all of these just mentioned steps (Bouyssou et al., 2006).

Bottero et al. (2018) applied the Choquet integral preference model (after introducing some methodological developments) to a MCDA problem involving the re-qualification of an abandoned quarry. The main advantage of this specific type of evaluation model is that it takes into account the interactions between different criteria (which is quite common in CSR issues), using capacities instead of weights. This is done by implementing mutual-strengthening effects (also called synergies) and mutual-weakening effects (also called redundancies).

Lastly, the final recommendations are a translation of both the evaluation model’s outputs and the conclusions of the decision aiding process to a language that is comprehensible and usable by the decision maker to help and assist him/her on his/her decision. To achieve such, the final recommendation should be technically sound (“*no incorrect or meaningless manipulations should be undertaken*”) (Bouyssou et al., 2006, p. 44), operationally complete (“*the client understands the recommendation and is able to apply it*”) (Bouyssou et al., 2006, p. 45) and legitimated (must consider the “*organizational, cultural, ethical and interpersonal dimensions*” in which the decision maker is inserted) (Bouyssou et al., 2006, p. 45).

During the remaining part of this chapter, each one of the previously referred parts of the decision aiding process will be further extended.

4.3.1 Representation of the problem situation

The MCDA methodology as exposed by Bouyssou and as applied in the clear majority of its numerous applications, implies the identification of a clear decision-maker (individual or collective). However, the decision-maker of this framework is not someone or any group of specific individuals but rather a generic consumer who wishes to incorporate CSR concerns into his buying process.

To deal with this issue, this framework resorts to the already presented/reviewed CSR-related literature and previous initiatives which attempt to capture consumers’ concerns regarding CSR issues.

Additionally, in order to participate and technically support the application of the MCDA methodology, a group of experts must be assembled (second step of the framework). These experts need

to have a good knowledge about the companies and CSR reality, which are being study (always considering both the chosen geographic location and sector) and must not include cases of conflict of interest (for example, an owner, manager or worker of one of the evaluated companies should not be part of the expert group).

The objective of this group of experts is to provide the evaluation effort with the needed know-how on the different fields of knowledge that CSR deals with (economics, environmental management, regulatory affairs, worker rights, corporate control, among others) and also to serve as “representatives” of the consumers’ sensitivities on the subject. The members of this group of experts will have to interact (as a group) with the analyst (hereinafter used to refer to the person who applies the proposed framework) in face-to-face meetings, where they will have to reach consensus among themselves to answers the questions posed by the analyst and to validate issues concerning the MCDA methodology.

On the part of the analyst, it is expected that he will be responsible for preparing, structuring and coordinating the meetings, for advising when requested, for implementing the analytical model and for analysing and presenting the results.

These last topics about the specificities of the interaction between analyst and group of experts will be further elaborated in the next sub-sections.

Finally, companies (which constitute the alternatives of the MCDA problem) are clearly a very important stakeholder of a CSR evaluation effort like this one. As this is an initiative with a spirit of voluntary participation, the willingness of companies to get involved will always be vital. The analyst and the group of experts should never have a confrontational or blaming attitude towards companies but rather reinforce the positive and pedagogical tone that will later be transmitted to consumers.

4.3.2 Problem formulation

During this part of the decision aiding process, the objective is to materialize the inputs and information gathered during the representation of the problem situation. This will result in an analysis and the development of the criteria that will ultimately evaluate the different alternatives under study (companies). The problem formulation part is thus responsible for identifying the fundamental points of view (FPVs) that shall be studied, for conducting a first exploration concerning the potential alternatives that might be considered and for defining the expected results of the decision analysis (which in the case of this framework is a ranking of the alternatives).

Some methodologies, standards and initiatives, while using different scopes and pursuing distinct objectives, have already attempted to do exactly that. Since none of them completely fulfilled the objectives of this work (topic previously analysed in the literature review chapter), a new extensive list of criteria must be developed and the best way to do this is through the creation of the value tree of this framework.

The structure and terminology of the MCDA problems' value trees are not entirely consensual. So, a brief explanation regarding this issue is required. In this framework the value tree will be divided into three different levels: FPVs, criteria and sub-criteria.

The FPVs are the highest and broadest level of the problem break down, representing the main (and normally quite general) dimensions, which the evaluation wishes to capture. The further detailing of the FPVs leads to the development of criteria. These last ones are already more concrete and understandable than the FPVs, but they are still not specific enough to allow a proper evaluation. Because of this, the problem is then, further broken down into sub-criteria. These last ones will represent the lowest level of the problem break down and allow the necessary operationalization of the criteria, which in turn are finally used to evaluate (and ultimately compare) the alternatives.

This framework will use as FPVs and criteria, respectively, the categories and sub-categories of the CSRHub schema (see Figure 4). The CSRHub's schema and the corresponding FPVs and criteria were chosen as the structure for this framework due to its comprehensible nature (covering a very complete list of topics), clear intention of focusing both on internal (for example, employees) and external (for example, community) matters and because it offered a good visual representation of the inherent multidimensionality character of CSR (four different FPVs) and the equilibrium of such multidimensionality (there are exactly three criteria for each FPV).

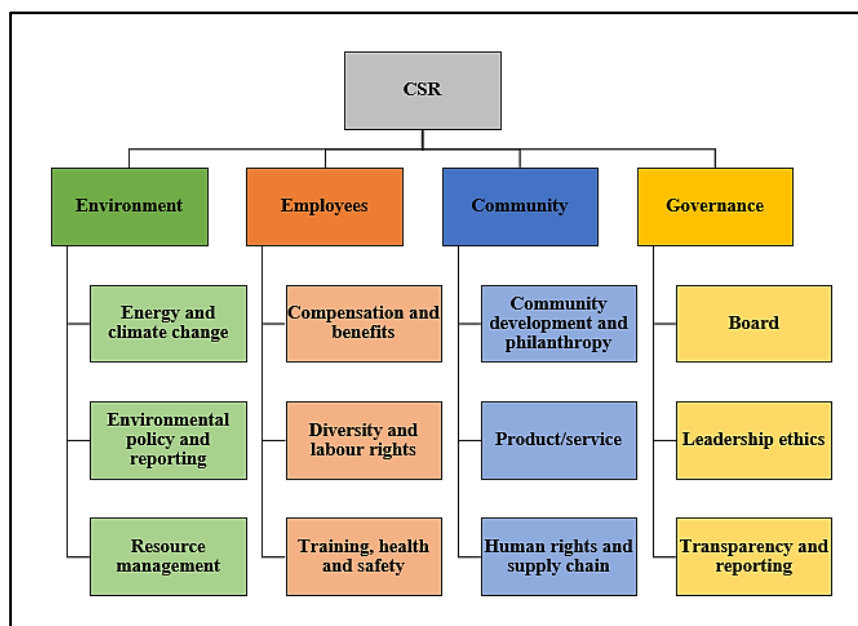


FIGURE 4 – CSRHub's CATEGORIES AND SUB-CATEGORIES SCHEMA

After having defined the FPVs and criteria to be used, the sub-criteria had to be chosen and added to the value tree. This was done using four different (and many times complementary) information sources: CSRHub's list of sub-criteria, SA8000's list of sub-criteria, GRI's list of sub-criteria, and GRACE's (GRACE – Grupo de Reflexão e Apoio à Cidadania Empresarial – is a Portuguese non-profit association exclusively dedicated to the promotion of CSR practices) CSR practical guide's checklist.

Then, the list was revised in order to remove the inevitable redundancies and to group/cluster highly related sub-criteria. As a final step, a final and general validation of the whole extensive list was performed as a way to make sure all CSR issues were present and duly represented. The contribution that each information source (or methodology) provided for the elaboration of the list of the 66 sub-criteria (15 for environment, 20 for employees, 18 for community and 13 for governance) can be seen in Tables 59, 60, 61 and 62 in Appendix A.

Summing up, the necessary steps to elaborate the extensive list of indicators were the following:

- 1) Value tree structuring (definition of the FPVs and criteria) using CSRHub's categories and sub-categories schema;
- 2) First addition of sub-criteria using CSRHub's list of sub-criteria;
- 3) Second addition of sub-criteria using SA8000's list of sub-criteria;
- 4) Third addition of sub-criteria using GRI's lists of sub-criteria;
- 5) Fourth addition of sub-criteria using GRACE's CSR practical guide's checklist;
- 6) Removal of redundancies and clustering of highly related sub-criteria;
- 7) Final validation.

4.3.3 Evaluation model

The evaluation model part of the decision aiding process is responsible for the identification of the alternatives which are going to be evaluated, the operationalization of the criteria (which is possible through the combination of sub-criteria) and for the implementation of the analytical model. When successfully constructed and applied, the evaluation model produces partial and global scores for the different alternatives under study. Partial scores will allow to compare the performance of companies on individual criteria or FPV, and global scores will allow to compare the overall CSR performances of the evaluated companies. These last global scores are considered the main result of this framework. Therefore, the analysis of the results and the final recommendations will mainly focus around them.

4.3.3.1 Identification of the alternatives

The third step of the framework is the identification of the alternatives. During this step the analyst should contact companies from the chosen sector and geographic location, and publicly announce that the evaluation effort will take place. The participation in this initiative should be completely voluntary and independent of any given corporate motivations. However, the more notoriety the initiative gets from consumers and public opinion in general, the more compelled companies will feel to get involved, even if this derives from consumer pressure and not from any specific corporate strategy's or corporate culture's push for improving the company's CSR performance. And, in fact, just the decision of a specific and important company not to participate when all the remaining relevant players and

competitors are doing so, is a negative indicator that consumers might use (if they take notice of it) to define their consumer patterns.

If it the first time that such sector and geographic location are evaluated and/or if it becomes too difficult to convince a good group of companies (for example, a group which represents a significant amount of the market share) to be evaluated, then the analyst should try to perform a more basic non-voluntary evaluation, using publicly available information from some selected companies (again, this selection should try to capture a significant amount of the market share). Sustainability reports, CSR reports and third-party audits are all good examples of publicly available information sources.

4.3.3.2 Criteria operationalization

The fifth step (the fourth step will only be presented later for practical reasons) of the framework deals with the criteria operationalization. This is accomplished through the development and use of descriptors.

According to Bana e Costa & Beinat (2005), a descriptor is “*an ordered set of plausible impact levels associated with a key concern*” (Bana e Costa & Beinat, 2005, p. 12). In the case of this framework, the key concerns will be the criteria and the ordered set of plausible impact levels will be called scale. Descriptors are used to describe the impacts of alternatives (regarding each criteria) with the highest objectivity possible, and to create a series of plausibility domains by limiting the range of impact levels, thus making the evaluation model easier to contextualize and to understand.

The same authors distinguish three types of descriptors (Bana e Costa & Beinat, 2005, p. 14):

- ❖ Direct (or natural): descriptors which “*directly reflect effects*” ;
- ❖ Indirect (or proxy): descriptors which “*indicate causes more than effects*”;
- ❖ Constructed: descriptors specifically developed for a certain decision context. This type of descriptor is much more common due to the usual lack of viable alternatives that describe the impacts of alternatives in a direct or indirect way.

Each constructed criterion is operationalized using at least one dimension and each dimension is composed of a sub-criterion and an associated ordered preference scale. If, on one hand, the descriptor considers only one dimension, it is called a one-dimension descriptor or a descriptor with a one-dimension scale; if, on the other hand, the descriptor considers more than one dimension, it is called a multidimensional descriptor or a descriptor with a multidimensional scale (Bana e Costa & Beinat, 2005).

The whole criteria operationalization should be performed according to the group of experts’ preferences and choices (including the creation of scales for each dimension of each descriptor) and should reflect the previous problem formulation. The ordered preference scale (used to define dimensions for constructed descriptors) can also be characterised in terms of the way their impact levels are described (Bana e Costa & Beinat, 2005):

- ❖ Pictorial: uses images to describe the different impact levels;
- ❖ Verbal: uses words (qualitative scale) to describe the different impact levels;
- ❖ Numerical: uses numbers (quantitative scale) to describe the different impact levels. Numerical preference scales can be further characterized whether they are discrete or continuous.

After the criteria operationalization is completed, the team of experts should then score all alternatives in all their dimensions (sixth step of this framework). A whole criteria operationalisation, which individual cases can be regarded as a practical example of the topics addressed in this sub-section, is performed later in this thesis during the fifth step of the framework in the case-study chapter.

In the following four sub-sections (one for each FPV, and with each sub-section further divided into three parts, one for each criterion) the extensive list of sub-criteria is presented and detailed. The FPVs will be denominated using their acronym itself (“FPV”), the criteria using the letter “c” and the sub-criteria using the letter “s”.

FPV₁ – Environment

Criteria c₁: Energy and climate change

Sub-criteria s₁: Climate change – evaluates the plan (long term policy) to tackle climate change, including current and future opportunities and threats for the company. It deals with corporate strategy and not with actual emission levels or other metrics of such type.

Sub-criteria s₂: Energy use and energy-efficiency – evaluates the undertaken actions to promote and implement energy efficiency across the company and measures factors such as energy intensity (relation between energy consumption and company revenue or between energy consumption and production output) and energy mix (sources of the energy consumed and their respective weight in the total energy consumption).

Sub-criteria s₃: Other alternative environmental technologies – evaluates the initiatives intended to make the company to develop both green technology and green engineering solutions in the company’s operations (and excluding energy related technologies).

Sub-criteria s₄: Greenhouse gases emissions – evaluates the amount of CO₂ (carbon dioxide) and other greenhouse gases (such as nitrous oxide and methane) emissions which directly contribute to global warming.

Sub-criteria s₅: Ozone depletion and acidification – evaluates the emissions of substances which directly contribute to the ozone layer depletion (ozone-depleting substances (ODS)) and to the formation of both acid rains and smog (including nitrogen oxides (NO_x) and sulfur oxides (SO_x)).

Criteria c₂: Environmental policy and reporting criteria

Sub-criteria s₆: Biodiversity – evaluates the impacts of the company on biodiversity as well as the strategies aimed at mitigating such impacts.

Sub-criteria s₇: Supplier screening using environmental criteria – evaluates whether and how the company considers and monitors environmental performance and compliance for its sourcing decisions.

Sub-criteria s₈: Environmental reporting and standards – evaluates how the company reports its environmental performance, including the level of depth and scientific validity of such reporting efforts, and whether the company adheres to environmental reporting standards.

Sub-criteria s₉: Requests for transparency – evaluates the company's information management system concerning investor, regulatory and stakeholders' requests for environmental transparency, including compliance with mandatory environmental legal procedures.

Criteria c₃: Resource management criteria

Sub-criteria s₁₀: Materials and water – evaluates the amount of materials and water needed for the company to operate and to ensure its production needs. It includes analysis on the type of materials (for example, if they are hazardous or not) and the type of water (drinking water, industrial water or steam).

Sub-criteria s₁₁: Supply chain management – evaluates the capacity to find more efficient environmental solutions by improving the company's supply chain (for example, the substitution of some hazardous input products for renewable or recycled materials, the optimization of the transport routes, or the introduction of more efficient and eco-friendly production methods).

Sub-criteria s₁₂: Life-cycle analysis – evaluates the life-cycle analysis (basically, a comprehensible identification of the total environmental impact of a product) of the company's products.

Sub-criteria s₁₃: Waste and recycling – evaluates the waste management and recycling performance of the company.

Sub-criteria s₁₄: Local airshed and watershed – evaluates the operations that the company performs in order to benefit the local airshed and watershed. It includes efforts to reduce the number of particles emitted to the atmosphere (using air filters in the industrial chimneys, for example) and all the water treatment activities.

Sub-criteria s₁₅: Land use and local ecological stability – evaluates the land use impacts caused by the physical presence of the company on its surroundings and the sustainability of such presence.

FPV₂ – Employees

Criteria c₄: Compensation and benefits criteria

Sub-criteria s₁₆: Compensation and financial benefits – evaluates the compensation and benefits policy of the company. It deals with issues regarding the fairness and equality of compensations and includes comparing the worker's current remuneration level with local costs of living and industry standards, as well as other issues such as overtime reimburse at a premium rate.

Sub-criteria s₁₇: Employees' engagement and development – evaluates the efforts (in the form of benefits) by the company to improve the workers' commitment with the company's current and future business (for example, by introducing employee stock ownership plans) and to invest on their development (for example, by offering MBA programs).

Sub-criteria s₁₈: Long-term employment growth and stability – evaluates the nature, longevity and stability of the company's labour relations.

Sub-criteria s₁₉: Promotion practices – evaluates how the company deals with promotions, including the existence of a clear career progression path and of salary improvements related to promotions.

Sub-criteria s₂₀: Lay-off practices – evaluates if (and the circumstances under which) the company pursues lay-off practices, and the sort of compensations (if they exist at all) provided to the affected workers.

Sub-criteria s₂₁: Retiring or retired employees – evaluates the relations of the company with workers currently retiring and already retired. It includes potential initiatives such as retirement counselling, pre-retirement programs and corporate pension plans.

Criteria c₅: Diversity and labour rights criteria

Sub-criteria s₂₂: Diversity policies – evaluates the current situation of the company in terms of worker's diversity as well as the plans to promote and sustain it.

Sub-criteria s₂₃: Labour-management relations and participation by employees – evaluates how management engages with its workers and the level of participation that these last ones have in the decision-making process of the company. It includes the existence (or not) of notice periods regarding operational changes and the promotion of internal feedback systems and group work approaches.

Sub-criteria s₂₄: Freedom of association and protection of rights to organize and to bargain collectively – evaluates all the aspects concerned with trade union activities, including the right to

strike and to negotiate directly with the company management on behalf of all the represented (unionized) workers.

Sub-criteria s₂₅: Employment of children and forced labour – evaluates whether or not the company engages in the practices of child labour or forced labour. Forced labour deals with a variety of different realities like modern slavery or forced prison labour.

Sub-criteria s₂₆: Equal opportunities – evaluates if the company provides equal opportunities (regardless of the gender, age, ethnicity, religion or sexual orientation) to its workers.

Sub-criteria s₂₇: Working hours, resting time and work-life balance – evaluates how the company copes with issues that directly affect the worker’s personal life. The “promotion of work-life balance” component includes issues such as parental leave and payed holidays.

Sub-criteria s₂₈: Cases of coercion – evaluates how the company deals with cases of coercion among workers or involving the management, including cases of sexual or psychological harassment.

Sub-criteria s₂₉: Complaint management/resolution and disciplinary practices – evaluates the corporate mechanisms and proceedings to receive, process and resolve complaints made by workers as well as the disciplinary practices used by the company (for dealing with such complaints and for any other situation). For example, disciplinary practices such as physical punishments, extra work or excessive/illegal deductions from wages should never take place.

Criteria c₆: Training, health and safety criteria

Sub-criteria s₃₀: Accidents and safety – evaluate the company’s record concerning accidents and safety (for example, job related injuries) as well as the current strategies and proposed plans to minimize the related risks (for example, the implementation of safety standards and of periodical emergency drills).

Sub-criteria s₃₁: Employee-management safety teams – evaluates if the company has or plans to create safety teams where both workers and management work and discuss safety issues together.

Sub-criteria s₃₂: Job training – evaluates the company’s efforts to provide job training programs to its workers.

Sub-criteria s₃₃: Health, well-being and productivity – evaluates how the company seeks to improve the quality of live and productivity of its workers. It includes ways to improve hygiene and comfort in the workplace and to deal with absenteeism.

Sub-criteria s₃₄: Employees’ morale and engagement – evaluates the non-financial initiatives undertaken by the company to boost worker’s morale and their commitment with both the company itself and remaining co-workers (for example, team building activities and recognition programs).

Sub-criteria s₃₅: Worker development programs – evaluates the non-financial contributions of the company for the personal development of each worker, including soft-skills workshops and foreign languages classes.

FPV₃ – Community

Criteria c₇: Community development and philanthropy criteria

Sub-criteria s₃₆: Charitable giving, donations of goods and pro-bono work – evaluates the amount of resources the company invests on philanthropy.

Sub-criteria s₃₇: Volunteerism of staff time – evaluates the company policy and incentives concerning corporate volunteering programs. Such volunteering programs do not include pro-bono work because they represent initiatives not directly related with the company's activities.

Sub-criteria s₃₈: Protection of public health – evaluates the company practices and commitments regarding public health matters (for example, awareness campaigns promoting healthier eating habits or blood donations).

Sub-criteria s₃₉: Direct socio-economic impacts – evaluates the direct socio-economic impacts of its operations on local communities. It includes the amount of jobs created, the value of the respective wages and the choice to operate in depopulated areas.

Sub-criteria s₄₀: Indirect socio-economic impacts – evaluates the indirect socio-economic impacts of its operations on local communities. It includes relations with local suppliers, infrastructure investments and support services provided.

Sub-criteria s₄₁: Land use – evaluates the socio-economic impact of the physical presence of the company and its facility in the community. It includes resources depletion, relocation of people and disruption of other economic activities.

Sub-criteria s₄₂: Public funds – evaluates the level of financial assistance received from government or local authorities. These funds, subsidies or tax exemptions are normally used to attract companies to a certain location but could have been used towards other ends (potential benefits that will never materialize due to current allocation of public financial resources).

Sub-criteria s₄₃: Community engagement and development programs – evaluates the company's initiatives concerning community engagement (for example, by hiring senior managers from the local community) and community development (for example, by promoting and supporting local cultural/traditional events).

Criteria c₈: Product/service criteria

Sub-criteria s₄₄: Sustainable technologies or processes – evaluates the capacity of the company for creating new market opportunities and to innovate through sustainable technologies or processes.

Sub-criteria s₄₅: Health and quality of life of consumers – evaluates if the company is able to produce products or provide services which enhance the health and quality of life of consumers.

Sub-criteria s₄₆: Negative social and environmental impacts – evaluates the main negative social and environmental impacts of the products or services of the company. It includes issues such as the possibility of harmful addictiveness (for example, common cigarettes) and end-of-life disposition (for example, non-recyclable products like ceramics).

Sub-criteria s₄₇: Integrity of products and sales practices – evaluates the integrity (the match between customers' expectation and actual product performance) of the company's products and of its sales methods (including labelling and marketing practices).

Sub-criteria s₄₈: Product safety and quality – evaluates how safe the company's products are, their quality and the company's response to problems related with safety and quality. It includes quality certification, reported safety issues and return/reimbursement practices.

Sub-criteria s₄₉: Customer privacy and data – evaluates the company's policy regarding the respect for the customers' privacy and data. It involves issues such as information sharing/selling to third party corporations, customer consent and database protection against virtual threats.

Criteria c₉: Human rights and supply chain criteria

Sub-criteria s₅₀: Human rights conventions – evaluates the company's commitment respecting fundamental human rights conventions.

Sub-criteria s₅₁: Supplier screening using social criteria – evaluates whether and how the company considers and monitors social performance and compliance for its sourcing decisions.

Sub-criteria s₅₂: Physical security practices – evaluates the physical security practices (the series of procedures and physical structures intended to deny unauthorised access of the company's property). It involves compliance with humanitarian norms, proportionate use of force and the proper articulation with local law enforcement authorities.

Sub-criteria s₅₃: Indigenous peoples – evaluates the relationship with the indigenous peoples (peoples with their own cultural patterns, social institutions and legal systems) near its proposed or current operations. Once again, it involves compliance with humanitarian norms and international conventions on the issue.

FPV₄ – Governance

Criteria c₁₀: Board criteria

Sub-criteria s₅₄: Management compensation – evaluates the company's compensation policy towards management in terms of competitiveness and proportionality.

Sub-criteria s₅₅: Board members' objectives – evaluates the corporate policy's ability to incentivize board members to achieve not only financial objectives, but also extra-financial goals (for example, by implementing board salary bonuses concerning different sustainability targets).

Sub-criteria s₅₆: Board structure, membership and decision-making – evaluates the corporate governance principles related to board structure and membership, including topics such as diversity, experience, level of independence, type of organogram and size.

Criteria c₁₁: Leadership ethics criteria

Sub-criteria s₅₇: Culture of ethical decision making – evaluates the policies implemented by the company in order to develop and achieve more ethical corporate procedures and practices. It includes the creation of anti-corruption plans and the implementation of a code of ethics and conduct.

Sub-criteria s₅₈: Legal actions, fines, non-monetary sanctions and non-favourable judicial decisions – evaluates the company's record regarding legal actions, fines, non-monetary sanctions and non-favourable judicial decisions. It includes past (or current) cases of anti-competitive behaviour, environmental transgressions and non-favourable class actions.

Sub-criteria s₅₉: Strategic level's ethics – evaluates the commitment and effectiveness toward the vision of integrating social and environmental aspects into the overall core strategy of the company.

Sub-criteria s₆₀: Tactical and operational levels' ethics – evaluates the integration (from the top down) of sustainability principles into the day-to-day operations of the company.

Sub-criteria s₆₁: Worker performance evaluation and recognition – evaluates the company's efforts regarding the evaluation and recognition of its workers' performance, including the use of fair, complete and constructive methods of evaluation and the implementation of corporate initiatives to recognize the successes, accomplishments and merits of well-performing workers.

Criteria c₁₂: Transparency and reporting criteria

Sub-criteria s₆₂: Transparent management towards stakeholders – evaluates the depth and level of reliability of the information which the company makes available for its stakeholders. It includes interactions with investors, customers and regulators.

Sub-criteria s₆₃: Compliance assurance – evaluates the company efforts concerning compliance with standards, public availability and assurance (third party audit) of the accuracy, completeness and reliability of its sustainability reports or CSR reports.

Sub-criteria s₆₄: Disclosure of major stakeholders – evaluates if the company produces a publicly available document containing a list of the company's major stakeholders and an explanation on how it engages each one of them (including, for example, political contributions).

Sub-criteria s_{65} : Employees' engagement in management – evaluates the measures implemented by the company in order to make workers more aware and participatory in the management affairs. It includes initiatives to make workers more attentive to corporate decisions (for example, by establishing a monthly internal newsletter) and strategies to involve them more and to take their ideas into account (for example, by implementing a modern version of a suggestion box).

Sub-criteria s_{66} : Membership of leading entities – evaluates whether the company is actively seeking to establish partnerships regarding CSR concerns, as a way to improve its own performance and know-how on the issue, or simply to contribute to the CSR global debate and efforts. Global Compact (international initiative), GRACE (Portugal-based initiative) and Instituto Ethos (Brazil-based initiative) are examples of such leading entities.

4.3.3.3 Adaptation of the value tree

Having presented the extensive list of FPVs, criteria and sub-criteria intended to allow an overall and complete evaluation of the CSR performance of companies, the fourth step of the framework (adaptation of the value tree) can now be presented.

Always considering the choice about the sector and geographical location and the important contributions of the group of experts (which has the final word), the original value tree with 66 sub-criteria (previously presented) has to be adapted. The objective of this adaptation is to reduce the number of sub-criteria and only select those which are regarded as relevant for a given problem. As it was already mentioned during the literature review, the selected sub-criteria should be regarded as “relevant” if, when combined, they allow an efficient, transparent and global evaluation of companies (see Table 2).

A possible way for adapting the value tree is through a two-phase elimination approach:

- ❖ Phase 1: eliminate from the sub-criteria list those sub-criteria which add no value to the problem formulation, considering the chosen geographical location. A sub-criterion should be considered as having no value to the problem formulation if, for a given geographical location, the represented concern is not applicable to that business reality or if it does not allow to distinguish the different alternatives. For example, sub-criteria s_{53} (indigenous peoples) is not applicable when evaluating the Portuguese business reality because no indigenous peoples exist in Portuguese territory; and sub-criteria s_{24} (freedom of association and protection of rights to organize and to bargain collectively) does not allow to distinguish the CSR performance of companies in Saudi Arabia due to political and legal restrictions to the existence and normal functioning of trade unions.
- ❖ Phase 2: eliminate from the remaining sub-criteria list those sub-criteria which add no value to the problem formulation, considering the chosen economic sector, and using the same logic as in phase 1. For example, sub-criteria s_{14} (local airshed and watershed) is not applicable when evaluating the real estate activities sector because no such sort of high-level emissions exists;

and sub-criteria s_{49} (customer privacy and data) does not allow to distinguish the CSR performance of companies of the financial and insurance activities sector because they all have to comply with very strict laws and regulations on the issue.

This elimination approach may not be enough to reach a desirable and workable number of sub-criteria. In that case, the expert group should try to relax the elimination conditions, within reasonable limits. In order to try to preserve the globality of the evaluation (vital in any CSR evaluation because of the nature of the CSR field), all four FPVs, at least two criteria from each FPV and at least two sub-criteria from each criterion should be kept represented in the value tree (suggesting a minimum of $4 \times 2 \times 2 = 16$ sub-criteria). However, the most important aspect is that, in the end, the adapted value tree should reach a compromise between assuring the presence of the most relevant CSR concerns for the chosen geographic location and sector and allowing a good representation of all the CSR's dimensions.

4.3.3.4 The Choquet integral

According to Bottero et al. (2018), the Choquet integral (see Choquet, 1953) is “an aggregation function that permits the aggregation of utilities on the considered criteria taking into account interactions among criteria” and it is “based on the concept of capacity or fuzzy measure”. It requires “the assignment of a weight to each subset of criteria by means of a function called capacity” and “that the evaluations or utilities of each action on the considered criteria are expressed on the same scale” (Bottero et al., 2018, p. 8). The following presentation (this sub-section and the following two which, when combined, form the seventh step of this framework) of the fundamental concepts about the Choquet integral, determining capacities and building interval scales is entirely based on the work done by Bottero et al. (Bottero et al., 2018, p. 8–13).

Let A denote a set containing m alternatives, $A = \{a_1, \dots, a_j, \dots, a_m\}$, and G denote a set with n criteria, $G = \{g_1, \dots, g_i, \dots, g_n\}$. For an alternative a and a criterion g_i , $g_i(a)$ is the performance of alternative a on criterion g_i , and $u_i(a)$ is the utility of the performance $g_i(a)$.

A capacity is a set function, $\mu : 2^G \rightarrow [0, 1]$, on the power set, 2^G satisfying the following properties:

- i) $\mu(\emptyset) = 0$ and $\mu(G) = 1$ (boundary conditions);
- ii) $\forall S \subseteq T \subseteq G \mu(S) \leq \mu(T)$ (monotonicity condition).

Since in any case $\mu(\emptyset) = 0$ and $\mu(G) = 1$, the values $\mu(S)$ assigned by the capacity μ to all other $2^{|G|} - 2$ subsets S of G have to be defined. For the sake of simplicity, let call the values $\mu(S)$ as the capacities of set S . Given an alternative $a \in A$ and a capacity μ on 2^G , the Choquet integral can be defined as follows:

$$C_\mu(a) = \sum_{i=1}^n \left(u_{(i)}(a) - u_{(i-1)}(a) \right) \mu(G_i), \quad (1)$$

where $u_{(1)}, \dots, u_{(n)}$ are the utilities of criteria from G , reordered in such a way that $u_{(1)}(a) \leq \dots \leq u_{(i)}(a) \leq \dots \leq u_{(n)}(a)$, and $G_i = \{(i), \dots, (n)\}$, for $i = 1, \dots, n$, with $u_{(0)}(a) = 0$.

Given a capacity μ on 2^G , its Möbius representation is a function $m : 2^G \rightarrow \mathbb{R}$ such that, for all $S \subseteq G$,

$$\mu(S) = \sum_{T \subseteq S} m(T), \quad (2)$$

we have that,

$$m(S) = \sum_{T \subseteq S} (-1)^{|S-T|} \mu(T), \quad (3)$$

and the above properties i) and ii) can be reformulated as follows,

$$i') m(\emptyset) = 0, \sum_{T \subseteq G} m(T) = 1;$$

$$ii') \forall i \in G \text{ and } \forall R \subseteq G \setminus \{i\}, m(\{i\}) + \sum_{T \subseteq R} m(T \cup \{i\}) \geq 0.$$

The Choquet integral can now be expressed in terms of the Möbius representation m of the capacity μ as follows,

$$C_\mu(a) = \sum_{T \subseteq G} m(T) \min_{i \in T} \{u_i(a)\}. \quad (4)$$

In real-world decision problems, it seems reasonable to focus on the interactions of a small set of pairs of criteria. Let O denote the set of interacting pairs of criteria, $\{i, j\}$; thus, for all $S \subseteq G$ we have

$$\mu(S) = \sum_{i \in S} m(\{i\}) + \sum_{\{i,j\} \subseteq S, \{i,j\} \in O} m(\{i,j\}), \quad (5)$$

and,

$$\mu(G) = \sum_{i \in G} m(\{i\}) + \sum_{\{i,j\} \in O} m(\{i,j\}) = 1, \quad (6)$$

so that the Choquet integral can be reformulated as

$$C_\mu(a) = \sum_{i \in G} m(\{i\}) u_i(a) + \sum_{\{i,j\} \in O} m(\{i,j\}) \min\{u_i(a), u_j(a)\}. \quad (7)$$

It should be noted that for $\{i, j\} \in O$, $m(\{i, j\}) > 0$ if there is a mutual-strengthening effect between i and j and $m(\{i, j\}) < 0$ if there is a mutual-weakening effect between these two criteria.

Again, for the sake of simplicity, m_i will be used instead of $m(\{i\})$ for all $i \in G$ and m_{ij} will be used instead of $m(\{i, j\})$ for all $\{i, j\} \in O$. The same applies to μ_i and μ_{ij} .

So, and in order to summarize the practical implications of possible interactions between a pair of criteria $\{i, j\}$, three scenarios are possible:

- ❖ No interaction: $\mu_{ij} = \mu_i + \mu_j$;
- ❖ Mutual-strengthening interaction: $\mu_{ij} \geq \mu_i + \mu_j$;
- ❖ Mutual-weakening interaction: $\max\{\mu_i, \mu_j\} \leq \mu_{ij} \leq \mu_i + \mu_j$.

Taking this into account, the group of experts has to clearly identify the pairs of interacting criteria that exist, as well as the nature (mutual-strengthening or mutual-weakening) of each one of such interactions. This identification should be done during the final stage of the third step of this framework (adaption of the value tree) and the amount of interactions should be small, otherwise the problem will

become too complex and the quality of the communication between the analyst and the group of experts may be negatively affected.

4.3.3.5 Determining the capacities

To determine the capacities μ (that can be roughly interpreted as the weights which are commonly used in the context of outranking methods) of the different criteria and interactions, Bottero et al. (2018) use an extension of the Simos' deck of cards method for building ratio scales (see Figueira & Roy, 2002). This method includes some sequential specificities concerning the way the analyst should communicate with the group of experts. These are:

- 1) The analyst provides the group of experts with a set of cards. The number of cards should be equal to sum of the number of criteria plus the number of interactions (representing each one of the elements of the sets just mentioned and which will be referred as objects from now on);
- 2) The analyst provides the group of experts with a large enough set of blank cards;
- 3) The group of experts ranks the first set of cards according to an order of preference, from the least to the most important. In case of one or more ties (which can happen), the objects (cards) with the same preference level should occupy the same position in the ranking;
- 4) The group of experts modulates the greater or smaller closeness between objects through the insertion of blank cards in the intervals of the consecutive positions in the ranking;
- 5) The group of experts decides the value of ratio z (z reflects how many times the most appreciated object is more important than the least appreciated one).

The construction of a ratio scale for capacities requires, in general, the consideration of very specific objects, which will be called projects. Assuming that the minimal and maximal utilities on each project are 0 and 1, respectively, it becomes necessary to build the reference set of projects with n projects (as many as the number of criteria) plus $|O|$ projects (as many as the number of interacting criteria).

Henceforth, the n projects will be denoted by p_j and the $|O|$ interacting criteria will be denoted by $p_k = p_{ij}$, $k = n + 1, \dots, n + |O|$. A general project p_j is characterized by a vector of the form $(0, \dots, 0, u_j(p_j) = 1, 0, \dots, 0)$ and represents a project which has the highest evaluation on criterion j and the lowest elsewhere. In its turn, a general project p_k is characterized by a vector of the form $(0, \dots, 0, u_i(p_i) = 1, 0, \dots, 0, u_j(p_j) = 1, 0, \dots, 0)$, for all $\{i, j\} \in O$, and represents a project which has the highest evaluation on criteria i and j , and the lowest elsewhere.

Let P denote the finite set of all the reference projects, $P = \{p_1, p_2, \dots, p_k, \dots, p_t\}$ and R denote the group of experts' ranking of the projects, $R = \{R_1, \dots, R_h, \dots, R_v\}$, with R_l containing the least preferred projects and R_v containing the most preferred projects. This implies that R_h represents a general preference level (formally known as equivalence class), that the first set of cards should contain a total of $t = n + |O|$ cards and that there are v different equivalence classes. Let, as well, e_h denote the number of blank cards between the equivalence classes R_h and R_{h+1} , $h = 1, \dots, v$.

This collected information (more concretely, the set of ranked reference projects R and the number of black cards between the equivalence classes e_n) should then be used to run software SRF. This software, mainly used for determining the weights of a certain criteria set with a revised Simos' procedure, returns the value $w(p_k)$ for each project (criterion or interaction). Values $w(p_k)$ should then be used to calculate modified values $\bar{w}(p_k)$ using one (the one which condition is fulfilled) of the following two equations:

$$\diamond \bar{w}(p_k) = w(p_k) \text{ if } k = i \in G \text{ (i.e., if it is a criterion);} \quad (8)$$

$$\diamond \bar{w}(p_k) = w(p_k) - w(p_i) - w(p_j) \text{ if } p_k = p_{ij}, \{i, j\} \in O, \text{ for } k \geq n + 1 \text{ (i.e., if it is an interaction).} \quad (9)$$

Then, to compute the Möbius coefficients m_k , we have

$$m_k = \frac{\bar{w}(p_k)}{\sum_{j=1}^t \bar{w}(p_j)}, \quad (10)$$

and, to compute the capacities μ_k , for $k = 1, \dots, t$, we have

$$\mu_k = \frac{w(p_k)}{\sum_{j=1}^t \bar{w}(p_j)}. \quad (11)$$

It is important to mention that the Möbius coefficients m_k must fulfil conditions i') and ii') and must be consistent with the sign of the interactions (positive values for mutual-strengthening cases and negative values for mutual-weakening cases).

4.3.3.6 Building interval scales

As stated by Bottero et al., in the methodology “it is necessary to compute the minimum of the utilities for all pairs of interacting criteria” which implicates that “the utilities on the considered criteria have to be expressed on a common scale”. To determine such type of interval scales (used to express utilities on the considered criteria), Bottero et al. (2018) use another extension of the deck of cards method (again, see Figueira & Roy, 2002) mentioned in the previous sub-section.

The procedure here presented will produce scales within the range $[0, 1]$ but this range is not imposed by the method itself, meaning that others values could have been chosen rather than 0 and 1. Additionally, and unlike the previously definition of the ratio z , this procedure involves the definition of every two consecutive reference level in order to anchor the computations. Considering this, the procedure requires the following steps:

- 1) Consider the following discrete scale of criterion g : $E_g = \{l_1, l_2, \dots, l_k, \dots, l_t\}$, where $l_1 < l_2 < \dots < l_k < \dots < l_{t-1} < l_t$ ($<$ means “strictly less preferred than”);
- 2) Define two reference levels, say l_p and l_q , and assign two utility values to these reference levels. These will be $u(l_p) = 0$ and $u(l_q) = 1$.
- 3) Consider the ranking of the levels with a certain number of blank cards, e_k , in the intervals between every two consecutive levels, l_k and l_{k+1} , $k = 1, \dots, t - 1$:

$$l_1 \ e_1 \ l_2 \ e_2 \ \dots \ l_p \ e_p \ l_{p+1} \ e_{p+1} \ \dots \ l_k \ e_k \ l_{k+1} \ e_{k+1} \ \dots \ l_{q-1} \ e_{q-1} \ l_q \ e_q \ \dots \ l_{t-1} \ e_{t-1} \ l_t.$$

- 4) Now, consider only the levels in between l_p and l_q (in between levels l_k and l_{k+1} there are $e_k + 1$ units) and compute the unit valuation:

$$\alpha = \frac{u(l_q) - u(l_p)}{h}, \quad (12)$$

where

$$h = \sum_{k=p}^{q-1} (e_k + 1), \quad (13)$$

which represents the number of units between levels l_p and l_q .

- 5) For a discrete scale, compute the utility value $u(l_k)$, for each level $k = 1, \dots, t$, as follows:

$$u(l_k) = u(l_{k-1}) + \alpha \sum_{j=1}^{k-1} (e_j + 1), \quad (14)$$

for $k = 2, \dots, t$.

For a continuous scale, compute the utility values $u_j(g_j)$, assigned to the intermediate performances of criterion g_j in a given subinterval $(g_j^l \leq g_j \leq g_j^u)$ and which are defined by linear interpolation, through the application of the following formula:

$$u_j(g_j) = u_j(g_j^l) + \frac{g_j - g_j^l}{g_j^u - g_j^l} (u_j(g_j^u) - u_j(g_j^l)). \quad (15)$$

4.3.4 Final recommendations

The final recommendations are the last part of the decision aiding process and also the represent the eighth and final step of this framework. Their main objective is to translate the raw output of the evaluation model into something that the decision makers can use to make their decision easier or more informed. From this moment on, the framework should, once again, centre the problem around consumers, since they are its most important stakeholders.

In the case of this framework, the final output of the evaluation model is a ranking of the evaluated alternatives. However, there are different ways of presenting such type of results and of providing the decision maker (in this case, a general consumer) with information which he may consider useful. Each different way has its own merits and will directly affect how the different stakeholders perceive the evaluation effort.

4.4 Information dissemination

If society is ever going to massively and almost automatically use CSR information on companies to shape its consumer behaviour, then that same CSR information will have to be easy to understand, clear to use, easy to reach and decision-wise valuable. Easy to understand refers to the fact that the information must be simple, visually appealing and coherent. Clear to use refers to the fact that the information must

allow a quick and correct interpretation of its true and wanted meaning. Easy to reach refers to the fact that the information must be easily accessible by consumers and be placed in intuitive locations for them to find. Finally, decision-wise valuable refers to the fact that the information must add value to the consumers' decision process and/or make consumers more aware (or more aware than they currently are) of the existence of such value itself (in this case, the value is the inclusion and promotion of CSR concerns in the whole consumer journey process).

The second most important stakeholders are, obviously, companies. Even though consumers play a pivotal role, the voluntary nature of this evaluation requires a considerable amount of cooperation and engagement from companies. So, any information dissemination strategy should always present a positive tone and avoid, at all costs, potential finger-pointing situations.

Three examples of ways of presenting the information (which try to balance the interests of both consumers and companies) are now presented:

- ❖ Simple ranking: totally or very similar with the raw output of the evaluation model. Each company would predictably display their own individual score or ranking position, and the full list with all scores and positions would be available in a separate location (for example, a specifically designed webpage for that purpose);
- ❖ Binary classification: it can also be regarded as a simple certification. The group of experts would stipulate a benchmark score from which companies would get the certification (implying that companies which fail to meet or surpass the benchmark do not receive the certification). Predictably, certified companies would display a sort of “certification stamp” to make consumers aware of it;
- ❖ Multiclass classification: uses the same principles as the previous type but instead of relying on a binary decision (to certify or to not certify), it always issues a certification and has more than just one category of certification (including a category which contains the worst possible CSR evaluation score), also defined by the group of experts. Predictably, certified companies would display their respective “certification stamp” (matching the certification category they received) to make consumers aware of it. This also means that more than one type of “certification stamp” would have to be created in order to allow the required distinctiveness between categories. This type can also be seen as a compromise between the previous two.

Some examples of pros and cons of each way of presenting the information are also not difficult to anticipate. On one hand, consumers would benefit the most (in terms of the accuracy of the information provided) with the simple ranking but it is harder to interpret and correctly use, and it represents the type of impersonal ranking that might make companies feel judged and ostracized. On the other hand, the binary classification makes companies feel less scrutinized and is likely to produce better results regarding consumers' usage due to its simplicity and clarity.

Other approaches on how the information is presented (including hybrid combinations of different types) may be equally or even more valid than the three just presented and analysed. Different types of

consumers and business environments should require different techniques in order to maximize the eventual level of impact that evaluation efforts like this one have on consumer behaviour. The fundamental aspect is, once again, to balance the sensitivities of consumers and companies, while always assuring a correct and reliable representation of the actual results.

4.5 Chapter conclusions

Throughout this chapter the seven sequential steps of the proposed framework were presented using an MCDA approach and after presenting the main motivation in the form of some research questions. The eight steps can be summarized as follows:

- ❖ Step 1 – Choice of economic sector and geographic location;
- ❖ Step 2 – Formation of a group of experts;
- ❖ Step 3 – Identification of the alternatives;
- ❖ Step 4 – Adaption of the value tree;
- ❖ Step 5 – Criteria operationalization;
- ❖ Step 6 – Scoring the alternatives;
- ❖ Step 7 – Application of the evaluation model;
- ❖ Step 8 – Analysis and presentation of the results.

The intention and assumption of the framework is that the successful implementation of all the seven steps will result in an efficient, transparent and global evaluation of the CSR performance of companies (see Table 2 for further details on this), using a sectorial and geographical approach. While this may seem a quite ambitious statement/objective, and despite the fact that the evaluation model may include many (or exclusively) objective and measurable/verifiable metrics to “measure” the CSR performance of companies, it is also important to concede that all the evaluations performed using this framework will also be based (and therefore, completely depend) on the inevitably subjective inputs and decisions emanated from the group of experts. Nevertheless, taking into account its multidisciplinary nature, the diverse approaches put forward by the academic community and the various previous attempts on the subject itself, it is also fair to assume that evaluating the CSR performance of companies will never be a totally objective task. Adaptable (yet consistent) frameworks such as this one, capable of being applied to different socio-economic contexts, considering the specificities of each economic sector, appear to be the way forward.

During the next chapter, the proposed framework will be applied to a concrete case study, covering all the steps just described previously. It will be a good opportunity to validate if it can be realistically transposed to the real corporate world and if its objectives are capable to be reached.

5. Case study

This chapter presents a concrete and practical first application of the proposed framework exposed in the previous chapter. This is done using a step-by-step approach with a total of eight steps. Such steps are the ones presented in the previous chapter during the formulation of the framework itself and clearly summarized during the chapter conclusions.

5.1 Step 1 – Choice of economic sector and geographic location

The case study part of this thesis was done in partnership with GRACE. As it was already mentioned in the previous chapter, GRACE is a non-profit association (whose associates are companies) dedicated to the promotion of CSR in the Portuguese business context.

After being contacted and agreeing to take part in this study, GRACE was given the task of choosing the economic sector which would be under analysis. This choice was done already considering that the geographic location under study would be Portugal because of the geographic presence and outreach of GRACE itself, and due to the predictable greater ease of access to companies' internal information if the analysed companies were also GRACE's associates.

GRACE ended up picking the energy sector. For this study, the energy sector is defined as being the sector comprising the complex network of companies involved in the extraction, transport, manufacturing, refining, production, distribution and direct commercialization of energy.

According to Amador (2010), the energy sector accounted for 2.6% of the gross value added and 0.22% of the employment in Portugal (average values for the period between the years of 2004 and 2006).

5.2 Step 2 – Formation of a group of experts

Once again, GRACE was left in charge of this step. GRACE was asked to select the people who would compose the group of experts, taking into account four criteria that were purposed in order to help GRACE with the selection and clarify the level of cooperation and knowledge intended (criteria which the potential experts would have to meet):

- ❖ Have some sort of relationship with GRACE (for greater ease of communication);
- ❖ Have a good general knowledge of CSR issues;
- ❖ Have a good knowledge about the energy sector and its specificities (also regarding CSR);
- ❖ Have the required availability to meet (in person) with the decider and remaining experts.

Considering this setting, GRACE formed a group of experts with two experts who shall be simply regarded as experts 1 and 2. Expert 1 is a GRACE's employee with a large experience on the field of CSR (in general) and good knowledge of the Portuguese CSR business reality. Expert 2 is a GRACE's board member and a high-level employee of a company from the energy sector, having many years of

experience working in that sector and being fully aware of the most important issues and trends regarding CSR.

5.3 Step 3 – Identification of the alternatives

The alternatives of this framework are the companies that shall be subjected to evaluation of their CSR performance. Four GRACE associates will be considered in this case-study but in order ensure a certain level of confidentiality they will simply be regarded as companies A₁, A₂, A₃ and A₄. All of them are part of the energy sector and operate in Portugal.

5.4 Step 4 – Adaption of the value tree

The framework proposes a two-phase elimination procedure to adapt the value tree to the specific problem in study. This being said, the extensive list of sub-criteria (see Table 3) had to be adapted to better focus on the nature of the Portuguese business reality in general (phase 1) and, more specifically, of its energy sector (phase 2).

Phase 1 led to the elimination of the following sub-criteria: S₈, S₉, S₂₄, S₂₅, S₄₉, S₅₀ and S₅₃.

Phase 2 led to the elimination of the following sub-criteria: S₄₅, S₄₆, S₅₂ and S₆₃.

Nevertheless, and considering that this case-study part of the thesis is only trying to accomplish a first and straightforward validation of the potentialities of the proposed framework, this two-phase sub-criteria elimination proved insufficient to provide a simple enough value tree: it led to the elimination of a total of 11 sub-criteria, meaning that 55 sub-criteria remained in the value tree. A further sub-criteria elimination effort was carried out (together with the group of experts), which led to the elimination of the following 32 sub-criteria: S₂, S₄, S₅, S₁₀, S₁₂, S₁₄, S₁₅, S₁₇, S₁₉, S₂₀, S₂₁, S₂₆, S₂₇, S₂₈, S₂₉, S₃₁, S₃₃, S₃₄, S₃₅, S₃₈, S₃₉, S₄₀, S₄₁, S₄₂, S₄₃, S₄₈, S₅₄, S₅₈, S₅₉, S₆₀, S₆₅ and S₆₆. This last elimination is much more subjective than the previous two and it is fair to assume that it negatively affects the overall CSR evaluation assessment of companies, making it, at least, less complete and rigorous. However, it was a much-needed process and a way of facilitating the application of the evaluation model, namely through the considerable reduction in the number of variables, the respective number of possible combinations, the number of decisions by the group of experts and the size (and complexity) of the calculations.

Therefore, the remaining 23 sub-criteria (and consequently the ones that will be used to evaluate the alternatives) are the following: S₁, S₃, S₆, S₇, S₁₁, S₁₃, S₁₆, S₁₈, S₂₂, S₂₃, S₃₀, S₃₂, S₃₆, S₃₇, S₄₄, S₄₇, S₅₁, S₅₅, S₅₆, S₅₇, S₆₁, S₆₂ and S₆₄.

The definition of the final set of sub-criteria (just done) also makes it possible to develop the final value tree of this case study, containing all the FPVs, criteria and sub-criteria that will be under consideration during the entire study itself and used by the evaluation model to produce the final scores/results. The content of such final value tree can be resumed in Table 4.

TABLE 3 – CASE STUDY'S SET OF FPVs, CRITERIA AND SUB-CRITERIA (WITH RESPECTIVE TYPE OF SCALE AND OBJECTIVE)

FPVs	Criteria	Sub-criteria
[FPV₁] Environment	[C ₁] Energy and climate change (max)	[S ₁] Climate change (qualitative) (max)
		[S ₃] Other alternative environmental technologies (qualitative) (max)
	[C ₂] Environmental policy and reporting (max)	[S ₆] Biodiversity (qualitative) (max)
		[S ₇] Supplier screening using environmental criteria (qualitative) (max)
	[C ₃] Resource management (max)	[S ₁₁] Supply chain management (qualitative) (max)
		[S ₁₃] Waste and recycling (qualitative) (max)
[FPV₂] Employees	[C ₄] Employees (max)	[S ₁₆] Compensation and financial benefits (qualitative) (max)
		[S ₁₈] Long-term employment growth and stability (qualitative) (max)
	[C ₅] Diversity and labour rights (max)	[S ₂₂] Diversity policies (qualitative) (max)
		[S ₂₃] Labour-management relations and participation by employees (qualitative) (max)
	[C ₆] Training, health and safety (max)	[S ₃₀] Accidents and safety (qualitative) (max)
		[S ₃₂] Job training (qualitative) (max)
[FPV₃] Community	[C ₇] Community development and philanthropy (max)	[S ₃₆] Charitable giving, donations of goods and pro-bono work (qualitative) (max)
		[S ₃₇] Volunteerism of staff time (qualitative) (max)
	[C ₈] Product/service (max)	[S ₄₄] Sustainable technologies or processes (qualitative) (max)
		[S ₄₇] Integrity of products and sales practices (qualitative) (max)
	[C ₉] Human rights and supply chain (max)	[S ₅₁] Supplier screening using social criteria (qualitative) (max)
[FPV₄] Governance	[C ₁₀] Board (max)	[S ₅₅] Board members' objectives (qualitative) (max)
		[S ₅₆] Board structure, membership and decision-making (qualitative) (max)
	[C ₁₁] Leadership ethics (max)	[S ₅₇] Culture of ethical decision making (qualitative) (max)
		[S ₆₁] Worker performance evaluation and recognition (qualitative) (max)
	[C ₁₂] Transparency and reporting (max)	[S ₆₂] Transparent management towards stakeholders (qualitative) (max)
		[S ₆₄] Disclosure of major stakeholders (qualitative) (max)

As it can be noticed on Table 4 no criterion was eliminated from this study and all criteria contain two sub-criteria, except for criterion c₉ which only contains one criterion (s₅₁). This last situation is not an ideal one and the complete removal of criterion c₉ could have been considered. Nevertheless, and

because the remaining sub-criteria of criterion c_9 (s_{50} , s_{51} and s_{52}) were removed due to geographic and sectorial reasons (and not during the more subjective removal), it was decided to keep it in the value tree.

This case study also considers the existence of two interactions between criteria: the mutual-weakening effect of criteria c_1 and c_8 (interaction $c_{1,8}$) and the also mutual-weakening effect of criteria c_6 and c_{11} (interaction $c_{6,11}$). This type of effect (mutual-weakening) indicates that the involved criteria usually present some sort of relation between their scores, namely when their performance is quite positive, which, in turn, implies that a small penalization should be applied. For example, when criterion c_6 (training, health and safety) scores high, it is highly probable that criterion c_{11} (leadership ethics) will also score high. This is because a governance policy characterized by a solid leadership ethics will naturally promote high corporate standards concerning employees' training, health and safety. The same sort of logic applies to the interaction $c_{1,8}$.

No other interaction was identified as relevant for this study, meaning that no mutual-strengthening effect will be studied.

5.5 Step 5 – Criteria operationalization

In this section each selected criterion will be operationalized. As it was already mentioned during the sub-section criteria operationalization of the previous chapter, this task is performed using descriptors, which are composed of sub-criteria and associated scales. Having also selected the sub-criteria under study, it is now needed to create the associated scales for them and, posteriorly, to use them to create the final scales associated with the criteria themselves.

It is important to note that the criteria operationalization task is not a linear one. In fact, how each criterion is operationalized (through the selection and use of different sub-criteria) is highly subjective. For starters, the scales for the sub-criteria are already very difficult to develop due to the diversity of topics that each criterion still contains and the variety of different ways that can be used to “measure” each one of those topics. The criteria operationalization of this case study is thus just a simplified example of how it could be done and a constant compromise between technical accuracy (on one side) and both the level of detail of information that companies are willing to report and their lack of internal knowledge concerning certain metrics and KPIs (on the other side). For example, the solution of creating scales with intervals for a given metric allows companies to not fully reveal their internal data but still allows the framework to approximately evaluate the company's performance and to take it into account.

During the remaining part of this section each criterion is operationalized, one at a time. This is done through the creation of tables that express the scales in use (Tables 4, 5, 8, 9, 12, 13, 16, 17, 20, 21, 24, 25, 28, 29, 32, 33, 36, 38, 39, 42, 43, 46 and 47). Such tables display the different levels used by the scale, the description of the levels as well as the corresponding short forms and codes. When the scales of all sub-criteria (contained in a certain criterion) are developed, a different table with all the possible

combinations between the levels of such scales must be created (Tables 6, 10, 14, 18, 22, 26, 30, 34, 40, 44 and 48). To facilitate the comprehension of this combinations and also to group combinations that may be regarded as equivalent in terms of preference level, a colour code may be used, if deemed necessary. After this last task is complete, the final table with the scale for the criterion is presented using the same format as the tables for the scales used for the sub-criteria, but with an additional column (if applicable) that displays the colour code of each level (Tables 7, 11, 15, 19, 23, 27, 31, 35, 37, 41, 45 and 49). Notice that this is a specific procedure for criteria with two associated sub-criteria. For the specific case of just one associated sub-criterion, the final table with the scale for the criterion is the same one as the table with the scale for the associated sub-criterion and be developed in a direct way. For any other type of cases (more than two associated sub-criteria) other strategies (for example, the construction of a decision tree) must be followed to deal with all the possible combinations between the levels of the different scales.

Criteria c₁: Energy and climate change

TABLE 4 – SCALE AND RESPECTIVE LEVELS USED FOR SUB-CRITERION S₁

[s₁] Climate change			
Maximize (↑)			
Level	Level description	Short form	Code
l_1^1	The company clearly identified current and future opportunities and threats caused by climate change and has a plan (a set of concrete short/medium-term policies and long-term strategies) to benefit from and to face them.	Very good	VG
l_2^1	The company identified current and future opportunities and threats caused by climate change but lacks a plan to benefit from and to face them.	Good	G
l_3^1	The company has not clearly identified current and future opportunities and threats caused by climate change and lacks a plan to benefit from and to face them.	Needs improvement	NI

TABLE 5 – SCALE AND RESPECTIVE LEVELS USED FOR SUB-CRITERION S₃

[s₃] Other alternative environmental technologies			
Maximize (↑)			
Level	Level description	Short form	Code
l_1^3	The company makes use of green technology/green engineering solutions (for example, the production of renewable energy or innovative environmentally friendly processes) on its operations and actively participates on their creation or development.	Very good	VG
l_2^3	The company makes use of green technology/green engineering solutions on its operations but does not participate on their creation or development.	Good	G
l_3^3	The company does not make use of green technology/green engineering solutions on its operations and does not participate on their creation or development.	Needs improvement	NI

TABLE 6 – POSSIBLE COMBINATIONS BETWEEN THE SCALES OF CRITERIA S₁ AND S₃

		[s₁] Climate change		
		VG	G	NI
[s₃] Other alternative environmental technologies	VG	VG_VG	VG_G	VG_NI
	G	G_VG	G_G	G_NI
	NI	NI_VG	NI_G	NI_NI

TABLE 7 – SCALE AND RESPECTIVE LEVELS USED FOR CRITERION C₁

[c ₁] Energy and climate change				
Maximize (↑)				
Level	Level description	([s ₃] [s ₁])	Code	Colour
L ₁ ¹	Excellent	Very good Very good	VG_VG	
L ₂ ¹	Very strong	Good Very good	G_VG	
		Very good Good	VG_G	
L ₃ ¹	Strong	Needs improvement Very good	NI_VG	
		Good Good	G_G	
		Very good Needs improvement	VG_NI	
L ₄ ¹	Average	Needs improvement Good	NI_G	
		Good Needs improvement	G_NI	
L ₅ ¹	Weak	Needs improvement Needs improvement	NI_NI	

Criteria c₂: Environmental policy and reporting

TABLE 8 – SCALE AND RESPECTIVE LEVELS USED FOR SUB-CRITERION S₆

[s ₆] Biodiversity			
Maximize (↑)			
Level	Level description	Short form	Code
l ₁ ⁶	The company has good knowledge about its ecological footprint and has developed strategies aimed at mitigating such impact.	Very good	VG
l ₂ ⁶	The company has good knowledge about its ecological footprint but still has not developed strategies aimed at mitigating such impact.	Good	G
l ₃ ⁶	The company does not have good knowledge about its ecological footprint.	Needs improvement	NI

TABLE 9 – SCALE AND RESPECTIVE LEVELS USED FOR SUB-CRITERION S₇

[s ₇] Supplier screening using environmental criteria			
Maximize (↑)			
Level	Level description	Short form	Code
l ₁ ⁷	The company screens its suppliers using environmental criteria and takes such information into consideration for sourcing decisions.	Yes	Y
l ₂ ⁷	The company does not screen its suppliers using environmental criteria.	No	N

TABLE 10 – POSSIBLE COMBINATIONS BETWEEN THE SCALES OF CRITERIA S₆ AND S₇

		[s ₆] Biodiversity		
		VG	G	NI
[s ₇] Supplier screening using environmental criteria	Y	Y_VG	Y_G	Y_NI
	N	N_VG	N_G	N_NI

TABLE 11 – SCALE AND RESPECTIVE LEVELS USED FOR CRITERION C₂

[c ₂] Environmental policy and reporting				
Maximize (↑)				
Level	Level description	([s ₇] [s ₆])	Code	Colour
L ₁ ²	Excellent	Yes Very good	Y_VG	
L ₂ ²	Strong	Yes Good	Y_G	
		No Very good	N_VG	
L ₃ ²	Average	Yes Needs improvement	Y_NI	
		No Good	N_G	
L ₄ ²	Weak	No Needs improvement	N_NI	

Criteria c₃: Resource management

TABLE 12 – SCALE AND RESPECTIVE LEVELS USED FOR SUB-CRITERION S₁₁

[s ₁₁] Supply chain management			
Maximize (↑)			
Level	Level description	Short form	Code
l_1^{11}	The company continuously tries to find more environmentally efficient solutions by improving the company's supply chain (for example, the substitution of some hazardous input products for renewable or recycled materials, the optimization of the transport routes, or the introduction of more efficient and eco-friendly production methods).	Very good	VG
l_2^{11}	The company often tries to find more environmentally efficient solutions by improving the company's supply chain.	Good	G
l_3^{11}	The company rarely tries to find more environmentally efficient solutions by improving the company's supply chain.	Needs improvement	NI

TABLE 13 – SCALE AND RESPECTIVE LEVELS USED FOR SUB-CRITERION S₁₃

[s ₁₃] Waste and recycling			
Maximize (↑)			
Level	Level description	Short form	Code
l_1^{13}	The company's recycling rate (the annual amount of recycled waste divided by the total annual amount of waste) is within the range of [75% , 100%].	Very large	VL
l_2^{13}	The company's recycling rate is within the range of [50% , 75%].	Large	L
l_3^{13}	The company's recycling rate is within the range of [25% , 50%].	Medium	M
l_4^{13}	The company's recycling rate is within the range of [0% , 25%].	Small	S

TABLE 14 – POSSIBLE COMBINATIONS BETWEEN THE SCALES OF CRITERIA S₁₁ AND S₁₃

		[s ₁₁] Supply chain management		
		VG	G	NI
[s ₁₃] Waste and recycling	Levels			
	VL	VL_VG	VL_G	VL_NI
	L	L_VG	L_G	L_NI
	M	M_VG	M_G	M_NI
	S	S_VG	S_G	S_NI

TABLE 15 – SCALE AND RESPECTIVE LEVELS USED FOR CRITERION C₃

[c ₃] Resource management				
Maximize (↑)				
Level	Level description	([s ₁₃] [s ₁₁])	Code	Colour
L_1^3	Excellent	Very large Very good	VL_VG	
L_2^3	Very strong	Large Very good	L_VG	
		Very large Good	VL_G	
L_3^3	Strong	Medium Very good	M_VG	
		Large Good	L_G	
		Very large Needs improvement	VL_NI	
L_4^3	Average	Small Very good	S_VG	
		Medium Good	M_G	
		Large Needs improvement	L_NI	
L_5^3	Weak	Small Good	S_G	
		Medium Needs improvement	M_NI	
L_6^3	Very weak	Small Needs improvement	S_NI	

Criteria c₄: Compensation and benefits

TABLE 16 – SCALE AND RESPECTIVE LEVELS USED FOR SUB-CRITERION S₁₆

[s ₁₆] Compensation and financial benefits			
Maximize (↑)			
Level	Level description	Short form	Code
l_1^{16}	The average monthly gross base remuneration of the company's employees (not counting board members) is equal or higher than €1200.	Very high	VH
l_2^{16}	The average monthly gross base remuneration of the company's employees (not counting board members) is within the range of [€1000 , €1200[.	High	H
l_3^{16}	The average monthly gross base remuneration of the company's employees (not counting board members) is within the range of [€800 , €1000[.	Average	A
l_4^{16}	The average monthly gross base remuneration of the company's employees (not counting board members) is within the range of [€600 , €800[.	Low	L

TABLE 17 – SCALE AND RESPECTIVE LEVELS USED FOR SUB-CRITERION S₁₈

[s ₁₈] Long-term employment growth and stability			
Maximize (↑)			
Level	Level description	Short form	Code
l_1^{18}	The company's long-term employment rate (the number of permanent workers divided by the total number of workers) is equal or higher than 95%.	Very high	VH
l_2^{18}	The company's long-term employment rate is within the range of [85% , 95%[.	High	H
l_3^{18}	The company's long-term employment rate is within the range of [75% , 85%[.	Average	A
l_4^{18}	The company's long-term employment rate is lower than 75%.	Low	L

TABLE 18 – POSSIBLE COMBINATIONS BETWEEN THE SCALES OF CRITERIA S₁₆ AND S₁₈

		[s ₁₆] Compensation and financial benefits				
		Levels	VH	H	A	L
[s ₁₈] Long-term employment growth and stability	VH	VH_VH	VH_H	VH_A	VH_L	
	H	H_VH	H_H	H_A	H_L	
	A	A_VH	A_H	A_A	A_L	
	L	L_VH	L_H	L_A	L_L	

TABLE 19 – SCALE AND RESPECTIVE LEVELS USED FOR CRITERION C₄

[c ₄] Compensation and benefits				
Maximize (↑)				
Level	Level description	([s ₁₈] [s ₁₆])	Code	Colour
L_1^4	Excellent	Very high Very high	VH_VH	Green
L_2^4	Very strong	High Very high	H_VH	
		Very high High	VH_H	Light Green
L_3^4	Strong	Average Very high	A_VH	
		High High	H_H	
		Very high Average	VH_A	Yellow
L_4^4	Fair	Low Very high	L_VH	
		Average High	A_H	
		High Average	H_A	
		Very high Low	VH_L	Orange
L_5^4	Average	Low High	L_H	
		Average Average	A_A	
		High Low	H_L	Light Orange
L_6^4	Weak	Low Average	L_A	
		Average Low	A_L	Light Yellow
L_7^4	Very weak	Low Low	L_L	

Criteria c₅: Diversity and labour rights

TABLE 20 – SCALE AND RESPECTIVE LEVELS USED FOR SUB-CRITERION S₂₂

[s ₂₂] Diversity policies			
Maximize (↑)			
Level	Level description	Short form	Code
l_1^{22}	The company promotes the value of workplace diversity and considers such factor (for example, in terms of age or gender) in the recruitment process of new workers.	Good	G
l_2^{22}	The company recognizes the value of workplace diversity but does not yet consider such factor in the recruitment process of new workers.	Average	A
l_3^{22}	The company has no strategy, plan of action or implemented policies oriented towards promoting of workplace diversity.	Needs improvement	NI

TABLE 21 – SCALE AND RESPECTIVE LEVELS USED FOR SUB-CRITERION S₂₃

[s ₂₃] Labour-management relations and participation by employees			
Maximize (↑)			
Level	Level description	Short form	Code
l_1^{23}	The company has a functional internal feedback system (intended to collect and valorise the opinions and suggestions of the workers) and promotes team work approaches for regular problem-solving and decision-making situations.	Good	G
l_2^{23}	The company has a functional internal feedback system or promotes team work approaches for regular problem-solving and decision-making situations.	Average	A
l_3^{23}	The company does not have a functional internal feedback system and does not promotes team work approaches for regular problem-solving and decision-making situations.	Needs improvement	NI

TABLE 22 – POSSIBLE COMBINATIONS BETWEEN THE SCALES OF CRITERIA S₂₂ AND S₂₃

		[s ₂₂] Diversity policies		
		G	A	NI
[s ₂₃] Labour-management relations and participation by employees	Levels			
	G	G_G	G_A	G_NI
	A	A_G	A_A	A_NI
	NI	NI_G	NI_A	NI_NI

TABLE 23 – SCALE AND RESPECTIVE LEVELS USED FOR CRITERION C₅

[c ₅] Diversity and labour rights				
Maximize (↑)				
Level	Level description	([s ₂₃] [s ₂₂])	Code	Colour
L_1^5	Excellent	Good Good	G_G	
L_2^5	Very strong	Average Good	A_G	
		Good Average	G_A	
L_3^5	Strong	Needs improvement Good	NI_G	
		Average Average	A_A	
		Good Needs improvement	G_NI	
L_4^5	Average	Needs improvement Average	NI_A	
		Average Needs improvement	A_NI	
L_5^5	Weak	Needs improvement Needs improvement	NI_NI	

Criteria c₆: Training, health and safety

TABLE 24 – SCALE AND RESPECTIVE LEVELS USED FOR SUB-CRITERION S₃₀

[s ₃₀] Accidents and safety			
Maximize (↑)			
Level	Level description	Short form	Code
l_1^{30}	The incident frequency rate (the annual number of injuries and illnesses multiplied by 200,000 and divided by the annual number of hours worked by all employees) of the company is equal or lower than 4.	Good	G
l_2^{30}	The incident frequency rate of the company is within the range of]4 , 8].	Average	A
l_3^{30}	The incident frequency rate of the company is higher than 8.	Needs improvement	NI

TABLE 25 – SCALE AND RESPECTIVE LEVELS USED FOR SUB-CRITERION S₃₂

[s ₃₂] Job training			
Maximize (↑)			
Level	Level description	Short form	Code
l_1^{32}	The annual training time per worker (the total annual number of training hours divided by the total number of workers) of the company is equal or higher than 70h.	Very good	VG
l_2^{32}	The annual training time per worker of the company is within the range of [52.5h , 70h[.	Good	G
l_3^{32}	The annual training time per worker of the company is within the range of [35h , 52.5h[.	Average	A
l_4^{32}	The annual training time per worker of the company is smaller than 35h.	Needs improvement	NI

TABLE 26 – POSSIBLE COMBINATIONS BETWEEN THE SCALES OF CRITERIA S₃₀ AND S₃₂

		[s ₃₀] Accidents and safety		
		G	A	NI
[s ₃₂] Job training	VG	VG_G	VG_A	VG_NI
	G	G_G	G_A	G_NI
	A	A_G	A_A	A_NI
	NI	NI_G	NI_A	NI_NI

TABLE 27 – SCALE AND RESPECTIVE LEVELS USED FOR CRITERION C₆

[c ₆] Training, health and safety				
Maximize (↑)				
Level	Level description	([s ₃₂] [s ₃₀])	Code	Colour
L_1^6	Excellent	Very good Good	VG_G	
L_2^6	Very strong	Good Good	G_G	
		Very good average	VG_A	
L_3^6	Strong	Average Good	A_G	
		Good Average	G_A	
		Very good Needs improvement	VG_NI	
L_4^6	Average	Needs improvement Good	NI_G	
		Average Average	A_A	
		Good Needs improvement	G_NI	
L_5^6	Weak	Needs improvement Average	NI_A	
L_6^6	Very weak	Average Needs improvement	A_NI	
		Needs improvement Needs improvement	NI_NI	

Criteria c₇: Community development and philanthropy

TABLE 28 – SCALE AND RESPECTIVE LEVELS USED FOR SUB-CRITERION S₃₆

[s ₃₆] Charitable giving, donations of goods and pro-bono work			
Maximize (↑)			
Level	Level description	Short form	Code
l_1^{36}	The company's annual CSR investment effort (the annual value of charitable giving, donations of goods and pro-bono work divided by the annual net profit) is equal or higher than 1%.	Very good	VG
l_2^{36}	The company's annual CSR investment effort is within the range of [0.5% , 1%[.	Good	G
l_3^{36}	The company's annual CSR investment effort is lower than 0.5%.	Average	A

TABLE 29 – SCALE AND RESPECTIVE LEVELS USED FOR SUB-CRITERION S₃₇

[s ₃₇] Volunteerism of staff time			
Maximize (↑)			
Level	Level description	Short form	Code
l_1^{37}	The company's annual volunteering effort (the annual number of hours for volunteering activities divided by the total number of workers) is equal or higher than 16h.	Very good	VG
l_2^{37}	The company's annual volunteering effort is within the range of [8h , 16h[.	Good	G
l_3^{37}	The company's annual volunteering effort is lower than 8h.	Average	A

TABLE 30 – POSSIBLE COMBINATIONS BETWEEN THE SCALES OF CRITERIA S₃₆ AND S₃₇

		[s ₃₆] Charitable giving, donations of goods and pro-bono work		
[s ₃₇] Volunteerism of staff time	Levels	VG	G	A
	VG	VG_VG	VG_G	VG_A
	G	G_VG	G_G	G_A
	A	A_VG	A_G	A_A

TABLE 31 – SCALE AND RESPECTIVE LEVELS USED FOR CRITERION C₇

[c ₇] Community development and philanthropy				
Maximize (↑)				
Level	Level description	([s ₃₇] [s ₃₆])	Code	Colour
L_1^7	Excellent	Very good Very good	VG_VG	
L_2^7	Very strong	Good Very good	G_VG	
		Very good Good	VG_G	
L_3^7	Strong	Average Very good	A_VG	
		Good Good	G_G	
		Very good Average	VG_A	
L_4^7	Average	Average Good	A_G	
		Good Average	G_A	
L_5^7	Weak	Average Average	A_A	

Criteria c₈: Product/service

TABLE 32 – SCALE AND RESPECTIVE LEVELS USED FOR SUB-CRITERION S₄₄

[s ₄₄] Sustainable technologies or processes			
Maximize (↑)			
Level	Level description	Short form	Code
l_1^{44}	The company innovates and creates new market opportunities through both sustainable technologies and processes.	Very good	VG
l_2^{44}	The company innovates and creates new market opportunities through sustainable technologies or processes.	Good	G
l_3^{44}	The company does not innovate nor creates new market opportunities through sustainable technologies or processes.	Needs improvement	NI

TABLE 33 – SCALE AND RESPECTIVE LEVELS USED FOR SUB-CRITERION S47

[s ₄₇] Integrity of products and sales practices			
Maximize (↑)			
Level	Level description	Short form	Code
l_1^{47}	The integrity (the match between customers' expectation and actual product performance) of both the company's products and sales methods (including labelling and marketing practices) is recognized by customers.	Good	G
l_2^{47}	The integrity of the company's products is recognized by customers, but the integrity of its sales methods is not.	Average	A
l_3^{47}	The integrity of the company's sales methods is recognized by customers, but the integrity of its products is not.	Needs improvement	NI
l_4^{47}	The integrity of both the company's products and sales methods is not recognized by customers.	Bad	B

TABLE 34 – POSSIBLE COMBINATIONS BETWEEN THE SCALES OF CRITERIA S44 AND S47

[s ₄₇] Integrity of products and sales practices	[s ₄₄] Sustainable technologies or processes			
	Levels	VG	G	NI
	G	G_VG	G_G	G_NI
	A	A_VG	A_G	A_NI
	NI	NI_VG	NI_G	NI_NI
	B	B_VG	B_G	B_NI

TABLE 35 – SCALE AND RESPECTIVE LEVELS USED FOR CRITERION C8

[c ₈] Product/service				
Maximize (↑)				
Level	Level description	([s ₄₇] [s ₄₄])	Code	Colour
L_1^8	Excellent	Good Very good	G_VG	
L_2^8	Very strong	Average Very good	A_VG	
		Good Good	G_G	
L_3^8	Strong	Needs improvement Very good	NI_VG	
		Average Good	A_G	
		Good Needs improvement	G_NI	
L_4^8	Average	Bad Very good	B_VG	
		Needs improvement Good	NI_G	
		Average Needs improvement	A_NI	
L_5^8	Weak	Bad Good	B_G	
		Needs improvement Needs improvement	NI_NI	
L_6^8	Very weak	Bad Needs improvement	B_NI	

Criteria c₉: Human rights and supply chain

TABLE 36 – SCALE AND RESPECTIVE LEVELS USED FOR SUB-CRITERION S51

[s ₅₁] Supplier screening using social criteria			
Maximize (↑)			
Level	Level description	Short form	Code
l_1^{51}	The company screens its suppliers using social criteria and takes such information into consideration for sourcing decisions.	Yes	Y
l_2^{51}	The company does not screen its suppliers using social criteria.	No	N

TABLE 37 – SCALE AND RESPECTIVE LEVELS USED FOR CRITERION C9

[c ₉] Human rights and supply chain			
Maximize (↑)			
Level	Level description	([s ₅₁])	Code
L_1^9	Strong	Yes	Y
L_2^9	Weak	No	N

Criteria c₁₀: Board

TABLE 38 – SCALE AND RESPECTIVE LEVELS USED FOR SUB-CRITERION S₅₅

[s ₅₅] Board members' objectives			
Maximize (↑)			
Level	Level description	Short form	Code
l_1^{55}	The company effectively incentivizes board members to achieve not only financial objectives, but also extra-financial goals (for example, by implementing board salary bonuses concerning different sustainability targets).	Good	G
l_2^{55}	The company is still studying or implementing strategies with the objective of incentivizing board members to achieve not only financial objectives, but also extra-financial goals.	Average	A
l_3^{55}	The company only incentivizes board members to achieve financial objectives.	Needs improvement	NI

TABLE 39 – SCALE AND RESPECTIVE LEVELS USED FOR SUB-CRITERION S₅₆

[s ₅₆] Board structure, membership and decision-making			
Maximize (↑)			
Level	Level description	Short form	Code
l_1^{56}	The percentage of female board members (the number of female board members divided by the total number of board members) is equal or higher than 40%.	Very good	VG
l_2^{56}	The percentage of female board members is within the range of [30% , 40%[.	Good	G
l_3^{56}	The percentage of female board members is within the range of [20% , 30%[.	Average	A
l_4^{56}	The percentage of female board members is lower than 20%.	Needs improvement	NI

TABLE 40 – POSSIBLE COMBINATIONS BETWEEN THE SCALES OF CRITERIA S₅₅ AND S₅₆

		[s ₅₅] Board members' objectives		
		G	A	NI
[s ₅₆] Board structure, membership and decision-making	Levels			
	VG	VG_G	VG_A	VG_NI
	G	G_G	G_A	G_NI
	A	A_G	A_A	A_NI
	NI	NI_G	NI_A	NI_NI

TABLE 41 – SCALE AND RESPECTIVE LEVELS USED FOR CRITERION C₁₀

[c ₁₀] Board				
Maximize (↑)				
Level	Level description	([s ₅₆] [s ₅₅])	Code	Colour
L_1^{10}	Excellent	Very good Good	VG_G	
L_2^{10}	Very strong	Good Good	G_G	
		Very good Average	VG_A	
L_3^{10}	Strong	Average Good	A_G	
		Good Average	G_A	
		Very good Needs improvement	VG_NI	
L_4^{10}	Average	Needs improvement Good	NI_G	
		Average Average	A_A	
		Good Needs improvement	G_NI	
L_5^{10}	Weak	Needs improvement Average	NI_A	
		Average Needs improvement	A_NI	
L_6^{10}	Very weak	Needs improvement Needs improvement	NI_NI	

Criteria **C₁₁**: Leadership ethics

TABLE 42 – SCALE AND RESPECTIVE LEVELS USED FOR SUB-CRITERION S₅₇

[S ₅₇] Culture of ethical decision making			
Maximize (↑)			
Level	Level description	Short form	Code
I_1^{57}	The company has created an anti-corruption plan and has implemented a code of ethics and conduct.	Very good	VG
I_2^{57}	The company has not created an anti-corruption plan but has implemented a code of ethics and conduct.	Good	G
I_3^{57}	The company has created an anti-corruption plan but has not implemented a code of ethics and conduct.	Average	A
I_4^{57}	The company has not created an anti-corruption plan and has not implemented a code of ethics and conduct.	Needs improvement	NI

TABLE 43 – SCALE AND RESPECTIVE LEVELS USED FOR SUB-CRITERION S₆₁

[S ₆₁] Worker performance evaluation and recognition			
Maximize (↑)			
Level	Level description	Short form	Code
I_1^{61}	The company has in place a comprehensive worker evaluation system and consistently promotes the recognition of well-performing workers.	Good	G
I_2^{61}	The company has in place a comprehensive worker evaluation system but does not usually promote the recognition of well-performing workers.	Average	A
I_3^{61}	The company does not have in place a comprehensive worker evaluation system.	Needs improvement	NI

TABLE 44 – POSSIBLE COMBINATIONS BETWEEN THE SCALES OF CRITERIA S₅₇ AND S₆₁

		[S ₅₇] Culture of ethical decision making				
		Levels	VG	G	A	NI
[S ₆₁] Worker performance evaluation and recognition	G	G_VG	G_G	G_A	G_NI	
	A	A_VG	A_G	A_A	A_NI	
	NI	NI_VG	NI_G	NI_A	NI_NI	

TABLE 45 – SCALE AND RESPECTIVE LEVELS USED FOR CRITERION C₁₁

[C ₁₁] Leadership ethics				
Maximize (↑)				
Level	Level description	([S ₆₁] [S ₅₇])	Code	Colour
L_1^{11}	Excellent	Good Very good	G_VG	Green
L_2^{11}	Very strong	Average Very good Good Good	A_VG G_G	
L_3^{11}	Strong	Needs improvement Very good Average Good Good Average	NI_VG A_G G_A	Yellow
L_4^{11}	Average	Needs improvement Good Average Average Good Needs improvement	NI_G A_A G_NI	
L_5^{11}	Weak	Needs improvement Average Average Needs improvement	NI_A A_NI	Orange
L_6^{11}	Very weak	Needs improvement Needs improvement	NI_NI	

Criteria c₁₂: Transparency and reporting

TABLE 46 – SCALE AND RESPECTIVE LEVELS USED FOR SUB-CRITERION S₆₂

[s ₆₂] Transparent management towards stakeholders			
Maximize (↑)			
Level	Level description	Short form	Code
l_1^{62}	The company provides in-depth and reliable information to its stakeholders (it includes interactions with investors, customers and regulators).	Good	G
l_2^{62}	The company provides reliable but scarce information to its stakeholders.	Average	A
l_3^{62}	The company does not provide reliable information to its stakeholders.	Needs improvement	NI

TABLE 47 – SCALE AND RESPECTIVE LEVELS USED FOR SUB-CRITERION S₆₄

[s ₆₄] Disclosure of major stakeholders			
Maximize (↑)			
Level	Level description	Short form	Code
l_1^{64}	The company produces a publicly available document containing a list of the company's major stakeholders and an explanation on how it engages each one of them (including, for example, political contributions).	Good	G
l_2^{64}	The company produces a publicly available document containing a list of the company's major stakeholders but does not provide an explanation on how it engages each one of them.	Average	A
l_3^{64}	The company does not produce a publicly available document containing a disclosure concerning its major stakeholders.	Needs improvement	NI

TABLE 48 – POSSIBLE COMBINATIONS BETWEEN THE SCALES OF CRITERIA S₆₂ AND S₆₄

		[s ₆₂] Transparent management towards stakeholders		
		G	A	NI
[s ₆₄] Disclosure of major stakeholders	Levels			
	G	G_G	G_A	G_NI
	A	A_G	A_A	A_NI
	NI	NI_G	NI_A	NI_NI

TABLE 49 – SCALE AND RESPECTIVE LEVELS USED FOR CRITERION C₁₂

[c ₁₂] Transparency and reporting				
Maximize (↑)				
Level	Level description	([s ₆₄] [s ₆₂])	Code	Colour
L_1^{12}	Excellent	Good Good	G_G	
L_2^{12}	Very strong	Average Good	A_G	
		Good Average	G_A	
L_3^{12}	Strong	Needs improvement Good	NI_G	
		Average Average	A_A	
		Good Needs improvement	G_NI	
L_4^{12}	Average	Needs improvement Average	NI_A	
		Average Needs improvement	A_NI	
L_5^{12}	Weak	Needs improvement Needs improvement	NI_NI	

5.6 Step 6 – Scoring the alternatives

Companies were scored based on publicly available information like annual reports (from the year 2017), sustainability reports (from the year 2017) and newspapers' articles. For each one of the four companies, an online questionnaire (see Appendix G), implemented using Google Forms, with twenty-three multiple-choice questions was filled incorporating the available data/knowledge provided by such sources. Such questions were a direct translation of the operationalization of the twenty-three sub-criteria used in this study and operationalized in the previous step of the framework (see Figure 5).

1) Climate change *

☒ The company clearly identified current and future opportunities and threats caused by climate change and has a plan (a set of concrete short/medium-term policies and long-term strategies) to benefit from and to face them.

☐ The company identified current and future opportunities and threats caused by climate change but lacks a plan to benefit from and to face them.

☐ The company has not clearly identified current and future opportunities and threats caused by climate change and lacks a plan to benefit from and to face them.

FIGURE 5 – QUESTION CONCERNING SUB-CRITERIA S₁ IMPLEMENTED USING GOOGLE FORMS

After processing all the answers from all the participating companies (for the full table containing the level description of each sub-criterion for all alternatives, see Table 63 in Appendix B), it was possible to deduce the scores for each criterion and organize/group such different individual scores in Table 50. A₀ is not a real company but rather a “benchmark company” and its scores were not a product of any self-evaluation. The scores of A₀ were obtained through the evaluation of each sub-criterion by the group of experts and correspond to their answer when faced with the following type question: “which level description fits best to describe a company that only fulfils the bare minimum in order to be considered a socially responsible company”.

TABLE 50 – LEVEL DESCRIPTION OF EACH CRITERION FOR ALL ALTERNATIVES

Criteria	Alternatives (companies)				
	A ₀	A ₁	A ₂	A ₃	A ₄
C ₁	Strong	Very strong	Excellent	Strong	Very strong
C ₂	Strong	Excellent	Average	Weak	Excellent
C ₃	Strong	Average	Very strong	Very strong	Strong
C ₄	Average	Strong	Excellent	Weak	Fair
C ₅	Strong	Strong	Very strong	Weak	Very strong
C ₆	Strong	Strong	Strong	Strong	Strong
C ₇	Average	Very strong	Average	Average	Weak
C ₈	Strong	Strong	Very strong	Very strong	Very strong
C ₉	Strong	Strong	Weak	Weak	Strong
C ₁₀	Strong	Strong	Weak	Strong	Strong
C ₁₁	Very strong	Average	Excellent	Strong	Very strong
C ₁₂	Very strong	Strong	Excellent	Average	Strong

5.7 Step 7 – Application of the evaluation model

The alternatives’ individual scores on every criterion are already know, but the application of the evaluation model also requires the use of an aggregation function (the Choquet integral) which in turn implies determining the capacities and building interval scales.

The capacities were determined using the same approach as the one previously exposed in subsection 4.3.3.5. The group of experts was asked to consider a set of projects (p₁, p₂, p₃, p₄, p₅, p₆, p₇, p₈,

$p_9, p_{10}, p_{11}, p_{12}, p_{1,8}$ and $p_{6,11}$ – fourteen in total), representing the set of criteria (the first twelve) plus the set of interactions between criteria (the last two). Such projects represent alternatives that present maximum utility (in this case, 1) in a certain criterion and minimum utility (in this case, 0) in all remaining criteria, or, in the case of interactions, maximum utility in a certain pair of criteria and minimum utility in all remaining criteria. For example, project p_5 presents maximum utility in criteria c_5 and minimum utility in all remaining criteria, and $p_{1,8}$ presents maximum utility in both criteria c_1 and c_8 and minimum utility in all remaining criteria. Having this in mind, the group of experts had to rank the different projects in terms of their preference (two or more projects can occupy the same ranking position, i.e., they can be equally preferable) and place a certain number of blank cards between ranking positions. Finally, the group of experts must also decide the value of the ratio z . Table 51 shows all the previously referred information that was collected during a meeting with the group of experts.

TABLE 51 – RANKING OF PROJECTS (R_H – WHERE R_1 IS THE MOST PREFERRED POSITION OF THE RANKING) WITH THE NUMBER OF BLANK CARDS BETWEEN RANKING POSITIONS (E_H) AND RATIO Z

R_1	e_1	R_2	e_2	R_3	e_3	R_4	e_4	R_5	e_5	R_6	e_6	R_7	e_7	R_8	e_8	R_9	e_9	R_{10}	z
$p_{1,8}$	2	p_1	1	p_4 p_7 $p_{6,11}$	1	p_2 p_9	2	p_{11}	5	p_6	2	p_5	2	p_8	3	p_3 p_{10}	4	p_{12}	20

This information (from Table 51) is then introduced in and processed by software SRF (which interface is displayed in Figures 14, 15, 16 and 17 in Appendix D). The software returns the values $w(p_k)$ which are used to calculate the modified values $\bar{w}(p_k)$ using equation (8) – if it is a criterion – or equation (9) – if it is an interaction. Finally, the Möbius coefficients m_k are calculated using equation (10) and the capacities μ_k are calculated using equation (11). These calculations were all performed using Microsoft Excel and the results can be seen in Table 52.

TABLE 52 – VALUES OF $w(p_k)$, $\bar{w}(p_k)$, m_k AND μ_k FOR ALL CRITERIA AND INTERACTIONS

Criteria/interactions	$w(p_k)$	$\bar{w}(p_k)$	m_k	μ_k
c_1	10.8	10.8	0.151899	0.151899
c_2	9.3	9.3	0.130802	0.130802
c_3	2.4	2.4	0.033755	0.033755
c_4	10	10	0.140647	0.140647
c_5	5	5	0.070323	0.070323
c_6	6	6	0.084388	0.084388
c_7	10.1	10.1	0.142053	0.142053
c_8	3.9	3.9	0.054852	0.054852
c_9	9.3	9.3	0.130802	0.130802
c_{10}	2.4	2.4	0.033755	0.033755
c_{11}	8.2	8.2	0.115331	0.115331
c_{12}	0.6	0.6	0.008439	0.008439
$c_{1,8}$	11.9	-2.8	-0.03938	0.16737
$c_{6,11}$	10.1	-4.1	-0.05767	0.142053

Note that both $m_{1,8}$ and $m_{6,11}$ are negative values, being in accordance with what would be theoretically expected for mutual-weakening interactions. Values from Table 52 also allow to verify that the following two conditions hold:

- ❖ $m_1 + m_2 + m_3 + m_4 + m_5 + m_6 + m_7 + m_8 + m_9 + m_{10} + m_{11} + m_{12} + m_{1,8} + m_{6,11} = 1$;
- ❖ $\mu_1 + \mu_2 + \mu_3 + \mu_4 + \mu_5 + \mu_6 + \mu_7 + \mu_8 + \mu_9 + \mu_{10} + \mu_{11} + \mu_{12} + (\mu_{1,8} - \mu_1 - \mu_8) + (\mu_{6,11} - \mu_6 - \mu_{11}) = 1$.

For their part, the interval scales were built using the same approach as the one previously exposed in sub-section 4.3.3.6. The group of experts was once again asked to place blank cards between levels of preference. The difference is that now no ranking had to be built because the levels were already defined during the criteria operationalization step and the group of experts only had to place the blank cards between the preference levels of the different criteria. After that, and because this case-study only considers qualitative scales, the utilities of all the levels are calculated using equation (14) which in turn requires equations (12) and (13) to obtain, respectively, the values of α and h . The group of experts' dispositions of the blank cards (also decided during a meeting) and the utility of the ordered levels of the criteria can be seen in Table 53.

TABLE 53 – UTILITY OF THE ORDERED LEVELS OF THE CRITERIA (L_k – WHERE L_1 IS THE MOST PREFERRED ONE) WITH THE NUMBER OF BLANK CARDS BETWEEN LEVELS (E_p)

Criteria	$u(L_1)$	e_1	$u(L_2)$	e_2	$u(L_3)$	e_3	$u(L_4)$	e_4	$u(L_5)$	e_5	$u(L_6)$	e_6	$u(L_7)$
c_1	1	3	0.75	2	0.563	2	0.375	5	0				
c_2	1	4	0.583	4	0.167	1	0						
c_3	1	1	0.923	3	0.769	5	0.538	7	0.231	5	0		
c_4	1	3	0.778	2	0.611	1	0.5	1	0.389	2	0.222	3	0
c_5	1	1	0.818	2	0.545	3	0.182	1	0				
c_6	1	1	0.944	2	0.861	4	0.722	8	0.472	16	0		
c_7	1	4	0.643	3	0.357	2	0.143	1	0				
c_8	1	3	0.714	1	0.571	3	0.286	1	0.143	1	0		
c_9	1		0										
c_{10}	1	3	0.75	2	0.563	2	0.375	1	0.25	3	0		
c_{11}	1	1	0.867	2	0.667	1	0.533	2	0.333	4	0		
c_{12}	1	1	0.75	1	0.5	1	0.25	1	0				

Having successfully determined the capacities (along with the Möbius coefficients m_k) and built the interval scales, it is now possible to calculate the final scores for each alternative, using equation (7), and to obtain the corresponding ranking of alternatives (being the 1st the highest). Such results are displayed in Table 54. Examples of the implementation of the evaluation model of this case-study in Microsoft Excel can be seen in Figures 10, 11, 12 and 13 in Appendix C.

TABLE 54 – FINAL SCORE OF EACH ALTERNATIVE (EVALUATION MODEL’S OUTPUT) AND RESPECTIVE RANKING POSITION

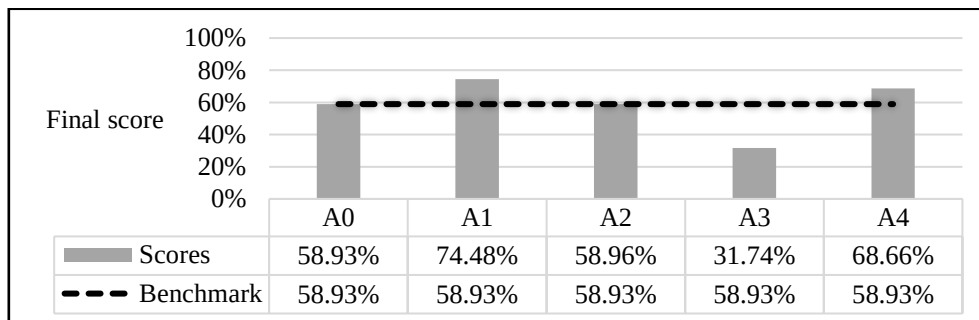
Alternatives	Final score	Ranking position
A ₀	0.5893	4 th
A ₁	0.7448	1 st
A ₂	0.5896	3 rd
A ₃	0.3174	5 th
A ₄	0.6866	2 nd

5.8 Step 8 – Analysis and presentation of the results

If one only considers the real companies under evaluation (leaving benchmark company A₀ out of the picture), the final scores displayed in Table 54 show that company A₁ presents the best CSR performance and is in the first (and highest) position of the ranking. Company A₄ occupies the second position in the ranking, followed by company A₂ which occupies the third position in the ranking. Finally, the lowest position of the ranking is occupied by company A₃.

The previous interpretation of the results only allows a decision-maker to compare the analysed alternatives, but it does not provide much information regarding the actual nature of their CSR performance. For example, all scores could represent poor CSR performances, and the decision-maker (who inevitably is unable to fully decode effective CSR performances from the obtained scores) would be doomed to choose the best of many bad choices, without being aware that they are in fact all bad. Perhaps, if the decision-maker knew their true nature, he would have ended up picking none.

Making use of the binary classification approach presented in section 4.4 and taking into account that the company A₀ represents the minimum benchmark (defined by the group of experts) for a socially responsible company, all companies that present a higher final score than A₀ should “pass” this evaluation and be considered socially responsible. Using Figure 6 as a visual support for this decision, it is possible to conclude that companies A₁, A₂ and A₄ have higher scores than the benchmark and so should be considered socially responsible companies, even though company A₂ only scores slightly higher than the benchmark (58.96% against 58.93%). However, the same cannot be said regarding company A₃ which clearly fails to meet or surpass the score of the benchmark, implicating that this company cannot be considered a socially responsible company.

FIGURE 6 – SCORES AND BENCHMARK (SCORE OF A₀)

Apart from the important overall information (evaluation in the form of scores) provided to the decision-maker (i.e., the general consumer), this framework also allows to extract more specific data which might be quite useful for companies that seek to improve their knowledge about themselves (and that want to improve their CSR performance based on that) and for consumers who might have particular CSR concerns. In order to make such data easier to obtain and to simplify the calculations, the interactions of criteria that were considered previously were now left aside through a simplification and approximation of the m_k of the criteria. This was accomplished by rescaling the original m_k values, after removing the m_k values of the interactions. This rescaling is obtained by simply dividing the original m_k values by their original total sum (in this case, 1.097046). Such values and calculations, as well as the new FPV m_k values (the aggregation of the m_k values of their corresponding criteria) can be seen in Table 55. Note that in this context, m_k values can be regarded as the weights of the criteria.

This just explained approximation produces new total scores for each company and a new benchmark value, which can be seen in Table 56.

TABLE 55 – VALUES OF m_k , RESCALED m_k AND FPV TOTALS (NOT CONSIDERING INTERACTIONS) FOR ALL CRITERIA

Criteria	m_k	Rescaled m_k	FPV totals
C ₁	0.151899	0.138462	0.288462
C ₂	0.130802	0.119231	
C ₃	0.033755	0.030769	
C ₄	0.140647	0.128205	0.269231
C ₅	0.070323	0.064103	
C ₆	0.084388	0.076923	
C ₇	0.142053	0.129487	0.298718
C ₈	0.054852	0.05	
C ₉	0.130802	0.119231	
C ₁₀	0.033755	0.030769	0.14359
C ₁₁	0.115331	0.105128	
C ₁₂	0.008439	0.007692	
Totals	1.097046	1	1

TABLE 56 – FINAL SCORE (NOT CONSIDERING INTERACTIONS) OF EACH ALTERNATIVE AND RESPECTIVE RANKING POSITION

Alternatives	Final score	Ranking position
A ₀	0.6027	4 th
A ₁	0.7275	1 st
A ₂	0.6084	3 rd
A ₃	0.3445	5 th
A ₄	0.6967	2 nd

The ranking positions do not change after the approximation is performed. This seems to indicate that the approximation does not affect the quality of the new data (which appears to still be valid) and that the interactions do not affect the results in a decisive way (see Figure 7). In fact, Table 57 shows that the variation can go both ways (for example, positive for A₂ and negative for A₁) and the value of the percentage of gain or loss between scores (with and without interactions) is never higher than 8.56%.

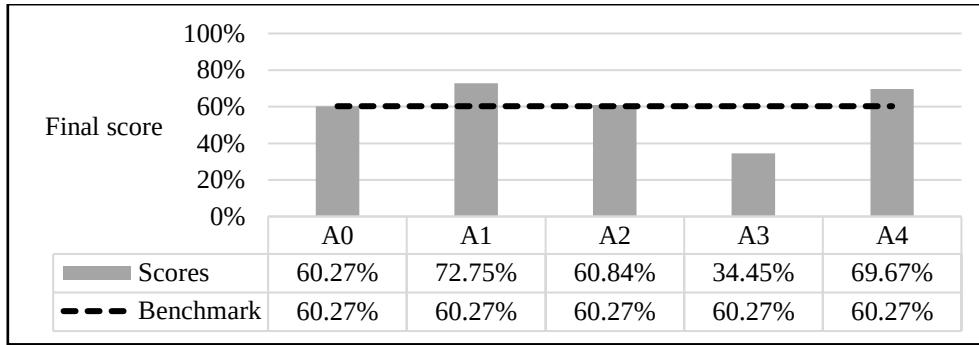


FIGURE 7 – SCORES (NOT CONSIDERING INTERACTIONS) AND BENCHMARK (SCORE OF A₀)

TABLE 57 – DIFFERENCE BETWEEN SCORES (WITH AND WITHOUT INTERACTIONS)

Alternatives	A ₀	A ₁	A ₂	A ₃	A ₄
Scores with interactions	58.93%	74.48%	58.96%	31.74%	68.66%
Scores without interactions	60.27%	72.75%	60.84%	34.45%	69.67%
% of gain (+) or loss (–)	2.26%	-2.33%	3.18%	8.56%	1.48%

After analysing in more detail the new FPV m_k values (see Figure 8) it also possible to notice that the weights of the FPVs are well distributed and no individual FPV dominates the others. This is an important remark because it validates the model's inclusion of the multidimensional nature of CSR itself. If something can be pointed out is the undervaluation of the governance FPV. This might be explained by the preconceived notions that consumers pay less attention to such matters and that higher CSR performances in the governance FPV produce less visible/measurable impacts than higher CSR performances in the remaining FPVs.

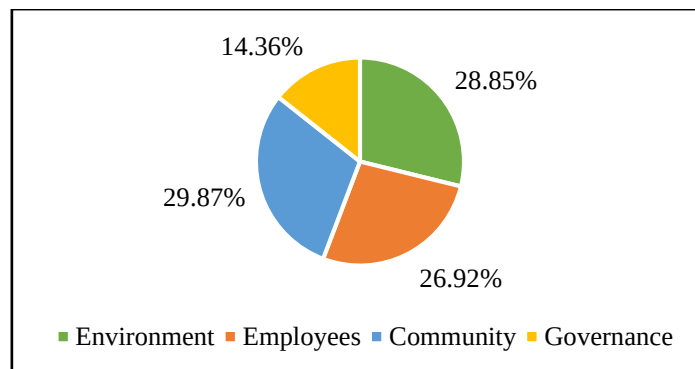


FIGURE 8 – FPVs' AGGREGATED m_k VALUES (NOT CONSIDERING INTERACTIONS)

An FPV aggregation of the scores may as well produce relevant results. The aggregation of the scores are obtained by summing the scores of all the criteria contained in a certain FPV. For example, in order to obtain the community FPV score of company A₃, one needs to sum the weighted utilities of company A₃ in criteria c_7 , c_8 and c_9 . Table 58 presents all the FPVs' aggregated scores for each alternative, including new FPVs' benchmark values.

TABLE 58 – FPVs' AGGREGATED SCORES (NOT CONSIDERING INTERACTIONS) FOR EACH ALTERNATIVE

Alternatives	A ₀	A ₁	A ₂	A ₃	A ₄
Environment scores	17.11%	23.96%	18.67%	10.63%	24.67%
Employees scores	15.11%	17.96%	24.69%	9.47%	18.28%
Community scores	16.63%	23.10%	5.42%	5.42%	15.49%
Governance scores	11.42%	7.72%	12.05%	8.93%	11.23%
Total scores	60.27%	72.75%	60.84%	34.45%	69.67%

For the environment aggregated scores, company A₄ has the highest score (best environmental management performance) and A₃ has the lowest score (worst environmental performance). For the employees aggregated scores, company A₂ has the highest score (best employee management performance) and company A₃ has the lowest score (worst employee management performance). For the community aggregated scores, company A₁ has the highest score (best community management performance) and companies A₂ and A₃ have both the lowest scores (worst community management performances). For the governance aggregated scores, company A₂ has the highest score (best governance performance) and company A₁ has the lowest score (worst governance performance).

In order to better visualize these previous conclusions and to further study the relation between the values of the aggregated FPVs scores and the FPVs benchmarks, figure 9 is presented.



FIGURE 9 – FPVs' AGGREGATED SCORES (NOT CONSIDERING INTERACTIONS) FOR EACH ALTERNATIVE AND BENCHMARK

All companies meet or surpass the benchmark value for the environment FPV, with the exception of company A₃. Exactly the same applies for the employees FPV. For the community FPV, only company

A_1 meets or surpasses the benchmark value. Finally, for the governance FPV, only company A_2 meets or surpasses the benchmark value.

Lastly, some overall conclusion for each company can also be drawn. Company A_1 meets or surpasses the benchmark of all the FPVs, except for the governance FPV. Company A_2 meets or surpasses the benchmark of all the FPVs, except for the community FPV. These two previous companies (A_1 and A_2) are the ones that “pass” the biggest number of FPVs (three out of four). Company A_3 does not meet or surpass the benchmark of any FPV and it is the company that “pass” the lowest number of FPVs (zero out of four). Finally, company A_4 meets or surpasses the benchmark of two FPVs (environment and employees).

Information like this one helps companies to clearly identify the CSR dimensions where their CSR performance is the weakest, allowing them to develop the proper strategies to deal with them. It also allows consumers to valorise each dimension according to their own preferences and sensibilities, and to include their CSR concerns on their daily consumer decisions in any way they like.

6. Discussion

This chapter presents a more detailed analysis of the case-study results and verifies its robustness. For that effect, a sensitivity analysis is performed and some changes in ratio z are tested. Lastly, the major implications of the case-study, of the proposed framework and of this whole thesis are stated.

6.1 Sensitivity analysis

A sensitivity analysis, in the context of an MCDA methodology, has the objective to study the effects of changes in the weights of the different criteria (and that may affect the overall scores of some alternatives and consequently the ranking). It is performed to consider the uncertainty that is always present in these types of models that require the subjective judgements and choices by the group of experts, and which the proposed framework includes. When the members that compose the group of experts are deciding the preference order of the criteria and interactions, and handling/positioning the blank cards between them, they are deciding in a visual and intuitive way but that may not fully and completely translate their concerns. These difficulties might be caused by the high number of criteria and interactions in study, which normally tends to reduce the general comprehension of the problem.

The uncertainty studied in this sensitivity analysis is translated in variations in the m_k value (in this case, a plausible variation of $\pm 10\%$) value of a certain criterion or interaction, while adjusting the remaining criteria and interactions in order to keep the same proportionality as before the variation is induced. The fourteen analyses (one for each criterion – twelve – and for each interaction – two) can be seen in Figures 18, 19, 20 and 20 in Appendix E. The horizontal axes represent the value of the variation in the value m_k of a certain criteria or interaction. Note that the value 100% in those axes do not mean that the criterion or interaction under analyses has an m_k of 100%, but rather that its original value of m_k is 100% higher (the double). The vertical axes represent the total score of the alternatives which can go from 0% (worst score possible) to 100% (best score possible). The different alternatives are then represented in different colours and their total scores are displayed using a solid line (for the variation interval here considered of $\pm 10\%$), bold dots for certain variation values (-10% , -5% , 0% , $+5\%$ and $+10\%$) and a dashed line for the remaining values of variation ($[-100\%, -10\% \cup 10\%, 100\%]$).

When ignoring the presence of alternative A_0 (the benchmark), the different sensitivities analysis show that results are robust. For the considered plausible variation, no relevant changes occur in the total score of the alternatives and the positions in the ranking never change (meaning that alternative A_1 is always preferable, followed by alternative A_4 , followed by alternative A_2 , followed by alternative A_3). Even if we consider the larger (and much less plausible) variations of -100% and $+100\%$, the results show a strong robustness: the unique change in the ranking of alternatives occurs for criteria c_7 (A_4 becomes more preferable than A_1) and only for values of considerably high variation (for values of variation starting around -60%).

The presence of alternative A_0 and its complex relation with alternative A_2 should be analysed separately. First of all, the original scores of both alternatives were already almost identical (58.93% for A_0 and 58.93% for A_2). This proximity immediately implies that even minor variations in some m_k values may invert the order of preference between these two alternatives and make A_0 preferable. In fact, this inversion in the ranking happens (considering just the plausible variation interval of $\pm 10\%$) for criteria $C_1, C_2, C_3, C_4, C_5, C_8, C_9, C_{10}$ and C_{11} and for interaction $C_{1,8}$, which represent 71.43% ($10 \div 14 = 0.7143$) of the total number of criteria and interactions and of the total number of sensitivity analyses performed. Such conclusions do not call into question the robustness of the results but rather evidence that few conclusions can be drawn when comparing or analysing alternatives A_0 and A_2 .

6.2 Changes in ratio z

Changes in ratio z are also important to be studied. These represent the uncertainty during the moment when the group of experts decide the value of ratio z (reflecting how many times the most appreciated criterion or interaction is more important than the least appreciated one) which in this case is 20. This is a highly subjective task and the level of plausible uncertainty is probably higher than the one considered during the sensitivity analysis. So, for the changes in ratio z , let's consider four different new values for the ratio z (16, 18, 22 and 24) that represent, respectively, variations of -20% , -10% , $+10\%$ and 20% to the original value. Changes like these ones implicate a complete recalculation of the m_k values and of the total scores of the alternatives. Software SRF was once again used for obtaining the new data and the subsequent calculations were done using Microsoft Excel like before. The effects of such changes in the m_k values of the different criteria and interactions and in the total scores of the alternatives can be seen, respectively, in Figures 22 and 23 in Appendix F.

The analysis of such figures indicates that some changes occur in the m_k values, but they are always slight changes and their effect in the total scores of the alternatives is negligible. Once again, the only exception was the relation between alternatives A_0 and A_2 : the order of preference inverts for all the newly tested ratio z values (i.e., A_2 is only preferable than A_0 for the original ratio z value, being less preferable than A_0 for all the four remaining tested values) but the total scores are always almost identical.

6.3 Major implications

Results from the sensitivity analysis attest to the robustness of the obtained results, which relevancy appears to be solid. Nevertheless, the nature of the complex relation between alternatives A_0 and A_2 seem to suggest that the decision of considering A_2 as a socially responsible company might have been hasty or misleading. When uncertainty is duly taken into account, this decision is much less linear. Having in mind that the higher preference of alternative A_2 (relative to alternative A_0) is not corroborated by 71.43% of the sensitivity analyses performed and by all the changes in ratio z , it becomes clear that

simply there is not enough evidence to produce such decision. And because the information dissemination would be made in the form of “certification”, it should always be a decision based on solid grounds and a good level of certainty, which is clearly not the case. Thus, one of the major implications of the previous robustness analyses is that company A_2 should no longer be considered a socially responsible company and should no longer receive the correspondent “certification”. This way, the conclusions of the case study change and only two companies obtain the CSR performance “certification” (i.e., undoubtedly meet or surpass the defined benchmark): companies A_1 and A_4 . The remaining two companies (A_2 and A_3) fail to obtain the CSR performance “certification” and cannot be considered socially responsible companies in this context.

This last outcome is a clear proof of the importance of robustness analyses when dealing with the results of the proposed framework (in particular) and MCDA problems (in general). Any future application of the framework must always be followed by sensitivity analyses and changes in ratio z as a way to verify the results and to provide consumers with the most credible conclusions possible.

The case study showed that this framework produces more relevant information than just the evaluation model output (the ordered ranking of alternatives). The aggregation of single criteria scores into FPVs scores can have a wide range of practical uses. For example, companies can perform CSR performance self-evaluations using this framework and identify the CSR dimensions for which their performance is lower than desire. Companies can also make use of the proposed framework to measure the impact of their CSR current strategy and compare it against sectorial best practices. Finally, consumers can use this broken-down information to better reflect their CSR concerns and to only consider the information that they find relevant.

Finally, unlike previous attempts to evaluate the CSR performance of companies, the proposed framework presented in this thesis does not evidence any problems related with its efficiency, transparency and globality (see Table 2) and one of its most important features is its implicit plasticity and capacity to adapt to the constantly changing reality of the business world and of CSR itself. Because it is always dependent and based on some inputs/decisions of a group of experts, the framework can be periodically updated through new meetings with the group of experts in order to incorporate new CSR trends, changes in consumers’ concerns, technological leaps or legal changes, all of which shall be taken into account by the group of experts in future meetings and in posterior applications of the framework.

7. Final conclusions

The proposed framework proved to be able to produce a ranking of the CSR performance of companies (main purpose) and to find the appropriate mechanism to properly present such information to a general consumer (in this case, through the use of a “benchmark company” which allows to “certify” socially responsible companies). If applied successfully and massively this framework might provide consumers with the much-needed widespread access to CSR performance information and has the potential of inducing a virtuous and mutual-beneficial cycle in which companies keep improving their CSR engagements and for which the market finds a way to reward them.

Considering the specific case study carried out under this thesis, half of the analysed companies (A_1 and A_4) qualified for receiving a CSR performance “certification” and the remaining half (A_2 and A_3) failed to do so. Robustness analyses (see the previous chapter) confirmed the validity of the results produced by the evaluation model and supported the overruling of a decision directly related with the “certification” (or not) of company A_2 and with the role of the “benchmark company” (A_0) in the study.

There are some limitations regarding both the proposed framework and the case study application that can be mentioned:

- ❖ The fact that the case study only considered the opinions of two experts probably limited the access to a wider range of technical information and sensitivities. The ideal number of experts should be around three to five. If it is true that a higher number of experts will result in a more difficult decision-making process for the group of experts (due to the need for reaching consensus or compromises during the meetings), it is also true that a higher number of experts will contribute to more informed and technically sound decisions (normally, a higher number of experts is associated with a higher degree of specialization of each expert).
- ❖ There is a clear lack of more objective and quantitative metrics/KPIs, to be used during the criteria operationalization. This is probably caused by the still too broad range of topics and concerns inside each sub-criterion that simply cannot be translated using just one KPI;
- ❖ The number of sub-criteria used (23 out of 66) was relatively small and the criteria operationalization was purposely simple (it never involved more than two sub-criteria for each criterion). For more complex and detailed applications of the proposed framework, the meetings with the group of experts might become too complex (too many decisions and an overwhelming amount of information) which might implicate the use of other MCDA strategies (not referred in this thesis) in order to simplify the problem;
- ❖ There were some problems regarding the tasks of obtaining or validating the attribution of scores to the alternatives (filling the questionnaires for each company). Part of the information that needed to be gathered was very difficult to obtain and when the information was simply not publicly available, sectorial average values were used in their place. It is highly recommended that future applications of the framework rely on the cooperation of the evaluated companies

(companies should directly fill the questionnaires about themselves in a self-evaluation approach). That gathered information can be later verified if deemed necessary.

Nevertheless, some recommendations can be enunciated. Managers should keep a proactive attitude and an open-mind perspective towards initiatives such as future applications of this proposed framework. CSR evaluation and certification efforts should not be perceived as threats or concealed ways of pressuring companies into adopting environmental or social practices (and which may cost considerable amounts of time/resources and bring little financial return) but rather as an opportunity for companies to create (or to develop already existing) competitiveness advantages, for anticipating future legal changes, for securing their future business activities (through the achievement of higher levels of sustainability on their product development, operations and sales) and for increasing product/service value, brand reputation and consumer loyalty.

For their part, policymakers should publicly recognize the importance of CSR in their sustainability strategies and promote initiatives of that type in the business world. This can be achieved through the adoption of business incentives for CSR implementation (for example, in the form of specifically oriented tax breaks or lines of credit). Instead of just relying on the regulatory side of the sustainability agenda, policymakers should also bet on consumer behaviour regarding CSR matters and on the voluntary actions of companies which try to keep pace with the constantly evolving consumers' concerns. For this approach to work, policies will have to be defined in order to create a much bigger CSR awareness and a much better CSR-related knowledge in common citizens (for example, by including such topics in high school and/or college curricula).

Future work on this issue can take different and varied approaches, such as:

- ❖ Application of this framework to other sectors and geographic locations;
- ❖ Creation of an even more detailed list of elementary consequences for each sub-criterion (adding an additional level of detail to this framework) which will likely allow a more elaborated criteria operationalization;
- ❖ Study the consumers' reaction to the framework results (using strategies such as direct interviews or focus groups);
- ❖ Study the possibility of obtaining government/regulators backing to create an official and legally-binding CSR certification;
- ❖ Study the possibility of establishing long-term partnerships with well-known/reputed specialized websites and magazines, and with massified user-based reviewing online platforms, which might accept to display a sort of complementary CSR performance "certification stamp" next to their own review/evaluation.

8. References

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9. Appendices

Appendix A

Contributions of each information source for the extensive list of sub-criteria

TABLE 59 – CONTRIBUTIONS OF EACH INFORMATION SOURCE CONCERNING THE ENVIRONMENT FPV

FPV, criteria and sub-criteria	Information source			
	CSRHub	SA8000	GRI	GRACE
Environment				
Energy and climate change				
Climate change	X		X	X
Energy use and energy-efficiency	X		X	X
Other alternative environmental technologies	X		X	X
Greenhouse gases emissions	X		X	
Ozone depletion and acidification			X	
Environmental policy and reporting				
Biodiversity	X		X	X
Supplier screening using environmental criteria			X	X
Environmental reporting standards	X		X	X
Requests for transparency	X		X	X
Resource management				
Materials and water	X		X	X
Supply chain management	X		X	X
Life-cycle analysis	X		X	
Waste and recycling	X		X	X
Local airshed and watershed	X		X	
Land use and local ecological stability	X		X	X

TABLE 60 – CONTRIBUTIONS OF EACH INFORMATION SOURCE CONCERNING THE EMPLOYEES FPV

FPV, criteria and sub-criteria	Information source			
	CSRHub	SA8000	GRI	GRACE
Employees				
Compensation and benefits				
Compensation and financial benefits	X	X	X	
Employees' engagement and development	X			X
Long-term employment growth and stability	X	X	X	
Promotion practices	X			X
Lay-off practices	X			X
Retiring or retired employees	X		X	X
Diversity and labour rights				
Diversity policies	X		X	X
Labour-management relations and participation by employees	X	X	X	X
Freedom of association and protection of rights to organize and to bargain collectively	X	X	X	X
Employment of children and forced labour	X	X	X	
Equal opportunities	X	X	X	X
Working hours, resting time and work-life balance	X	X	X	X
Cases of coercion				X
Complaint management/resolution and disciplinary practices		X	X	X
Training, health and safety				
Accidents and safety	X	X	X	X
Employee-management safety teams	X	X	X	
Job training	X	X	X	X
Health, well-being and productivity	X	X	X	X
Employees' morale and engagement	X			X
Worker development programs	X		X	X

TABLE 61 – CONTRIBUTIONS OF EACH INFORMATION SOURCE CONCERNING THE COMMUNITY FPV

FPV, criteria and sub-criteria	Information source			
	CSRHub	SA8000	GRI	GRACE
Community				
Community development and philanthropy				
Charitable giving, donations of goods and pro-bono work	X			X
Volunteerism of staff time	X			X
Protection of public health	X		X	
Direct socio-economic impacts	X		X	
Indirect socio-economic impacts			X	X
Land use	X		X	X
Public funds			X	
Community engagement and development programs			X	X
Product/service				
Sustainable technologies or processes	X		X	X
Health and quality of life of consumers	X		X	
Negative social and environmental impacts	X		X	X
Integrity of products and sales practices	X		X	X
Product safety and quality	X		X	
Customer privacy and data			X	X
Human rights and supply chain				
Human rights conventions	X	X	X	X
Supplier screening using social criteria	X	X	X	X
Security practices			X	
Indigenous peoples	X		X	

TABLE 62 – CONTRIBUTIONS OF EACH INFORMATION SOURCE CONCERNING THE GOVERNANCE FPV

FPV, criteria and sub-criteria	Information source			
	CSRHub	SA8000	GRI	GRACE
Governance				
Board				
Management compensation	X			
Board members' objectives	X			
Board structure, membership and decision-making	X		X	X
Leadership ethics				
Culture of ethical decision making	X		X	X
Legal actions, fines, non-monetary sanctions and non-favourable judicial decisions			X	
Strategic level's ethics	X			X
Tactical and operational levels' ethics	X			X
Worker performance evaluation and recognition				X
Transparency and reporting				
Transparent management towards stakeholders	X	X	X	
Compliance assurance	X	X	X	
Disclosure of major stakeholders	X		X	
Employees' engagement in management	X	X		
Membership of leading entities	X			X

Appendix B

Level description of each sub-criterion for all alternatives

TABLE 63 – LEVEL DESCRIPTION OF EACH SUB-CRITERION FOR ALL ALTERNATIVES

Sub-criteria	Alternatives (companies)				
	A ₀	A ₁	A ₂	A ₃	A ₄
S ₁	Good	Very good	Very good	Good	Very good
S ₃	Good	Good	Very good	Good	Good
S ₆	Good	Very good	Good	Needs improvement	Very good
S ₇	Yes	Yes	No	No	Yes
S ₁₁	Good	Good	Good	Very good	Very good
S ₁₃	Large	Medium	Very large	Large	Medium
S ₁₆	Average	High	Very high	Average	High
S ₁₈	Average	High	Very high	Low	Average
S ₂₂	Average	Average	Average	Needs improvement	Average
S ₂₃	Average	Average	Good	Needs improvement	Good
S ₃₀	Average	Good	Needs improvement	Good	Average
S ₃₂	Good	Average	Very good	Average	Good
S ₃₆	Good	Very good	Average	Good	Average
S ₃₇	Average	Good	Good	Average	Average
S ₄₄	Needs improvement	Very good	Very good	Good	Good
S ₄₇	Good	Needs improvement	Average	Good	Good
S ₅₁	Yes	Yes	No	No	Yes
S ₅₅	Average	Average	Needs improvement	Average	Good
S ₅₆	Good	Good	Average	Good	Average
S ₅₇	Good	Good	Very good	Good	Good
S ₆₁	Good	Needs improvement	Good	Average	Good
S ₆₂	Good	Average	Good	Needs improvement	Average
S ₆₄	Average	Average	Good	Average	Average

Appendix C

Examples of the implementation of the evaluation model using Microsoft Excel

Building interval scales	
C1: Energy and climate change	
Climate change	Alternative environmental technologies
A0 - Good	A0 - Good
Criterion levels	
L1	
3	
L2	
2	
L3	
2	
L4	
5	
L5	

FIGURE 10 – EXCEL IMPLEMENTATION CONCERNING THE BUILDING OF INTERVAL SCALES (THE RESULTS – BENCHMARK PERFORMANCE AND NUMBER OF BLANK CARDS – WERE OBTAINED DURING THE MEETING WITH THE GROUP OF EXPERTS)

Determining the capacities	
C1_C8	
2	
C1	
1	
C4 C7 C6_C11	
1	
C2 C9	
2	
C11	
5	
C6	
2	
C5	
2	
C8	
3	
C3 C10	
4	
C12	
Z value	20

FIGURE 11 – EXCEL IMPLEMENTATION CONCERNING THE DETERMINATION OF THE CAPACITIES (THE RESULTS – NUMBER OF BLANK CARDS AND RATIO Z – WERE OBTAINED DURING THE MEETING WITH THE GROUP OF EXPERTS)

C1		A0	A1	A2	A3	A4
Level	Utility					
L1	1			1		
3						
L2	0.75		1			1
2						
L3	0.563	1			1	
2						
L4	0.375					
5						
L5	0					
alpha	0.063					
h	16					
					</	

FIGURE 12 – EXCEL IMPLEMENTATION OF THE EVALUATION MODEL

Criteria and Interactions	w(p)	w~(p)	m(k)	u(k)	Scores of A				
					A0	A1	A2	A3	A4
C1 - Energy and climate change	10.8	10.8	0.1519	0.1519	58.93%	74.48%	58.96%	31.74%	68.66%
C2 - Environmental policy and reporting	9.3	9.3	0.1308	0.1308	58.93%	58.93%	58.93%	58.93%	58.93%
C3 - Resource management	2.4	2.4	0.03376	0.03376					
C4 - Employees	10	10	0.14065	0.14065					
C5 - Diversity and labour rights	5	5	0.07032	0.07032	Con m(k)	1			
C6 - Training, health and safety	6	6	0.08439	0.08439	Con u(k)	1			
C7 - Community development and philanthropy	10.1	10.1	0.14205	0.14205					
C8 - Product/service	3.9	3.9	0.05485	0.05485					
C9 - Human rights and supply chain	9.3	9.3	0.1308	0.1308					
C10 - Board	2.4	2.4	0.03376	0.03376					
C11 - Leadership ethics	8.2	8.2	0.11533	0.11533					
C12 - Transparency and reporting	0.6	0.6	0.00844	0.00844					
C1 & C8 - Interaction 1	11.9	-2.8	-0.03938	0.16737					
C6 & C11 - Interaction 2	10.1	-4.1	-0.05767	0.14205					
Totals	100	71.1							

FIGURE 13 – EXCEL IMPLEMENTATION OF THE EVALUATION MODEL, INTERMEDIATE CALCULATIONS, FINAL SCORES AND VERIFICATION OF THE MODEL CONDITIONS

Appendix D

Examples of the interface of software SRF

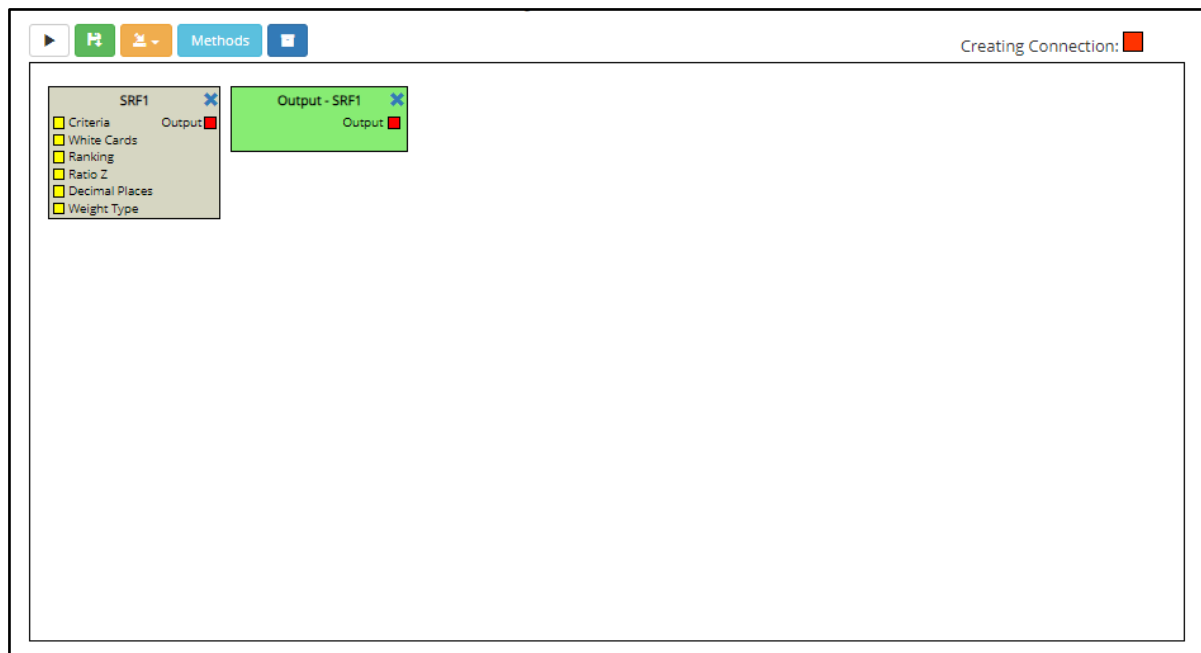


FIGURE 14 – MAIN INTERFACE OF A PROJECT IN DecSPACE

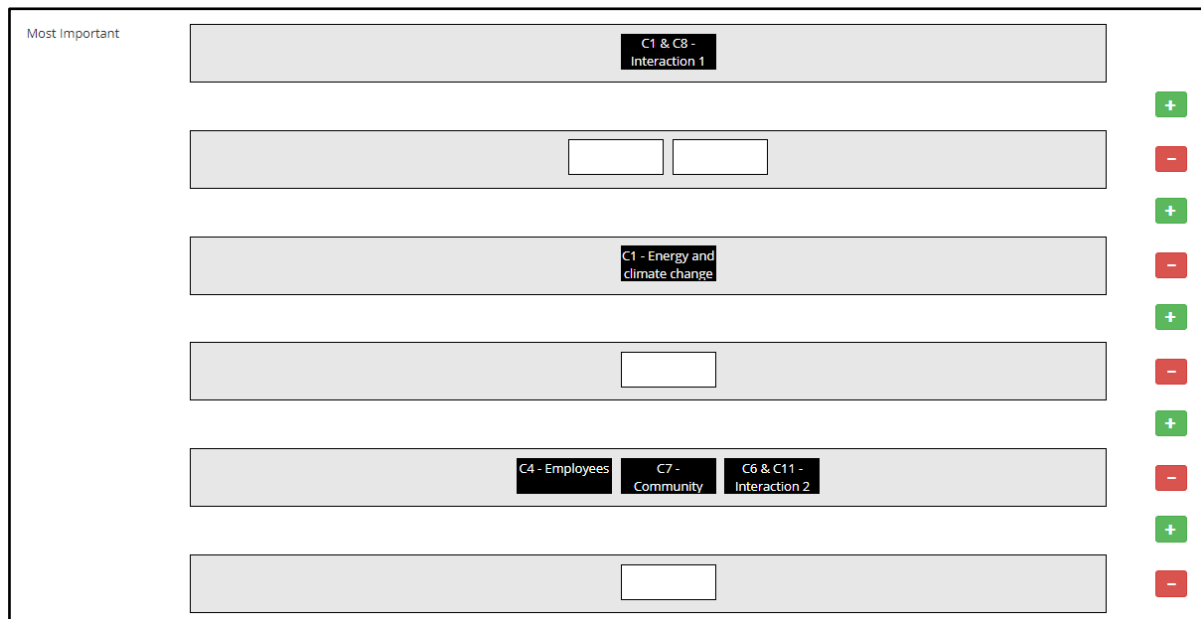


FIGURE 15 – SRF METHOD INTERFACE

Other Parameters

Ratio Z

Decimal Places

Weight Type

FIGURE 16 – OTHER PARAMETERS INCLUDED IN THE SRF METHOD

Output - SRF1	
Criterion	Normalized Weight
C1 - Energy and climate change	10.8
C2 - Environmental policy and reporting	9.3
C3 - Resource management	2.4
C4 - Employees	10
C5 - Diversity and labour rights	5
C6 - Training, health and safety	6
C7 - Community development and philanthropy	10.1
C8 - Product/service	3.9
C9 - Human rights and supply chain	9.3
C10 - Board	2.4
C11 - Leadership ethics	8.2
C12 - Transparency and reporting	0.6
C1 & C8 - Interaction 1	11.9
C6 & C11 - Interaction 2	10.1

FIGURE 17 – OUTPUT (NORMALIZED WEIGHT – $w(p_k)$) OF THE SRF METHOD

Appendix E

Sensitivity analysis

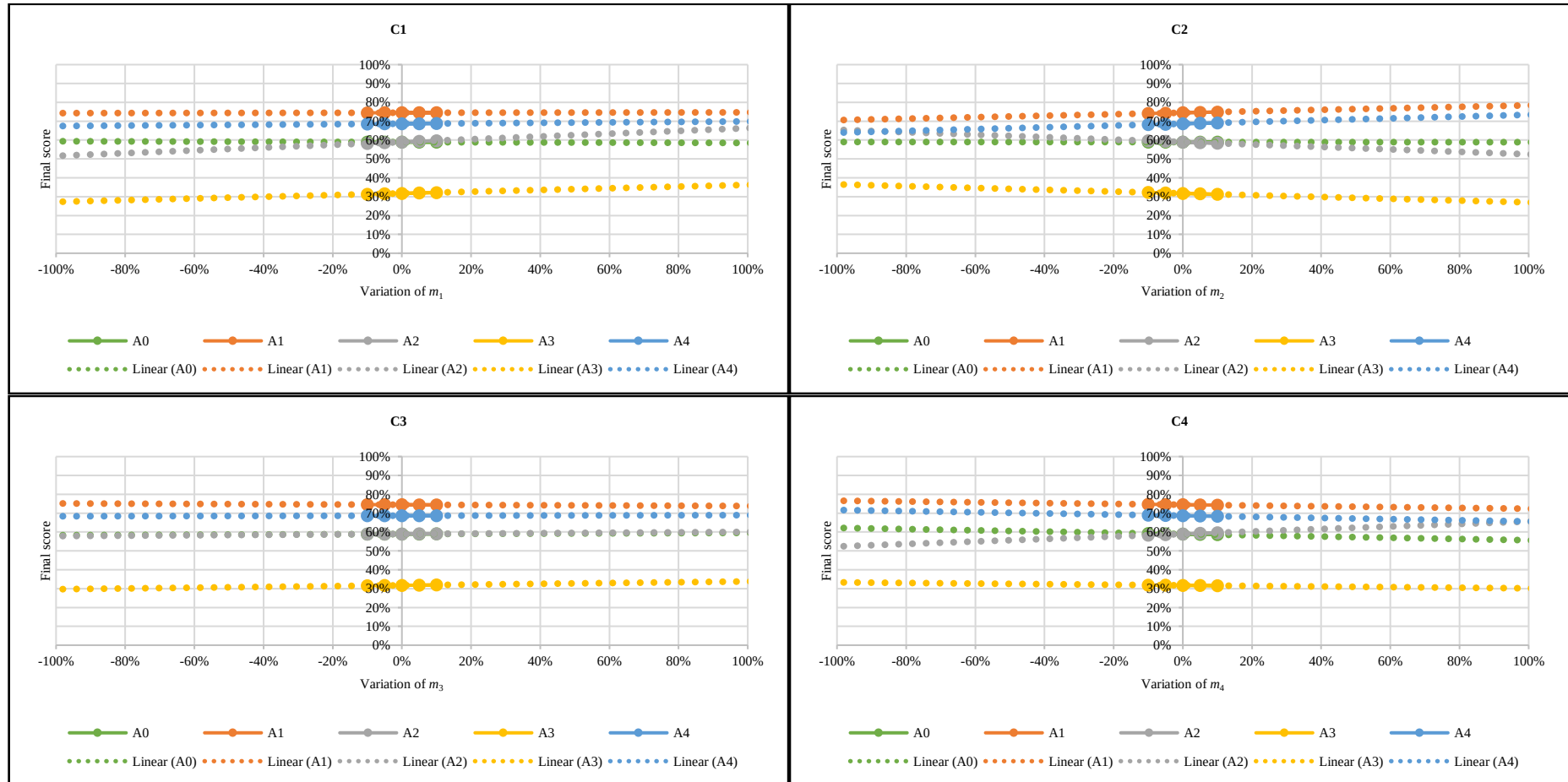


FIGURE 18 – SENSITIVITY ANALYSIS OF CRITERIA C1, C2, C3 AND C4

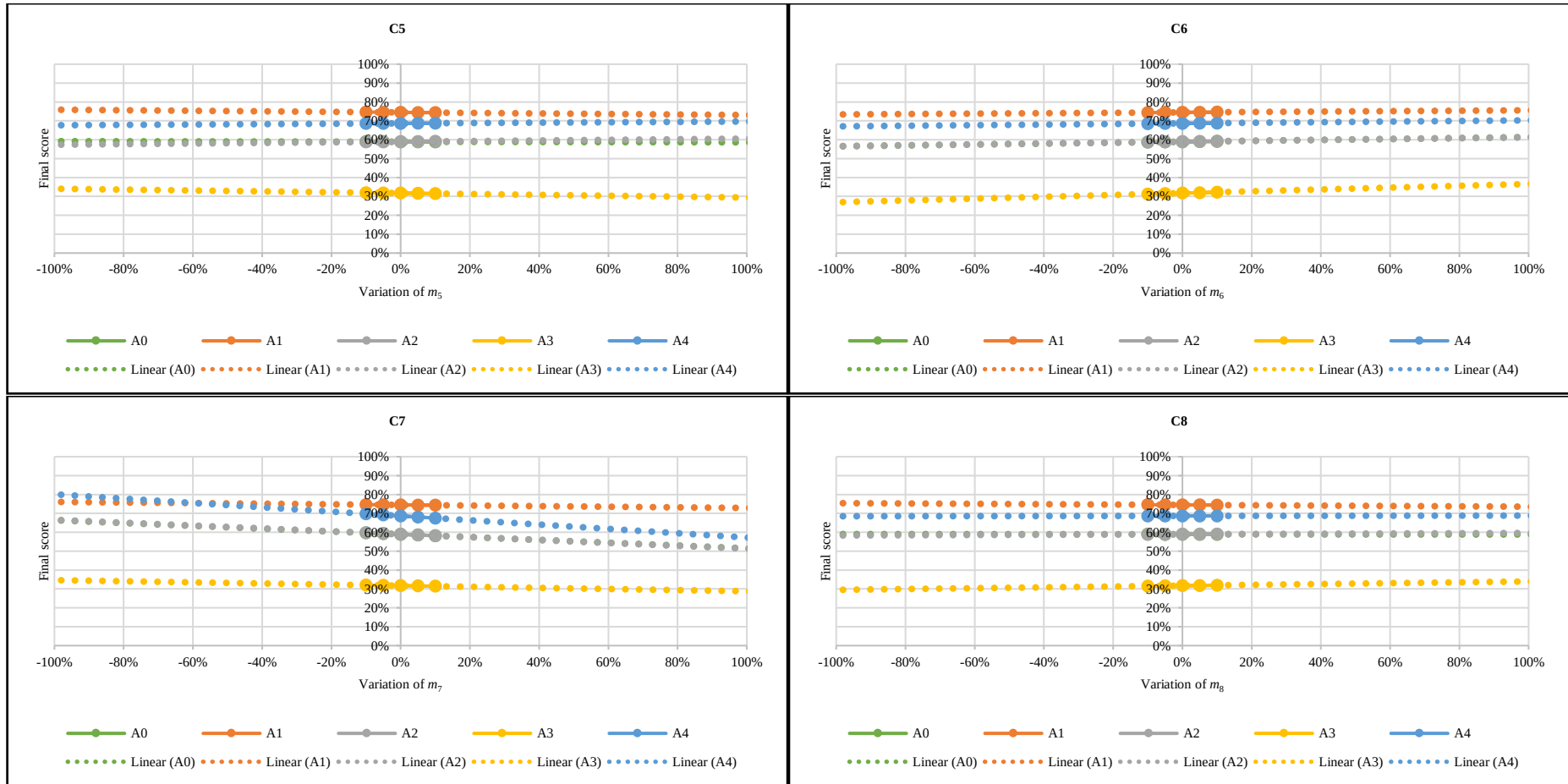


FIGURE 19 – SENSITIVITY ANALYSIS OF CRITERIA C5, C6, C7 AND C8

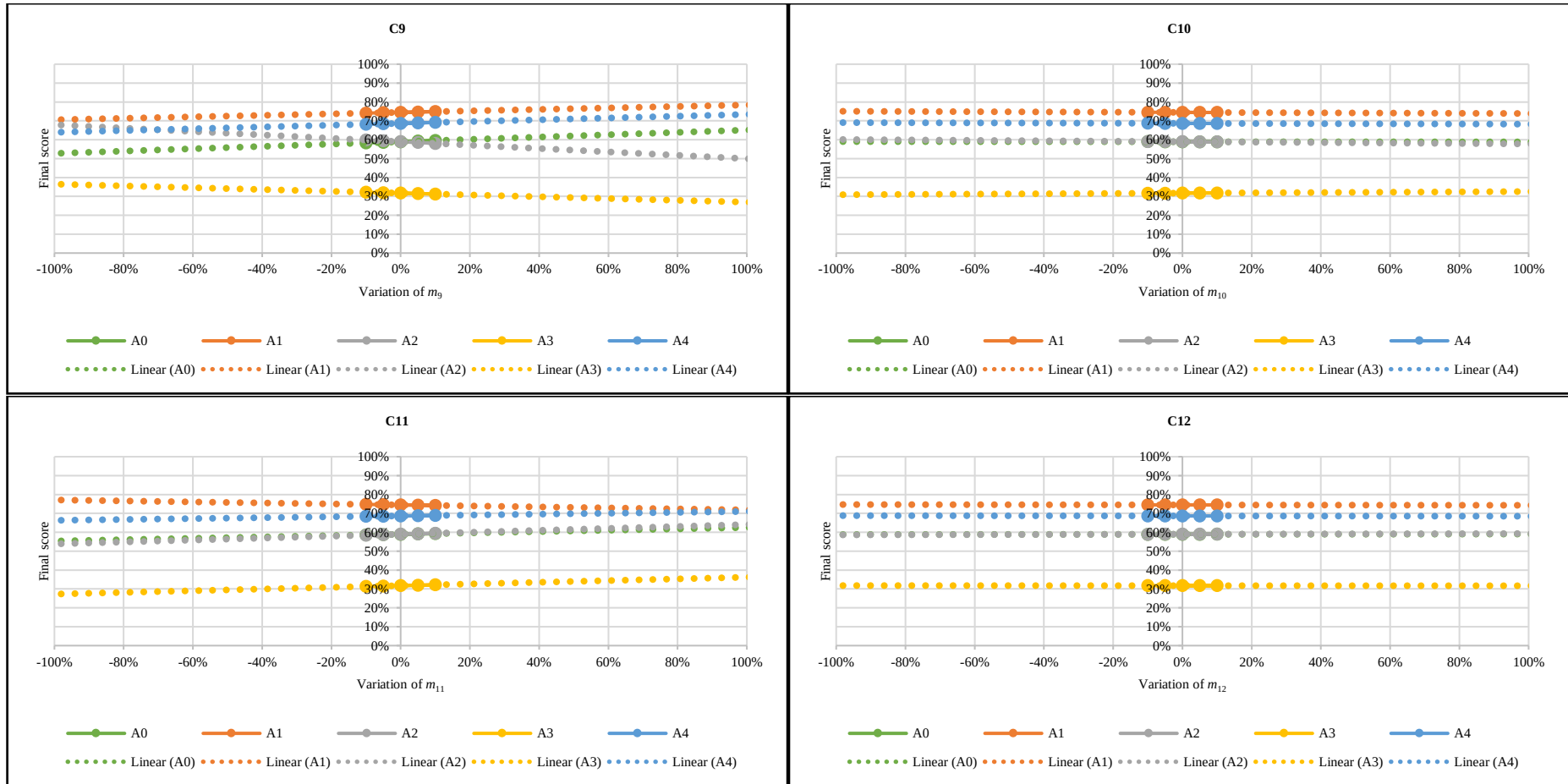


FIGURE 20 – SENSITIVITY ANALYSIS OF CRITERIA C9, C10, C11 AND C12

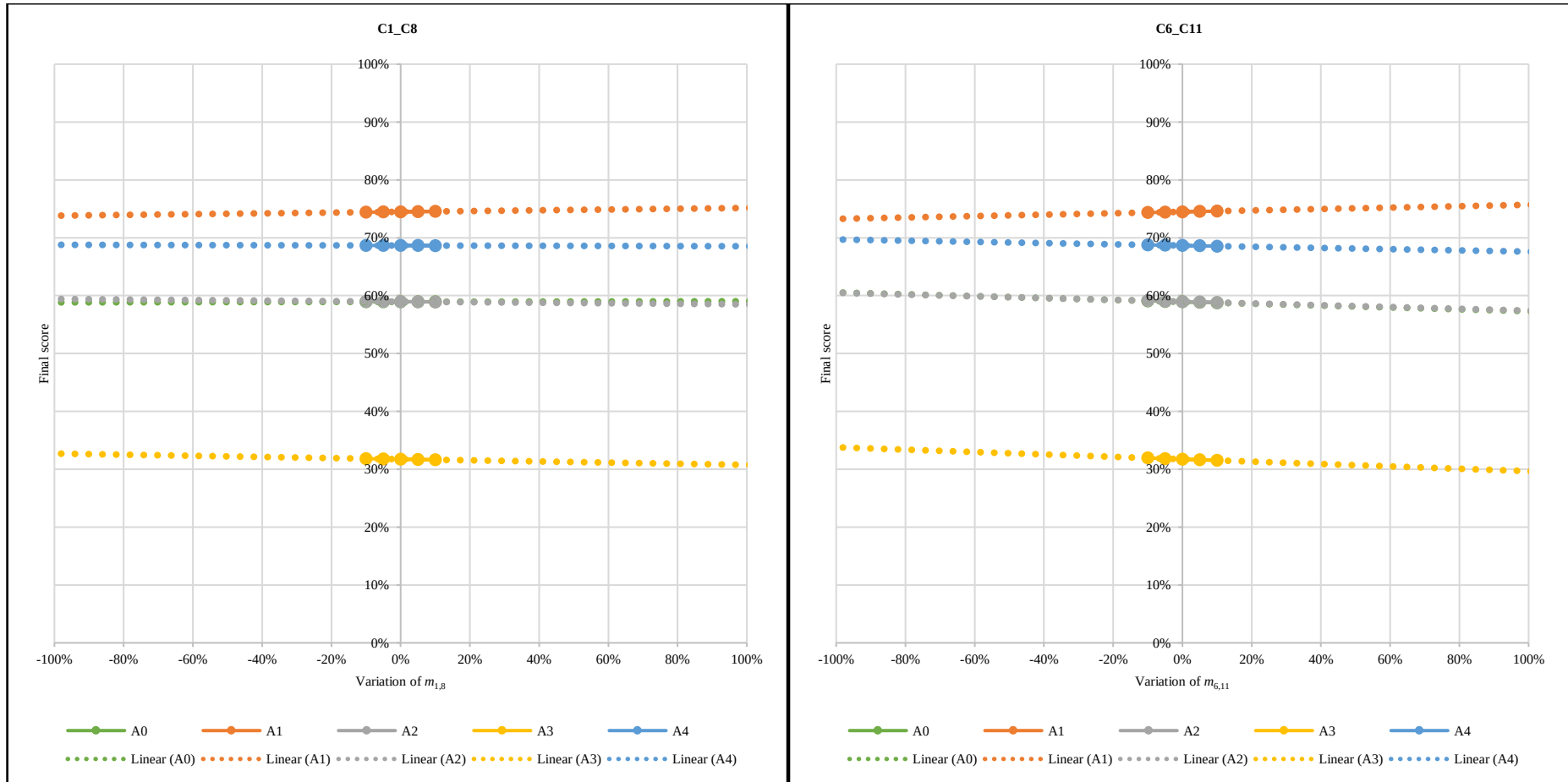


FIGURE 21 – SENSITIVITY ANALYSIS OF INTERACTIONS C1,8 AND C6,11

Appendix F

Changes in ratio z

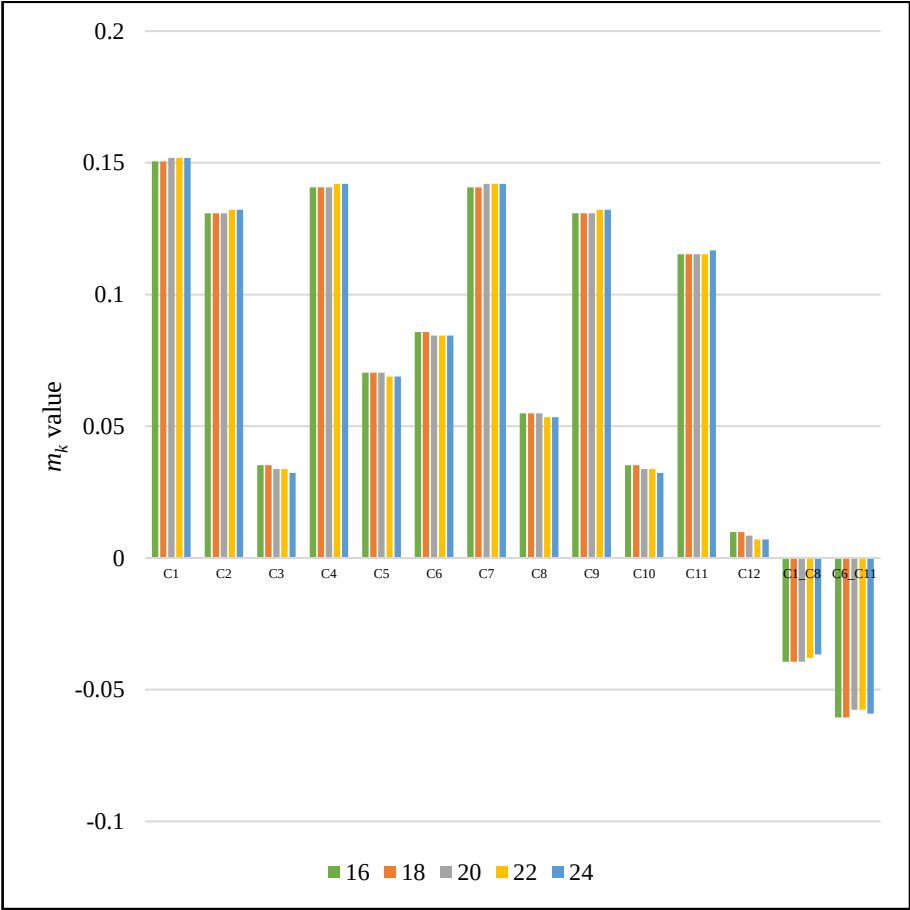


FIGURE 22 – EFFECT OF CHANGES IN RATIO Z ON THE m_k VALUES OF CRITERIA AND INTERACTIONS

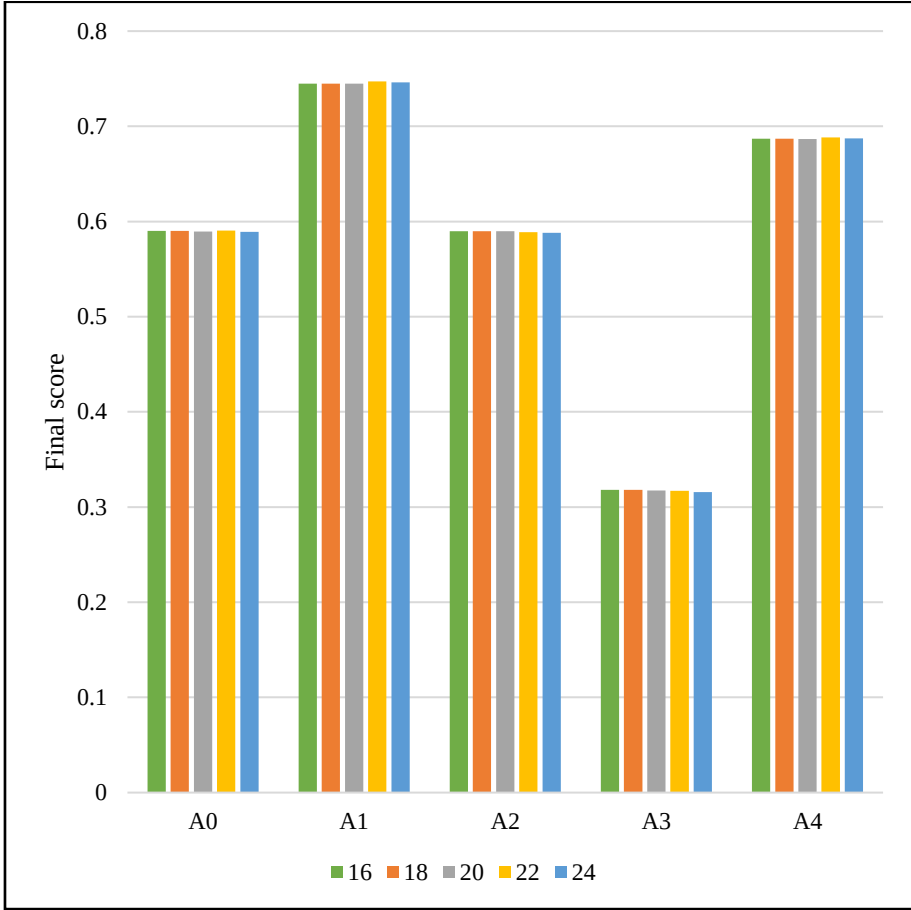


FIGURE 23 – EFFECT OF CHANGES IN RATIO Z ON THE FINAL SCORES OF THE ALTERNATIVES

Appendix G

Online questionnaires

1) Climate change

- ☐ The company clearly identified current and future opportunities and threats caused by climate change and has a plan (a set of concrete short/medium-term policies and long-term strategies) to benefit from and to face them.
- ☐ The company identified current and future opportunities and threats caused by climate change but lacks a plan to benefit from and to face them.
- ☐ The company has not clearly identified current and future opportunities and threats caused by climate change and lacks a plan to benefit from and to face them.

2) Other alternative environmental technologies

- ☐ The company makes use of green technology/green engineering solutions (excluding energy related topics) on its operations and actively participates on their creation or development.
- ☐ The company makes use of green technology/green engineering solutions on its operations but does not participate on their creation or development.
- ☐ The company does not make use of green technology/green engineering solutions on its operations and does not participate on their creation or development.

3) Biodiversity

- ☐ The company has good knowledge about its impacts on biodiversity and has developed strategies aimed at mitigating such impact.
- ☐ The company has good knowledge about its impacts on biodiversity but still has not developed strategies aimed at mitigating such impact.
- ☐ The company does not have good knowledge about its impacts on biodiversity.

4) Supplier screening using environmental criteria

- ☐ The company screens its suppliers using environmental criteria and takes such information into consideration for sourcing decisions.
- ☐ The company does not screen its suppliers using environmental criteria.

5) Supply chain management

- ☐ The company continuously tries to find more environmentally efficient solutions by improving the company's supply chain (for example, the substitution of some hazardous input products for renewable or recycled materials, the optimization of the transport routes, or the introduction of more efficient and eco-friendly production methods).
- ☐ The company often tries to find more environmentally efficient solutions by improving the company's supply chain.
- ☐ The company rarely tries to find more environmentally efficient solutions by improving the company's supply chain.

6) Waste and recycling

- ☐ The company's recycling rate (the annual amount of recycled waste divided by the total annual amount of waste) is within the range of [75% , 100%].
- ☐ The company's recycling rate is within the range of [50% , 75%].
- ☐ The company's recycling rate is within the range of [25% , 50%].
- ☐ The company's recycling rate is within the range of [0% , 25%].

7) Compensation and financial benefits

- ☐ The average monthly gross base remuneration of the company's employees (not counting board members) is equal or higher than €1200.
- ☐ The average monthly gross base remuneration of the company's employees (not counting board members) is within the range of [€1000 , €1200[.
- ☐ The average monthly gross base remuneration of the company's employees (not counting board members) is within the range of [€800 , €1000[.
- ☐ The average monthly gross base remuneration of the company's employees (not counting board members) is within the range of [€600 , €800[.

8) Long-term employment growth and stability

- The company's long-term employment rate (the number of permanent workers divided by the total number of workers) is equal or higher than 95%.
- The company's long-term employment rate is within the range of [85% , 95%[.
- The company's long-term employment rate is within the range of [75% , 85%[.
- The company's long-term employment rate is lower than 75%.

9) Diversity policies

- The company promotes the value of workplace diversity and considers such factor (for example, in terms of age or gender) in the recruitment process of new workers.
- The company recognizes the value of workplace diversity but does not yet consider such factor in the recruitment process of new workers.
- The company has no strategy, plan of action or implemented policies oriented towards promoting of workplace diversity.

10) Labour-management relations and participation by employees

- The company has a functional internal feedback system (intended to collect and valorise the opinions and suggestions of the workers) and promotes team work approaches for regular problem-solving and decision-making situations.
- The company has a functional internal feedback system or promotes team work approaches for regular problem-solving and decision-making situations.
- The company does not have a functional internal feedback system and does not promotes team work approaches for regular problem-solving and decision-making situations.

11) Accidents and safety

- The incident frequency rate (the annual number of injuries and illnesses multiplied by 200,000 and divided by the annual number of hours worked by all employees) of the company is equal or lower than 4.
- The incident frequency rate of the company is within the range of]4 , 8].
- The incident frequency rate of the company is higher than 8.

12) Job training

- The annual training time per worker (the total annual number of training hours divided by the total number of workers) of the company is equal or higher than 70h.
- The annual training time per worker of the company is within the range of [52.5h , 70h[.
- The annual training time per worker of the company is within the range of [35h , 52.5h[.
- The annual training time per worker of the company is smaller than 35h.

13) Charitable giving, donations of goods and pro-bono work

- The company's annual CSR investment effort (the annual value of charitable giving, donations of goods and pro-bono work divided by the annual net profit) is equal or higher than 1%.
- The company's annual CSR investment effort is within the range of [0.5% , 1%[.
- The company's annual CSR investment effort is lower than 0.5%.

14) Volunteerism of staff time

- The company's annual volunteering effort (the annual number of hours for volunteering activities divided by the total number of workers) is equal or higher than 16h.
- The company's annual volunteering effort is within the range of [8h , 16h[.
- The company's annual volunteering effort is lower than 8h.

15) Sustainable technologies or processes

- The company innovates and creates new market opportunities through both sustainable technologies and processes.
- The company innovates and creates new market opportunities through sustainable technologies or processes.
- The company does not innovate nor creates new market opportunities through sustainable technologies or processes.

16) Integrity of products and sales practices

○ The integrity (the match between customers' expectation and actual product performance) of both the company's products and sales methods (including labelling and marketing practices) is recognized by customers.

○ The integrity of the company's products is recognized by customers, but the integrity of its sales methods is not.

○ The integrity of the company's sales methods is recognized by customers, but the integrity of its products is not.

○ The integrity of both the company's products and sales methods is not recognized by customers.

17) Supplier screening using social criteria

○ The company screens its suppliers using social criteria and takes such information into consideration for sourcing decisions.

○ The company does not screen its suppliers using social criteria.

18) Board members' objectives

○ The company effectively incentivizes board members to achieve not only financial objectives, but also extra-financial goals (for example, by implementing board salary bonuses concerning different sustainability targets).

○ The company is still studying or implementing strategies with the objective of incentivizing board members to achieve not only financial objectives, but also extra-financial goals.

○ The company only incentivizes board members to achieve financial objectives.

19) Board structure, membership and decision-making

○ The percentage of female board members (the number of female board members divided by the total number of board members) is equal or higher than 40%.

○ The percentage of female board members is within the range of [30% , 40%[.

○ The percentage of female board members is within the range of [20% , 30%[.

○ The percentage of female board members is lower than 20%.

20) Culture of ethical decision making

○ The company has created an anti-corruption plan and has implemented a code of ethics and conduct.

○ The company has not created an anti-corruption plan but has implemented a code of ethics and conduct.

○ The company has created an anti-corruption plan but has not implemented a code of ethics and conduct.

○ The company has not created an anti-corruption plan and has not implemented a code of ethics and conduct.

21) Worker performance evaluation and recognition

○ The company has in place a comprehensive worker evaluation system and consistently promotes the recognition of well-performing workers.

○ The company has in place a comprehensive worker evaluation system but does not usually promote the recognition of well-performing workers.

○ The company does not have in place a comprehensive worker evaluation system.

22) Transparent management towards stakeholders

○ The company provides in-depth and reliable information to its stakeholders (it includes interactions with investors, customers and regulators).

○ The company provides reliable but scarce information to its stakeholders.

○ The company does not provide reliable information to its stakeholders.

23) Disclosure of major stakeholders

○ The company produces a publicly available document containing a list of the company's major stakeholders and an explanation on how it engages each one of them (including, for example, political contributions).

○ The company produces a publicly available document containing a list of the company's major stakeholders but does not provide an explanation on how it engages each one of them.

○ The company does not produce a publicly available document containing a disclosure concerning its major stakeholders.

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